



CPG: SPINAL CORD MEDICINE – Management of Mental Health Disorders, Substance Use Disorders, and Suicide in Adults with Spinal Cord Injury



**Paralyzed Veterans  
of America**

consortium for  
**SPINAL CORD  
MEDICINE**  
CLINICAL PRACTICE GUIDELINES

# CLINICAL PRACTICE GUIDELINES: SPINAL CORD MEDICINE

## Management of Mental Health Disorders, Substance Use Disorders, and Suicide in Adults with Spinal Cord Injury

Clinical Practice Guideline for Healthcare Providers



**Paralyzed Veterans  
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Administrative and financial  
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Paralyzed Veterans of America  
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## Management of Mental Health Disorders, Substance Use Disorders, and Suicide in Adults with Spinal Cord Injury

Clinical Practice Guideline for Health Care Providers

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*These guidelines have been prepared based on scientific and professional information available in 2019. Users should periodically review this material to ensure that the advice herein is consistent with current reasonable clinical practice. The websites noted in this document were current at the time of publication; however, because web addresses and the information contained therein change frequently, the reader is encouraged to stay apprised of the most current information.*

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# Preface

Suicide is at least 3 times more common in individuals with spinal cord injury (SCI) than in individuals without SCI, and anxiety and posttraumatic stress disorder (PTSD) are at least twice as prevalent. Substance use is also significantly more prevalent. However, even though individuals with SCI usually have contact with health care professionals, these mental health disorders are often not recognized and therefore often not addressed optimally, perhaps because of the other more obvious physical health impairments caused by SCI and the stigma that surrounds mental health disorders.

This clinical practice guideline (CPG), which has been in development for over 15 years, is long overdue. Fortunately, however, during this time, progress has been made in recognizing the extent of the problem and beginning to evaluate potential treatments. This CPG has been rigorously developed with the thought that implementable things can be done to improve the recognition and treatment of mental health disorders, specifically depression and anxiety, PTSD, substance use disorders, and suicide prevention. It is anticipated that this important and practical work will educate clinicians about the scope of the problems and raise awareness about the availability of the means to accurately diagnose and treat these disorders.

We are fortunate to have the representation of all the various stakeholders in the development and peer review of this CPG, including all of the subspecialists who are impacted by these recommendations, ranging from experts in psychiatry and psychology to rehabilitation professionals. We hope that this wide-ranging representation will translate into uniform quality practice through the widespread use of this CPG to guide the detection and treatment of mental health and substance use disorders in all settings, which can only result in the best outcomes and least amount of morbidity and mortality for individuals who experience SCI.

On behalf of the consortium steering committee, I want first to acknowledge the leadership of the Chair, Charles Bombardier, in guiding this panel inexorably through the seemingly unending development process over the past decade. Next to be commended are the panel members themselves for keeping to task, even as many have retired along the way, and the many reviewers who provided valuable feedback from all areas. All these people, including the panel Chair, have volunteered their time to help produce this superb document. In addition, I wish to acknowledge the ongoing support of the Paralyzed Veterans of America, especially President David Zurfluh, Executive Director Carl Blake, and Director of Research and Education Cheryl Vines, as well as the rest of the leadership team without whose support these guidelines would not exist.

*Thomas Bryce  
Chair  
Consortium for Spinal Cord Medicine*

# Foreword

This clinical practice guideline (CPG) has had a long gestation period. We owe a great debt of gratitude to those who long ago envisioned and nurtured the idea of a broad psychosocial CPG that would further define and elevate standards of care for individuals with spinal cord injury (SCI). In March 2003, Lester Butt, PhD, presented a 5-phase proposal to the Consortium for Spinal Cord Medicine (“the Consortium”) to develop a psychosocial CPG. The proposal called for the establishment of a psychosocial workgroup led by Dr. Butt and joined by Helen Bosshart, LCSW, ACSW; Bob Sontag, MSW; Hugh Taylor, MSW; Pat Tracy, MSW; Chuck Bombardier, PhD; Scott Richards, PhD; and Dan Rohe, PhD. Don Kewman, PhD, and Romel Mackelprang, DSW, were identified as topic champions for the CPG. Dr. Butt and colleagues constructed a compendium of psychosocial issues from which the CPG topics could be chosen. They next developed 2 parallel surveys to identify the most important topics for inclusion in the CPG from the perspectives of individuals with SCI, as well as SCI physicians, psychologists, and social workers. Results of that survey were bundled into a CPG proposal that incorporated psychosocial comorbidities (e.g., pain, substance abuse, traumatic brain injury, diagnoses listed in the 4th edition of the Diagnostic and Statistical Manual of Mental Disorders [DSM-IV]), health/wellness/quality of life (e.g., coping, sexuality, family, aging, compliance), community reintegration, psychosocial treatment approaches, summary, and future directions. The proposed content was recognized by the Consortium as identifying important aspects of psychosocial care for individuals with SCI; however, the comprehensive nature of the proposal was felt by the Consortium to be overly ambitious and consequently impractical, given available time and resources. In 2005, the Consortium unsuccessfully sought support from the Agency for Healthcare Research and Quality, Evidence-based Practice Centers, to complete the literature reviews and evidence grading for the psychosocial CPG. In 2008, Don Kewman, Lester Butt, and I met to discuss potential ways forward. During that meeting, we decided to take a “Swiss cheese” approach and identify smaller, doable, but still meaningful psychosocial domains that could be the subject of several separate CPGs. The topic of sexuality had already been selected as a stand-alone CPG topic. Ultimately, the group decided to focus the second psychosocial CPG on common disorders in the

American Psychiatric Association DSM-IV that were prevalent in SCI: depression, anxiety/posttraumatic stress disorder (PTSD), and substance use. We reasoned that these conditions were not only prevalent, but they were clinically important, clearly defined, and the subject of considerable research that could inform care and could benefit from a guideline to elevate and enhance current standards of care. In about 2010, I took over the leadership of the revised CPG. The Consortium approved of the more narrowly focused CPG proposal, but other new and revised CPGs were already in the pipeline and so a start date was deferred. The Great Recession, limited resources, and more urgent emerging priorities delayed the commencement of this CPG until 2016. Still, the Paralyzed Veterans of America (PVA) and their CPG directors and managers proved their mettle by sustaining the CPG program through difficult times and kept their commitment to see this CPG through to completion.

I am deeply grateful to the PVA for financial and institutional support. I am especially thankful for the PVA staff who have guided and enabled the development of this CPG over the years: Kim Nalle, Lana McKenzie, Christina Arenas, Caryn Cohen, Kera Lawson, Rita Obi, and Cheryl Vines, as well as PVA consultant J. Paul Thomas. Consortium chairs Larry Vogel and Tom Bryce have been ardent supporters of psychosocial research and this CPG. The methodology team at the Pacific Northwest Evidence-based Practice Center, Oregon Health & Science University, led by Shelly Selph, MD, MPH, along with Jessica Griffin, MS, and Ryan C. Stoner, PhD, produced an excellent systematic review of the literature and responded to comments and additional requests in a very collegial manner. I am also thankful for the Veterans Administration/Department of Defense guidelines on treating depression, substance use disorders, tobacco use, PTSD, acute stress disorder, and suicide management, which we have quoted heavily. These and other guidelines have formed the basis for many of the recommendations that we have provided where relevant information from individuals with SCI is lacking.

I also want to recognize at least a few of the pioneering researchers who embraced an empirical approach to understanding psychosocial aspects of SCI: Fiona Judd, Roberta Trieschmann, J. Scott Richards, Robert

Frank, Timothy Elliott, Ashley Craig, Paul Kennedy, James Krause, Bryan Kemp, and Denise Tate. These individuals and their colleagues modeled evidence-based approaches and produced an early foundation of empirical support on which to base assessment and treatment practices. They inspired me and the next generation of psychosocial researchers to build on what they had discovered. No CPG provides final

## Acknowledgments

Paralyzed Veterans is proud to sponsor the development and dissemination of the SCI CPGs. For over twenty five years we have partnered with the Consortium of Spinal Cord Medicine in a shared mission to improve the health of individuals living with SCI. Today, hundreds of thousands of copies of the guidelines are used around the world by physicians and other medical professionals who provide care to individuals living with SCI at every level, from the emergency department to acute care, rehabilitation to community services.

We thank Dr. Bombardier for his leadership and perseverance in guiding this important new guideline into practice. Sincere thanks is also extended to each of the panel members who worked tirelessly, without remuneration, to bring this project to fruition. Dr. Thomas Bryce and the members of the SCI Consortium have provided vision, leadership and support bring this and many other clinical practice guidelines to completion. Their efforts and those of the field reviewers assure the high quality of the recommendations.

answers. May this CPG point us toward a higher standard of care for now, eventually to be challenged, updated, and replaced with better information, more effective methods, and improved standards of care. This is what individuals living with SCI deserve from us.

*Charles H. Bombardier, PhD  
Panel Chair*

As with any project of this magnitude, many were involved in the process. Sincere appreciation goes to Dr. Shelly Selph and her team at the Pacific Northwest Evidence-based Practice Center, Oregon Health and Science University, who conducted the review of literature and methodology for this guideline.

Within Paralyzed Veterans, work on this guideline benefitted from the efforts of nearly every department. But special appreciation goes to our graphic designers Jonathan Franklin and Kevin Johnson.

Finally, it is only with the significant, mission-driven support of Paralyzed Veterans, our leadership and our members, that we are able to provide these services. Sincere thanks to Paralyzed Veterans President David Zurfluh, Past President Al Kovach, Executive Director Carl Blake and Deputy Executive Director Shaun Castle for their support.

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# Abbreviations

**ASD** – Acute Stress Disorder

**AUDIT-C** – Alcohol Use Disorders Identification  
Test-Consumption

**BDI** – Beck Depression Inventory

**CAGE-AID** – CAGE Adapted to Include Drugs

**CBT** – cognitive behavioral therapy

**CDC HRQOL-14** – Centers for Disease Control and  
Prevention Health-Related Quality of Life Measure

**CPG** – clinical practice guideline

**CRAFT** - Community Reinforcement Approach and  
Family Training

**C-SSRS** – Columbia Suicide Severity Rating Scale

**DoD** – Department of Defense

**DSM** – Diagnostic and Statistical Manual of  
Mental Disorders

**DSM-IV** – Diagnostic and Statistical Manual of  
Mental Disorders, 4th edition

**DSM-5** – Diagnostic and Statistical Manual of  
Mental Disorders, 5th edition

**FDA** – Food and Drug Administration

**FIM** – Functional Independence Measure

**GAD** – generalized anxiety disorder

**GAD-7** – Generalized Anxiety Disorder 7-item scale

**GRADE** – Grading of Recommendations Assessment,  
Development and Evaluation

**HADS** – Hospital Anxiety and Depression Scale

**MAT** – medication-assisted treatment

**MBC** – measurement-based care

**MDD** – major depressive disorder

**NPV** – negative predictive value

**OAHMQ** – Older Adult Health and Mood Questionnaire

**PC-MHI** – Primary Care-Mental Health Integration

**PD** – panic disorder

**PHQ** – Patient Health Questionnaire

**PHQ-2** – 2-item Patient Health Questionnaire-2

**PHQ-4** – 4-item Patient Health Questionnaire-4

**PHQ-9** – 9-item Patient Health Questionnaire-9

**PPV** – positive predictive value

**PROMIS** – Patient-Reported Outcomes  
Measurement Information System

**PTSD** – posttraumatic stress disorder

**PVA** – Paralyzed Veterans of America

**QUIPS** – Quality in Prognostic Studies

**RCT** – randomized controlled trial

**SAMHSA** – Substance Abuse and Mental Health  
Services Administration

**SBIRT** – Screening, Brief Intervention, and Referral  
to Treatment

**SCI** – spinal cord injury

**SCID DSM-III-R** – Structured Clinical Interview for the  
Diagnostic and Statistical Manual of Mental  
Disorders, 3rd edition, revised

**SCID DSM-IV** – Structured Clinical Interview for the  
Diagnostic and Statistical Manual of  
Mental Disorders, 4th edition

**SCI-QOL** – Spinal Cord Injury-Quality of Life

**SF-36** – 36-Item Short Form Health Survey

**SNRI** – serotonin-norepinephrine reuptake inhibitor

**SSRI** – selective serotonin reuptake inhibitor

**SUD** – substance use disorder

**TAPS** – Tobacco, Alcohol, Prescription Medication,  
and Other Substance Use

**TBI** – traumatic brain injury

**TICS** – Two-Item Conjoint Screening test

**VA** – United States Department of Veterans Affairs

**Zung SDS** – Zung Self-Rating Depression Scale

## Conditions Covered

**AD** – Anxiety disorders

• **GAD** – Generalized anxiety disorder

• **PD** – Panic disorder

**MDD** – Major depressive disorder

**SUDs** – Substance use disorders

**PTSD** – Posttraumatic stress disorder

**ASD** – Acute stress disorder

Suicide



2.4 Treat GAD, PD, or other clinically significant anxiety by using pharmacological and/or nonpharmacological interventions on the basis of salient clinical considerations and patient preferences.

Level IV                      Strength C                      Agreement strong

2.4.1 Consider pharmacological treatment for anxiety, if indicated.

Level IV                      Strength C                      Agreement strong

2.4.2 Consider nonpharmacological treatment for anxiety.

Level IV                      Strength C                      Agreement strong

### 3. Major Depressive Disorder (MDD)

3.1 Screen all individuals with SCI for major depression by using a brief, valid measure that has good sensitivity and specificity: (a) early during the initial inpatient hospital or rehabilitation stay; (b) as a repeat screen if indicated to assess persistence of symptoms or change in status; (c) at the first discharge follow-up point; and (d) at least annually or more frequently, depending on risk stratification factors such as prior positive screening results and chronic pain.

Level IV                      Strength C                      Agreement strong

3.2 Refer patients with positive screen results or those suspected of having a depressive disorder to a mental health provider for a diagnostic assessment.

Level IV                      Strength C                      Agreement strong

3.3 Follow up on positive screening test results by using a valid diagnostic assessment to confirm conditions such as major depressive disorder (MDD) or adjustment disorder (including sufficient persistence of symptoms and interference with rehabilitation or role functioning) and rule out the possibility that the symptoms are better explained by the effects of the medical condition, medications, drugs, the environment, or other factors.

Level IV                      Strength C                      Agreement strong

3.4 Support patients with major depression with nonspecific and depression-specific relationship skills, used by all health care professionals (physicians, nurses, therapists, psychologists, social workers, and others) who work with them.

Level IV                      Strength C                      Agreement strong

3.5 Treat major depression by using pharmacological and/or nonpharmacological approaches on the basis of clinical presentation (e.g., comorbid conditions), treatment efficacy, and patient preferences.

Level I                      Strength A                      Agreement strong

3.5.1 Consider pharmacological treatments for major depression.

Level I                      Strength A                      Agreement strong

3.5.2 Consider nonpharmacological treatments for major depression.

Level I                      Strength A                      Agreement strong

### 4. Substance Use Disorders (SUDs)

4.1 Screen all patients for common SUDs: (a) Before discharge from inpatient rehabilitation, use a brief, valid measure that has good sensitivity to screen for lifetime use of and problems with alcohol, other (illicit) drugs, tobacco, marijuana, and nonmedical use of prescription medications; and, (b) depending on initial screening results and other risk factors, rescreen patients for recent substance use in outpatient rehabilitation or primary care.

Level IV                      Strength C                      Agreement strong

4.2 Refer patients with positive screen results or those suspected of having an SUD to a mental health provider for a diagnostic assessment of SUD criteria.

Level IV                      Strength C                      Agreement strong

4.3 Support patients with SUD with nonspecific and SUD-specific relationship skills, used by all health care professionals (physicians, nurses, therapists, psychologists, social workers, and others) who work with them.

Level IV                      Strength C                      Agreement strong

4.4 Treat SUDs, within rehabilitation to the extent possible, by using pharmacological, nonpharmacological, and community-based approaches on the basis of clinical presentation (e.g., comorbid conditions), length of stay, treatment efficacy, and patient preferences.

Level IV                      Strength C                      Agreement strong

4.5 Use medication-assisted treatment (MAT) for SUDs, including opioid use and alcohol use disorders, when indicated.

Level IV                      Strength C                      Agreement strong

4.6 Consider nonpharmacological treatments for SUDs.

Level IV                      Strength C                      Agreement strong

4.7 Consider referral to community-based SUD treatment programs and self-help resources.

Level IV                      Strength C                      Agreement strong

### 5. Posttraumatic Stress Disorder (PTSD) and Acute Stress Disorder (ASD)

5.1 Screen all patients for ASD within 1 month of SCI and for PTSD after the first month. Screening should occur (a) early during initial inpatient hospital or rehabilitation stay; (b) as a repeat screen if indicated to assess persistence of symptoms or change in status; (c) at the first post-discharge follow-up point; and (d) at future time points beyond 6 months, depending on risk stratification factors, such as being a veteran or other trauma-exposed professional or having subthreshold symptom severity on prior screening examinations.

Level IV                      Strength C                      Agreement strong

5.2 Refer patients with positive screen results or those suspected of having ASD or PTSD to a mental health provider for a diagnostic assessment of ASD or PTSD criteria.

Level IV                      Strength C                      Agreement strong

5.3 Support patients with PTSD with nonspecific and PTSD-specific relationship skills, used by all health care professionals (physicians, nurses, therapists, psychologists, social workers, and others) who work with them.

Level IV                      Strength C                      Agreement strong

5.4 Treat ASD and PTSD, within rehabilitation to the extent possible, by using pharmacological and nonpharmacological approaches on the basis of treatment efficacy, clinical presentation (e.g., comorbid conditions), length of stay, and patient preferences.

Level IV                      Strength C                      Agreement strong

5.5 Offer patients with brief, evidence-based psychological interventions to treat ASD and prevent PTSD within the first 30 days after injury.

Level IV                      Strength C                      Agreement strong

5.6 Offer patients with PTSD evidence-based, trauma-focused psychological treatment.

Level IV                      Strength C                      Agreement strong

5.7 Offer patients with ASD pharmacological treatment if trauma-focused psychotherapies are not available or not preferred.

Level IV                      Strength C                      Agreement strong

5.8 Offer patients with PTSD pharmacological treatment if trauma-focused psychotherapies are not available or not preferred.

Level IV                      Strength C                      Agreement strong



## 6. Suicide

6.1 Formally screen individuals with SCI for suicidal ideation by using a brief, standardized, evidence-based screening tool. Screen for suicidal intent and behavior in individuals who report suicidal ideation. Screen (a) early during the initial inpatient hospital or rehabilitation stay, (b) as a repeat screen if indicated to assess persistence of symptoms or change in status, (c) at an early discharge follow-up point, and (d) at least annually or more frequently depending on risk stratification factors.

Level IV                      Strength C                      Agreement strong

6.2 Recognize warning signs for suicide and expedite evaluation of such signs by a trained professional. Take immediate follow-up action for anyone who displays direct warning signs for suicide (e.g., suicidal communication, preparation for suicide, and/or seeking access to or recent use of lethal means).

Level IV                      Strength C                      Agreement strong

6.3 Stratify suicide risk on the basis of severity and temporality (acute or chronic) to determine appropriate therapeutic interventions and care setting.

Level IV                      Strength C                      Agreement strong

6.3.1 Facilitate comprehensive assessment by a trained professional to integrate information about suicidal intent and behavior, warning signs, ability to maintain safety, and factors that impact risk of suicidal acts.

Level IV                      Strength C                      Agreement strong

6.3.2 Hospitalize individuals with high acute risk for suicide to maintain their safety, and aggressively target modifiable factors. Directly observe them in a secure environment with limited access to lethal means (e.g., kept away from items with sharp points or edges, cords/tubing, toxic substances).

Level IV                      Strength C                      Agreement strong

6.3.3 Address chronic increased risk for suicide in the context of long-term outpatient therapy with established providers, adjusting frequency of contact on the basis of risk level.

Level IV                      Strength C                      Agreement strong

6.4 Establish a treatment plan for high-risk individuals that fosters therapeutic alliance with mental health professionals and includes evidence-based suicide-focused psychotherapies.

Level IV                      Strength C                      Agreement strong

6.5 Optimize treatment for coexisting mental health and medical conditions that may impact the risk of suicide.

Level IV                      Strength C                      Agreement strong

6.6 Educate the at-risk individual, family, and caregivers on suicide risk and treatment options. Provide information on suicide prevention resources, including crisis lines and services, e.g., the National Suicide Prevention Lifeline number 1-800-273-8255 or 1-800-273-TALK. Provide information to veterans of the U.S. Armed Services about veteran-specific suicide prevention resources including a Veterans Crisis Line accessed by pressing 1 after dialing 1-800-273-8255, online chatting at VeteransCrisisLine.net, or sending a text to 838255).

Level IV                      Strength C                      Agreement strong

6.7 Establish a safety plan for individuals considered to be at high risk for suicide. Limit access to lethal means (e.g., restricting access to firearms, making use of gun locks, limiting medication supply).

Level IV                      Strength C                      Agreement strong

6.8 Augment personal and environmental protective factors that may mitigate suicide risk. Enhance coping skills.

Level IV                      Strength C                      Agreement strong

## Introduction

This guideline is the second Consortium for Spinal Cord Medicine clinical practice guideline (CPG) on mental health. The first mental health guideline, published in 1998, focused exclusively on depression after SCI. We now know that a number of mental health disorders and SUDs are prevalent and contribute to additional suffering and disability in individuals with SCI.<sup>3</sup> Therefore, this guideline focuses on recognition and treatment of the most common mental health conditions in SCI: depression, anxiety, PTSD, and SUDs. The guideline also includes specific sections on detection and management of suicide because of the elevated risk of completed suicide among individuals living with SCI.

This CPG was designed for SCI rehabilitation professionals who are not mental health specialists as well as for those who are. Therefore, we need to begin with foundational concepts such as how mental health disorders and SUDs are defined. According to the most recent edition of the American Psychiatric Association's Diagnostic and Statistical Manual of Mental Disorders (DSM), the 5th edition (DSM-5) published in 2013, mental illnesses are "health conditions involving changes in thinking, emotion or behavior (or a combination of these). Mental illnesses are associated with distress and/or problems functioning in social, work or family activities."<sup>4</sup> SUDs occur when the use of substances (e.g., alcohol, tobacco, cannabis, inhalants, stimulants, hallucinogens, and opioids) cause significant impairment, such as health problems, disability, and failure to meet major responsibilities at work, school, or home.<sup>4</sup> In the DSM-5, mild, moderate, and severe SUDs replace the diagnoses of substance abuse and substance dependence found in the 4th edition of the DSM (DSM-IV).<sup>5</sup>

Mental health and SUDs are common in the general population and even more so in individuals with SCI. Each year, 1 in 5 Americans is affected by mental illness and 1 in 12 by an SUD. There is evidence to suggest that individuals with SCI are at greater risk of mental illness and substance use. Estimates of depression in the first year after SCI range from 20% to 40%.<sup>3,6</sup> Estimates range from 13% to 40%<sup>7-10</sup> for anxiety disorders following SCI. Between 25% and 96% of individuals with SCI used alcohol prior to injury and 32% to 35% used illegal drugs.<sup>11</sup> Suicide is the cause of SCI in 0% to 6.8% of cases and is reported to be the cause of death in 5.8% to 11% of decedents with SCI.<sup>12</sup>

Comorbid mental illnesses and SUDs adversely influence SCI-related symptoms such as pain, as well as functioning, level of independence, community participation, quality of life, and mortality.<sup>3</sup> Yet, mental health and SUDs seem to be underrecognized and undertreated in individuals with SCI.<sup>13,14</sup> Under-recognition may occur because SCI is a catastrophic injury that blurs the lines between normal emotional responses and mental health disorders. Undertreatment may stem from poor recognition, as well as a failure to use rehabilitation as a window of opportunity to intervene in mental health and SUD conditions. Treatment of mental illness and SUDs is becoming more integrated into regular medical<sup>15</sup> and trauma care.<sup>16</sup> This is a trend that should be followed in SCI rehabilitation because it can be more effective<sup>17</sup> and consistent with mental health treatment preferences in individuals with SCI.<sup>18</sup> Consequently, we hope that consumers of this guideline—professionals, students, individuals with SCI and their loved ones—find a document that answers practical questions regarding the prevalence and risk factors for these disorders, how to screen for and assess these conditions, and what can be done to treat mental illness and SUDs, especially within rehabilitation settings.

This CPG does not address other psychological concepts such as adjustment, grief, resilience, coping, and so forth except to the extent that these variables are related to the included mental health conditions. While these other psychological factors may be important, they were judged to be too expansive and to lack consensus definitions to be included in this CPG.

# The Consortium for Spinal Cord Medicine

The Consortium is a collaboration of professional and consumer organizations funded and administered by the Paralyzed Veterans of America (PVA). The Steering Committee, administratively supported by the PVA's Research and Education Department, is made up of 1 representative from each Consortium-member organization. The Consortium's mission is to direct the development and dissemination of evidence-based CPGs and companion consumer guides. This mission is solely directed to improving the health care and quality of life for individuals with SCI.

## Summary of Guidelines Development Process

The development of these guidelines involved the following major steps: creating a list of formal questions to be addressed, systematic searches of published literature related to these questions, critical appraisal of the quality of the retrieved studies, abstraction of relevant study results, creation of evidence-based recommendations, writing and revising of various drafts of text that explain the recommendations, and multiple reviews by panel members and outside organizations. The Consortium's CPG development process also involved extensive field review and a legal review.

# Methodology

## Literature Search

A medical librarian searched Ovid MEDLINE (through August 22, 2016), PsycINFO (through July, 2016), the Cochrane Central Register of Controlled Trials (through July, 2016), and the Cochrane Database of Systematic Reviews (through August 17, 2016) by using search terms related to chronic SCI. See Appendix A for complete search strategies. We also attempted to identify additional studies through hand searches of reference lists of included studies and reviews. All citations were imported into an electronic database (Endnote X7, Thomson Reuters).

## Study Selection

Selection of included studies was based on inclusion criteria created in consultation with the PVA. Two reviewers independently assessed titles and abstracts of citations identified through literature searches for inclusion by using the criteria below. Full-text articles of potentially relevant citations were retrieved and assessed for inclusion by both reviewers. Disagreements were resolved by consensus. Results published only in abstract form were not included because inadequate details were available for risk of bias assessment; we did consider for inclusion those abstracts that had additional information available in the form of slide sets from conference presentations, or those that provided supplemental data from published studies. When the data were sparse, we included studies conducted in countries that are less similar to the United States (e.g., Iran, Taiwan) and studies with smaller sample sizes (e.g., less than 100). See Appendix B for a list of included studies and Appendix C for a list of excluded studies.

## Inclusion Criteria

In consultation with the PVA, we formulated 8 key questions. Key questions and inclusion criteria are as follows.

## Key Questions

1. What is the prevalence of common mental health disorders and SUDs (e.g., MDD, PTSD, GAD, alcohol or other drug dependence, and alcohol or other drug abuse) in individuals with SCI?
2. What are the risks and protective factors for common mental health disorders and SUDs in individuals with SCI?
3. What is the evidence that common mental health disorders and SUDs influence body functions and structures, activities, participation, health, and quality of life in individuals with SCI?
4. What is the evidence that the presence and severity of common mental health disorders and SUDs can be reliably and validly assessed in individuals with SCI?
5. What is the evidence that common mental health disorders and SUDs can be effectively treated in individuals with SCI? What is the comparative effectiveness of treatments for common mental health disorders and SUDs? What are the comparative harms of treatments for common mental health disorders and SUDs?
6. What is the evidence that mental health disorders and SUD treatment can be delivered to individuals with SCI in ways that are accessible, acceptable, and efficient?
7. What is the evidence that common mental health disorders and SUDs can be prevented in individuals with SCI?
8. Are there subgroups of patients within the SCI population based on demographics (e.g., gender, race/ethnicity, age, socioeconomic status, geographic region), level of SCI, duration of injury, comorbidities (e.g., heart disease, chronic obstructive pulmonary disease, other mental health disorder) for which risk or protective factors, specific treatments, or preventive measures differ?

## PICOTS

### Population

- Adults with traumatic SCI

### Intervention

- Pharmacotherapy
  - ☒ Antidepressants
  - ☒ Antipsychotics
  - ☒ Antiepileptics
  - ☒ Anxiolytics
  - ☒ Herbal medicines (e.g., S-adenosyl methionine, St. John's wort)
  - ☒ Cannabis
  - ☒ Other pharmacotherapies
- Behavioral intervention
  - ☒ Individual counseling
  - ☒ Group counseling
  - ☒ Peer counseling
  - ☒ Cognitive behavioral therapy (CBT)
  - ☒ Attendance at 12-step or similar meetings
  - ☒ Lifestyle counseling
  - ☒ Education
  - ☒ Motivational interviewing
  - ☒ Mindfulness training
  - ☒ Stress management, coping skills training
  - ☒ Rehabilitation
  - ☒ Chinese medicine
  - ☒ Massage
  - ☒ Acupuncture
  - ☒ Yoga, Tai Chi Chuan (or similar martial art)
  - ☒ Physical exercise, physical activity
  - ☒ Healthy eating

### Comparators

- Any other included intervention
- Placebo
- Usual care
- Healthy controls
- Wait list controls

### Outcomes

- Mortality
- Suicide/Suicidal ideation
- Health

- ☒ 36-Item Short Form Health Survey (SF-36)
- ☒ Oswestry Disability Index
- ☒ Other scales or questionnaires
- ☒ Hospital admissions
- ☒ Emergency department visits
- ☒ Sleep
  - ◆ Duration
  - ◆ Nocturnal awakenings
- Quality of Life
  - ☒ Spinal Cord Injury-Quality of Life (SCI-QOL) Anxiety item bank and Depression item bank
  - ☒ Centers for Disease Control and Prevention Health-Related Quality of Life Measure (CDC HRQOL-14)
  - ☒ Other scales or questionnaires
- Return to work/school
- Participation in leisure activities
- Change on depression scales
  - ☒ Hamilton Depression Rating Scale
  - ☒ Beck Depression Inventory
  - ☒ Patient Health Questionnaire (PHQ)
  - ☒ Major Depression Inventory
  - ☒ Center for Epidemiologic Studies Depression Scale
  - ☒ Zung Self-Rating Depression Scale
  - ☒ Geriatric Depression Scale
  - ☒ Other scales or questionnaires
- Change on anxiety scales
  - ☒ Hamilton Anxiety Rating Scale
  - ☒ Beck Anxiety Inventory
  - ☒ Zung Self-Rating Anxiety Scale
  - ☒ Generalized Anxiety Disorder 7-item scale (GAD-7)
  - ☒ Hospital Anxiety and Depression Scale (HADS)
  - ☒ 4-Item Patient Health Questionnaire-4 (PHQ-4)
  - ☒ Multidimensional Anxiety Questionnaire
  - ☒ Other scales or questionnaires
- Perception of improvement
- Meet criteria for DSM diagnosis (e.g., major depressive disorder, GAD)
- Substance abuse
  - ☒ Drug/alcohol abuse (quantity, frequency, variability, abstinence)

- ☒ Urine/blood drug screen
- ☒ Blood alcohol level
- Perception of improvement
  - ☒ Patient
  - ☒ Clinician

### Timing

- Acute injury
- Chronic injury

### Setting

- Inpatient
- Outpatient
- Community
- Rehabilitation
  - ☒ Physical
  - ☒ Substance abuse

### Study Design

- Key Questions 1-3:
  - ☒ Epidemiological database studies
  - ☒ Cohort studies
  - ☒ Case-control studies
  - ☒ Before and after studies
  - ☒ Systematic reviews
- Key Question 4: Diagnostic accuracy studies
- Key Question 5:
  - ☒ Intervention studies
    - ◆ Randomized trials
    - ◆ Cohort studies
    - ◆ Before and after studies
    - ◆ Systematic reviews
- Key Question 6:
  - ☒ Same as Key Question 5
  - ☒ Focus groups
  - ☒ Surveys
  - ☒ Other studies reporting accessibility and acceptability
- Key Question 7:
  - ☒ Prevention studies
    - ◆ Randomized trials
    - ◆ Cohort studies
    - ◆ Systematic reviews
- Key Question 8: Studies reporting data on a subgroup of individuals with SCI or reporting results stratified by subgroup

## Data Abstraction

We abstracted information on population characteristics, interventions, subject enrollment, prevalence, results for efficacy, effectiveness, and harms outcomes for trials, observational studies, and systematic reviews. We recorded intent-to-treat results when reported. Data abstraction was performed by one reviewer and independently checked by a second reviewer. Differences were resolved by consensus.

## Validity Assessment (Risk of Bias)

We assessed the internal validity (risk of bias) of randomized trials, observational studies, and systematic reviews by using predefined criteria. These criteria are based on the U.S. Preventive Services Task Force and the National Health Service Centre for Reviews and Dissemination (United Kingdom) criteria<sup>19,20</sup>; the Grading of Recommendations Assessment, Development and Evaluation (GRADE) guidelines<sup>21</sup>; and the Quality in Prognostic Studies (QUIPS) tool.<sup>22</sup>

We rated the internal validity of each randomized trial on the basis of the methods used for randomization, allocation concealment, blinding, the similarity of compared groups at baseline, loss to follow-up, and the use of intent-to-treat analysis. Observational studies were rated on nonbiased selection, loss to follow-up, pre-specification of outcomes, well-described and adequate ascertainment techniques, statistical analysis of potential confounders, and adequate duration of follow-up. For studies of risk factors, we used the QUIPS tool.<sup>22</sup> This tool includes domains on study participants, attrition, measurement of the prognostic factor, statistical adjustment for confounding factors, and appropriate statistical analysis. Systematic reviews were rated on clarity of the review question, specification of inclusion and exclusion criteria, use of multiple databases and search for grey literature, sufficient detail of included studies, adequate assessment of risk of bias of included studies, and adequate summarization of primary studies.

Two reviewers independently assessed the risk of bias of each included study and differences were resolved by consensus. Studies were rated as “low risk of bias,” “medium risk of bias,” or “high risk of bias” from the presence and seriousness of methodological limitations. Risk of bias assessments for included studies are listed in Appendix D.

Studies that had a significant or “fatal” flaw were rated as having a high risk of bias, studies that met all criteria were rated as a low risk of bias, and the remainder were rated as a medium risk of bias. As the medium risk of bias category is broad, studies with this rating vary in their strengths and weaknesses. The results of some studies rated as having a medium risk of bias are likely to be valid, while others are only possibly valid. A fatal flaw is reflected by the failure to meet combinations of items from the risk of bias criteria. An example would be a study with high attrition (e.g., 60%) combined with inadequate handling of missing data, or one in which details of randomization and/or allocation concealment were lacking and there were baseline differences in important prognostic characteristics.

## Grading the Quality of Evidence

We graded the quality of evidence by using the GRADE approach.<sup>23-27</sup> Developed to grade the overall quality of a body of evidence, this approach incorporates 4 key domains: risk of bias (includes study design and aggregate risk of bias), consistency, directness, and precision of the evidence. It also considers other optional domains that may be relevant for some scenarios, such as a dose-response association, plausible confounding that would decrease the observed effect, strength of association (magnitude of effect), and publication bias.

Table 1 describes the grades of evidence that can be assigned. Grades reflect the quality of the body of evidence to answer key questions. Grades do not refer to the general efficacy or effectiveness of treatments, for example. Two reviewers independently assessed each domain for each outcome and differences were resolved by consensus.

The quality of the body of evidence was evaluated for each outcome by key question.

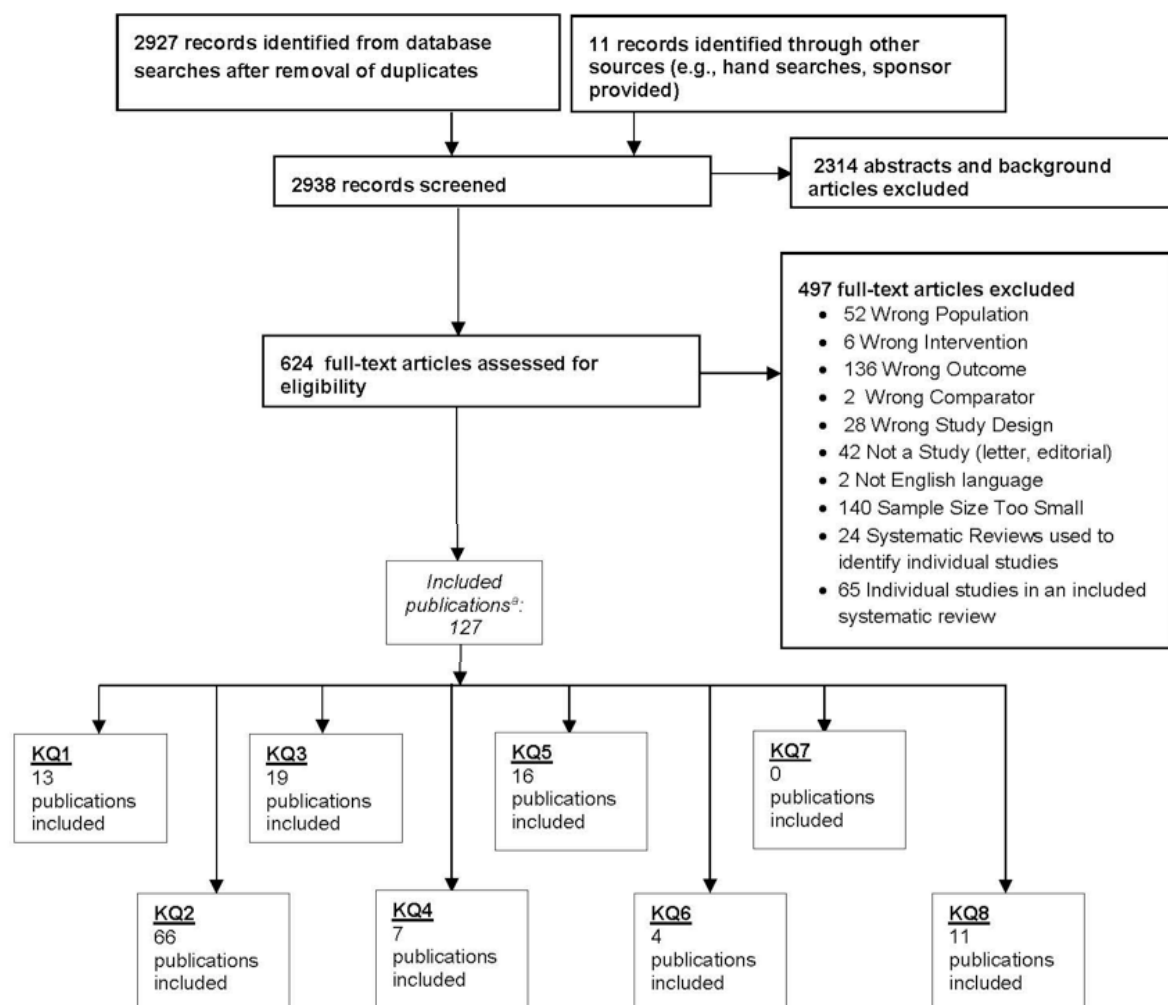


Grade	Definition
High	High confidence that the true effect lies close to that of the estimate of effect.
Moderate	Moderate confidence in the effect estimate. The true effect is likely to be close to the estimate of the effect, but there is a possibility that it is substantially different.
Low	Limited confidence in the effect estimate. The true effect may be substantially different from the estimate of the effect.
Very Low	Very little confidence in the effect estimate. The true effect is likely to be substantially different from the estimate of effect.

### Data Synthesis

We constructed in-text tables that show the study characteristics, risk of bias ratings, and results for all included studies. We reviewed studies by using a hierarchy of evidence approach, in which the best evidence is the focus of our synthesis for each question, population, intervention, and outcome addressed. When possible, we pooled study results with meta-analyses by using Stata 14.28

**Figure 1. Results of literature searches<sup>a</sup>**



<sup>a</sup> Publications may be included in more than one key question (KQ).

### RESULTS

#### Overview

The search and selection of articles are summarized in the literature flow diagram (Figure 1). Database searches resulted in 2,927 potentially relevant articles. After dual review of abstracts and titles, 624 articles were selected for full-text dual review, and 127 studies were determined to meet inclusion criteria and were included in this review.

## Recommendations and Rationales

### GENERAL CROSS-CUTTING RECOMMENDATIONS

#### 1. SCREENING, ASSESSMENT, AND TREATMENT

##### 1.1 Integrate mental health professionals with education, training, and experience in spinal cord injury (SCI), as well as in general mental health and substance use disorders (SUDs) within comprehensive inpatient and outpatient SCI rehabilitation programs.

**Rationale:** Mental health disorders and SUDs are common comorbid conditions in individuals with SCI.<sup>10</sup> These conditions can contribute to the overall suffering and disability of individuals with SCI,<sup>29,30</sup> adversely affect outcomes,<sup>3,13,29-31</sup> increase the costs and reduce the efficiency of rehabilitation,<sup>32,33</sup> and lead to premature death.<sup>34</sup> It is widely recognized that mental health disorders and SUDs are undertreated generally,<sup>35,36</sup> including within SCI rehabilitation. For example, a minority of individuals with SCI are treated for major depression when it is present.<sup>13,14</sup> To address mental health treatment disparities, health care organizations are adopting care models wherein screening, assessment, and treatment for mental health disorders and SUDs are integrated into regular health care settings. A good example is the United States Department of Veterans Affairs (VA) Primary Care-Mental Health Integration (PC-MHI) program that has demonstrated increased access to care for mental health disorders and SUDs.<sup>37</sup> Integrated mental health and SCI rehabilitation care is already the standard in other countries.<sup>38</sup> People with SCI can be affected by multiple interacting comorbid conditions (such as traumatic brain injury,<sup>39</sup> substance use disorder, other mental health disorders<sup>40</sup>, and chronic pain<sup>41</sup>) as well as distinct adjustment patterns<sup>42</sup> and the need to adopt many new SCI-specific health behaviors. Therefore, we recommend that mental health providers have education, training and experience in SCI rehabilitation and in as many of these other areas as possible.<sup>43</sup>

##### 1.2 Routinely screen all individuals with SCI for mental health disorders, SUDs, and suicide risk as part of inpatient and outpatient rehabilitation.

**Rationale:** Screening all patients for common comorbid mental health and substance use issues is justified

by the prevalence and impact of these conditions in SCI and by the availability of validated brief screening instruments.<sup>10,29,30</sup> Routine screening is also critical to the integration of behavioral health care into other medical care and to overcoming undertreatment.<sup>11</sup> Widely adopted effective programs for mental health integration such as collaborative care rely on universal screening for target problems.<sup>44</sup> This CPG focuses on depression, anxiety, PTSD, SUDs, and suicide because there is evidence that these conditions are prevalent and disabling in individuals with SCI. Each section provides more specific recommendations regarding the timing of screening, screening measures, and responses to positive screening test results.

##### 1.3 Include current symptoms and pre-injury history in screening and assessment of mental health disorders and SUDs.

**Rationale:** We also recommend that screening include preinjury history of mental health and substance use problems because individuals with SCI have high rates of pre-injury mental health disorders and SUDs, and a history of these disorders is predictive of post-SCI mental health.<sup>10</sup> These investigators found that the odds of having a psychological disorder after SCI were 24 times greater if the individual had been treated for a psychological disorder before the SCI.<sup>10</sup>

##### 1.4 Refer individuals who screen positive for a mental health disorder or SUD to a mental health professional for a diagnostic assessment and initiation of treatment, if indicated.

**Rationale:** As noted above, mental health disorders and SUDs are undertreated. A national survey showed that only 32.7% of individuals with mental health disorders or SUDs received adequate treatment, and of the individuals with a SUD, only 28.6% received adequate treatment.<sup>45</sup> The VA's PC-MHI program demonstrated that integrated care resulted in increased access to care<sup>37</sup> and treatment initiation.<sup>46</sup> In primary care, the collaborative care model of mental health integration led to more than double the percentage of patients who experienced at least a 50% reduction in depression severity compared with those who were treated with usual care (45% vs.



19%).<sup>47</sup> A study of depression treatment preferences in SCI showed that patients tend to prefer depression treatment provided in medical or rehabilitation settings rather than in specialty mental health settings.<sup>18</sup> A randomized controlled trial (RCT) of collaborative care for depression, pain, and physical inactivity in outpatients with SCI resulted in significantly improved pain interference and reduced depression severity, as well as increased treatment satisfaction among those who received collaborative care versus those who received usual care.<sup>48</sup>

**1.5 Use principles of shared decision making to involve individuals with a mental health disorder or SUD in treatment planning.**

**Rationale:** Consistent with the 2001 Institute of Medicine report, Crossing the Quality Chasm,<sup>49</sup> clinicians are encouraged to inform their patients regarding treatment options, expected outcomes, and what treatment is available in order to facilitate informed choice and a collaborative decision-making process. These processes are thought to result in better treatment plans and greater patient engagement.<sup>49</sup>

**1.6 Systematically use reliable and valid measures of progress to inform care and adjust treatment for mental health disorders or SUDs.**

**Rationale:** There is a growing body of evidence showing that using repeated outcome assessment and decision rules to adjust treatment improves clinical outcomes, aids recognition of clinical worsening, and highlights residual symptoms that can be a risk factor for relapse.<sup>50-52</sup> This approach, called measurement based care (MBC), can also enhance the therapeutic relationship and boost patient adherence and recognition of progress, especially early in treatment.<sup>50-52</sup> The Joint Commission recommends the MBC standard (CTS.03.01.09). The VA has invested in MBC by creating a behavioral assessment software program and committing to the adoption of MBC.<sup>50</sup>

**1.7 Refer to follow-up treatment and coordinate care upon discharge or transition to the next phase of care, if indicated.**

**Rationale:** Mental health conditions and SUDs are often chronic, relapsing conditions that require prolonged treatment, relapse prevention efforts, and

ongoing monitoring or rescreening.<sup>53,54</sup> Consequently, it is vital to plan for continued treatment across transitions in care such as from inpatient rehabilitation to outpatient rehabilitation.

**DISORDER-BASED RECOMMENDATIONS**

**2. ANXIETY DISORDERS**

**Background**

Anxiety is a normal reaction to SCI, but anxiety can become overwhelming and interfere with daily functioning, consistent with anxiety disorders. Anxiety disorders are characterized by anticipation or worry about future threat and are typically accompanied by symptoms such as muscle tension, vigilance, and cautious or avoidant behaviors. These disorders are persistent (typically lasting 6 months or more); out of proportion to reality (taking cultural and contextual factors into account); and interfere with cognitive, emotional, social, and physical functioning.<sup>4</sup> In individuals with SCI, anxiety is often studied generically without specifying diagnostic subtypes. Lack of SCI-specific data and the need for brevity have led to the limiting of this review to generalized anxiety disorder (GAD) and Panic Disorder (PD).

High-quality evidence from a meta-analysis of 18 studies shows that the overall weighted prevalence of anxiety symptoms using self-report measures is 27% in individuals with SCI.<sup>55</sup> Longitudinal studies indicate that anxiety does not necessarily remit over time. However, longitudinal research specifically designed to detect prognostic subgroups revealed 3 patterns of anxiety over the first 2 years following SCI: stable low anxiety, anxiety improvement, and delayed anxiety.<sup>42</sup> Two studies that used diagnostic interviews to identify specific types of anxiety found that the prevalence of GAD was 5%, as was the prevalence of PD.<sup>55</sup> In comparison, the 12-month prevalence of GAD and PD in the general population is 3.1% and 2.7%, respectively.<sup>56</sup>

Anxiety is closely associated with respiratory symptoms in non-SCI populations<sup>57</sup> and may be higher in females.<sup>58</sup> High-quality evidence from a Chinese population-based cohort study of 3556 persons with SCI indicated that high Injury Severity Scores (ISS > 16) had an almost two-fold higher risk of anxiety than those with an ISS < 16.<sup>59</sup> Low-quality evidence suggests that participation in team sports as opposed to individual

sports is associated with reduced levels of anxiety.<sup>60</sup> Low-quality evidence also indicates that lower income and poorer health are associated with greater anxiety<sup>61</sup> and that a sense of coherence and acceptance of the SCI appear to be protective against anxiety.<sup>62</sup> Very low-quality evidence indicates that threat or loss appraisal, mental disengagement, behavioral disengagement, focus on emotions, and attachment avoidance are risk factors for anxiety.<sup>63</sup> Higher anxiety is associated with greater odds of having pain and impaired occupational independence 10 and with lower gains in functional independence (motor scores on the Functional Independence Measure [FIM]).<sup>64</sup>

**Table 5. See Below**

**Table 6. See on Following Page**

**2.1 Use a brief, valid measure that has good sensitivity to screen all patients for general anxiety and panic disorder (PDs): (a) early during initial inpatient hospital or rehabilitation stay; (b) as a repeat screen if indicated to assess persistence of symptoms or change in status; (c) at the first post-discharge follow-up point; and (d) at future time points depending on risk stratification factors such as prior positive anxiety screening results or preinjury history of psychological disorder.**

<b>Table 5. DSM-5 Generalized Anxiety Disorder Diagnostic Criteria<sup>4</sup></b>
A. Excessive anxiety and worry (apprehensive expectation), occurring more days than not for at least 6 months, about a number of events or activities (such as work or school performance).
B. The individual finds it difficult to control the worry.
C. The anxiety and worry are associated with three (or more) of the following six symptoms (with at least some symptoms having been present for more days than not for the past 6 months):
1. Restlessness or feeling keyed up or on edge.
2. Being easily fatigued.
3. Difficulty concentrating or mind going blank.
4. Irritability.
5. Muscle tension.
6. Sleep disturbance (difficulty falling or staying asleep, or restless, unsatisfying sleep).
D. The anxiety, worry, or physical symptoms cause clinically significant distress or impairment in social, occupational, or other important areas of functioning.
E. The disturbance is not attributable to the physiological effects of a substance (e.g., a drug of abuse, a medication) or another medical condition (e.g., hyperthyroidism).
F. The disturbance is not better explained by another mental disorder (e.g.: <ul style="list-style-type: none"> <li>- anxiety or worry about having panic attacks in panic disorder</li> <li>- negative evaluation in social anxiety disorder [social phobia],</li> <li>- contamination or other obsessions in obsessive-compulsive disorder,</li> <li>- separation from attachment figures in separation anxiety disorder,</li> <li>- reminders of traumatic events in posttraumatic stress disorder,</li> <li>- gaining weight in anorexia nervosa,</li> <li>- physical complaints in somatic symptom disorder,</li> <li>- perceived appearance flaws in body dysmorphic disorder,</li> <li>- having a serious illness in illness anxiety disorder,</li> <li>- or the content of delusional beliefs in schizophrenia or delusional disorder).</li> </ul>

**Table 6. DSM-5 Panic Disorder Diagnostic Criteria<sup>4</sup>**

A. Recurrent unexpected panic attacks. A panic attack is an abrupt surge of intense fear or intense discomfort that reaches a peak within minutes, and during which time four (or more) of the following symptoms occur: <b>Note:</b> The abrupt surge can occur from a calm state or an anxious state.
1. Palpitations, pounding heart, or accelerated heart rate.
2. Sweating.
3. Trembling or shaking.
4. Sensations of shortness of breath or smothering.
5. Feelings of choking.
6. Chest pain or discomfort.
7. Nausea or abdominal distress.
8. Feeling dizzy, unsteady, light-headed, or faint.
9. Chills or heat sensations.
10. Paresthesias (numbness or tingling sensations).
11. Derealization (feelings of unreality) or depersonalization (being detached from oneself).
12. Fear of losing control or “going crazy.”
13. Fear of dying.
<b>Note:</b> Culture-specific symptoms (e.g., tinnitus, neck soreness, headache, uncontrollable screaming or crying) may be seen. Such symptoms should not count as one of the four required symptoms.
B. At least one of the attacks has been followed by 1 month (or more) of one or both of the following:
1. Persistent concern or worry about additional panic attacks or their consequences (e.g., losing control, having a heart attack, “going crazy”).
2. A significant maladaptive change in behavior related to the attacks (e.g., behaviors designed to avoid having panic attacks, such as avoidance of exercise or unfamiliar situations).
C. The disturbance is not attributable to the physiological effects of a substance (e.g., a drug of abuse, a medication) or another medical condition (e.g., hyperthyroidism, cardiopulmonary disorders).
D. The disturbance is not better explained by another mental disorder (e.g., - the panic attacks do not occur only in response to feared social situations, as in social anxiety disorder; - in response to circumscribed phobic objects or situations, as in specific phobia; - in response to obsessions, as in obsessive-compulsive disorder; - in response to reminders of traumatic events, as in posttraumatic stress disorder; - or in response to separation from attachment figures, as in separation anxiety disorder).

**Rationale:** Most screening measures of anxiety have not been normed for individuals with SCI and may be confounded by sequelae of the injury itself rather than reflecting anxiety (e.g., shortness of breath, sweating, increased blood pressure, and rapid heart rate). A positive screen therefore may or may not lead to an anxiety disorder diagnosis.

Three anxiety screening measures worth considering are the Hospital Anxiety and Depression Scale (HADS),<sup>65</sup> the Spinal Cord Injury-Quality of Life (SCI-QOL) Anxiety item bank,<sup>66</sup> and the Generalized Anxiety Disorder 7-item scale (GAD-7).<sup>66,67</sup> The HADS has been used in numerous studies and has an internal consistency of 0.85.<sup>68-70</sup> The 25-item SCI-QOL Anxiety scale (fixed-length version or computer adaptive test version, both adapted from and anchored to the Patient-Reported Outcomes Measurement Information System [PROMIS] v1.0 Anxiety bank and metrics) has an internal consistency of 0.95 and is unidimensional.<sup>66</sup> All items have adequate or better model fit statistics, good 1-week test-retest reliability (0.80), and negligible differential item functioning. The 9-item short form has an internal reliability of 0.92. The GAD-7 is a 7-item measure of global anxiety developed for use in primary care.<sup>67</sup> It was included in the SCI-QOL Anxiety study, which showed a mean GAD score of 3.86 (standard deviation 4.34) in a sample of 465 individuals with SCI. Correlation of the GAD-7 with the SCI-QOL Anxiety instrument was moderate (0.67). In primary care patients, a score of 10 or more on the GAD-7 has a sensitivity and specificity for GAD of .89 and .82, respectively.<sup>71</sup> At a cutoff of 7 or more, the GAD-7 has a sensitivity and specificity of .82 and .75, respectively, for PD.<sup>71</sup> The GAD-7 takes 1-2 minutes to administer, the HADS about 5 minutes, and the SCI-QL full 25 item anxiety item about 7-8 minutes.

**2.2 Refer patients with positive screen results or those suspected of having an anxiety disorder to a mental health provider for a diagnostic assessment to assess for conditions such as generalized anxiety disorder (GAD) or PD. Rule out the possibility that the symptoms are better explained by the effects of the medical condition, medications, drugs, the environment, or other factors.**

**Rationale:** As noted above, more than 1 in 4 individuals with SCI are affected by significant self-reported anxiety, which is associated with greater pain and poorer functioning. Mental health conditions tend to

be undertreated and under recognized in individuals with SCI.<sup>13,14</sup> A positive screen may not lead to a DSM-5 anxiety disorder; conversely, the absence of a positive screen does not rule out an ultimate anxiety disorder diagnosis. The person screening should always refer to a mental health provider if significant anxiety is suspected, particularly since screening items are self-report and can be susceptible to denial or minimization. The DSM-5 diagnostic criteria for GAD and PD are presented in Tables 5 and 6 because these 2 conditions are relatively common in SCI. GAD requires excessive anxiety and worry (apprehensive expectation) to have occurred more days than not for at least 6 months about a number of events or activities (such as work or school performance). In individuals for whom anxiety or other symptoms emerge within 3 months after injury, adjustment disorder with anxious mood (or other subtypes) may be a more appropriate diagnosis. In addition, other post-injury stressors such as care transitions or marital stress, as well as financial, housing, and social insecurity, may trigger an adjustment disorder.

Other differential diagnoses to be considered for GAD include social anxiety disorder, post-traumatic stress disorder and obsessive-compulsive disorder. Substance/medication induced anxiety disorder also should be ruled out. The DSM-5 manual lists alcohol, caffeine, cannabis, phencyclidine, hallucinogens, inhalants, opioids, sedative, hypnotic or anxiolytic medications, amphetamine (or other stimulant), and cocaine as substances which can induce anxiety symptoms.<sup>4</sup> Differential diagnoses for PD include dizziness, cardiac arrhythmias, hyperthyroidism, asthma, and COPD, although the nature of the association (cause and effect) between PD and these conditions remains unclear.

**2.3 To minimize anxiety, support anxious patients with specific and nonspecific therapeutic strategies, provided by all health care professionals (physicians, nurses, therapists, psychologists, social workers, and others) who work with them.**

**Rationale:** Individuals with anxiety may present with unrealistic fears, worries about the future, and avoidance of fear-provoking situations based on their understanding and appraisal of their particular injury and its implications. They may express a heightened need for consistency and control, heavy reliance on staff for reassurance, and even anger when their fears are



especially acute. Therefore, it is especially important and sometimes difficult for staff to express core nonspecific relationship factors such as interpersonal warmth, unconditional positive regard, understanding, empathy, and acceptance with these patients<sup>72</sup>, and to normalize anxiety-based concerns. Some additional anxiety-specific strategies that rehabilitation team members can implement include the following: (1) provide patients with enhanced informational control (e.g., extra details about the nature of rehabilitation, specifically which therapies, procedures, and medications are used and what they do), (2) increase trust through predictability and maintenance of a stable routine (keep schedule, therapists, nurses, and other aspects of care as consistent as possible and give advance warnings regarding anticipated changes to the team or schedule), (3) provide regular positive feedback and affirm all efforts to participate actively in goal setting and review of progress during therapies and training, (4) gradually expose patients to feared situations and prevent their escape from those situations when possible, (5) stay with patients and maintain a calm demeanor during episodes of high anxiety, (6) encouraging patients to actively engage in decision-making where possible such as determining the schedule for administering psychotropic medications and/or deciding between psychotropic vs. psychological approaches to anxiety management, (7) provide conditions for “errorless learning” to enhance confidence, (8) provide community outings prior to discharge to ease discharge anxiety, and (9) provide patients with extra support around transitions such as discharge from inpatient rehabilitation to manage perceived risks and uncertainties that may seem overwhelming (e.g., make sure follow-up appointments are made and occur soon after discharge, provide “warm hand-offs” and co-treatment if possible between inpatient and future outpatient therapists when possible, give patients a way to contact staff who can answer questions or provide referrals for urgent concerns between discharge and initiation of outpatient care).

#### **2.4 Treat GAD, PD, or other clinically significant anxiety by using pharmacological and/or nonpharmacological interventions based on salient clinical considerations and patient preferences.**

**Rationale:** There is minimal evidence of the effectiveness of pharmacological or nonpharmacological treatments for GAD or PD in SCI. For treatment of GAD

and PD in the non-SCI population, the effectiveness of serotonergic antidepressants and cognitive behavioral therapy (CBT) are roughly equivalent.<sup>73</sup> Therefore, treatment decisions should be based on patient preferences, polypharmacy, medication interactions and potential side effects, and availability from specialized mental health providers.

##### **2.4.1 Consider pharmacological treatment for anxiety, if indicated.**

**Rationale:** There is no evidence for the efficacy of pharmacotherapy for treating anxiety, including GAD or PD, in individuals with SCI. Therefore, we base this recommendation on evidence from other patient populations. For GAD, selective serotonin reuptake inhibitors (SSRIs) and serotonin-norepinephrine reuptake inhibitors (SNRIs) are considered first-line treatments.<sup>73</sup> They are judged to have better combined safety and efficacy compared with alternatives such as tricyclic antidepressants and benzodiazepines. The efficacy of different SSRIs and SNRIs is similar.<sup>73</sup> Thus, medication choice is based on anticipated side effects, interactions with other medications, and patient treatment history or preferences. Therapeutic dosages of these medications for treating anxiety are similar to those for treating depression. Clinical improvement is expected within 4 weeks on average, but may range from 2 to 6 weeks. There is a case-report indicating that serotonergic agents may exacerbate spasticity.<sup>74</sup> In that case, buspirone (for GAD) and pregabalin are considered second-line treatments and are sometimes used to augment treatment when patients have partially responded to maximum dosages of SSRIs or SNRIs.<sup>73</sup> Benzodiazepines to simultaneously treat spasticity and anxiety have fallen out of favor because of the potential for the development of tolerance, dependence and other side effects, and because of the demonstrated effectiveness of other modalities such as baclofen.<sup>75</sup> As a result, use of benzodiazepines should be reserved for short-term relief of acute severe anxiety or panic. Beta-blockers and antihistamines have been used for anxiety in other populations, but data do not exist for their use in SCI and potential cardiovascular and anticholinergic side effects, respectively, make their use in SCI problematic.

For PD, SSRIs are considered the first-line medical treatment.<sup>76</sup> Other medications such as SNRIs, tricyclic antidepressants, monoamine oxidase inhibitors, and benzodiazepines have evidence of efficacy, but are less

preferred because of the strength of evidence, side-effect profiles, and abuse potential.<sup>76</sup> Chronic use of benzodiazepines is associated with poorer response to CBT and sustained PRN benzodiazepine use is associated with poorer outcomes generally.<sup>76</sup> Prescribers should note the dangers of combining benzodiazepines and opioids and the anticholinergic and sedating effects of tricyclic antidepressants when considering the use of either class of drug for anxiety.<sup>76</sup> A check on EKG for QTc prolongation due to frequent polypharmacy before selecting treatment including serotonergic agents should be considered, particularly with citalopram or concurrent use of other medications with pro-arrhythmic risk, such as prochlorperazine or methadone. Serotonin syndrome and the possibility of increased spasms and agitation are risks for polypharmacy as well, particularly when combined with indirectly or directly acting sympathomimetic agents.<sup>77</sup>

##### **2.4.2 Consider nonpharmacological treatment for anxiety.**

**Rationale:** There is very low-quality evidence that CBT improves symptoms of anxiety in individuals with SCI either directly or indirectly through treatment directed at reducing the impact of chronic pain.<sup>78,79</sup> There is also very low-quality evidence that physical activity improves anxiety in individuals with SCI.<sup>80</sup> However, there are no studies of SCI treated GAD or PD specifically. Drawing from the broader mental health literature, robust evidence shows that CBT is effective in the treatment of GAD<sup>81</sup> and PD<sup>76</sup>, suggesting that this should be considered a first-line treatment option for patients who are receptive to it and where trained mental health providers are available. For individuals with PD, CBT has the advantage of reducing their risk of relapse compared with individuals treated with medications alone. Outcomes for psychodynamic, supportive, and behavioral therapies for the treatment of GAD are less robust.<sup>73</sup> Clinicians should consider using adapted relaxation skills training, depending on the individual’s ability to breathe independently and the level of motor functioning and sensation. Clinicians should also be alert to the possibility of anxiety symptoms leading to avoidance of engagement in social activities and activities outside the home, which could further lead to depression and other negative outcomes. Graded exposure to social and activity situations hierarchically ordered in terms of anxiety symptoms they provoke, can be incorporated into the therapy treatment plan. Modalities like yoga, Taiichi,

massage therapy and meditation may be helpful and are currently being offered in the VHA.

### **3. MAJOR DEPRESSIVE DISORDER (MDD)**

#### **Background**

Feelings of sadness and depression are normal reactions to stress and loss. However, when these and associated psychological (e.g., anhedonia, guilt, suicidal ideation), cognitive (e.g., poor concentration), and physical (e.g., insomnia, low energy, anorexia) symptoms become severe, prolonged, and impair daily functioning, treatment for a clinically significant depressive disorder is indicated. See Table 7 for DSM-5 criteria for MDD. Data from 21 studies show there is high-quality evidence that the prevalence of depression is 22% globally in individuals with SCI and approximately 28% in U.S. veterans with SCI.<sup>82</sup>

There is high quality evidence that pain and depression are associated in SCI.<sup>83</sup> Moderate-quality evidence indicates that risk factors for depression in individuals with SCI include female gender<sup>40,61,84,85</sup> and current unemployment or unemployment at injury.<sup>84-87</sup> Moderate-quality evidence also suggests that protective factors include increased involvement with life, both socially<sup>88,89</sup> and physically,<sup>90</sup> and greater time since injury.<sup>61,91,92</sup> Other risk factors for depression or increased depression severity include a history of mental illness or substance abuse, current mental illness other than depression, and current abuse of alcohol or illegal substances.<sup>88,93-96</sup> One implication of these risk factor studies is that depression often precedes SCI and therefore can be conceptualized and treated as a recurrent mental health condition rather than simply a reaction to SCI.

General prevalence estimates obscure the fact that there are clinically distinct depression subgroup trajectories within the SCI population. Research suggests 3 to 4 trajectory groups: stable low depression, depression improvement, and delayed depression and chronic high depression.<sup>42,97</sup> These groups can be identified through repeated screening and can be predicted by individual differences in cognitive appraisals about disability, ways of coping, preinjury mental health history, and grief.<sup>42,97</sup>

In addition to the direct suffering caused, depression is associated with multiple poor health outcomes

in SCI. A systematic review<sup>83</sup> and studies published since<sup>89,98,99,100-102,91</sup> provide high-quality evidence that depression and pain are positively associated in the SCI population and that the relationship may be bidirectional. In addition, low-quality evidence suggests that depression is a risk factor for comorbid cardiovascular disease, pressure injuries, urinary tract infections, rehospitalization,<sup>103</sup> and unemployment.<sup>103-105</sup> Very low-quality evidence indicates that depression predicts other health outcomes, participation, and quality of life.<sup>106-107</sup>

**See Table 7. On Opposite Page and continued on Following Page**

**3.1 Screen all individuals with SCI for major depression by using a brief, valid measure that has good sensitivity and specificity: (a) early during the initial inpatient hospital or rehabilitation stay; (b) as a repeat screen if indicated to assess persistence of symptoms or change in status; (c) at the first discharge follow-up point; and (d) at least annually or more frequently, depending on risk stratification factors such as prior positive screening results and chronic pain.**

**Rationale:** Studies in SCI populations have demonstrated that depression screening instruments can be reliably and validly administered via self-report or face-to-face interview. Early depression screening is recommended because it helps predict risk for depression 1-2 years after injury.<sup>42,97</sup> The 9-item Patient Health Questionnaire-9 (PHQ-9), Center for Epidemiologic Studies Depression Scale, and Older Adult Health and Mood Questionnaire have been studied most extensively in SCI (see Table 8).<sup>108,109</sup> The SCI-QOL Depression item bank (28 items) is a new measure that was developed specifically for SCI by using the PROMIS metric.<sup>110</sup> This measure is unidimensional and has excellent internal consistency (0.95), good 1- to 2-week test-retest reliability (0.83), and adequate or better model fit statistics. A computer adaptive test assessment format is available, as well as a 10-item short form. The SCI-QOL Depression item bank has a correlation of 0.76 with the PHQ-9 and yields greater precision of measurements across scores. Thus far, the SCI-QOL has not been validated against a structured diagnostic interview. The Hospital Depression and Anxiety Scale is used throughout the world but lacks validity data in SCI.

Among the instruments currently available in the public domain, the PHQ-9 is the best-performing measure when tested against an independent DSM diagnosis of MDD in individuals with SCI (see Table 8). The PHQ-9 also has the advantage of widespread clinical use in primary care and other medical settings, ease of use, strong psychometric properties for both screening and treatment monitoring, and items that correspond to those of the DSM-5 criteria for MDD.<sup>111,112</sup> Research that uses differential item functioning has shown that somatic symptoms such as insomnia, low energy, and anorexia are not inflated in SCI and should not be discounted when screening for and diagnosing depression, as long as at least one of the cardinal symptoms—depressed mood or anhedonia—is endorsed.<sup>113</sup> For greater efficiency, the 2-item Patient Health Questionnaire (PHQ-2) can be used as an initial screen. If neither anhedonia nor depressed mood are endorsed, screening can be discontinued, and if either are endorsed at any level, screening should continue with the remaining PHQ-9 items. PHQ item 9 can be added to cover screening for suicidal ideation. The optimal cutoff for detecting major depression with the PHQ-9 during inpatient rehabilitation is 11 or higher, resulting in 100% sensitivity and 84% specificity.<sup>111</sup> The specificity of the screening process can be improved if the screener ensures at least one of the cardinal symptoms is endorsed.

**See Table 8. On Following Page**

**3.2 Refer patients with positive screen results or those suspected of having a depressive disorder to a mental health provider for a diagnostic assessment.**

**Rationale:** Optimally, mental health providers (social workers, psychologists, psychiatrists) will practice within the rehabilitation setting to ensure appropriate continuation of care after discharge. Studies have shown that only a minority of individuals with SCI and depression receive adequate treatment.<sup>13,14</sup> For example, Fann et al.<sup>13,14</sup> found that only 29% of depressed individuals with SCI received any pharmacotherapy for depression and only 11% received any psychotherapy, with rates of guideline level care at 11% and 6%, respectively. Integrating mental health care into standard medical care (e.g., by implementing a collaborative care model) has been shown to improve outcomes in primary care,<sup>47</sup> other chronic diseases,<sup>117,118</sup> and SCI care.<sup>48</sup>

**Table 7. DSM-5 Major Depressive Disorder Diagnostic Criteria<sup>4</sup>**

A. Five (or more) of the following symptoms have been present during the same 2-week period and represent a change from previous functioning; at least one of the symptoms is either (1) depressed mood or (2) loss of interest or pleasure. Note: Do not include symptoms that are clearly attributable to another medical condition.
1. Depressed mood most of the day, nearly every day, as indicated by either subjective report (e.g., feels sad, empty, hopeless) or observation made by others (e.g., appears tearful). (Note: In children and adolescents, can be irritable mood.)
2. Markedly diminished interest or pleasure in all, or almost all, activities most of the day, nearly every day (as indicated by either subjective account or observation).
3. Significant weight loss when not dieting or weight gain (e.g., a change of more than 5% of body weight in a month) or decrease or increase in appetite nearly every day. (Note: In children, consider failure to make expected weight gain.)
4. Insomnia or hypersomnia nearly every day.
5. Psychomotor agitation or retardation nearly every day (observable by others, not merely subjective feelings of restlessness or being slowed down).
6. Fatigue or loss of energy nearly every day.
7. Feelings of worthlessness or excessive or inappropriate guilt (which may be delusional) nearly every day (not merely self-reproach or guilt about being sick).
8. Diminished ability to think or concentrate, or indecisiveness, nearly every day (either by subjective account or as observed by others).
9. Recurrent thoughts of death (not just fear of dying), recurrent suicidal ideation without a specific plan, or a suicide attempt or a specific plan for committing suicide.
B. The symptoms cause clinically significant distress or impairment in social, occupational, or other important areas of functioning.
C. The episode is not attributable to the physiological effects of a substance or another medical condition.
<b>Note:</b> Criteria A–C represent a major depressive episode.
<b>Note:</b> Responses to a significant loss (e.g., bereavement, financial ruin, losses from a natural disaster, a serious medical illness or disability) may include the feelings of intense sadness, rumination about the loss, insomnia, poor appetite, and weight loss noted in Criterion A, which may resemble a depressive episode. Although such symptoms may be understandable or considered appropriate to the loss, the presence of a major depressive episode in addition to the normal response to a significant loss should also be carefully considered. This decision inevitably requires the exercise of clinical judgment based on the individual’s history and the cultural norms for the expression of distress in the context of loss.



In distinguishing grief from a major depressive episode (MDE), it is useful to consider that in grief the predominant affect is feelings of emptiness and loss, while in an MDE it is persistent depressed mood and the inability to anticipate happiness or pleasure. The dysphoria in grief is likely to decrease in intensity over days to weeks and occurs in waves, the so-called pangs of grief. These waves tend to be associated with thoughts or reminders of the deceased. The depressed mood of an MDE is more persistent and not tied to specific thoughts or preoccupations. The pain of grief may be accompanied by positive emotions and humor that are uncharacteristic of the pervasive unhappiness and misery characteristic of an MDE. The thought content associated with grief generally features a preoccupation with thoughts and memories of the deceased, rather than the self-critical or pessimistic ruminations seen in an MDE. In grief, self-esteem is generally preserved, whereas in an MDE feelings of worthlessness and self-loathing are common. If self-derogatory ideation is present in grief, it typically involves perceived failings vis-à-vis the deceased (e.g., not visiting frequently enough, not telling the deceased how much he or she was loved). If a bereaved individual thinks about death and dying, such thoughts are generally focused on the deceased and possibly about “joining” the deceased, whereas in an MDE such thoughts are focused on ending one’s own life because of feeling worthless, undeserving of life, or unable to cope with the pain of depression.

D. The occurrence of the major depressive episode is not better explained by schizoaffective disorder, schizophrenia, schizophreniform disorder, delusional disorder, or other specified and unspecified schizophrenia spectrum and other psychotic disorders.

E. There has never been a manic episode or a hypomanic episode.

**Table 8. Validity of Depression Screeners Compared with Major Depression Diagnosis**

Study	Screening Measure	Cut Point	Criterion Measure	Sensitivity %	Specificity %	PPV	NPV	Prevalence %	N
Radnitz et al., 1996 <sup>114</sup>	BDI	≥18	SCID DSM-III-R	83.3	90.8	50.0*	98.1*	9.7	124
Tate et al., 1993 <sup>115</sup>	Zung SDS	≥55	DSM-III-R	86.0	67.0	42.9*	93.8*	23	30
Bombardier et al., 2012 <sup>111</sup>	PHQ-9	≥10	SCID DSM-IV	100	80	36.0	100	10	142
Bombardier et al., 2012 <sup>111</sup>	PHQ-9	≥11	SCID DSM-IV	100	84	40.0	100	10	142
Krause et al., 2009 <sup>116</sup>	OAHMQ	≥11	PHQ-9	89.7	88.8	48.4*	98.6	10.7	727

Abbreviations: PPV, positive predictive value; NPV, negative predictive value; BDI, Beck Depression Inventory; SCID DSM-III-R, Structured Clinical Interview for the Diagnostic and Statistical Manual of Mental Disorders, 3rd edition, revised; SCID DSM-IV, Structured Clinical Interview for the Diagnostic and Statistical Manual of Mental Disorders, 4th edition; Zung SDS, Zung Self-Rating Depression Scale; PHQ-9, 9-item Patient Health Questionnaire-9; OAHMQ, Older Adult Health and Mood Questionnaire.

\*Oregon Health & Science University calculations.

**3.3 Follow up on positive screening test results by using a valid diagnostic assessment to confirm conditions such as MDD or adjustment disorder (including sufficient persistence of symptoms and interference with rehabilitation or role functioning) and rule out the possibility that the symptoms are better explained by the effects of the medical condition, medications, drugs, the environment, or other factors.**

**Rationale:** Depression screening with measures such as the PHQ-9 may over-diagnose MDD (i.e., false positives) and therefore require diagnostic interviews and/or reassessment after a short period to ensure the person meets diagnostic criteria. Depressive symptoms may arise in a number of contexts, ranging from stressful situations that may be transient (e.g., transitions in care, anniversaries of the injury, financial or housing difficulty) to chronic stressors such as physical disability, chronic medical illness barriers to participation in meaningful or enjoyable activities. Other contributing factors may include medication side effects, delirium, alcohol or drug use, or a comorbid mental health condition (e.g., bipolar disorder, dementia, schizophrenia). Because of this wide range of etiologies and contributors, a thorough history and diagnostic assessment is essential before deciding on a course of action. The differential diagnosis may include grief related to exposure to losses, demoralization, adjustment disorder, MDD, depression secondary to a medical condition (e.g., traumatic brain injury [TBI], pain, hypothyroidism), and delirium (e.g., due to alcohol withdrawal, corticosteroids). In some cases, somatic symptoms of depression may be better explained by the physical or medical effects of SCI. For example, early morning awakening and fatigue that is worst in the morning are more suggestive of depression, while middle insomnia (associated with turns) and fatigue later in the day may be related to SCI. Weight loss with a normal appetite suggests a medical condition. An important consideration when assessing the significance of depressive symptoms is whether they are impairing the individual’s functioning. When a biological or psychosocial cause or contributor to the symptoms can be identified, it should be addressed.

The use of DSM-5 diagnostic criteria is recommended to guide diagnosis and facilitate shared decision making. Although the presence of MDD typically warrants pharmacological and/or nonpharmacological treatment,

adjustment disorder may remit spontaneously or with psychosocial support. However, anyone identified with depressive symptoms (e.g., PHQ-9 score > 5) should be followed to monitor symptom trajectory and determine appropriate management, as adjustment disorders or minor depression can still impair functioning and may evolve into an MDD.

**3.4 Support patients with major depression with nonspecific and depression-specific relationship skills, used by all health care professionals (physicians, nurses, therapists, psychologists, social workers, and others) who work with them.**

**Rationale:** Because of the multiple medical and psychosocial issues faced by individuals with medical comorbidity and the complexity (and often fragmentation) of the current health care system, team-based delivery of evidence-based treatment has emerged as a cost-effective approach to depression care.<sup>119</sup> A recent study showed that the collaborative care model, a team-based approach to the management of chronic conditions centered around a care manager who is a core member of the medical team, is effective in managing symptoms of depression and pain among individuals with SCI.<sup>48</sup> This approach is particularly compelling, given the preference of many individuals with SCI and depression to be treated within the rehabilitation or primary care setting as opposed to a mental health setting or via telephone.<sup>18</sup>

The Christopher Reeve Foundation has excellent information for members of the team, patients, and their families on understanding depression with SCI (<https://www.christopherreeve.org/living-with-paralysis/health/depression>). A key point is that team members can contribute to depression if they believe that individuals with SCI will have a low quality of life. Research shows that individuals with SCI have a much higher quality of life than health care providers anticipate.<sup>120</sup>

Specific strategies that all team members can use to inspire hope include setting small, easily achievable goals to promote self-efficacy and hope,<sup>121</sup> engineering high success rates, providing access to activities that the individual finds to be meaningful or pleasant outside of therapies,<sup>122</sup> promoting ongoing access to meaningful relationships, focusing on a future with meaning and purpose, and promoting a sense of “the possible,” as well as hope for the moment.<sup>123</sup>

When team members note depressive symptoms in individuals with SCI that have not been diagnosed, they should encourage and initiate referrals for treatment and tell these individuals and their families that medication and therapy, even for short periods, have been shown to be very effective.<sup>124</sup> Evidence-based strategies for promoting family integrity when there is a new disability include maintaining meaningful family traditions during rehabilitation, facilitating open communication among family members, promoting a tone of togetherness, and relieving guilt. Implementing these strategies as a cluster may also promote hope for the moment.

An SCI may be transformative for patients and their families. In health psychology research, positive change and transcendence from challenging life experiences and disability are referred to as posttraumatic growth, benefit finding, stress-related growth, and thriving, all of which have been found to be correlated with a high quality of life.<sup>125</sup> Assisting individuals with SCI and their families to experience transformation may also be transformative for the team.<sup>124</sup>

### 3.5 Treat major depression by using pharmacological and/or nonpharmacological approaches on the basis of clinical presentation (e.g., comorbid conditions), treatment efficacy, and patient preferences.

**Rationale:** Research in the mental health treatment literature shows that combined medical and psychotherapeutic treatment is more effective than either treatment alone.<sup>126,127</sup> Therefore, for individuals with SCI, clinicians should offer combined medical and psychosocial treatment for major depression whenever possible. Otherwise, treatment recommendations can be based on other factors such as patient preferences because the efficacy of antidepressant medications and psychotherapy for depression are similar.<sup>128</sup> A treatment preference study found that 78% to 80% of individuals with SCI and depression were very or somewhat likely to use antidepressants or individual counseling, whereas significantly fewer (48%) were willing to use group counseling.<sup>18</sup> Individuals with SCI tend to prefer being treated for depression in rehabilitation or other medical settings rather than being referred to specialized mental health providers. Some guidelines recommend psychotherapy over medications for mild depression.<sup>129</sup> Aggressively treating comorbid conditions that may exacerbate depression, such as using pregabalin for chronic neuropathic pain and treating

hypothyroidism or obstructive sleep apnea, may also improve depression.<sup>130</sup>

#### 3.5.1 Consider pharmacological treatments for major depression.

**Rationale:** One good-quality, randomized, double-blind, placebo-controlled trial conducted in individuals with SCI found that venlafaxine extended release (mean dose 186 mg per day), an SNRI, was effective in treating core symptoms of MDD (depressed mood, anhedonia, guilt, psychomotor agitation, psychomotor retardation, and psychic anxiety) diagnosed an average of 11 years following SCI.<sup>131</sup> Venlafaxine extended release was also found to significantly decrease nociceptive pain and did not increase spasticity.

Because of the paucity of RCTs that use other antidepressants, evidence-based treatment algorithms cannot be developed. However, from knowledge gained from nonrandomized studies in SCI populations<sup>132</sup> and practice guidelines and meta-analyses from other populations,<sup>133-135</sup> some general recommendations regarding pharmacotherapy can be made, including the following:

- In general, SSRIs and SNRIs are likely the best-tolerated antidepressant classes. However, fluoxetine, an SSRI with a long half-life, should be used with caution because of case study data showing increased risk of spasticity in individuals with SCI.<sup>74</sup> From studies in non-SCI populations, the efficacies of SSRIs and SNRIs are similar.<sup>73</sup> Thus, medication choice is based on anticipated side effects, interactions with other medications, and patient treatment history or preferences.
- As with treatment of anxiety, a check on EKG for QTc prolongation due to frequent polypharmacy before selecting treatment including serotonergic agents should be considered, particularly with citalopram or concurrent use of other medications with pro-arrhythmic risk, such as prochlorperazine or methadone. Serotonin syndrome and the possibility of increased spasms and agitation are risks for polypharmacy as well, particularly when combined with indirectly or directly acting sympathomimetic agents.
- Tricyclic antidepressants can cause drowsiness and should be used with caution because of the risk of anticholinergic side effects that may exacerbate common SCI-related symptoms (e.g., hypotension, constipation, urinary retention).
- Other antidepressant options such as bupropion,

mirtazapine, vortioxetine, and vilazodone have not been systematically studied in SCI populations.

- Antidepressant dosages should be started at about half the typical starting dose, and dose titration should occur at about half the rate of that typically used in non-medically ill populations.
- Target doses and duration at that dose (i.e., 6 to 8 weeks) required to achieve full therapeutic effect are similar to the non-SCI population.
- Monitoring of depressive symptoms and medication tolerability and efficacy should be performed at least at Health Effectiveness Data Information Set (HEDIS) guideline levels<sup>136</sup> and likely more frequently because of the increased potential for adverse effects in medically complex patients.<sup>137</sup>
- Depression that is treatment resistant may require<sup>138,139</sup>
  1. Reconsideration of the diagnosis
  2. Switching to another antidepressant if there is no improvement
  3. Pharmacological or nonpharmacological (e.g., with psychotherapy) augmentation of the antidepressant
  4. Electroconvulsive therapy or repetitive transcranial magnetic stimulation

#### 3.5.2 Consider nonpharmacological treatments for major depression.

**Rationale:** On the basis of 3 systematic reviews,<sup>79,140,141</sup> low-quality evidence shows that 6 to 16 sessions of CBT (including coping effectiveness training) improves depression over 6 weeks to 6 months in individuals with SCI. The effect sizes of studies that used individual CBT were much larger than in those that used group CBT. There is very low-quality evidence that an automated, interactive voice response system improved depression at 6 months in a community setting<sup>142-144</sup> and no evidence that telephone counseling improved depression.<sup>145</sup> In addition, very low-quality evidence suggested that physical activity improved depression.<sup>146-151</sup>

Given that relatively little research is available on the efficacy of psychosocial treatments for depression in individuals with SCI, we recommend offering such individuals CBT or interpersonal therapy based on their preferences and the available treatment expertise.<sup>152</sup> In addition, a structured physical exercise program (3 times per week consisting of progressive resistance training and aerobic training) may be considered as an adjunct to other therapies.<sup>129</sup>

## 4. SUBSTANCE USE DISORDERS

### Background

Alcohol and other SUDs are included in this CPG because these conditions are prevalent and associated with poor outcomes in individuals with SCI (see Table 9 for generic diagnostic criteria). Fourteen percent of individuals with SCI report significant alcohol-related problems and 19.3% report heavy drinking.<sup>153</sup> Among U.S. veterans, approximately 9% were diagnosed with alcohol-related SUD and 8% had an SUD due to use of illegal drugs.<sup>40</sup> Among civilians, the prevalence estimated for other drug use varied widely, from 0% to 14%.<sup>154</sup> An estimated 35.3% of individuals with SCI smoke tobacco.<sup>155</sup> Large studies of U.S. veterans<sup>156</sup> and Canadians<sup>157</sup> with SCI found that 55% to 79% were prescribed opioids, and low-quality evidence shows that risk of opioid misuse is higher in individuals with SCI than in those without.<sup>158</sup> It is estimated that 35.2% of individuals with SCI use opioids daily<sup>159</sup> and that 17.6% to 25.8% self-report significant misuse of pain medications.<sup>160,161</sup>

Risk factors for SUD include having paraplegia versus tetraplegia, chronic pain, and low income.<sup>40,141, 162-163</sup>

High-quality evidence shows that being at least 65 years old, Latino, and married, as well as having a duration of injury of at least 10 years, are protective against SUD.<sup>40,141,162-163</sup> Moderate-quality evidence shows that being older at injury and having higher satisfaction with life, lower education, and employment predicts less alcohol abuse or heavy drinking and that higher satisfaction with life is protective against use of illegal substances.<sup>40,141,162-163</sup>

Low-quality evidence suggests that alcohol abuse is associated with increased pain and fatigue, poor sleep, lower life satisfaction, and lower likelihood of gainful employment.<sup>107,141</sup> Moderate-quality evidence shows that illicit drug use or prescription drug misuse is associated with developing pressure injuries.<sup>164</sup> Low-quality evidence also links the use of illegal drugs to pain and lower satisfaction with life.<sup>103,141</sup> Tobacco use is associated with poor health and increased mortality in SCI.<sup>165,166</sup> Nicotine (2 mg) increases neuropathic pain severity in smokers compared with those receiving a placebo.<sup>167</sup> Opioid use is associated with increased risk of upper and lower extremity fractures.<sup>168,169</sup> Ominously, 2 studies have found that prescription pain medication use was associated with higher mortality rates in individuals with SCI.<sup>34,161</sup>



**Table 9. DSM-5 Substance Use Disorder Diagnostic Criteria (generic)<sup>4</sup>**

A problematic pattern of substance use leading to clinically significant impairment or distress is manifested by two or more of the following within a 12-month period:

1. Substance often taken in larger amounts or over a longer period than was intended.
2. A persistent desire or unsuccessful efforts to cut down or control use of substance.
3. A great deal of time is spent in activities necessary to obtain, use, or recover from the substance's effects.
4. Craving or a strong desire or urge to use the substance.
5. Recurrent substance use resulting in a failure to fulfill major role obligations at work, school, or home.
6. Continued substance use despite having persistent or recurrent social or interpersonal problems caused or exacerbated by its effects.
7. Important social, occupational, or recreational activities are given up or reduced because of use.
8. Recurrent substance use in situations in which it is physically hazardous.
9. Continued substance use despite knowledge of having a persistent or recurrent physical or psychological problem that is likely to have been caused or exacerbated by the substance.
10. Tolerance.
  - A. A need for markedly increased amounts of substance to achieve intoxication or desired effect.
  - B. A markedly diminished effect with continued use of the same amount of a substance.

**Note:** This criterion is not considered to be met for those taking substances solely under appropriate medical supervision.

DSM5 severity specifiers: Mild – Two to three criteria met; Moderate – Four to five criteria met; Severe – Six or more criteria met

**4.1 Screen all patients for common SUDs: (a) Before discharge from inpatient rehabilitation, use a brief, valid measure that has good sensitivity to screen for lifetime use of and problems with alcohol, other (illicit) drugs, tobacco, marijuana, and nonmedical use of prescription medications; and (b) depending on initial screening results and other risk factors, rescreen patients for recent substance use in outpatient rehabilitation or primary care.**

**Rationale:** The CAGE screen<sup>95,164,170</sup> and the Alcohol Use Disorders Identification Test-Consumption<sup>103,160</sup> have been used in multiple alcohol misuse screening studies. However, substance use screening measures have not been tested for diagnostic validity in individuals with SCI. Therefore, screening recommendations are based on research in other medical populations.

**Table 10. Clinical Utility of Substance Use Disorder Screeners Compared with Diagnostic Assessment**

Study	Screening Measure	Cut Point	Sensitivity %	Specificity %	PPV	NPV	Prevalence %	N
Smith et al., 2009 <sup>171</sup>	Single-question alcohol screening test	≥1	0.82	0.79			11.5	286
Smith et al., 2010 <sup>172</sup>	Single-question screening test for drug use and drug use disorders (illicit and nonmedical use of prescription drugs)	≥1	1.00	0.74			11.9	286
Brown and Rounds, 1995 <sup>174</sup>	CAGE-AID	≥1 ≥2	0.79, 0.77	0.77, 0.85				
Brown et al., 2001 <sup>175</sup>	TICS		0.79	0.78			23	434, 702
Bradley et al., 2007 <sup>176</sup>	AUDIT-C for men and women		0.86, 0.73	0.89, 0.91				
Gryczynski et al., 2017 <sup>176</sup>	TAPS		0.80, 0.85, 0.91, 0.85	0.92, 0.71, 0.89, 0.93	0.60, 0.44, 0.25, 0.49	0.97, 0.95, 1.0, 0.99	25, 14, 4, 17	1,995- 2,000

*Abbreviations: PPV, positive predictive value; NPV, negative predictive value; CAGE-AID, CAGE Adapted to Include Drugs; TICS, Two-Item Conjoint Screening test; AUDIT-C, Alcohol Use Disorders Identification Test-Consumption; TAPS, Tobacco, Alcohol, Prescription Medication, and Other Substance use.*

Several single-item screens for harmful alcohol use have been developed. One valid measure asks, “How many times in the past year have you had X or more drinks in a day?” where X = 5 for men and 4 for women.<sup>171</sup> Individuals who give an answer that is greater than 0 or respond that they are not sure are considered a positive screen. The test is 82% sensitive and 79% specific for unhealthy alcohol use. Valid single-item drug abuse questions also exist, including one that asks, “How many times in the past year have you used an illegal drug or used a prescription medication for non-medical reasons?”<sup>172</sup> At a cutoff of greater than 0, this measure is 100% sensitive and 74% specific for detection of a drug use disorder. One relatively new measure called the Tobacco, Alcohol, Prescription Medication, and Other Substance use

covers 4 key drug classes with just 4 questions.<sup>173</sup> Information on valid brief screening measures is included in **Table 10. See Above**

**4.2 Refer patients with positive screen results or those suspected of having a SUD to a mental health provider for a diagnostic assessment of SUD criteria.**

**Rationale:** Individuals who screen positive for SUD should undergo a more comprehensive assessment. Standard elements of SUD assessment include determining the type, frequency, and amount of substance use (including route of administration); DSM-5 diagnosis of SUD severity and readiness to change substance use; comorbid psychiatric conditions and relevant medical conditions; and barriers and

facilitators to reducing substance use.<sup>177</sup> An exception to the recommendation is for persons who obtain screening results indicating risky alcohol use without other signs of alcohol use disorder e.g., AUDIT-C >3 and <8. For these individuals, brief education on risks of alcohol use tailored to the individual along with recommendations to decrease alcohol to within recommended limits or to abstain are effective.<sup>178</sup>

#### **4.3 Support patients with SUD with nonspecific and SUD-specific relationship skills, used by all health care professionals (physicians, nurses, therapists, psychologists, social workers, and others) who work with them.**

**Rationale:** Individuals with SUDs can be stigmatized by unscientific beliefs about the cause, course, and treatment of these conditions. Educate the team that SUDs are often chronic, relapsing biopsychosocial conditions that require episodic or continuous care, similar that required for other chronic diseases such as diabetes.<sup>179</sup> Conceptualize readiness to change SUD in non-moralistic terms, for example, by using the transtheoretical stages of change model (precontemplation, contemplation, determination, action, maintenance, relapse).<sup>180</sup> Reframe relapse as a normal phase in the overall change process and encourage an empathic, nonjudgmental approach to outreach and reengagement in treatment.<sup>179</sup> Familiarize rehabilitation staff with common evidence-based psychological and pharmacological treatments for SUDs. Engage staff in educating patients about the adverse health effects of substances, particularly the specific risks of substances in SCI and potential interactions with prescribed medications. Staff can focus on socially reinforcing all abstinence, moderation, and harm reduction efforts, as well as any other positive substance use-related changes made by patients.

#### **4.4 Treat SUDs, within rehabilitation to the extent possible, by using pharmacological, nonpharmacological, and community-based approaches on the basis of clinical presentation (e.g., comorbid conditions), length of stay, treatment efficacy, and patient preferences.**

**Rationale:** SUD treatment involves a spectrum of medical and psychosocial services: screening and referral; early intervention; and outpatient services, intensive outpatient services, inpatient services, and

residential services.<sup>178</sup> However, only about 1 in 10 individuals with SUD will attend specialized addiction treatment programs.<sup>181</sup> Therefore, almost 3 decades ago, the Institute of Medicine called for nonspecialists to deliver briefer, less intensive addiction treatment in settings where individuals with substance use problems are found.<sup>182</sup> Treatment delivered in nonspecialist settings can be effective, especially for less severe SUDs. For example, meta-analyses show that brief interventions reduce risky drinking and number of drinks per week in primary care settings.<sup>183,184</sup> Brief substance abuse treatment integrated within acute medical/surgical trauma programs also can be effective, especially for individuals with mild-to-moderate SUD severity.<sup>185</sup> Brief interventions can function as the initial phase in a stepped-care approach and increase an individual's readiness for formal treatment.<sup>186</sup>

Not only are substance abuse problems prevalent within rehabilitation settings, but trauma rehabilitation can also represent a window of opportunity within which individuals with SUDs are more open to change and receptive to treatment.<sup>33,187,188</sup> Rehabilitation physicians and psychologists are highly concerned about SUDs in their patients and are increasingly prepared to identify and treat individuals with comorbid SUD.<sup>189,190</sup> The American College of Surgeons Committee on Trauma already recommends universal SUD Screening, Brief Intervention, and Referral to Treatment (SBIRT) in trauma services.<sup>16</sup> Medically assisted treatment and psychosocial interventions can be delivered within rehabilitation settings. Therefore, we recommend that SUD screening, assessment, and first-line interventions be integrated within SCI rehabilitation programs.

#### **4.5 Use medication-assisted treatment (MAT) for SUDs, including opioid use disorders and alcohol use disorders, when indicated.**

**Rationale:** No literature is available on the efficacy of using MATs for SUDs in individuals with SCI. Therefore, we rely on evidence-based practices in other populations. MATs are used especially for tobacco, alcohol, and opioid use disorders. Numerous CPGs are available online that cover the rationale and implementation of MATs for these disorders. Excellent examples of guidelines include the VA's Primary Care & Tobacco Cessation Handbook<sup>191</sup> and the VA/DoD Clinical Practice Guideline for the Management of Substance Use Disorders.<sup>178</sup>

For individuals with tobacco use disorder, nicotine replacement therapies are Food and Drug Administration (FDA) approved and include the nicotine patch, gum, lozenge, oral inhaler, and nasal spray.<sup>178</sup> These therapies help reduce withdrawal symptoms such as anger and irritability but have little effect on craving. Combining a nicotine patch with another medication such as nicotine gum or lozenges or bupropion significantly increases abstinence rates over monotherapy. Bupropion (Zyban, Wellbutrin) is an FDA-approved dopamine-norepinephrine reuptake-blocking antidepressant that is effective for tobacco cessation. Varenicline (Chantix, Champix) is a nicotine partial agonist that reduces craving and withdrawal and facilitates smoking cessation (close monitoring is advised, as serious psychiatric symptoms such as increased depression [3% to 11%] and suicidal behavior/ideation [6% to 11%] have been reported).<sup>192,193</sup> SCI experts recommend combining medical and psychosocial treatments for smoking cessation, using telehealth to follow patients over time, and treating associated conditions such as depression to improve outcomes.<sup>194</sup>

The VA SUD guideline strongly recommends acamprosate, disulfiram, naltrexone, or topiramate for alcohol use disorder.<sup>178</sup> The applicability of these MATs in the context of SCI is to be determined by individual prescribers. Acamprosate works by increasing the GABA-ergic system and decreasing glutamate activity. Acamprosate reduces symptoms of prolonged withdrawal.<sup>195</sup> However, acamprosate increases the risk of death by suicide and should be used with caution.<sup>195</sup> Disulfiram works by increasing acetaldehyde levels when alcohol is consumed, resulting in a number of uncomfortable adverse effects including flushing, nausea, diaphoresis, palpitations, tachycardia, blurred vision, and hypotension.<sup>195</sup> Autonomic dysfunction may be a contraindication to the use of disulfiram after SCI. Naltrexone is an opioid antagonist that blocks endogenous opioids that are released when alcohol is ingested.<sup>195</sup> Naltrexone is available in daily pill form or monthly injectable form. Topiramate reduces craving for alcohol by increasing GABA receptor activity, acting as a glutamate receptor antagonist and inhibiting dopamine release.<sup>195</sup>

The VA SUD guideline recommends buprenorphine and methadone for treatment of opioid use disorder, while extended-release injectable naltrexone as well as

methadone and buprenorphine are recommended for maintenance phase treatment.<sup>178</sup> Pharmacotherapy is recommended over psychosocial treatments alone on the basis of existing evidence.

Methadone is an opioid agonist that prevents opioid withdrawal, reduces craving, and reduces the effects of illicit opioids.<sup>178</sup> Decades of work with methadone maintenance shows that it also improves social, vocational, and other health outcomes. Methadone can be administered, and dose adjusted for pain management during inpatient rehabilitation. Consider baseline electrocardiogram and physical examination for patients at risk for QT prolongation or arrhythmias.<sup>178</sup> However, methadone maintenance therapy for addiction is available only through federally regulated outpatient treatment programs. Therefore, careful coordination with methadone treatment programs is necessary to continue therapy and prevent relapse upon discharge from inpatient settings.

Buprenorphine is a partial opioid agonist and comes in the form of a monotherapy or in an agonist/antagonist form combined with naloxone.<sup>178</sup> Buprenorphine treatment is effective in specialty addiction settings, as well as in other clinical settings. It reduces withdrawal symptoms and cravings without producing euphoria or other dangerous side effects such as respiratory suppression. Physicians who complete 8 hours of specialized training can perform buprenorphine induction and maintenance therapy. Buprenorphine induction can occur during inpatient or outpatient rehabilitation, and patients receiving buprenorphine can be followed by providers who have office-based treatment programs.

Naltrexone, an opioid antagonist, is an effective treatment for opioid use disorder only in its long-acting injectable form.<sup>178</sup> Naltrexone acts by blocking the effects of opioids. Patients must be opioid free for 7-10 days when naltrexone is started because it is an opioid antagonist and may precipitate withdrawal.<sup>195</sup>

In addition to the VA/Department of Defense (DoD) guideline, updated guidelines for the use of medications to manage opioid stabilization and withdrawal, tapering, and maintenance are available through the Substance Abuse and Mental Health Services Administration (SAMHSA) website (<https://www.samhsa.gov/medication-assisted-treatment>). To



facilitate access to specialist programs and providers, SAMHSA provides an online methadone treatment program locator (<https://dpt2.samhsa.gov/treatment-directory.aspx>) and a website dedicated to locating physicians who are certified to provide buprenorphine treatment (<https://www.samhsa.gov/medication-assisted-treatment/physician-program-data/treatment-physician-locator>). Lastly, consistent with national Veterans Health Administration guidelines, overdose education and naloxone distribution should be provided for anyone who is prescribed opioids.<sup>196</sup>

#### 4.6 Consider nonpharmacological treatments for SUDs.

**Rationale:** SCI intervention research is limited to low-quality evidence that multimodal inpatient/outpatient treatment reduces self-reported alcohol and drug abuse in veterans with SCI.<sup>197</sup> Therefore, we rely on the general treatment literature to guide recommendations in this section. A complete review of the SUD treatment literature is beyond the scope of this CPG (see the VA/DoD guideline for a review of the psychosocial treatment literature).<sup>178</sup> Instead, we list examples of evidence-based treatment for SUDs that can be implemented within rehabilitation settings.

Moderate-quality evidence shows that brief interventions (1 to 5 sessions and less than 1 hour total time), typically consisting of feedback, information, advice, motivation enhancement, and development of a change plan, reduce alcohol consumption after 1 year in primary care and in patients in emergency departments who are hazardous and harmful drinkers.<sup>198</sup> One brief intervention, the SBIRT,<sup>199</sup> has numerous online educational modules and videos from which to learn the intervention. Motivational interviewing, often delivered within 1 to 4 sessions, is an evidence-based treatment with demonstrated efficacy across a range of SUDs.<sup>200</sup> CBT, contingency management, and relapse prevention are effective treatments across a wide range of SUDs.<sup>201,202</sup> Community Reinforcement Approach and Family Training (CRAFT) is a nonconfrontational, positive-reinforcement intervention delivered through concerned family members or friends to motivate individuals with SUDs to engage in addiction treatment. CRAFT is 2 to 3 times more effective than other approaches such as Al-Anon or the Johnson Institute Intervention in overcoming resistance to formal substance abuse treatment.<sup>203</sup> For tobacco cessation, interventions lasting 3 minutes or more can have

an effect.<sup>204</sup> Counseling lasting 4 to 30 minutes can double abstinence rates, while counseling lasting more than 30 minutes can triple abstinence rates. Step-by-step tobacco cessation counseling approaches are described in the VA Primary Care & Tobacco Cessation Handbook<sup>191</sup> and there is a companion patient workbook to go along with this program.<sup>205</sup>

With regard to opioid use disorder, there is little evidence that psychosocial interventions improve outcomes beyond the effects of MAT alone, although treatment dropout is high and keeping patients engaged is critical. The strongest evidence to date comes from a trial that combined MAT and CBT. Abstinence was significantly longer in prescription opioid-dependent patients who were randomized to primary care physician-managed MAT plus CBT than it was in those randomized to physician-managed MAT alone.<sup>206</sup> However, there was no abstinence effect of CBT for patients who were heroin dependent. One effectiveness trial showed that a collaborative care intervention consisting of buprenorphine/naloxone plus a 6-session motivation enhancement CBT program significantly improved access to treatment and 6-month abstinence from alcohol or opioids compared with usual primary care.<sup>207</sup> The CBT program for that study is available online from the Rand Corporation.<sup>208</sup>

#### 4.7 Consider referral to community-based SUD treatment programs and self-help resources.

**Rationale:** Although we recommend SUD treatment delivered as part of standard physical rehabilitation, referral to specialized SUD programs is strongly encouraged for patients who are willing and able to participate in these programs.<sup>33,187</sup> Community-based programs are indicated for individuals with more severe SUD, for those who do not fully recover with physical rehabilitation-based treatment, and for those who need maintenance of follow-up treatment for extended periods. Physical rehabilitation providers can use the SAMHSA treatment finder website <https://findtreatment.samhsa.gov/> to help patients find appropriate, accessible treatment programs. Unfortunately, in our opinion it remains difficult to find residential SUD treatment programs that can accommodate persons with SCI, especially those with tetraplegia who require assistance with personal care.

Give patients the option of participating in 12-step

programs (e.g., Alcoholics Anonymous) as an adjunct to or continuation of SUD treatment. Refer patients, family, and friends to Al-Anon and similar groups for support if using CRAFT is not feasible or not preferred.

### 5. POSTTRAUMATIC STRESS DISORDER (PTSD) AND ACUTE STRESS DISORDER (ASD)

#### Background

An SCI often involves exposure to a life-threatening traumatic event. The emotional responses that individuals have to trauma exposure tend to follow 1 of 4 trajectories: resilient, recovering, chronically distressed, and delayed.<sup>209,210</sup> Overall, about 5% to 20% of individuals experience symptoms of ASD during the first 3 to 30 days after exposure (see Table 11 for diagnostic criteria).<sup>211</sup> ASD was originally conceptualized as a precursor of PTSD, and between 40% and 80% of individuals with ASD go on to develop PTSD.<sup>212</sup> Yet, ASD has been found to be a poor predictor of PTSD and most individuals who develop PTSD had not previously met ASD criteria.<sup>213</sup> Therefore, ASD is included in the DSM-5 as a severe stress reaction that merits clinical attention of its own.<sup>214</sup>

PTSD is viewed as a state of non-recovery from or inability to extinguish the fear experienced during a traumatic event.<sup>215</sup> The symptoms of PTSD are captured by 4 symptom clusters: intrusion, avoidance, negative alterations in cognitions and mood, and alterations in arousal and reactivity (see Table 12 for diagnostic criteria). To qualify for a diagnosis of PTSD, an individual must have symptoms for at least 1 month that cause significant distress or impairment.<sup>4</sup> Low-quality evidence suggests that the prevalence of PTSD following SCI is 10%, similar to the rate in the general population.<sup>3</sup>

A recent systematic review of 17 studies concluded that multiple posttraumatic factors had clinically important associations with increased PTSD symptoms: depression, lower levels of acceptance or adjustment, psychological distress, anxiety, negative appraisal, neuroticism, and pain.<sup>216,217</sup> Women tended to report more severe PTSD symptoms.<sup>216</sup> A large, multisite study (n=1,062) that oversampled Hispanics and non-Hispanic Blacks and was not included in the meta-analysis reported an overall prevalence of PTSD of 24.9% and significantly higher PTSD prevalence among individuals who were Hispanic (31.3%) and non-Hispanic Black (24.7%) than among those who were non-Hispanic White (19.4%).<sup>218</sup>

There is a dearth of information on the relationship of PTSD to outcomes after SCI. However, PTSD is related to lower social participation.<sup>219</sup>

See Table 11 on pages 32-33 & Table 12 on pages 33-34.

**5.1 Screen all patients for ASD within 1 month of SCI and for PTSD after the first month. Screening should occur (a) early during initial inpatient hospital or rehabilitation stay; (b) as a repeat screen if indicated to assess persistence of symptoms or change in status; (c) at the first post-discharge follow-up point; and (d) at future time points beyond 6 months, depending on risk stratification factors, such as being a veteran or other trauma-exposed professional or having subthreshold symptom severity on prior screening examinations.**

**Rationale:** On February 1, 2018, the American College of Surgeons Committee on Trauma adopted a resolution to foster screening and early intervention for PTSD in patients with trauma.<sup>220</sup> Their recommendations are based on emerging evidence that demonstrates the feasibility of identifying ASD/PTSD early in trauma survivors<sup>221</sup> and on promising research that suggests that early interventions integrated within trauma care can improve outcomes.<sup>17</sup> The window of time during which ASD can be treated and PTSD prevented and treated overlaps with the time that individuals with SCI are typically undergoing inpatient or outpatient rehabilitation. Recent research demonstrates the feasibility of identifying PTSD soon after SCI;<sup>222</sup> therefore, it seems prudent to have the SCI rehabilitation policies follow the Committee on Trauma recommendations for ACS.

No research has validated ASD or PTSD screens or symptom severity measures in SCI. However, the Injured Trauma Survivor Screen (ITSS), which can be administered acutely after injury and has been shown to predict those most at risk for developing PTSD and/or depression 6 months after admission to a Level I trauma center following traumatic injury.<sup>223</sup> The Purdue Post-Traumatic Stress Disorder Scale-Revised has been used in SCI,<sup>224,225</sup> as has the Traumatic Life Events Scale<sup>226</sup> and the Clinician-Administered PTSD Scale for DSM 5.<sup>82</sup> According to a recent systematic review of PTSD measures, the PTSD Checklist and the Primary Care PTSD Screen are the best-performing screening measures overall (**See Table 13 on page 35**).<sup>227</sup>

**Table 11. DSM-5 Acute Stress Disorder Diagnostic Criteria<sup>4</sup>**

A. Exposure to actual or threatened death, serious injury, or sexual violence violation in one (or more) of the following ways:
1. Directly experiencing the traumatic event(s).
2. Witnessing, in person, the event(s) as it occurred to others.
3. Learning that the event(s) occurred to a close family member or close friend. Note: In cases of actual or threatened death of a family member or friend, the event(s) must have been violent or accidental.
4. Experiencing repeated or extreme exposure to aversive details of the traumatic event(s) (e.g., first responders collecting human remains, police officers repeatedly exposed to details of child abuse). Does not apply to exposure through electronic media, television, movies, or pictures, unless this exposure is work related.
B. Presence of nine (or more) of the following symptoms from any of the five categories of intrusion, negative mood, dissociation, avoidance, and arousal, beginning or worsening after the traumatic event(s) occurred:
<b>Intrusion Symptoms</b>
1. Recurrent, involuntary, and intrusive distressing memories of the traumatic event(s).
2. Recurrent distressing dreams in which the content and/or affect of the dream are related to the event(s).
3. Dissociative reactions (e.g., flashbacks) in which the individual feels or acts as if the traumatic event(s) were recurring. (Such reactions may occur on a continuum, with the most extreme expression being a complete loss of awareness of present surroundings.)
4. Intense or prolonged psychological distress or marked physiological reactions in response to internal or external cues that symbolize or resemble an aspect of the traumatic event(s).
<b>Negative Mood</b>
5. Persistent inability to experience positive emotions (e.g., inability to experience happiness, satisfaction, or loving feelings).
<b>Dissociative Symptoms</b>
6. An altered sense of the reality of one’s surroundings or oneself (e.g., seeing oneself from another’s perspective, being in a daze, time slowing).
7. Inability to remember an important aspect of the traumatic event(s) (typically due to dissociative amnesia and not to other factors such as head injury, alcohol, or drugs).
<b>Avoidance Symptoms</b>
8. Efforts to avoid distressing memories, thoughts, or feelings about or closely associated with the traumatic event(s).
9. Efforts to avoid external reminders (people, places, conversations, activities, objects, situations) that arouse distressing memories, thoughts, or feelings about or closely associated with the traumatic event(s).
<b>Arousal Symptoms</b>
10. Sleep disturbance (e.g., difficulty falling or staying asleep, restless sleep).

11. Irritable behavior and angry outbursts (with little or no provocation), typically expressed as verbal or physical aggression toward people or objects.
12. Hypervigilance.
13. Problems with concentration.
14. Exaggerated startle response.
C. Duration of disturbance (symptoms in Criterion B) is 3 days to 1 month after trauma exposure.
<b>Note:</b> Symptoms typically begin immediately after the trauma, but persistence for at least 3 days and up to a month is needed to meet disorder criteria.
D. The disturbance causes clinically significant distress or impairment in social, occupational, or other important areas of functioning.
E. The disturbance is not attributable to the physiological effects of a substance (e.g., medication or alcohol) or another medical condition (e.g., mild traumatic brain injury) and is not better explained by brief psychotic disorder.

**Table 12. DSM-5 Posttraumatic Stress Disorder Diagnostic Criteria<sup>4</sup>**

A. Exposure to actual or threatened death, serious injury, or sexual violence in one (or more) of the following ways:
1. Directly experiencing the traumatic event(s).
2. Witnessing, in person, the event(s) as it occurred to others.
3. Learning that the event(s) occurred to a close family member or close friend. Note: In cases of actual or threatened death of a family member or friend, the event(s) must have been violent or accidental.
4. Experiencing repeated or extreme exposure to aversive details of the traumatic event(s) (e.g., first responders collecting human remains, police officers repeatedly exposed to details of child abuse). Does not apply to exposure through electronic media, television, movies, or pictures, unless this exposure is work related.
B. Presence of nine (or more) of the following symptoms from any of the five categories of intrusion, negative mood, dissociation, avoidance, and arousal, beginning or worsening after the traumatic event(s) occurred:
<b>Intrusion Symptoms</b>
1. Recurrent, involuntary, and intrusive distressing memories of the traumatic event(s).
2. Recurrent distressing dreams in which the content and/or affect of the dream are related to the event(s).
3. Dissociative reactions (e.g., flashbacks) in which the individual feels or acts as if the traumatic event(s) were recurring. (Such reactions may occur on a continuum, with the most extreme expression being a complete loss of awareness of present surroundings.)
4. Intense or prolonged psychological distress or marked physiological reactions in response to internal or external cues that symbolize or resemble an aspect of the traumatic event(s).
5. Marked physiological reactions to internal or external cues that symbolize or resemble an aspect of the traumatic event(s).

C. Persistent avoidance of stimuli associated with the traumatic event(s), beginning after the traumatic event(s) occurred, as evidenced by one or both of the following:
1. Avoidance of or efforts to avoid distressing memories, thoughts, or feelings about or closely associated with the traumatic event(s).
2. Avoidance of or efforts to avoid external reminders (people, places, conversations, activities, objects, situations) that arouse distressing memories, thoughts, or feelings about or closely associated with the traumatic event(s).
D. Negative alterations in cognitions and mood associated with the traumatic event(s), beginning or worsening after the traumatic event(s) occurred, as evidenced by two (or more) of the following:
1. Inability to remember an important aspect of the traumatic event(s) (typically due to dissociative amnesia and not to other factors such as head injury, alcohol, or drugs).
2. Avoidance of or efforts to avoid external reminders (people, places, conversations, activities, objects, situations) that arouse distressing memories, thoughts, or feelings about or closely associated with the traumatic event(s).
3. Persistent, distorted cognitions about the cause or consequences of the traumatic event(s) that lead the individual to blame himself/herself or others.
4. Persistent negative emotional state (e.g., fear, horror, anger, guilt, or shame).
5. Markedly diminished interest or participation in significant activities.
6. Feelings of detachment/estrangement from others.
7. Persistent inability to experience positive emotions (e.g., inability to experience happiness, satisfaction, or loving feelings).
E. Marked alterations in arousal and reactivity associated with the traumatic event(s), beginning or worsening after the traumatic event(s) occurred, as evidenced by two (or more) of the following:
1. Irritable behavior and angry outbursts (with little or no provocation) typically expressed as verbal or physical aggression toward people or objects.
2. Reckless or self-destructive behavior.
3. Hypervigilance.
4. Exaggerated startle response.
5. Problems with concentration.
6. Sleep disturbance (e.g., difficulty falling or staying asleep or restless sleep).
F. Duration of the disturbance (Criteria B, C, D, and E) is more than 1 month.
G. The disturbance causes clinically significant distress or impairment in social, occupational, or other important areas of functioning.
H. The disturbance is not attributable to the physiological effects of a substance (e.g., medication, alcohol) or another medical condition.

**Table 13. PTSD Screening Measures**

Study	Screening Measure	Cut Point	Sensitivity %	Specificity %	PPV	NPV	Prevalence %	N
Geier et al., 2018 <sup>228</sup>	Posttraumatic Checklist-5	≥30	0.94	0.94	0.80	0.98	28.3	251
Prins et al., 2016 <sup>229</sup>	Primary Care PTSD Screen	≥3	0.95	0.85	0.51	0.99		

Abbreviations: PPV, positive predictive value; NPV, negative predictive value.

**5.2 Refer patients with positive screen results or those suspected of having ASD or PTSD to a mental health provider for a diagnostic assessment of ASD or PTSD criteria.**

**Rationale:** Individuals who screen positive for ASD or PTSD should undergo a more comprehensive assessment by using the DSM-5 criteria. Optimally, the mental health provider will be practicing within acute trauma care or rehabilitation to improve early detection, intervention, and care coordination, as well as to reduce environmental and other barriers to receipt of services. ASD and PTSD often co-occur with another mental health disorder such as SUD or anxiety disorder. Note that PTSD can be preexisting, caused by the index injury, or caused by peritraumatic events during acute care and delirium. Approximately 25% of individuals with PTSD can have late onset (beyond 6 months).<sup>230</sup>

**5.3 Support patients with PTSD with non-specific and PTSD-specific relationship skills, used by all health care professionals (physicians, nurses, therapists, psychologists, social workers, and others) who work with them.**

**Rationale:** By nature of the disorder, individuals with PTSD may have difficulty trusting others and accepting help. Moreover, many individuals who sustain trauma have a prior history of trauma and/or adverse childhood experiences. The trauma-informed movement provides resources and strategies that nursing and other non-mental health specialist staff can use to care for patients with historical and recent trauma.<sup>231,232</sup> The basic premise of trauma-informed care is that the team ask “What happened to this person?” rather than “What is wrong with this

person?” The 5 guiding principles and primary goals for the team are fostering safety, trustworthiness, choice, collaboration, and empowerment.<sup>233</sup> These principles highlight the importance of asking, listening, and accepting the patient as a significant intervention for the patient each time this occurs with any team member. Team members can also encourage journaling, reorienting the patient during care, engaging families in caregiving, and using pharmacological interventions.

**5.4 Treat ASD and PTSD, within rehabilitation to the extent possible, by using pharmacological and nonpharmacological approaches on the basis of treatment efficacy, clinical presentation (e.g., comorbid conditions), length of stay, and patient preferences.**

**Rationale:** Overall, research on treating ASD and PTSD in SCI is limited. What has been shown appears to be similar to that for the general population. Therefore, we can extrapolate that evidence-based treatments in the general population may be appropriate and effective within the SCI population.

For ASD, trauma-focused psychotherapies are considered first-line treatment, as there is insufficient evidence that medications are effective.<sup>234</sup> For PTSD, trauma-focused therapies should be recommended first, unless these therapies are unavailable or not preferred, or if the patient prefers pharmacotherapy.<sup>234</sup> The timing of trauma-focused therapy should take into consideration other stressors and the environment. For example, if a patient is medically unstable or overwhelmed by intense inpatient rehabilitation, it may not be appropriate to initiate treatment.



Nevertheless, certain treatment elements may be appropriate, such as education and normalization, acute symptom management, social support, rehabilitation-oriented exposure experiences, and, as needed, cognitive restructuring.<sup>234</sup> Psychological debriefing should not be used due to lack of efficacy and evidence of potential harms.<sup>234</sup>

### **5.5 Offer patients with ASD brief, evidence-based psychological interventions (trauma-focused CBT) to treat ASD and prevent PTSD within the first 30 days after injury.**

**Rationale:** Several meta-analyses show that early trauma-focused CBT significantly limits subsequent PTSD.<sup>235,236</sup> These interventions typically comprise 5 to 6 sessions of education on psychological trauma, anxiety management training, exposure therapy, and cognitive restructuring.<sup>214</sup>

### **5.6 Offer patients with PTSD evidence-based, trauma-focused psychological treatment.**

**Rationale:** From the weight of evidence for these treatments, the VA/DoD Clinical Practice Guideline for the Management of Posttraumatic Stress Disorder and Acute Stress Disorder strongly recommends individual, manualized therapies that combine exposure and/or cognitive restructuring with prolonged exposure such as the following: cognitive processing therapy, eye movement desensitization and reprocessing, brief eclectic psychotherapy, narrative exposure, CBT, cognitive therapy, and prolonged exposure therapy.<sup>234</sup> Cognitive approaches work to correct maladaptive thought patterns, while behavioral approaches aim to decrease physiological arousal through exposure to triggering stimuli. Trauma-focused CBT typically includes education, cognitive restructuring, and exposure. CBT has been found to reduce the likelihood of developing PTSD.<sup>237</sup>

### **5.7 Offer patients with ASD pharmacological treatment if trauma-focused psychotherapies are not available or not preferred.**

**Rationale:** Limited evidence indicates that pharmacotherapy is effective for ASD. The largest pharmacotherapy trial to date found that escitalopram was not effective for early PTSD symptoms.<sup>238</sup> A meta-analysis of propranolol concluded that it did not

reduce later PTSD symptoms.<sup>239</sup> Early administration of hydrocortisone is a promising treatment worthy of additional research.<sup>214</sup> Benzodiazepines may be helpful for acute anxiety, agitation, or sleep disturbance in the immediate period following the traumatic event, but prolonged use may be detrimental for adaptation, increasing the risk for development of PTSD.<sup>234</sup> In addition, benzodiazepines should be avoided if the patient has a history of substance abuse, and all patients prescribed these medications should be closely monitored for signs of abuse.<sup>234</sup> Benzodiazepines should also be limited if patients are prescribed opiates due to risk for respiratory depression.

### **5.8 Offer patients with PTSD pharmacological treatment if trauma-focused psychotherapies are not available or not preferred.**

**Rationale:** According to the VA/DoD CPG on PTSD, there is strong evidence for the efficacy of sertraline, paroxetine, fluoxetine, or venlafaxine as monotherapy for PTSD in individuals diagnosed with PTSD who choose not to engage in or are unable to access trauma-focused psychotherapy (see VA DoD CPG for details). The VA/DOD determined mirtazapine, prazosin for sleep/nightmares, nefazodone, phenelzine, and the TCAs to have fair evidence in treating PTSD.<sup>234</sup> Prazosin is an alpha-1 blocker so there is risk for orthostatic hypotension episodes in patients with SCI; therefore, patients should not be started on this medication if they have unstable low blood pressure.

## **6. SUICIDE**

### **Background**

Routine screening for suicide and systematic suicide risk management in individuals with SCI are supported by the increased reported prevalence of suicidal ideation, suicide attempts, and suicidal deaths in this population. In U.S. studies, individuals with SCI were reported to be 3 to 5 times more likely to die of suicide than were those in the general population,<sup>240,241</sup> although data for those injured in the last 2 decades are limited. One study reported a decreasing trend of suicide mortality in SCI cohorts from the 1970s to the 1990s, but the observed suicide rate was still at least 3 times that of the general population even in the later cohorts.<sup>241</sup> Suicidal ideation is common after SCI. Over 13% of an SCI cohort reported suicidal ideation in the prior 2 weeks in a cross-sectional analysis, and 7.4%

reported a lifetime suicide attempt.<sup>242</sup> Studies in non-U.S. populations also found increased suicidal ideation and suicidal attempts in individuals with SCI.<sup>243</sup>

While SCI in itself increases suicide risk, higher risk of death by suicide after SCI has been associated with certain demographic (non-Hispanic White race) and injury characteristics (paraplegia, T1-S3 level with American Spinal Injury Association Impairment Scale A, B, or C),<sup>240</sup> as well as a history of drug abuse or current alcohol abuse.<sup>244</sup> Psychotherapy for depression, treatment for bipolar disorder or schizophrenia, or worse PHQ-9 scores are related to increased lifetime suicide attempts.<sup>242</sup> Having suicidal ideation in the past year was a risk factor for a suicide attempt in that year.<sup>243</sup> Deaths by suicide are significantly higher in individuals whose SCI is caused by an attempted suicide when compared with all other SCI causes.<sup>245</sup>

### **6.1 Formally screen individuals with SCI for suicidal ideation by using a brief, standardized, evidence-based screening tool. Screen for suicidal intent and behavior in individuals who report suicidal ideation. Screen (a) early during the initial inpatient hospital or rehabilitation stay, (b) as a repeat screen if indicated to assess persistence of symptoms or change in status, (c) at an early discharge follow-up point, and (d) at least annually or more frequently depending on risk stratification factors.**

**Rationale:** Although suicidal thoughts do not result in suicidal acts in most cases, the incidence of suicide attempts and suicidal deaths in individuals with SCI is significantly higher among those who report suicidal ideation.<sup>243</sup> All individuals identified as having suicidal thoughts need further evaluation, including examination of suicidal intent and behavior.

Item 9 of the PHQ-9 (“Over the past two weeks, how often have you been bothered by thoughts that you would be better off dead or of hurting yourself in some way?”) can be used as an initial screen for suicidal ideation.<sup>246</sup> A positive response (i.e., a response other than “not at all”) to Item 9 of the PHQ-9 should generate inquiry about suicidal intent and behavior. The Columbia Suicide Severity Rating Scale (C-SSRS) is a standardized tool that screens for suicidal ideation, quantifies the severity of suicidal ideation and behavior, and further evaluates for suicidal intent or plan if questions for suicidal ideation generate a positive response (See

Appendix 1).<sup>247</sup> The diagnostic accuracy of suicide risk assessment instruments requires additional study.<sup>248</sup> Anyone with a positive screen should undergo more in-depth mental or behavioral health assessment.

Evidence-based guidance on optimal frequency or effectiveness of screening in SCI is lacking. Screening frequency may be influenced by identified risk. More frequent screening may be indicated for individuals with multiple risk factors or previous history of suicide ideation or attempt. The highest reported risk of death by suicide is in the first 6 years post-injury.<sup>240,241</sup> The risk subsequently decreases, although the decline does not reach statistical significance until 10 years post-injury and the risk continues to be higher than the general population.<sup>241</sup> It is, therefore, prudent to consider routine periodic screening especially during the first 6 to 10 years post-injury.

### **6.2 Recognize warning signs for suicide and expedite evaluation of such signs by a trained professional. Take immediate follow-up action for anyone displaying direct warning signs for suicide (e.g., suicidal communication, preparation for suicide, and/or seeking access to or recent use of lethal means).**

**Rationale:** Warning signs for suicide differ from risk factors.<sup>249</sup> While risk factors are chronic or long-standing circumstances known to elevate suicide risk, warning signs are the things happening now or very recently that indicate a heightened or imminent risk for suicide. Direct warning signs include suicidal communication (writing or talking about death or suicide); preparations for suicide (suspected when individuals give away possessions, divest themselves of responsibility for dependents, update their will, or indicate in some way that they are “saying goodbye”); or seeking access to lethal means such as guns, medications, or toxins.<sup>250</sup> While not always the case, a majority of individuals who attempt or die by suicide give some warning of their intentions.<sup>250</sup> Those who talk about suicide must be taken seriously. Individuals who present with direct warning signs must be evaluated expeditiously by a trained professional with expertise in suicide prevention. If an individual seems acutely suicidal, he or she should not be left alone; safety should be ensured while determining the most appropriate treatment setting.

Indirect warning signs may include recently increasing or excessive substance abuse, hopelessness (feels

that nothing can be done to improve the situation); burdensomeness (talking about being a burden to others); purposelessness (no reason for living); feeling trapped with no way out; social withdrawal (from family, friends, society); dramatic mood changes; overwhelming guilt, self-blame, or shame; or neglecting bowel, bladder, skin and other aspects of self-care.

Suicidal thoughts or behaviors may be identified in many different clinical settings. Sometimes an individual will approach a primary care provider, nurse, or other member of the rehabilitation team with mental health issues, or an individual may make suicidal statements in the context of despair over health concerns. Other times, a clinician is simply able to detect emotional distress. Regardless of the circumstances, it is important that concerns regarding the individual's mental health be explored. Those caring for individuals with SCI must be conscientious about recognizing warning signs for suicide and asking directly about thoughts of suicide when indicated. Some providers fear that by asking about suicide, they may prompt the individual to feel suicidal. However, evidence shows that direct assessment of suicidal ideation and intent does not increase the risk for suicide.<sup>250</sup> On the other hand, there is a risk of ignoring or missing suicidality if the topic is avoided. Questions should be framed in a direct and nonjudgmental way to enhance the probability of eliciting a truthful response, for example, "Have you had thoughts about taking your own life?". The question should not be asked as though looking for a "no" answer ("You aren't thinking of killing yourself, are you?"). Anyone endorsing suicidal thoughts should undergo more in-depth mental or behavioral health assessment.

### **6.3 Stratify suicide risk on the basis of severity and temporality (acute or chronic) to determine appropriate therapeutic interventions and care setting.**

**6.3.1 Facilitate comprehensive assessment by a trained professional to integrate information about suicidal intent and behavior, warning signs, ability to maintain safety, and factors that impact risk of suicidal acts.**

**6.3.2 Hospitalize individuals with high acute risk for suicide to maintain their safety, and aggressively target modifiable factors. Directly observe them in a secure environment with limited access to lethal means (e.g., kept away from items with sharp points or edges, cords/tubing, toxic substances).**

### **6.3.3 Address chronic increased risk for suicide in the context of long-term outpatient therapy with established providers, adjusting frequency of contact on the basis of risk level.**

**Rationale:** The stakes when managing suicidal patients are high. Underestimation of risk can lead to inadequate treatment planning and a missed opportunity to prevent death. On the other hand, overestimation of risk leads to unnecessary hospital admissions, with a significant potential for infringement of civil liberties. The seriousness of the risk assessment process can place the goals of safety at odds with patient autonomy and create significant tension between the patient, the clinician, the health care system, and the law. Hence, it is imperative that the evaluation be guided by objectivity and evidence.<sup>250</sup>

Suicide risk assessment is not absolute. Determination of suicide risk includes gathering information related to the individual's intent to engage in suicide-related behavior, evaluating factors that elevate or reduce the risk of acting on that intent, and integrating all available information to determine the level of risk and appropriate setting for care.

Although specific protocols for managing suicide risk in individuals with SCI are lacking, guidelines and protocols developed for other at-risk populations can be adapted and applied. For example, the VA has developed established protocols and algorithms to manage different levels of severity and temporality of suicide risk.<sup>251</sup> The guidelines are available at <https://www.healthquality.va.gov/guidelines/MH/srb/VADoDSuicideRiskFullCPGFinal5088212019.pdf>.

Essential features of high acute risk include suicidal ideation with intent to die by suicide and inability to maintain safety independent of external support or help. A plan for suicide, access to lethal means, and recent or ongoing preparatory behaviors and/or suicidal attempts are often present in such situations and contribute to the severity of suicide risk. Hospitalization is typically required for individuals identified as high acute risk for suicide in order to maintain their safety and aggressively target the modifiable factors driving the acute spike in suicide risk. Observation in a secure environment is needed. Access to lethal means should be eliminated as much as feasible; individuals should be kept away from items with sharp points or edges, cords or tubing, and toxic substances,

and medication administration should be supervised. Lack of trained staff to provide SCI-related care (e.g., bowel and bladder management) may sometimes preclude admission to a secure psychiatric unit that would often otherwise be recommended. An alternative would be to observe in as secure an environment as feasible in an inpatient setting where the needed SCI care can be provided, which may sometimes include a 1:1 sitter. Close collaboration between mental health and SCI providers is critical in these situations.

Individuals at intermediate acute risk for suicide may share many of the same clinical features with those at high acute risk, but the essential difference is the perceived ability to maintain safety independent of external support or help. This involves a clinical judgment based on the totality of available clinical data. It is prudent and often preferable to consider hospitalization for these individuals to address suicidal thoughts and/or behaviors. Outpatient management, if considered in these instances, should be intensive, with frequent contact, regular reassessment of suicide risk, and a well-articulated safety plan.

Low acute risk typically involves clinical presentations in which current suicidal intent, a suicide plan, and preparatory behaviors are all absent. There is high collective confidence in the ability of the individual to independently maintain his or her own safety and hospitalization is not indicated. Some of these individuals may still be considered to be at increased chronic risk for suicide on the basis of identified risk factors.

Chronic risk for suicide is appropriately addressed through long-term outpatient therapy with established providers, with the appropriate frequency of contact based on risk level. These individuals require a well-articulated safety plan and routine screening regarding risk for suicide.

**6.4 Establish a treatment plan for high-risk individuals that fosters therapeutic alliance with mental health professionals and includes evidence-based suicide-focused psychotherapies.**

**Rationale:** Individuals who are identified as high risk should receive intensive treatment that includes appropriate, evidence-based, suicide-focused psychotherapies, in addition to addressing coexisting psychiatric disorders. Therapeutic techniques that have been used to decrease suicide risk incorporate different

combinations of cognitive, emotional, behavioral, and interpersonal approaches, including CBT, problem-solving therapy, dialectical behavioral therapy, and interpersonal therapy. Details of specific psychotherapies can be found elsewhere and are beyond the scope of these guidelines.<sup>250,252</sup> The specific type and focus of treatment will vary from patient to patient, based on presentation, patient preference, and practitioner skill and experience in particular techniques.

### **6.5 Optimize treatment for coexisting mental health and medical conditions that may impact the risk of suicide.**

**Rationale:** Modifiable risk factors should be identified and addressed, including evidence-based treatment for any mental health and medical conditions that may be related to the risk of suicide, including SUDs, MDD, schizophrenia, bipolar disorder, PTSD, TBI, and chronic pain. Major depression should be identified and adequately treated. When prescribing antidepressants for patients at risk for suicide, it is prudent to use medications with a low risk of lethal overdose (e.g., SSRI, SNRI) and to limit the amount of medication dispensed and refilled if medications with a higher risk of lethal overdose are prescribed (e.g., tricyclic antidepressants).

Chronic non-cancer pain has been associated with an elevated risk for suicide,<sup>253</sup> although studies specific to SCI-related pain are lacking. After controlling for other psychiatric disorders, the association between pain and suicide remains significant, although it is partially attenuated in consistency with the interpretation that pain increases suicide risk above and beyond the association between pain and depression. High doses of opioids have been associated with increased suicide risk in individuals with non-SCI chronic pain, although that relationship is complex and the effects of confounding factors and of opioid weaning on suicide risk require further investigation.<sup>254</sup> Comprehensive evaluation and management of individuals with chronic pain is important, including attention to pain interference with function and life participation, as is awareness of the increased suicide risk in this population and monitoring of suicidal thoughts or plans.<sup>255</sup>

A strong interplay exists between SUDs, psychiatric illness, psychosocial stressors, and suicide potential.<sup>256,257</sup> The integration of psychiatric assessment and care, along with addiction treatment, plays an important role in stabilizing and supporting



the individual with a dual diagnosis who has substantial risk for suicide. Assessment of social risk factors such as disruptions in relationships and legal and financial difficulties are important aspects of care.

TBI, including mild TBI, has been associated with suicide risk even after accounting for the relative influence of confounding risk factors,<sup>258,259</sup> although the precise mechanisms are unclear. Although the influence of coexisting TBI and SCI on suicide risk has not been reported, it is important to identify TBI in individuals with SCI, to be aware of its potential contribution to suicide risk, and to attend to its sequelae in conjunction with SCI and other health care follow-up.

### **6.6 Educate the at-risk individual, family, and caregivers on suicide risk and treatment options.**

**Provide information on suicide prevention resources, including crisis lines and services, e.g., the National Suicide Prevention Lifeline number 1-800-273-8255 or 1-800-273-TALK. Provide information to veterans of the U.S. Armed Services about veteran-specific suicide prevention resources including a Veterans Crisis Line accessed by pressing 1 after dialing 1-800-273-8255, online chatting at VeteransCrisisLine.net, or sending a text to 838255.**

**Rationale:** Effective communication about suicide prevention can help shift knowledge, attitudes, and behaviors by dispelling misconceptions about mental health treatment, raising awareness of available resources, and encouraging help-seeking and healthy behaviors. Suicidal individuals may benefit from education about the way that their emotional responses, thoughts, and behavioral responses to negative life events may be associated with suicidal crises. Family education, with appropriate patient consent, is a recommended practice when providers become aware that an individual is at risk of self-directed violence or is engaging in suicidal behaviors. For individuals who are not considered to be at risk, family member education may unnecessarily induce anxiety within the support system and is typically limited to providing general awareness about resources. There is a need to increase awareness of the role of crisis lines in providing services and support to individuals in crisis. The National Suicide Prevention Lifeline (1-800-273-TALK [8255]) is a U.S.-based suicide prevention network of crisis centers that provides a 24/7, toll-free

hotline available to anyone in suicidal crisis or emotional distress. This crisis line supports individuals who call for themselves or someone they care about.<sup>260</sup> Callers are routed to their nearest crisis center to receive immediate counseling and local mental health referrals. Crisis line brochures and wallet cards are available at [www.suicidepreventionlifeline.org](http://www.suicidepreventionlifeline.org). For veterans and active duty service members, the VA has partnered with the National Suicide Prevention Lifeline to provide a veteran-specific crisis line that can be accessed by pressing 1 after dialing 1-800-273-TALK, chatting online at [VeteransCrisisLine.net](http://VeteransCrisisLine.net), or sending a text to 838255.

### **6.7 Establish a safety plan for individuals considered to be at high risk for suicide. Limit access to lethal means (e.g., restricting access to firearms, use of gun locks, limited medication supply).**

**Rationale:** Discussion between clinicians and at-risk individuals for developing strategies and skills that support the individual's ability to avoid acting on thoughts of suicide is an important component of suicide prevention. Putting this process in writing for the anticipation of a suicidal crisis and how to manage it constitutes a patient's safety plan or crisis response plan. These plans are tailored to the individual on the basis of his or her specific warning signs and past effective coping strategies. Components of a safety plan include recognizing warning signs of an impending suicidal crisis, using internal coping strategies, using social contacts and social settings as a means of distraction from suicidal thoughts, using family members or friends to help resolve the crisis, contacting mental health professionals or agencies, and restricting access to lethal means. The plan should be included in the medical record, and the patient should have received a copy of the plan. It should be shared with family members and others if the patient consents. Safety plans should be updated to remain relevant during changes in clinical state and transitions of care. Safety planning is a provider-patient collaborative process, not a "no-harm" contract. There is no empirical evidence for the use of "no-harm" or "no-suicide" contracts, and a safety plan is a preferred strategy for preventing suicide.<sup>261</sup>

Firearms are the most common means of suicidal deaths in the United States, both in the general population and in individuals with SCI. Gunshots accounted for 50% of all suicides among individuals

with SCI in one study, followed by overdose/poisoning at 16% and cutting, hanging/suffocation, drowning, and fall from heights as other reported means.<sup>240</sup>

Professionals who provide health care and other services to individuals at risk for suicide are in a unique position to ask about the availability of lethal means and work with these individuals and their support networks to reduce access. Means restriction and means safety counseling are important aspects of suicide prevention, especially given the impulsive nature of many suicide attempts.<sup>262</sup> Lethal means safety includes, among other things, restriction of access to firearms and ammunition, safer prescribing and dispensing of medications to prevent intentional overdoses, and modifying the environment of care in clinical settings to prevent suicide attempts by falls, strangulation or hanging. Practices to reduce risk of suicide by medication overdose include prescription of drugs with a low risk of lethal overdose when feasible and limiting the amount of medication dispensed and refilled when prescribing drugs with a higher risk of lethal overdose, such as opioids, tricyclic antidepressants, benzodiazepines, and other sedative-hypnotics. Naloxone prescription should be considered for those at risk for opioid overdose.<sup>184</sup> Compared with those who store their firearms unlocked or loaded, individuals who store their firearms locked and/or unloaded are less likely to die from suicide by firearms, and so making gunlocks available and encouraging their use could be an important safety measure for those who have firearms at home.<sup>262,263</sup>

### **6.8 Augment personal and environmental protective factors that may mitigate suicide risk. Enhance coping skills.**

**Rationale:** Protective factors are those things that have the potential to prevent individuals from attempting suicide, in other words, their identified reasons for living. Strengthening existing protective factors can help offset suicide risk by promoting physical, mental, emotional, and spiritual wellness. Research on the effect of individual protective factors on suicide risk is sparse.<sup>250</sup> However, social interaction and connectedness with the community have been associated with lower suicide risk,<sup>264,265</sup> and connectedness to others, including family members, co-workers, community organizations, and social institutions, has been identified as an important

protective factor.<sup>266,267</sup> These positive relationships can help increase an individual's sense of belonging, foster a sense of personal worth, and provide access to sources of support. Advancements in physical and societal accessibility, with improved social participation, community integration, and social support for individuals with SCI, have been suggested as protective factors that have possibly contributed to the reported decline in suicide rates between the 1970s and 1990s in the United States.<sup>241</sup>

Engagement in pleasurable and rewarding activities, such as adaptive sports or other enjoyable avocational or vocational pursuits; cultural, spiritual, and religious beliefs about the meaning and value of life; and access to supportive health care relationships that foster engagement in one's own wellness are all examples of potential protective factors. Chaplains, pastors, benefits counselors, recreational therapists, vocational rehabilitation specialists, and peer support groups, as well as other members of the rehabilitation team and health care support network, may be valuable in bolstering protective factors.

Development of coping skills is an important component of suicide risk mitigation. Training in skills, attitudes, and behaviors may allow individuals with SCI to interact more appropriately with their environment, thereby lessening the impact of modifiable risk factors for suicide. For example, replacing maladaptive coping skills with more adaptive coping skills may have a direct impact on the quality of relationships with significant others. Skills such as anger management, conflict resolution, stress and anxiety management, financial planning, career guidance, assertiveness, relationship building, relaxation, self-care, communication, and mindfulness can potentially help individuals better cope with life challenges, improve their quality of life, and decrease suicide risk.



# Future Research

## Overarching

Further research, such as trajectory and risk factor studies,<sup>42,97</sup> is needed to identify individuals soon after SCI who are most likely to benefit from heightened surveillance or early interventions.

We need studies that examine ways to improve the transition from inpatient to outpatient settings and on how transition strategies can prevent and mitigate mental health problems.

We need comparative effectiveness studies that help health care providers and patients choose the best treatment for each individual.

We need studies that compare the effectiveness of traditional mental health service delivery (e.g., screen and refer) to integrated forms of mental health care within rehabilitation.

In addition to the efficacy studies mentioned below, we need effectiveness and implementation studies of patient-centered, multifaceted, stepped-care approaches that focus the limited mental health resources on the individual's level of need.

Research is needed on the efficacy and effectiveness of alternative mental health treatment delivery models such as telephone, videoconference, web-based, and app-based interventions.

Because mental health disorders and SUDs tend to be chronic relapsing conditions, the effectiveness of patient-based relapse prevention (e.g., education, skills training) and system-based relapse prevention (e.g., ongoing continuous or intermittent care) merits research.

Because mental health disorders, especially depression, are associated with increased rehabilitation costs,<sup>32</sup> research is needed on the effect of mental health and SUD treatment on the overall cost and effectiveness of SCI rehabilitation.

Research is needed on use of peer-led interventions for mental health disorders, SUD, and suicide risk.

## Anxiety

There are no studies with adequate sample sizes that have examined the criterion validity of anxiety measures in SCI. Strong, valid assessments normed within the SCI population is the first step in identifying individuals at risk and in measuring benefits from treatment.

No evidence has been shown for the efficacy of pharmacotherapy for treating anxiety, including GAD or PD, in individuals with SCI. Further research is needed to test the efficacy of medications in treating anxiety in individuals with SCI, as well as comparison trials for pharmacotherapy versus psychotherapies in this population.

Validated psychotherapies have demonstrated limited benefit in this population; however, many known treatments for anxiety have not yet been investigated for individuals with SCI and among the treatments that have been investigated, the sample size has been small.

## Depression

Specific SCI depression screens (i.e., SCI-QOL) should be validated against a structured diagnostic interview.

RCTs that use antidepressants other than venlafaxine will help develop evidence-based treatment algorithms for individuals with SCI and MDD.

Further research is needed on the efficacy of evidence-based psychosocial treatments for depression, including physical activity or exercise interventions, in individuals with SCI.

Studies of combined treatments and alternative treatments are needed, such as transcranial magnetic stimulation and ketamine for treatment-resistant depression.

## Substance Use Disorder

Substance use screening measures have not been tested for diagnostic validity in individuals with SCI.

Studies of the acceptability, feasibility, efficacy, and effectiveness of integrated SUD treatment during inpatient or outpatient rehabilitation for individuals with SCI are warranted.

Research on the efficacy of psychosocial treatments and MATs alone and in combination for SUD in individuals with SCI is warranted.

Research is needed on the effects of nonopioid and nonpharmacological pain interventions on opioid use, opioid addiction, and other mental health outcomes.

## PTSD/ASD

Little information is available on the association of PTSD with outcomes after SCI, including factors that promote posttraumatic development. Long-term follow-up is needed to determine the effects of trauma on physical recovery following SCI.

There is no research that validates ASD or PTSD screens or symptom severity measures in SCI. This is a needed area of research, considering that many individuals acquire SCI secondary to a traumatic event.

Treatment studies are needed for evidence-based pharmacotherapy and psychotherapy for ASD and PTSD in individuals with SCI.

## Suicide

Evidence-based guidance on the optimal frequency or effectiveness of screening for individuals with SCI is lacking. Further research that supports screening protocols is warranted.

Pain has been demonstrated to be a strong indicator for suicidal ideation in other populations; however, studies specific to psychological effects and suicide risk associated with SCI-related pain are lacking.

Research is needed on measures to mitigate suicide risk following SCI, including the role and effectiveness of efforts to augment protective factors.

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# Appendices

## Appendix 1. Substance Use Disorder Screening Measures

**Single-question alcohol screening test:** “How many times in the past year have you had X or more drinks in a day?”, where X is 5 for men and 4 for women, and a response of  $\geq 1$  is considered positive. Subjects responding negatively to the pre-screening question were still asked the single screening question. If asked to clarify, the research associate provided definitions of a standard drink (12 ounces of beer, 5 ounces of wine, or 1.5 ounces of 80 proof spirits).

**Single-question screening test for drug use and drug use disorders:** “How many times in the past year have you used an illegal drug or used a prescription medication for non-medical reasons?” A response of at least 1 time was considered positive for drug use. If asked to clarify the meaning of “non-medical reasons,” the research associate added “for instance because of the experience or feeling it caused.”

**CAGE-AID Questionnaire:** “When thinking about drug use, include illegal drug use and the use of prescription drug use other than prescribed.”

1. Have you ever felt that you ought to cut down on your drinking or drug use?  
YES NO
2. Have people annoyed you by criticizing your drinking or drug use?  
YES NO
3. Have you ever felt bad or guilty about your drinking or drug use?  
YES NO
4. Have you ever had a drink or used drugs first thing in the morning to steady your nerves or to get rid of a hangover?  
YES NO

**Two-Item Conjoint Screening (TICS) test:** “In the last year, have you ever drank or used drugs more than you meant to?” and “Have you felt you wanted or needed to cut down on your drinking or drug use in the last year?” (yes to at least one question is considered positive).

### TOBACCO, ALCOHOL, PRESCRIPTION MEDICATIONS, AND OTHER SUBSTANCES (TAPS) TOOL

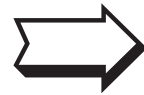
	Daily or almost daily	Weekly	Monthly	Less than monthly	Never
In the PAST 12 MONTHS, how often have you used any tobacco product (for example, cigarettes, e-cigarettes, cigars, pipes, or smokeless tobacco)?					
In the PAST 12 MONTHS, how often have you had <b>(5 or more drinks for men; 4 or more drinks for women)</b> containing alcohol in one day? One standard drink is about 1 small glass of wine (5 oz), 1 beer (12 oz), or 1 single shot of liquor.					
In the PAST 12 MONTHS, how often have you used any drugs including marijuana, cocaine or crack, heroin, methamphetamine (crystal meth), hallucinogens, ecstasy/MDMA?					
In the PAST 12 MONTHS, how often have you used any prescription medications just for the feeling, more than prescribed, or that were not prescribed for you? Prescription medications that may be used this way include opiate pain relievers (for example, OxyContin, Vicodin, Percocet, methadone), medications for anxiety or sleeping (for example, Xanax, Ativan, Klonopin), or medications for ADHD (for example, Adderall or Ritalin).					



## Appendix 2. PTSD Screening Measures Primary Care PTSD Screen

Sometimes things happen to people that are unusually or especially frightening, horrible, or traumatic (fire, abuse, earthquake, flood, war, death) Have you ever experienced this kind of event? If no, stop If yes, proceed to ask, <b>“In the past month have you...”</b>	Yes	No
1. had nightmares about the event(s) or thought about the event(s) when you did not want to?	Yes	No
2. tried hard not to think about the event(s) or went out of your way to avoid situations that reminded you of the event(s)?	Yes	No
3. been constantly on guard, watchful, or easily startled?	Yes	No
4. felt numb or detached from people, activities, or your surroundings?	Yes	No
5. felt guilty or unable to stop blaming yourself or others for the event(s) or any problems the event(s) may have caused?	Yes	No

**INSTRUCTIONS:** In the following table is a list of problems that people sometimes have in response to a very stressful experience. Please read each problem carefully and then circle one of the numbers to the right to indicate how much you have been bothered by the problem in the past month.



The Posttraumatic Checklist-5 can determine a provisional diagnosis in 2 ways:

- Treating each item rated as 2 = “Moderately” or higher as a symptom endorsed, and then following the DSM-5 diagnostic rule, which requires at least 1 Criterion B item (Questions 1-5), 1 Criterion C item (Questions 6-7), 2 Criterion D items (Questions 8-14), and 2 Criterion E items (Questions 15-20).
- Summing all 20 items (range 0-80) and using a cut-point score of 33 appears to be reasonable based on current psychometric work. However, when choosing a cut-point score, it is essential to consider the goals of the assessment and the population being assessed. The lower the cut-point score, the more lenient the criteria for inclusion, increasing the possible number of false positives. The higher the cut-point score, the more stringent the inclusion criteria and the more potential for false negatives.

If a patient meets a provisional diagnosis by using either of the methods above, he or she needs further assessment (e.g., Clinician-Administered PTSD Scale for DSM 5) to confirm a diagnosis of PTSD.

In the past months, how much were you bothered by:	Not at all	A little bit	Moderately	Quite a bit	Extremely
1. Repeated, disturbing, and unwanted memories of the stressful experience?	0	1	2	3	4
2. Repeated, disturbing dreams of the stressful experience?	0	1	2	3	4
3. Suddenly feeling or acting as if the stressful experience was actually happening again (as if you were back reliving it)?	0	1	2	3	4
4. Feeling very upset when someone reminded you of the stressful experience?	0	1	2	3	4
5. Having strong physical reactions to when someone reminded you of the stressful experience (for example, heart pounding, trouble breathing, sweating)?	0	1	2	3	4
6. Avoiding memories, thoughts, or feelings related to the stressful experience?	0	1	2	3	4
7. Avoiding external reminders of the stressful experience (for example, people, places, conversations, activities, objects, or situations)?	0	1	2	3	4
8. Trouble remembering important parts of the stressful experience?	0	1	2	3	4
9. Having strong negative beliefs about yourself, other people, or the world (for example, having thoughts such as: I am bad, there is something seriously wrong with me, no one can be trusted, the world is completely dangerous)?	0	1	2	3	4
10. Blaming yourself or someone else for the stressful experience or what happened after it?	0	1	2	3	4
11. Having strong negative feelings such as fear, horror, anger, guilt, or shame?	0	1	2	3	4
12. Loss of interest in activities that you used to enjoy?	0	1	2	3	4
13. Feeling distant or cut off from people?	0	1	2	3	4
14. Trouble experiencing positive feelings (for example, being unable to feel happiness or have loving feelings for people close to you)?	0	1	2	3	4
15. Irritable behavior, angry outbursts, or acting aggressively?	0	1	2	3	4
16. Taking too many risks or doing things that could cause you harm?	0	1	2	3	4
17. Being “superalert” or watchful, on guard?	0	1	2	3	4
18. Feeling jumpy or easily startled?	0	1	2	3	4
19. Having difficulty concentrating?	0	1	2	3	4
20. Trouble falling or staying asleep?	0	1	2	3	4

### Appendix 3. Depression Screening Measures

#### Patient Health Questionnaire-9

Over the last two weeks, how often have you been bothered by any of the following problems?

	Not at all	Several days	More than half the days	Nearly every day
1. Little interest or pleasure in doing things	0	1	2	3
2. Feeling down, depressed or hopeless	0	1	2	3
3. Trouble falling or staying asleep, or sleeping too much	0	1	2	3
4. Feeling tired or having little energy	0	1	2	3
5. Poor appetite or overeating	0	1	2	3
6. Feeling bad about yourself – or that you are a failure or have let yourself or your family down	0	1	2	3
7. Trouble concentrating on things, such as reading the newspaper or watching television	0	1	2	3
8. Moving or speaking so slowly that other people could have noticed? Or the opposite – being so fidgety or restless that you have been moving around a lot more than usual	0	1	2	3
9. Thoughts that you would be better off dead or of hurting yourself in some way	0	1	2	3
PHQ9 Total Score				

*Developed by Drs Robert L. Spitzer, Janet B. W. Williams, Kurt Kroenke, and colleagues, with an educational grant from Pfizer Inc.*

### Appendix 4. Anxiety Disorder Screening Measures

#### Generalized Anxiety Disorder-7 (GAD-7)

Over the last two weeks, how often have you been bothered by any of the following problems?

	Not at all	Several days	More than half the days	Nearly every day
1. Feeling nervous, anxious or on edge	0	1	2	3
2. Not being able to stop or control worrying	0	1	2	3
3. Worrying too much about different things	0	1	2	3
4. Trouble relaxing	0	1	2	3
5. Being so restless that it is hard to sit still	0	1	2	3
6. Becoming easily annoyed or irritable	0	1	2	3
7. Feeling afraid as if something awful might happen	0	1	2	3
GAD7 Total Score				

*Developed by Drs Robert L. Spitzer, Janet B. W. Williams, Kurt Kroenke, and colleagues, with an educational grant from Pfizer Inc.*

## Appendix 5. Suicide Severity Screening Measures

### COLUMBIA-SUICIDE SEVERITY RATING SCALE-SCREEN VERSION

SUICIDE IDEATION DEFINITIONS AND PROMPTS	Past Month	
	YES	NO
<b>Ask Questions that are bolded and <u>underlined</u>.</b>		
<b>Ask Questions 1 and 2</b>		
<b>1. <u>Have you wished you were dead or wished you could go to sleep and not wake up?</u></b>		
<b>2. <u>Have you actually had any thoughts of killing yourself?</u></b>		
<b>If YES to 2, ask questions 3, 4, 5, and 6. If NO to 2, go directly to question 6.</b>		
<b>3. <u>Have you ever been thinking about how you might do this?</u></b> eg. "I thought about taking an overdose, but I never made a specific plan as to when, where or how I would actually do it... and I would never go through with it."		
<b>4. <u>Have you had these thoughts and had some intention of acting on them?</u></b> As opposed to "I have the thoughts, but I definitely will not do anything about them."		
<b>5. <u>Have you started to work out or worked out the details of how to kill yourself? Do you intend to carry out this plan?</u></b>		
<b>6. <u>Have you ever done anything, started to do anything, or prepared to do anything to end your life?</u></b>  <b>Examples:</b> Collected pills, obtained a gun, gave away valuables, wrote a will or suicide note, took out pills but didn't swallow any, held a gun but changed your mind or it was grabbed from your hand, went to the roof but didn't jump; or actually took pills, tried to shoot yourself, cut yourself, tried to hang yourself, etc.  <b>If YES, ask: <u>Was this within the past three months?</u></b>	YES	NO

■ Low Risk  
■ Moderate Risk  
■ High Risk

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 posnerk@nyspi.columbia.edu © 2008 The Research Foundation for Mental Hygiene, Inc.

## Appendix 6:

### Panel Conflict of Interest Statement

#### CONSORTIUM FOR SPINAL CORD MEDICINE

Steering Committee Member and Guideline Development Panel Member please read the following policies on Conflicts of Interest and Confidentiality and sign below to indicate acceptance.

#### POLICY ON CONFLICTS OF INTEREST

The Consortium for Spinal Cord Medicine (hereafter referred to as "the Consortium") is a collaboration of professional and consumer organizations funded and administered through Paralyzed Veterans of America (hereafter referred to as "PVA"). PVA wants to ensure that regular business of the Consortium's Steering Committee and the guideline development process are free from conflicts of interest. PVA recognizes that those on the Steering Committee and Guidelines Development Panels are involved in a variety of organizations and projects, and may hold financial investments which might create actual or potential conflicts of interest or the appearance of a conflict (each a "conflict" or "conflict of interest").

To achieve that result, the following policy is adopted:

**1. Applicability.** This Policy applies to the Consortium's Steering Committee Members, including the Chair and Vice-Chair, in addition to those members on the Guideline Development Panels (collectively, "Covered Persons").

**2. Term.** This agreement is effective for the term the Covered Person is a member of the Steering Committee and/or a Guideline Development Panel, notwithstanding how active or passive a role he or she may play as a member of the Steering Committee or a Guideline Development Panel.

**3. Determining the Existence of a Conflict.** The guidelines set forth below shall be used to determine the existence of a conflict. The guidelines are meant to be illustrative and not exclusive; a conflict may exist even though the situation in question is not included below. Each Covered Person bears the personal responsibility for initially determining if a conflict of interest exists with respect to such Covered Person. If a Covered Person has any questions regarding the existence of a conflict, such Covered Person should promptly contact the Steering Committee Chair.

#### 4. Guidelines for Determining Existence of Conflict.

A conflict may exist if the Covered Person is unduly influenced by others (i.e. his/her spouse, parent, child, or other individual with whom such Covered Person has a close personal, business or professional relationship (including persons with whom such Covered Person is a partner, shareholder in a closely held corporation, coauthor or other close professional coworker or colleague) to the detriment of and against the mission of the Consortium, the Steering Committee, the Guideline Development Panels, and PVA.

**5. Disclosure of Conflict: Recusal.** If a Covered Person determines that a conflict exists, then he or she shall notify immediately the Steering Committee Chair or the Director of PVA's Research and Education Department. The Chair, with input from the Director of Research and Education, shall determine whether a conflict exists (except that in cases of conflicts involving the Chair, the Vice Chair shall decide). The decision on conflicts and the basis of that decision shall be reported to the Steering Committee and recorded in the minutes. Unless otherwise determined by the Chair (or, as appropriate, the Vice Chair) in individual cases, if a conflict is found to exist, the affected person shall recuse himself/herself from all discussions, determinations and votes with respect to the matter with which the conflict exists, and shall excuse him/herself from all meetings at which any discussions regarding the matter take place. Following the termination of such determinations and discussions involving the conflict, such Covered Person may rejoin the meeting.

#### POLICY ON CONFIDENTIALITY

In the course of conducting regular business for the Consortium and/or Guideline Development Panel(s), Steering Committee Members and Panel Members may receive and be given access to confidential information concerning PVA or another entity working with the Consortium. To ensure that the confidentiality of the information will be maintained, the following Policy on Confidentiality is adopted.

**1. Applicability.** This Policy applies to the Consortium's Steering Committee Members, including the Chair and Vice-Chair, in addition to those members on the Guideline Development Panels (collectively, "Covered Persons").



2. **Term.** This agreement is effective for the term the Covered Person is a member of the Steering Committee and/or a Guideline Development Panel, notwithstanding how active or passive a role they may play as a member of the Steering Committee or a Guideline Development Panel.

3. **Definition of Confidential Information.**

“Confidential Information” means (i) all written business, financial, technical and scientific information relating to the Consortium and which PVA has marked conspicuously “CONFIDENTIAL,” “PROPRIETARY,” or similar marking; or (ii) oral information which is specified as confidential by the Steering Committee and/or PVA. All documents derived during the guideline development process are confidential, and they remain so until 1) the document has been approved for publication by a vote of the Steering Committee and 2) the document is released by PVA as a printed document.

“Confidential Information” shall exclude information which (a) is in the public domain at the time of disclosure; (b) is in the possession of the Consortium (including any Covered Person) free of any obligation of confidence prior to the time of disclosure; (c) though originally within the definition of “Confidential Information”, subsequently becomes part of the public knowledge through no fault of the Consortium (including any Covered Person), as of the date of its becoming part of the public knowledge; (d) though originally within the definition of “Confidential Information”, subsequently is received by the Consortium (including any Covered Person) without any obligation of confidentiality from a third party who is free to disclose the information, as of the date of such third-party disclosure; or (e) is independently developed by the Consortium without the use of any Confidential Information.

4. **Nondisclosure of Confidential Information.**

Each Covered Person agrees not to disclose to any person outside the Consortium or its affiliates (including for these purposes Chapters and International Affiliates) any Confidential Information, except as provided below. Each Covered Person agrees that he/she will use the Confidential Information only for the purpose of Consortium business. Notwithstanding the foregoing, a Covered Person may disclose the Confidential Information (i) to employees, professional advisors, volunteer scientists and other Covered Persons asked to participate in

Consortium business, consultants and agents of the Consortium who have a need to know and who have been informed of this Policy on Confidentiality; or (ii) to the extent required by a court order or by law. Each Covered Person shall use the same degree of care, but not less than a reasonable degree of care, that he/she uses to protect the Consortium’s own most highly confidential information to prevent any unauthorized or inadvertent disclosure of Confidential Information.

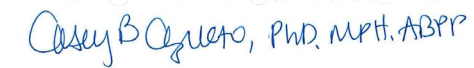
Any individual having question(s) concerning this policy or its applicability in a given situation(s) should address those question(s) to the Director of Research and Education (PVA).

5. **Return of Confidential Information.**


Each Covered Person agrees to return to the Chair of the Steering Committee or the Director of Research and Education, all tangible materials incorporating Confidential Information made available or supplied to such Covered Person and all copies and reproductions thereof upon request of the Chair of the Committee and/or the Director of Research and Education (PVA).


**CERTIFICATION REGARDING CONFLICTS OF INTEREST AND CONFIDENTIALITY OF INFORMATION**

Each Covered Person agrees to comply with the provisions of these Policies so long as he/she is a Covered Person. By signing, you are confirming that you have read and understand the above Policy on Conflicts of Interest and Confidentiality and agree to abide by same during all times that you are a Covered Person, as defined in the Policy.


  
Casey B. Azuero, PhD, MPH, ABPP

  
Charles H. Bombardier, PhD, ABPP

  
Jesse R. Fann, MD, MPH

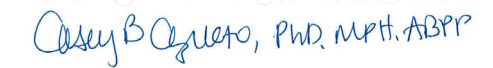
  
Donald D. Kautz, RN, PhD

  
J. Scott Richards, PhD, ABPP


  
Sunil Sabharwal, MD


**CERTIFICATION REGARDING CONSORTIUM POLICIES AND PROCEDURES**

Each Covered Person agrees to comply with the provisions of the policies and procedures outlined in the Clinical Practice Guideline Orientation Manual so long as he/she is a Covered Person. By signing, you are confirming that you have read and understand the Clinical Practice Guidelines Orientation Manual Policies and Procedures and agree to abide by same during all times that you are a Covered Person.


  
Casey B. Azuero, PhD, MPH, ABPP

  
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## Appendix A: Search Strategies

### Ovid MEDLINE® <1946 to August Week 2 2016>

1. exp Spinal Cord Injuries/
2. spinal cord injur\*.mp
3. (spine or spinal) and sci).mp
4. or/1-3
5. exp Mental Disorders/
6. (mental adj3 (health or disorder\*)).mp
7. (anxiety or depression or post-traumatic or posttraumatic or PTSD or bipolar or suicid\* or "self-harm").ti,ab.
8. exp Substance-Related Disorders/
9. ((drug\* or alcohol\* or illicit or substance) adj3 (use\* or abus\*)).ti,ab.
10. or/5-9
11. 4 and 10
12. limit 11 to English language
13. limit 11 to abstracts
14. 12 or 13
15. limit 14 to humans

### Ovid MEDLINE® In-Process & Other Non-Indexed Citations <August 22, 2016>

1. spinal cord injur\*.mp
2. ((spine or spinal) and sci).mp
3. (mental adj3 (health or disorder\*)).mp
4. (anxiety or depression or post-traumatic or posttraumatic or PTSD or bipolar or suicid\* or "self-harm").ti,ab.
5. ((drug\* or alcohol\* or illicit or substance) adj3 (use\* or abus\*)).ti,ab.
6. (1 or 2) and (3 or 4 or 5)
7. limit 6 to English language

### PsycINFO <1806 to July Week 4 2016>

1. exp Spinal Cord Injuries/
2. spinal cord injur\*.mp
3. ((spine or spinal) and sci).mp
4. or/1-3
5. exp Mental Disorders/
6. (mental adj3 (health or disorder\*)).mp
7. (anxiety or depression or post-traumatic or posttraumatic or PTSD or bipolar or suicid\* or "self-harm").ti,ab.

8. exp "SUBSTANCE USE DISORDER"/
9. ((drug\* or alcohol\* or illicit or substance) adj3 (use\* or abus\*)).ti,ab.
10. or/5-8
11. 4 and 10

### Cochrane Central Register of Controlled Trials <July 2016>

1. exp Spinal Cord Injuries/
2. spinal cord injur\*.mp
3. ((spine or spinal) and sci).mp
4. or/1-3
5. exp Mental Disorders/
6. (mental adj3 (health or disorder\*)).mp
7. (anxiety or depression or post-traumatic or posttraumatic or PTSD or bipolar or suicid\* or "self-harm").ti,ab.
8. exp Substance-Related Disorders/
9. ((drug\* or alcohol\* or illicit or substance) adj3 (use\* or abus\*)).ti,ab.
10. or/5-9
11. 4 and 10

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## Appendix C. Excluded Studies

The following full-text publications were considered for inclusion but failed to meet the criteria for this report.

### Exclusion codes

(first reviewer/second reviewer after consensus):

2 = Population not included;

3 = Intervention not included;

4 = Outcome not included;

5 = Comparator not included;

6 = Study design not included;

7 = Not a study

(letter, editorial, non-systematic/narrative review);

8 = Non-English language;

9 = Inadequate duration;

10 = Sample size too small for applicable Key Questions;

11 = Systematic Review or meta-analysis used as a source document to identify individual studies;

12 = No original data, duplicate data;

13 = Individual study in an included systematic review

Citation Number	Citation	Exclusion Code
1	Abeyasinghe NL, de Zoysa P, Bandara KM, Bartholameuz NA, Bandara JM. The prevalence of symptoms of Post-Traumatic Stress Disorder among soldiers with amputation of a limb or spinal injury: a report from a rehabilitation centre in Sri Lanka. <i>Psychol Health Med</i> . 2012;17(3):376-381.	6/6
2	Abramson AS. Modern concepts of management of the patient with spinal cord injury. <i>Arch Phys Med Rehabil</i> . 1967;48(3):113-121.	7/7
3	Abramson CE, McBride KE, Konnyu KJ, Elliott SL, Team SR. Sexual health outcome measures for individuals with a spinal cord injury: a systematic review. <i>Spinal Cord</i> . 2008;46(5):320-324.	4/4
4	Agar E, Kennedy P, King NS. The Role of Negative Cognitive Appraisals in PTSD Symptoms Following Spinal Cord Injuries. <i>Behavioural and Cognitive Psychotherapy</i> . 2006;34(4):437-452.	13/13
5	Akman RY, Coskun Celik E, Karatas M. Sexuality and sexual dysfunction in spinal cord-injured men in Turkey. <i>Turkish Journal of Medical Sciences</i> . 2015;45(4):758-761.	4/4
6	Allen-Wright S. Expanding health promotion to individuals with spinal cord injuries. <i>SCI Nurs</i> . 1999;16(3):85-88.	6/6
7	Allison DJ, Ditor DS. Targeting inflammation to influence mood following spinal cord injury: A randomized clinical trial. <i>Journal of neuroinflammation</i> . 2015;12(1).	3/3
8	Al-Owesie RM, Moussa NM, Robert AA. Anxiety and depression among traumatic spinal cord injured patients. <i>Neurosciences</i> . 2012;17(2):145-150.	4/4
9	Alschuler KN, Kratz AL, Ehde DM. Resilience and vulnerability in individuals with chronic pain and physical disability. <i>Rehabilitation Psychology</i> . 2016;61(1):7-18.	10/10
10	Anderson CJ, Krajci KA, Vogel LC. Life satisfaction in adults with pediatric-onset spinal cord injuries. <i>Journal of Spinal Cord Medicine</i> . 2002;25(3):184-190.	4/4
11	Anderson CJ, Vogel LC, Betz RR, Willis KM. Overview of adult outcomes in pediatric-onset spinal cord injuries: implications for transition to adulthood. <i>Journal of Spinal Cord Medicine</i> . 2004;27 Suppl 1:S98-106.	10/10
12	Anderson CJ, Vogel LC, Chlan KM, Betz RR, McDonald CM. Depression in adults who sustained spinal cord injuries as children or adolescents. <i>Journal of Spinal Cord Medicine</i> . 2007;30 Suppl 1:S76-82.	6/6



Citation Number	Citation	Exclusion Code
13	Anderson CJ, Vogel LC, Chlan KM, Betz RR. Coping with spinal cord injury: strategies used by adults who sustained their injuries as children or adolescents. <i>Journal of Spinal Cord Medicine</i> . 2008;31(3):290-296.	4/4
14	Anton HA, Miller WC, Townson AF. Measuring fatigue in persons with spinal cord injury. <i>Arch Phys Med Rehabil</i> . 2008;89(3):538-542.	10/10
15	Ataoglu E, Tiftik T, Kara M, Tunc H, Ersoz M, Akkus S. Effects of chronic pain on quality of life and depression in patients with spinal cord injury. <i>Spinal Cord</i> . 2013;51(1):23-26.	2/2
16	Avluk OC, Gurcay E, Gurcay AG, Karaahmet OZ, Tamkan U, Cakci A. Effects of chronic pain on function, depression, and sleep among patients with traumatic spinal cord injury. <i>Ann Saudi Med</i> . 2014;34(3):211-216.	10/10
17	Baker FA, Rickard N, Tamplin J, Roddy C. Flow and Meaningfulness as Mechanisms of Change in Self-Concept and Well-Being Following a Songwriting Intervention for People in the Early Phase of Neurorehabilitation. <i>Front Hum Neurosci</i> . 2015;9:299.	3/3
18	Barbonetti A, Cavallo F, Felzani G, Francavilla S, Francavilla F. Erectile dysfunction is the main determinant of psychological distress in men with spinal cord injury. <i>J Sex Med</i> . 2012;9(3):830-836.	10/10
19	Beedie A, Kennedy P. Quality of social support predicts hopelessness and depression post spinal cord injury. <i>Journal of Clinical Psychology in Medical Settings</i> . 2002;9(3):227-234.	13/13
20	Benony H, Daloz L, Bungener C, Chahraoui K, Frenay C, Auvin J. Emotional factors and subjective quality of life in subjects with spinal cord injuries. <i>Am J Phys Med Rehabil</i> . 2002;81(6):437-445.	6/6
21	Bermond B, Schuerman J, Nieuwenhuijse B, Fasotti L, et al. Spinal cord lesions: Coping and mood states. <i>Clinical Rehabilitation</i> . 1987;1(2):111-117.	10/10
22	Berry JW, Elliott TR, Rivera P. Resilient, undercontrolled, and overcontrolled personality prototypes among persons with spinal cord injury. <i>J Pers Assess</i> . 2007;89(3):292-302.	13/13
23	Biering-Sorensen F, Hartkopp A. Spinal cord lesions. <i>Curr Opin Neurol</i> . 1995;8(6):451-455.	6/6
24	Blanes L, Carmagnani MI, Ferreira LM. Quality of life and self-esteem of persons with paraplegia living in Sao Paulo, Brazil. <i>Qual Life Res</i> . 2009;18(1):15-21.	10/10
25	Boakye M, Moore R, Kong M, Skirboll SL, Arrigo RT. Health-related quality-of-life status in Veterans with spinal disorders. <i>Quality of Life Research: An International Journal of Quality of Life Aspects of Treatment, Care &amp; Rehabilitation</i> . 2013;22(1):45-52.	2/2
26	Bockian NR, Lee A, Fidanque CS. Personality disorders and spinal cord injury: A pilot study. <i>Journal of Clinical Psychology in Medical Settings</i> . 2003;10(4):307-313.	4/4
27	Boekamp JR, Overholser JC, Schubert DS. Depression following a spinal cord injury. <i>Int J Psychiatry Med</i> . 1996;26(3):329-349.	11/11
28	Bombardier CH, Ehde DM, Stoelb B, Molton IR. The relationship of age-related factors to psychological functioning among people with disabilities. <i>Phys Med Rehabil Clin N Am</i> . 2010;21(2):281-297.	11/11
29	Bombardier CH, Rimmele CT. Alcohol use and readiness to change after spinal cord injury. <i>Arch Phys Med Rehabil</i> . 1998;79(9):1110-1115.	10/10

Citation Number	Citation	Exclusion Code
30	Bombardier CH, Stroud MW, Esselman PC, Rimmele CT. Do preinjury alcohol problems predict poorer rehabilitation progress in persons with spinal cord injury? <i>Arch Phys Med Rehabil</i> . 2004;85(9):1488-1492.	13/13
31	Bombardier CH. Depression and spinal cord injury. <i>Arch Phys Med Rehabil</i> . 2014;95(2):413-414.	7/7
32	Bombardier CH. Venlafaxine XR for depression and pain in spinal cord injury: Major outcomes. <i>Journal of spinal cord medicine</i> .36(5 SPEC. ISSUE):551.	7/7
33	Bonanno GA, Kennedy P, Galatzer-Levy IR, Lude P, Elfstrom ML. Trajectories of resilience, depression, and anxiety following spinal cord injury. <i>Rehabilitation Psychology</i> . 2012;57(3):236-247.	4/4
34	Borsbo B, Gerdle B, Peolsson M. Impact of the interaction between self-efficacy, symptoms and catastrophising on disability, quality of life and health in with chronic pain patients. <i>Disabil Rehabil</i> . 2010;32(17):1387-1396.	10/10
35	Boxall J. Care of the spinal cord-injured patient. <i>Can Fam Physician</i> . 1989;35:2435-2439.	7/7
36	Bozzacco V. Vulnerability and alcohol and substance abuse in spinal cord injury. <i>Rehabil Nurs</i> . 1990;15(2):70-72.	7/7
37	Bracken MB, Shepard MJ. Coping and adaptation following acute spinal cord injury: a theoretical analysis. <i>Paraplegia</i> . 1980;18(2):74-85.	7/7
38	Buckelew SP, Burk JP, Brownlee-Duffeck M, Frank RG, DeGood D. Cognitive and somatic aspects of depression among a rehabilitation sample: Reliability and validity of SCL-90-R research subscales. <i>Rehabilitation Psychology</i> . 1988;33(2):67-75.	4/4
39	Buckelew SP, Frank RG, Elliott TR, Chaney J, Hewett J. Adjustment to spinal cord injury: stage theory revisited. <i>Paraplegia</i> . 1991;29(2):125-130.	13/13
40	Budh CN, Osteraker AL. Life satisfaction in individuals with a spinal cord injury and pain. <i>Clinical Rehabilitation</i> . 2007;21(1):89-96.	10/10
41	Buunk AP, Zurriaga R, Gonzalez P. Social comparison, coping and depression in people with spinal cord injury. <i>Psychol Health</i> . 2006;21(6):791-807.	13/13
42	Byra S. Posttraumatic growth in people with traumatic long-term spinal cord injury: predictive role of basic hope and coping. <i>Spinal Cord</i> . 2016;54(6):478-482.	4/4
43	Cairns DM, Adkins RH, Scott MD. Pain and depression in acute traumatic spinal cord injury: origins of chronic problematic pain? <i>Arch Phys Med Rehabil</i> . 1996;77(4):329-335.	10/10
44	Cao Y, Walker EA, Krause JS. Environmental barriers and subjective health among people with chronic spinal cord injury: A cohort study. <i>Journal of Spinal Cord Medicine</i> . 2015;38(4):526-531.	2/2
45	Castriotta RJ, Wilde MC, Sahay S. Sleep disorders in spinal cord injury. <i>Sleep Medicine Clinics</i> . 2012;7(4):643-653.	7/7
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47	Chan RC, Lee PW, Lieh-Mak F. The pattern of coping in persons with spinal cord injuries. <i>Disabil Rehabil</i> . 2000;22(11):501-507.	13/13
48	Chapin MH, Holbert D. Differences in affect, life satisfaction, and depression between successfully and unsuccessfully rehabilitated persons with spinal cord injuries. <i>Rehabilitation Counseling Bulletin</i> . 2009;53(1):6-15.	10/10



Citation Number	Citation	Exclusion Code
49	Charlifue S, Apple D, Burns SP, et al. Mechanical ventilation, health, and quality of life following spinal cord injury. Archives of physical medicine and rehabilitation. 2011;92(3):457-463.	4/4
50	Charlifue S, Gerhart K. Changing psychosocial morbidity in people aging with spinal cord injury. Neurorehabilitation. 2004;19(1):15-23.	2/2
51	Chen Y, Anderson CJ, Vogel LC, Chlan KM, Betz RR, McDonald CM. Change in life satisfaction of adults with pediatric-onset spinal cord injury. Arch Phys Med Rehabil. 2008;89(12):2285-2292.	10/10
52	Chevalier Z, Kennedy P, Sherlock O. Spinal cord injury, coping and psychological adjustment: a literature review. Spinal Cord. 2009;47(11):778-782.	7/7
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444	Smith BM, Weaver FM, Ullrich PM. Prevalence of depression diagnoses and use of antidepressant medications by veterans with spinal cord injury. <i>Am J Phys Med Rehabil</i> . 2007;86(8):662-671.	13/13
445	Smith TF, Russell HF, Kelly EH, Mulcahey MJ, Betz RR, Vogel LC. Examination and measurement of coping among adolescents with spinal cord injury. <i>Spinal Cord</i> . 2013;51(9):710-714.	2/2
446	Soden RJ, Walsh J, Middleton JW, Craven ML, Rutkowski SB, Yeo JD. Causes of death after spinal cord injury. <i>Spinal Cord</i> . 2000;38(10):604-610.	10/10
447	Somasundaram O, Balakrishnan S, Ravindran OS, Shanmugasundaram TK. A psychological study of spinal cord injured patients involved in the Madras Paraplegia Project. <i>Paraplegia</i> . 1992;30(11):799-802.	10/10



Citation Number	Citation	Exclusion Code
448	Stroud MW, Bombardier CH, Dyer JR, Rimmele CT, Esselman PC. Preinjury alcohol and drug use among persons with spinal cord injury: implications for rehabilitation. <i>Journal of Spinal Cord Medicine</i> . 2011;34(5):461-472.	13/13
449	Stroud MW, Turner JA, Jensen MP, Cardenas DD. Partner responses to pain behaviors are associated with depression and activity interference among persons with chronic pain and spinal cord injury. <i>Journal of Pain</i> . 2006;7(2):91-99.	13/13
450	Summers JD, Rapoff MA, Varghese G, Porter K, Palmer RE. Psychosocial factors in chronic spinal cord injury pain. <i>Pain</i> . 1991;47(2):183-189.	13/13
451	Tamplin J, Baker FA, Grocke D, Berlowitz DJ. Thematic analysis of the experience of group music therapy for people with chronic quadriplegia. <i>Topics in Spinal Cord Injury Rehabilitation</i> . 2014;20(3):236-247.	10/10
452	Tasiemski T, Kennedy P, Gardner BP, Blaikley RA. Athletic Identity and Sports Participation in People With Spinal Cord Injury. <i>Adapt Phys Act Q</i> . 2004;21(4):364-378.	13/13
453	Tasiemski T, Kennedy P, Gardner BP, Taylor N. The association of sports and physical recreation with life satisfaction in a community sample of people with spinal cord injuries. <i>Neurorehabilitation</i> . 2005;20(4):253-265.	4/4
454	Tate DG, Forchheimer M, Bombardier CH, Heinemann AW, Neumann HD, Fann JR. Differences in quality of life outcomes among depressed spinal cord injury trial participants. <i>Archives of physical medicine and rehabilitation</i> . 2015;96(2):340-348.	4/4
455	Tate DG, Forchheimer M, Maynard F, Davidoff G, Dijkers M. Comparing two measures of depression in spinal cord injury. <i>Rehabilitation Psychology</i> . 1993;38(1):53-61.	13/13
456	Tate DG, Forchheimer MB, Karana-Zebari D, Chiodo AE, Kendall Thomas JY. Depression and pain among inpatients with spinal cord injury and spinal cord disease: differences in symptoms and neurological function. <i>Disabil Rehabil</i> . 2013;35(14):1204-1212.	4/4
457	Tate DG, Heinrich RK, Maynard F, Buckelew SP. Moderator-variable effect on the Brief Symptom Inventory test-item endorsements of spinal cord injury patients. <i>Paraplegia</i> . 1994;32(7):473-479.	4/4
458	Tate DG, Kalpakjian C, Chiodo A, et al. Treatment of mild to moderate depression in persons with SCI: A randomized clinical trial. <i>Archives of physical medicine and rehabilitation</i> . 93(10):E9.	7/7
459	Tate DG, Kewman DG, Maynard F. The Brief Symptom Inventory: Measuring psychological distress in spinal cord injury. <i>Rehabilitation Psychology</i> . 1990;35(4):211-216.	4/4
460	Tate DG. Alcohol use among spinal cord-injured patients. <i>Am J Phys Med Rehabil</i> . 1993;72(4):192-195.	13/13
461	Tavakoli SA, Kavian M, Bakhsh SC, et al. Is Level of Injury a Determinant of Quality of Life Among Individuals with Spinal Cord Injury? A Tertiary Rehabilitation Center Report. <i>Oman med</i> . 2016;31(2):112-116.	2/2
462	Tawashy AE, Eng JJ, Lin KH, Tang PF, Hung C. Physical activity is related to lower levels of pain, fatigue and depression in individuals with spinal-cord injury: a correlational study. <i>Spinal Cord</i> . 2009;47(4):301-306.	10/10

Citation Number	Citation	Exclusion Code
463	Tee JW, Chan CH, Gruen RL, et al. Early predictors of health-related quality of life outcomes in polytrauma patients with spine injuries: a level 1 trauma center study. <i>Global spine j</i> . 2014;4(1):21-32.	4/4
464	Temple RO, Elliott TR. Personality disorder characteristics and adjustment following spinal cord injury. <i>Topics in Spinal Cord Injury Rehabilitation</i> . 2000;6(1):54-65.	10/10
465	Tetrault M, Courtois F. Use of psychoactive substances in persons with spinal cord injury: a literature review. <i>Ann Phys Rehabil Med</i> . 2014;57(9-10):684-695.	11/11
466	Tirch D, Radnitz CL, Bauman WA. Depression and spinal cord injury: a monozygotic twin study. <i>Journal of Spinal Cord Medicine</i> . 1999;22(4):284-286.	11/11
467	Tomey KM, Chen DM, Wang X, Braunschweig CL. Dietary intake and nutritional status of urban community-dwelling men with paraplegia. <i>Arch Phys Med Rehabil</i> . 2005;86(4):664-671.	4/4
468	Tramonti F, Gerini A, Stampacchia G. Relationship quality and perceived social support in persons with spinal cord injury. <i>Spinal Cord</i> . 2015;53(2):120-124.	10/10
469	Tulsky DS, Kisala PA, Kalpakjian CZ, et al. Measuring depression after spinal cord injury: Development and psychometric characteristics of the SCI-QOL Depression item bank and linkage with PHQ-9. <i>Journal of Spinal Cord Medicine</i> . 2015;38(3):335-346.	6/6
470	Turner AP, Bombardier CH, Rimmele CT. A typology of alcohol use patterns among persons with recent traumatic brain injury or spinal cord injury: implications for treatment matching. <i>Arch Phys Med Rehabil</i> . 2003;84(3):358-364.	4/4
471	Turner JA, Jensen MP, Warms CA, Cardenas DD. Catastrophizing is associated with pain intensity, psychological distress, and pain-related disability among individuals with chronic pain after spinal cord injury. <i>Pain</i> . 2002;98(1-2):127-134.	4/4
472	Ullrich P, Jensen M, Loeser J, Cardenas D. Catastrophizing mediates associations between pain severity, psychological distress, and functional disability among persons with spinal cord injury. <i>Rehabilitation Psychology</i> . 2007;52(4):390-398.	2/2
473	Ullrich PM, Smith BM, Poggensee L, et al. Pain and post-traumatic stress disorder symptoms during inpatient rehabilitation among operation enduring freedom/operation iraqi freedom veterans with spinal cord injury. <i>Arch Phys Med Rehabil</i> . 2013;94(1):80-85.	13/13
474	Valtonen K, Karlsson AK, Alaranta H, Viikari-Juntura E. Work participation among persons with traumatic spinal cord injury and meningomyelocele1. <i>Journal of Rehabilitation Medicine</i> . 2006;38(3):192-200.	4/4
475	van Leeuwen CM, Edelaar-Peeters Y, Peter C, Stiggelbout AM, Post MW. Psychological factors and mental health in persons with spinal cord injury: An exploration of change or stability. <i>Journal of Rehabilitation Medicine</i> . 2015;47(6):531-537.	10/10
476	van Leeuwen CM, Hoekstra T, van Koppenhagen CF, de Groot S, Post MW. Trajectories and predictors of the course of mental health after spinal cord injury. <i>Arch Phys Med Rehabil</i> . 2012;93(12):2170-2176.	2/2
477	van Leeuwen CM, Post MW, Westers P, et al. Relationships between activities, participation, personal factors, mental health, and life satisfaction in persons with spinal cord injury. <i>Arch Phys Med Rehabil</i> . 2012;93(1):82-89.	2/2
478	van Leeuwen CM, van der Woude LH, Post MW. Validity of the mental health subscale of the SF-36 in persons with spinal cord injury. <i>Spinal Cord</i> . 2012;50(9):707-710.	6/6

Citation Number	Citation	Exclusion Code
479	Virseda-Chamorro M, Salinas-Casado J, Lopez-Garcia-Moreno AM, Cobo-Cuenca AI, Esteban-Fuertes M. Sexual dysfunction in men with spinal cord injury: a case-control study. <i>Int J Impot Res</i> . 2013;25(4):133-137.	10/10
480	Vissers M, van den Berg-Emons R, Sluis T, Bergen M, Stam H, Bussmann H. Barriers to and facilitators of everyday physical activity in persons with a spinal cord injury after discharge from the rehabilitation centre. <i>Journal of Rehabilitation Medicine</i> . 2008;40(6):461-467.	4/4
481	Weaver FM, LaVela SL, Miskevics S, Clemmons N, Janke EA, Spring B. Smoking behavior and readiness to change in male veterans with spinal cord injuries. <i>Rehabilitation Psychology</i> . 2007;52(3):304-310.	4/4
482	Weaver FM, Smith B, LaVela SL, et al. Smoking behavior and delivery of evidence-based care for veterans with spinal cord injuries and disorders. <i>Journal of Spinal Cord Medicine</i> . 2011;34(1):35-45.	13/13
483	Weeks DL, Greer CL, Bray BS, Schwartz CR, White JR, Jr. Association of antidepressant medication therapy with inpatient rehabilitation outcomes for stroke, traumatic brain injury, or traumatic spinal cord injury. <i>Arch Phys Med Rehabil</i> . 2011;92(5):683-695.	4/4
484	Weingardt KR, Hsu J, Dunn ME. Brief screening for psychological and substance abuse disorders in veterans with long-term spinal cord injury. <i>Rehabilitation Psychology</i> . 2001;46(3):271-278.	10/10
485	Westgren N, Levi R. Quality of life and traumatic spinal cord injury. <i>Arch Phys Med Rehabil</i> . 1998;79(11):1433-1439.	4/4
486	White B, Driver S, Warren AM. Resilience and indicators of adjustment during rehabilitation from a spinal cord injury. <i>Rehabilitation Psychology</i> . 2010;55(1):23-32.	10/10
487	Widerstrom-Noga EG, Felipe-Cuervo E, Yeziarski RP. Chronic pain after spinal injury: interference with sleep and daily activities. <i>Arch Phys Med Rehabil</i> . 2001;82(11):1571-1577.	4/4
488	Wilcox NE, Stauffer ES. Follow-up of 423 consecutive patients admitted to the Spinal Cord Centre, Rancho Los Amigos Hospital, 1 January to 31 December 1967. <i>Paraplegia</i> . 1972;10(2):115-122.	10/10
489	Williams RT, Heinemann AW, Bode RK, Wilson CS, Fann JR, Tate DG. Improving measurement properties of the Patient Health Questionnaire-9 with rating scale analysis. <i>Rehabilitation Psychology</i> . 2009;54(2):198-203.	4/4
490	Williamson ML, Elliott TR. Major depressive disorder and factorial dimensions among individuals with recent-onset spinal cord injury. <i>Rehabilitation Psychology</i> . 2013;58(1):10-17.	4/4
491	Wollaars MM, Post MW, van Asbeck FW, Brand N. Spinal cord injury pain: the influence of psychologic factors and impact on quality of life. <i>Clinical Journal of Pain</i> . 2007;23(5):383-391.	13/13
492	Wong AW, Heinemann AW, Wilson CS, et al. Predictors of participation enfranchisement after spinal cord injury: the mediating role of depression and moderating role of demographic and injury characteristics. <i>Arch Phys Med Rehabil</i> . 2014;95(6):1106-1113.	4/4

Citation Number	Citation	Exclusion Code
493	Wood-Dauphinee S, Exner G, Bostanci B, et al. Quality of life in patients with spinal cord injury--basic issues, assessment, and recommendations. <i>Restor Neurol Neurosci</i> . 2002;20(3-4):135-149.	7/7
494	Wool RN, Siegel D, Fine PR. Task performance in spinal cord injury: effect of helplessness training. <i>Arch Phys Med Rehabil</i> . 1980;61(7):321-325.	10/10
495	Woolrich RA, Kennedy P, Tasiemski T. A preliminary psychometric evaluation of the Hospital Anxiety and Depression Scale (HADS) in 963 people living with a spinal cord injury. <i>Psychol Health Med</i> . 2006;11(1):80-90.	13/13
496	Young ME, Rintala DH, Rossi CD, Hart KA, Fuhrer MJ. Alcohol and marijuana use in a community-based sample of persons with spinal cord injury. <i>Arch Phys Med Rehabil</i> . 1995;76(6):525-532.	10/10
497	Znoj HJ, Lude P. Regulation of emotion and psychological symptoms in people with spinal cord injury. <i>Swiss Journal of Psychology / Schweizerische Zeitschrift fur Psychologie / Revue Suisse de Psychologie</i> . 2002;61(4):203-210.	4/4

## Appendix D. Evidence Tables

**Table D-1. Risk of bias of systematic reviews**

Author, Year	Was an “a priori” design provided?	Was there duplicate study selection?	Was there duplicate data extraction?	Was a comprehensive literature search performed?	Was the status of publication (i.e., grey literature) used as an inclusion criterion?	Was inclusion/ exclusion criteria determined a priori?
Boldt, 2014	Yes	Yes	Yes	Yes	No	Yes
Craig, 2009	Yes	Unclear	Unclear	Yes	Unclear	Yes
Dorstyn, 2011 (CBT)	Yes	Unclear	Unclear	Yes	Unclear	Yes
Dorstyn, 2013 (telehealth)	Yes	Unclear	Unclear	Yes	Unclear	Yes
Jones, 2015	Yes	Unclear	No	Yes	No	Unclear
Kalpakjian, 2009	Yes	Yes	Partial	Yes	No	Partial
Le, 2016	Yes	Yes	Yes	Yes	Yes	Yes
Lusilla-Palacios, 2015	Yes	Unclear	Yes	Yes	No	Yes
Mehta, 2014	Yes	Yes	Yes	Yes	Yes	Yes
Muller, 2012	Yes	Yes	Yes	Yes	Unclear	Yes
Perkes, 2014	Yes	Yes	Yes	Yes	Unclear	Yes
Sakakibara, 2009	Yes	Yes	Yes	Yes	No	Yes
van Gorp, 2014	Yes	Unclear	Unclear	Yes	Unclear	Yes
van Leeuwen, 2012	Yes	Yes	Unclear	Yes	Unclear	Yes
Williams, 2015	Yes	Yes	No	Yes	Unclear	Yes

Author, Year	Was a list of included studies provided?	Was a list of excluded studies provided?	Were the characteristics of the included studies provided?	Was the scientific quality of the included studies assessed and documented?	Was the scientific quality of the included studies used appropriately in formulating conclusions?
Boldt, 2014	Yes	Yes	Yes	Yes	Yes
Craig, 2009	Yes	No	Yes	No	No
Dorstyn, 2011 (CBT)	Yes	No	Yes	Yes	Yes
Dorstyn, 2013 (telehealth)	Yes	No	Yes	Yes	Yes
Jones, 2015	Yes	No	Yes	No	No
Kalpakjian, 2009	Yes	No	Yes	No	No
Le, 2016	Yes	No	Yes	Unclear	Unclear
Lusilla-Palacios, 2015	Yes	No	Yes	No	Unclear
Mehta, 2014	Yes	No	Yes	Yes	Yes



Author, Year	Was a list of included studies provided?	Was a list of excluded studies provided?		Were the characteristics of the included studies provided?	Was the scientific quality of the included studies assessed and documented?	Was the scientific quality of the included studies used appropriately in formulating conclusions?
Muller, 2012	No	No		Yes	Yes	Yes
Perkes, 2014	Yes	No		Yes	Yes	Yes
Sakakibara, 2009	Yes	No		Yes	Yes	Yes
van Gorp, 2014	Yes	No		Yes	Yes	Yes
van Leeuwen, 2012	Yes	No		Yes	Yes	Yes
Williams, 2015	Yes	No		Yes	Unclear	Unclear

Author, Year	Were the methods used to combine the findings of studies appropriate? Do the qualitative syntheses and Strength of Evidence ratings appropriately consider factors such as precision, consistency, and methodological limitations?		Was the likelihood of publication bias assessed?	Were conflicts of interest described for the systematic review authors?	Were conflicts of interest described for authors of the primary studies?	Risk of Bias
Boldt, 2014	Yes		No	Yes	No	Low
Craig, 2009	Unclear		No	No	No	High
Dorstyn, 2011 (CBT)	Yes		Unclear	No	No	Medium
Dorstyn, 2013 (telehealth)	Yes		Unclear	Yes	No	Medium
Jones, 2015	Unclear		No	Yes	No	High
Kalpakjian, 2009	Yes		No	No	No	Medium
Le, 2016	Yes		Yes	Yes	No	Low
Lusilla-Palacios, 2015	No		No	Yes	No	Medium
Mehta, 2014	Yes		No	Yes	No	Medium
Muller, 2012	Yes		No	Yes	No	Medium
Perkes, 2014	Yes		Yes	Yes	No	Low
Sakakibara, 2009	Yes		No	No	No	Medium
van Gorp, 2014	Yes		No	Yes	No	Medium
van Leeuwen, 2012	Yes		No	Yes	No	Medium
Williams, 2015	Yes		Yes	No	No	Medium

**Table D-2. Risk of bias of randomized controlled trials**

Author, Year	Random-ization adequate?	Allocation concealment adequate?	Groups similar at baseline?	Outcome assessors masked?	Care provider masked?	Patient masked?	Intention-to-treat analysis	Acceptable level of overall attrition (<20%)	Acceptable level of differential attrition (<10%)	Risk of Bias
Cardenas, 2002	Yes	Unclear	Yes	Yes	Yes	Yes	Yes	No	Yes	Medium
Cardenas, 2013	Yes	Yes	Yes	Unclear	Yes	Yes	Yesv	Yes	Yes	Low
Diego, 2002	No	Unclear	Unclear	Yes	No	No	Unclear	Unclear	Unclear	High
Fann, 2015 Bombardier, 2014 Ruhe, 2005 Williams, 2016	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Low
Hicks, 2003 Martin-Ginnis, 2003	No	Unclear	Yes	Unclear	No	No	Yes	Yes	Yes	High
Houlihan, 2011 Houlihan, 2013 Mercier, 2015	Unclear	Unclear	No	Unclear	No	No	Yes	Yes	Yes	Medium
Nooijen, 2016	Yes	Unclear	Yes	Yes	No	No	Yes	No	Yes	Medium
Norrbrink, 2009	Unclear	Unclear	No	Unclear	Yes	Yes	Yes	Yes	Yes	High
Rintala, 2007	Yes	Unclear	Yes	Unclear	Unclear, double-blind	Unclear, double-blind	Yes	No	Yes	Medium
Siddall, 2006	Yes	Yes	Yes	Unclear	Unclear, double-blind	Unclear, double-blind	Yes	No	Yes	Medium
Yilmaz, 2014	Unclear	Unclear	Unclear	Unclear	Yes	Unclear, double-blind	Unclear	No	Yes	High

**Table D-3. Risk of bias of observational studies**

Author, Year	Non-biased selection?	Acceptable overall loss to follow-up or differential loss to follow-up?	Outcomes pre- specified and defined?	Ascertainment techniques adequately described?	Non-biased and adequate ascertainment methods?	Statistical analysis of potential confounders?	Adequate duration of follow-up?	Overall risk of bias rating (High, Medium, Low)
Ahoniemi, 2011	Yes	Unclear	Yes	Yes	Yes	Unclear	Yes	Medium
Bradley, 1994	No	No; Yes	Yes	Yes	Yes	No	Yes	High
Hartkopp, 1997	Yes	Unclear	Unclear	Yes	Yes	Unclear	Yes	Medium
Kalpakjian, 2006	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Medium
Kemp, 1999 “depression among african american..”	Unclear	Yes	Yes	Yes	Yes	Unclear	Yes	High
Kennedy, 2006 (psychosocial activity)	Unclear	Yes	Yes	Yes	Yes	No	Yes	High
Krause, 1999								
Krause, 2000 “health outcomes..”	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Medium
Krause, 2009	Yes	Yes	Yes	Yes	Yes	Unclear	Yes	Medium
Sweeney, 1982	No	Yes	Unclear	Yes	Unclear	No	Yes	High
Ullrich, 2014	Yes	Yes	Yes	Yes	Yes	Unclear	Yes	Medium

**Table D-4. Risk of bias of observational studies of risk factors**

Author, Year	The study sample adequately represents the population of interest?	The study data available (i.e., participants not lost to followup) adequately represent the study sample?	The prognostic factor is measured in a similar way for all participants?	The outcome of interest is measured in a similar way for all participants?	Important potential confounding factors are appropriately accounted for?	The statistical analysis is appropriate, and all primary outcome are reported?	Risk of Bias
Abdul-Sattar, 2014	Yes	Yes	Yes	Yes	Yes	Yes	Medium
Alschuler, 2013	Yes	Yes	Yes	Yes	Yes	Yes	Medium
Arango-Lasprilla, 2011	Yes	Yes	Yes	Yes	Yes	Yes	Medium
Bailey, 2012	Yes	Yes	Yes	Yes	Yes	Yes	Medium
Bannerjea, 2009	Yes	Yes	Yes	Yes	Yes	Yes	Medium
Binks, 1997	Unclear	Unclear	Unclear	Unclear	Unclear	Unclear	High
Bombardier, 2016	Yes	Yes	Yes	Yes	Yes	Yes	Medium
Burns, 2009 Burns, 2010	Yes	Unclear	Yes	Yes	Yes	Yes	Medium
Cao, 2014 (Rehab Psychology)	Unclear	Yes	Yes	Yes	Yes	Yes	Medium
Cao 2014b (Archives of...)	Yes	Yes	Yes	Yes	Yes	Yes	Medium
Catalano, 2011	Unclear	Unclear	Yes	Yes	Yes	Unclear	Medium
Charlifue, 1991	Yes	Yes	Yes	Yes	Yes	Yes	Medium
Cuff, 2014	Yes	Yes	Yes	Yes	Yes	Yes	Medium
Cragg, 2015	Unclear	Unclear	Yes	Yes	Yes	Yes	High
Craig, 2015	Unclear	Unclear	Yes	Yes	Yes	Yes	High
Danner, 2000	Yes (VA)	Yes	Yes	Yes	Yes	Yes	Medium
Daverat, 1995	Yes	Yes	Yes	Yes	Yes	Yes	Medium
Dodd, 2015	Yes	Yes	Yes	Yes	Yes	Yes	Medium
Dryden, 2005	Yes	Yes	Yes	Yes	Yes	Yes	Medium
Fann, 2013	Yes	Yes	Yes	Yes	Yes	Yes	Medium
Geyh, 2013	Yes	Yes	Yes	Yes	Yes	Yes	Medium
Gioia, 2006	Yes	Yes	Yes	Yes	Yes	Yes	Medium
Hartoonian, 2014	Yes	Yes	Yes	Yes	Yes	Yes	Medium
Hassanpour, 2012	Yes	Yes	Yes	Yes	Yes	Yes	Medium
Hatcher, 2009	Unclear	Yes	Yes	Yes	Yes	Yes	High



Author, Year	The study sample adequately represents the population of interest?	The study data available (i.e., participants not lost to followup) adequately represent the study sample?	The prognostic factor is measured in a similar way for all participants?	The outcome of interest is measured in a similar way for all participants?	Important potential confounding factors are appropriately accounted for?	The statistical analysis is appropriate, and all primary outcome are reported?	Risk of Bias
Hoffman, 2011	Yes	Yes	Yes	Yes	Yes	Yes	Medium
Holicky, 1999	Yes	Yes	Yes	Yes	Yes	Yes	Medium
Huang, 2014	Yes	Yes	Yes	Yes	Yes	Yes	Medium
Hwang, 2014	Yes	Yes	Yes	Yes	Yes	Yes	Medium
January, 2014 (Archives of Phys Med and Rehab)	Yes	Yes	Yes	Yes	Yes	Yes	Medium
January, 2015 (Rehabilitation Psych)	Yes	Yes	Yes	Yes	Yes	Yes	Medium
Jensen, 2014	Yes	Yes	Yes	Yes	Yes	Yes	Medium
Kalpakjian, 2011	Yes	Yes	Yes	Yes	Yes	Yes	Medium
Kemp, 2014	Yes	Yes	Yes	Yes	Yes	Yes	Medium
Krause, 2010 (arch phys med rehabil)	Yes	Yes	Yes	Yes	Yes	Yes	Medium
LaVela, 2012	Unclear	Unclear	Yes	Yes	Yes	Yes	High
Lidal, 2013	Unclear	Unclear	Yes	Yes	Yes	Yes	High
Lin, 2009	Unclear	Unclear	Yes	Yes	Yes	Yes	High
Liu, 2010	Unclear	Yes	Yes	Yes	Yes	Yes	Medium
Lundqvist, 1997	Unclear	Yes	Yes	Yes	Yes	Yes	Medium
Martz, 2005 (rehab psych)	Unclear	Yes	Yes	Yes	Yes	Yes	Medium
McCullumsmith, 2015	Yes	Yes	Yes	Yes	Yes	Yes	Medium
Migliorini, 2008	Yes	Yes	Yes	Yes	Yes	Yes	Medium
Migliorini, 2009	Yes	Yes	Yes	Yes	Yes	Yes	Medium
Monin, 2014	Yes	Yes	Yes	Yes	Yes	Yes	Medium
Muller, 2015	Yes	Yes	Yes	Yes	Yes	Yes	Medium
Nam, 2013	Yes	Yes	Yes	Yes	Yes	Yes	Medium
Nelson, 2010	Yes	Yes	Yes	Yes	Yes	Yes	Medium
Nielsen, 2003	Yes	Yes	Yes	Yes	Yes	Yes	High
O'Shea, 2014	Yes	Yes	Yes	Yes	Yes	Yes	Medium
Oh, 2006	Yes	Yes	Yes	Yes	Yes	Yes	Medium

Author, Year	The study sample adequately represents the population of interest?	The study data available (i.e., participants not lost to followup) adequately represent the study sample?	The prognostic factor is measured in a similar way for all participants?	The outcome of interest is measured in a similar way for all participants?	Important potential confounding factors are appropriately accounted for?	The statistical analysis is appropriate, and all primary outcome are reported?	Risk of Bias
Pakpour, 2016	Yes	Yes	Yes	Yes	Yes	Yes	Medium
Peter, 2015	Yes	Yes	Yes	Yes	Yes	Yes	Medium
Riggins, 2011	Yes	Yes	Yes	Yes	Yes	Yes	Medium
Rintala, 2005	Yes	Yes	Yes	Yes	Yes	Yes	Medium
Saunders, 2011 Saunders, 2013	Yes	Unclear	Yes	Yes	Yes	Yes	Medium
Saunders, 2012	Yes	Yes	Yes	Yes	Yes	Yes	Medium
Schandler, 1995	Yes	Yes	Yes	Yes	Yes	Yes	Medium
Schonenberg, 2014	Yes	Yes	Yes	Yes	Yes	Yes	Medium
Tasiemski, 2011	Yes	Yes	Yes	Yes	Yes	Yes	Medium
Tate, 1994	Yes	Yes	Yes	Yes	Yes	Yes	Medium
Tate, 2004	Yes	Yes	Yes	Yes	Yes	Yes	Medium
Tsai, 2014	Yes	Yes	Yes	Yes	Yes	Yes	Medium
Ullrich, 2013 (rehabilitation psychology)	Yes	Yes	Yes	Yes	Yes	Yes	Medium
Ullrich, 2014	Yes	Yes	Yes	Yes	Yes	Yes	High
Williams, 2014	Yes	Yes	Yes	Yes	Yes	Yes	Medium