

Case Definition for Surveillance of Work-Related Musculoskeletal Disorders (WMSDs) in the Washington Workers' Compensation System

September 2020

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SHARP Technical Report 99-05-2020



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INTRODUCTION

Rationale

There are few public health surveillance systems for work-related musculoskeletal disorders (WMSDs). WMSD surveillance systems have relied on case definitions using available administrative data from workers compensation data systems, or clinic or physician based case reporting schemes. Washington State (WA) has one of the few public health surveillance systems for WMSDs. This system uses the monopolistic workers' compensation data for case ascertainment. Periodically, the case identification methods need refinement based on the evolution of administrative data systems and updated information available for case detection and validation. The diagnostic coding system change from the International Classification of Diseases (ICD)-9-Clinical Modification (CM) to ICD-10-CM prompted us to evaluate and revise our previously used WMSD case definitions¹⁻³.

WMSDs defined

For the purpose of surveillance with the WA workers' compensation system, we define WMSDs as conditions that disturb or disrupt the functions of the musculoskeletal system, and are caused or exacerbated by work. These conditions typically affect soft tissues such as joints, nerves, tendons, ligaments, muscles, blood vessels, cartilage, or spinal discs. WMSDs occur when the physical requirements (intensity, frequency, and duration) of the job exceed the physical capacity of the human body. WMSDs are generally caused by work activities that are repetitive, require forceful exertion, or involve awkward postures and unnatural positions of the worker. WMSDs may also result from exposure to vibration. By definition, WMSDs do not include injuries resulting from impact, such as slips/trips/falls, struck by/against, cuts, or motor vehicle crashes. WMSDs often develop gradually over time, with an accumulation of exposures leading to wear and tear on the body. WMSDs may also appear as an immediate effect of certain exposures, which is more common with high-force exertions (e.g., lifting a heavy object).

METHODS

Description of Washington workers' compensation system

The Washington State Department of Labor and Industries' State Fund provides workers' compensation coverage to approximately 179,000 employers for 3 million workers in WA⁴. All employers in the state obtain workers' compensation coverage from the State Fund unless they are covered by an alternate system (e.g., the federal government, employers of railroad and long-shore workers), are specifically exempted in WA Statute (e.g., the self-employed), or self-insure. The State Fund covers approximately 75% of non-exempt workers in WA, and the remaining 25% work for self-insured employers⁴. The Department administers all State Fund claims, and regulates self-insured employers management of claims. Available information on self-insured claims is limited. State Fund claims and self-insured claims are included in the results in this report, unless otherwise noted due to data limitations.

Workers' compensation claims

Claims with an injury date between January 1, 2006 and December 31, 2018 were included in this evaluation. Evaluation of claims with case definitions based on ICD-10-CM (International Classification of Diseases with clinical modification, 10th revision) codes were limited to those with medical services after October 1, 2015. Throughout this report, we divide workers' compensation claims into three categories—accepted, medical aid only and compensable. Accepted claims are the combination of medical aid only claims and compensable claims. Medical aid only refers to claims that were reimbursed for medical costs only. Compensable claims were reimbursed for medical costs and additional costs such as time-loss compensation, permanent disability awards, survivors' benefits, funeral expenses, and/or pension benefits. To qualify for a compensable claim, the injured worker must have been medically certified as unable to perform normal work duties beyond a three-calendar-day waiting period not including the day of the injury. We excluded state fund and self-insured claims that were rejected for workers compensation benefits.

Claim information from the Report of Industrial Injury or Occupational Disease, usually referred to as the Report of Accident (ROA) was used for this evaluation. The ROA contains information from the injured worker or employer, and initial diagnosis of the treating physician. The injured worker or employer describe the event(s) that led to the injury/illness and the nature of the injury/illness. Along with the initial diagnosis from the physician, this information on the ROA is used to assign OIICS (Occupational Injury and Illness Coding System) codes that describe the event or exposure that led to the injury/illness, the nature of the injury/illness, source of the injury/illness, and body part affected⁵. OIICS codes are assigned based upon information available early during the life of the claim, which is typically within a month after the claim is established. OIICS coding, based on the ROA, reflects the primary injury/illness for which the worker first sought medical treatment. All WA workers' compensation claims after 2005 are assigned OIICS v1.01 codes by specialized staff within the Department.

Claim information was also gathered from the medical records provided to the Washington workers' compensation system for adjudication of the claim and administration of benefits. We have medical records for the work-related injuries and illnesses reimbursed by the Washington workers' compensation among all State Fund claims. This information is not consistently available for all accepted self-insured claims, however. Therefore, parts of this evaluation are limited to State Fund claims.

Manual review of claims

A case definition based on the OIICS codes was evaluated and revised to distinguish claims resulting from WMSDs from claims for other work-related injuries or illnesses. To determine the inclusion and exclusion criteria for this case definition, diagnosis information and circumstances that led to the injury recorded on the ROA were reviewed among a random sample of claims identified as potential WMSD cases. In general, a sample of 100 claims was pulled and reviewed by an epidemiologist and/or an occupational medicine physician for each OIICS code evaluated. Not all OIICS codes included in this case definition were evaluated by manual review (see Table 1). More than half (>50%) of reviewed claims were required to be consistent with the definition of a WMSD detailed in the introduction of this report

for inclusion. For the positive WMSD cases, we then described the claims by body area affected. OIICS body part codes were combined to create mutually exclusive body area categories as detailed below.

We also evaluated and revised case definitions for several specific WMSDs, including carpal tunnel syndrome, rotator cuff syndrome, epicondylitis, and sciatica. Among the positive WMSD cases identified using OIICS as described above, we reviewed claims with ICD-10-CM diagnostic codes that indicate the above specific WMSD conditions. We pulled a simple random sample of 100 claims for each specific condition. These samples were then reviewed manually using information from the ROA and associated medical records.

The manual review for these conditions was more detailed than for the OIICS-based WMSD case definition, as the specificity of the case definition increased. The manual review for the specific WMSD conditions involved both OIICS and ICD-10-CM diagnostic codes. Each claim receives one set of OIICS codes (nature, event, part of body, and source), which represent the primary reason the worker first sought medical treatment. Throughout the life of the claim however, many diagnostic ICD-10-CM codes may be reimbursed by workers' compensation. These diagnostic codes could be the primary injury or illness described by OIICS codes, injuries or illnesses caused by the same work exposure that led to the primary injury or illness, or for additional conditions that delay recovery from the primary condition. Therefore, we reviewed for alignment with OIICS and ICD-10-CM diagnostic codes to ensure our surveillance case definitions would identify claims for specific WMSD conditions that were the primary reason for the claim. Because multiple conditions may be reimbursed for a claim within workers' compensation, we also quantified medical costs for conditions unrelated to the primary work-related injury or illness captured by these case definitions.

The remaining body of this report details the final, revised WMSD case definitions to be used for surveillance within the Washington workers' compensation system followed by the claim review results and rationale for the inclusions and exclusions for those case definitions.

DEVELOPMENT OF A WORK-RELATED MUSCULOSKELETAL DISORDER (WMSD) CASE DEFINITION FOR SURVEILLANCE

The case definition we developed to identify WMSD claims is based on the Occupation Illness and Injury Coding System (OIICS) nature **and** event codes⁴. In general, a claim must be coded as a condition that disrupts the musculoskeletal system caused by certain work activities as described above (forceful exertion, repetitive motion, awkward postures, or vibration). See Table 1 for the WMSD case inclusion criteria based on OIICS nature and event codes. The inclusion and exclusion of event and nature codes for the WMSD case definition was based on an evaluation of certain OIICS codes. Not all OIICS event and nature codes were evaluated. Some codes were automatically included or excluded based on extensive previous work with the codes¹⁻³. For example, overexertion and repetitive motion events were included but not formally evaluated. Alternatively, all claims with a nature coded as a neoplasm were excluded

without evaluation. Details about the event and nature codes evaluated are described below. Evaluation by manual review of codes that are included in the case definition are specified in Table 1.

WMSD event codes

See Table 2 for OIICS descriptions of the exposures or events included in the WMSD case definition. To understand the real-life events that led to these workers' compensation claims better, we provide some common circumstances described in the claim narratives from those claims with the WMSD event codes in Table 3. Frequencies of claims with WMSD events as described above by claim type are found in Table 4. Claims with WMSD events are approximately one quarter of all accepted claims (23.5%), 16.6% of medical aid only claims, and 40.0% of compensable claims. Due to data limitations with self-insured claims, almost all (98%) of these claims have blank or unclassifiable OIICS event codes. Therefore, the proportions of all accepted and medical-aid only claims with WMSD events are underestimates.

The following event codes were evaluated, but did not meet the criteria for inclusion, see Table 5. The bodily reaction event codes 210 ("bodily reaction, unspecified"), 213 ("Running—without other incident"), 217 ("Walking—without other incident"), and 219 ("Bodily reaction, n.e.c.") were excluded from the WMSD case definition. The majority (>50%) of claims with these bodily reaction codes did not have enough information about the event leading to the injury/condition, or the description of the event was not related to WMSDs. Many of the claims coded with the excluded bodily reaction codes mentioned above resulted from loss of balance or instability such as ankle/knee sprains and strains while working on uneven surfaces, or ankle sprains when stepping off ladder or out of truck/tractor. These types of events are similar to slips/trips/falls, and not considered WMSDs here.

The claims coded as an unclassifiable event, '9999', were also evaluated for inclusion (Table 5). Events leading to WMSDs may be particularly vague due to their often-cumulative nature. Therefore, we reviewed the available medical records and the narratives on the ROA for a random sample of 100 claims coded as event= '9999' to determine if more detail about the event could be found and, if the event was one of the WMSD exposures established earlier. We were able to find more information in some cases about the event during the review; however, less than half of the claims had additional event information and fit one of the WMSD events listed above. So, this event code is excluded from the WMSD case definition. See Table 6 for the frequencies of claims with the OIICS event codes that were evaluated and excluded from the WMSD case definition.

WMSD nature codes

OIICS nature codes were similarly evaluated for inclusion and exclusion in the WMSD case definition. Only those claims with an *event* code listed in Table 1 were evaluated for nature code inclusion (i.e., if the event that led to the claim was not a WMSD event, the nature was not evaluated for inclusion). Additionally, only a subset of nature codes were evaluated for inclusion, those that potentially fit a musculoskeletal disorder (see Tables 1 and 9). All evaluated nature codes were kept for inclusion for the WMSD case definition. Fewer exclusions (none) were made at this step, as we were only evaluating a subset of claims already identified as being caused by a WMSD event. See Table 7 for the OIICS

descriptions of the natures included in the WMSD case definition, and Table 8 for specific examples of the nature codes included from claim narratives. Frequencies of claims with the WMSD nature codes, among those claims with a WMSD event, are found in Tables 9–11. Sprains, strains, and tears were the most frequent WMSD nature.

Claims with an unclassifiable nature, but a WMSD event were also evaluated for inclusion. Self-insured claims are more likely to be coded with nature=‘unclassifiable’ because the Department receives less information on those claims, and receives the information at different times in the life of the claim compared to the State Fund claims. For self-insured accounts, OIICS codes are only assigned to compensable claims. We reviewed a sample of the claims where nature was unclassifiable and claim had a WMSD event code. The review included all documents on file for that claim, beyond the Report of Accident/Report of Industrial Injury and Occupational Disease forms. We found enough information for over half of these to determine they fit into one of the WMSD nature categories, and therefore, included this code in our WMSD case definition. It was especially important to include this nature for the self-insured claims, because over one-quarter (28%) of their claims with a WMSD event had an unclassifiable nature code.

WMSD case definition: event and nature

Claim frequencies for the final WMSD case definitions are found in Table 12, using the OIICS event and nature codes described in Table 1. WMSDs were 21% of all accepted claims, 15% of medical aid only claims, and 36% of compensable claims.

WMSDs are often described as disorders that develop gradually, over time as opposed to resulting from a single event or exposure. However, we do not make that distinction with this WMSD case definition for several reasons. Workers’ compensation claim data rely on report of the event or exposure from the injured worker, and workers aren’t describing the development and progression of their symptoms. As described earlier, WA workers’ compensation claims are assigned OIICS codes based upon the information provided on the ROA, which typically comes from the workers’ recount of the incident. Workers may attribute their disorder to the last exposure before the pain, even if the disorder had a gradual onset—e.g., even if they repetitively throw trash into bins during their shift, they may only describe the one time they threw trash and it resulted in pain or when the pain a certain threshold of severity. There also may be the perception that a claim is more likely to be accepted and an injury deemed work-related if the worker can describe a specific individual exposure that happened at work that directly led to their symptoms.

Additionally, there are limitations with OIICS coding rules that make the distinction between the onset and progression of symptoms. The OIICS selection rules indicate a strained back should be placed in the traumatic injury category of “Sprains, strains, tears” without consideration of the event or exposure¹. This results in many claims being coded with a nature in the traumatic injury category (i.e., caused by a single event), and an event or exposure code in the repetitive motion category. Approximately half (46%) of our accepted claims with an event or exposure code in the repetitive motion category are also coded as having a traumatic injury nature.

We are equally interested in capturing cases that present with the immediate onset of symptoms as we are in capturing those that develop gradually over time. That distinction typically does not change the ergonomic approaches used for prevention. For example, proper lifting techniques will reduce hazards associated with repetitive lifting, or infrequent lifting requiring high-force. The more important distinction here is by how the injury or disorder may be prevented. Therefore, the WMSD case definition described here does not include injuries resulting from impact—slips, trips, and falls; struck by/against; and cuts or punctures.

WMSDs by part of body

The distribution of WMSD claims by specific OIICS body part code is displayed in Table 13. The most frequent body regions affected by WMSDs were lumbar region; shoulder, including clavicle, scapula; and wrist(s). We have collapsed the specific body part codes into ten mutually exclusive body region categories for surveillance uses (see Table 14). More information about specific body parts included in the ‘other’ region category can be found in Table 15. WMSD claim frequencies are displayed in Table 16 by body region and claim type. The back was the region most affected in WMSD claims, over 42% of all accepted WMSD claims affected the back. This is an underestimate because some WMSDs affecting the back may also be in the ‘multiple body parts’ category.

Overexertion hernia

We also created a separate case definition for hernias caused by overexertion as these disorders have similar approaches to prevention as other overexertion injuries and disorders, though are not technically disorders of the musculoskeletal system. This hernia case definition includes inguinal and ventral hernias caused by overexertion (OIICS event= 22). See Table 17 for included nature codes and claim frequencies of the overexertion hernia cases. Hernias are not included in the WMSD case definition described earlier.

Comparison to BLS

The Bureau of Labor Statistics (BLS) also uses a WMSD case definition based on OIICS nature and event codes for surveillance using the Survey of Occupational Injuries and Illnesses (SOII) data². The current BLS WMSD case definition is based on OIICS v2.01 and the Washington workers’ compensation system uses OIICS v1.01. Overall, the WMSD case definition described here, WA WMSD, is very similar to the BLS case definition with a few differences, including OIICS version. The BLS WMSD case definition includes hernias, while we have created a separate case definition for hernias in WA. The WA WMSD case definition also includes the following events or exposures, which BLS does not include: bodily reaction, sitting; bodily reaction, standing; and rubbed or abraded by kneeling on surface. Finally, the WA WMSD case definition also includes some non-specific nature categories that BLS does not, such as “symptoms, signs and ill-defined conditions”. We have been able to identify additional nature and event categories that are likely WMSDs in WA through review of medical records for claims as described above, whereas the BLS definition was created with limited information.

SPECIFIC MUSCULOSKELETAL CONDITION CASE DEFINITIONS—CARPAL TUNNEL SYNDROME, EPICONDYLITIS, AND ROTATOR CUFF SYNDROME

Final case definitions

In addition to tracking WMSDs by body region, we have also created surveillance definitions for specific WMSDs—carpal tunnel syndrome (CTS), rotator cuff syndrome (RCS), and medial and lateral epicondylitis based on the findings from the evaluation detailed later. These case definitions are multi-part, and rely on information from both OIICS and ICD-9-CM/ICD-10-CM diagnostic codes. Overall, the claim must meet the following inclusion criteria:

1. Meets requirements for the WMSD case, based on OIICS nature and event codes (see Table 1), **AND**
2. OIICS body part codes are consistent with the specific WMSD, **AND**
3. Workers' compensation paid medical bills for diagnosis and treatment of the specific WMSD as indicated by the specific ICD-9/10-CM codes.

The criteria used to identify these claims is more complex than the previous WMSD cases because it requires additional information beyond OIICS codes. Epicondylitis and RCS are instructed to receive the same OIICS nature code—1739, 'rheumatism, except the back'. Therefore, those two conditions can't be distinguished from OIICS codes alone. Alternatively, CTS does have a specific OIICS nature code, 1241, but it is also important to use diagnosis information throughout the life of the claim to ensure most CTS cases are captured. At the time of OIICS assignment, some CTS cases receive less-specific diagnoses, such as wrist tendonitis. Then, after more in-depth diagnostic testing is performed, it is determined the wrist tendonitis, for example, is actually CTS. Medical diagnosis information is currently only available for State Fund claims, so these specific-condition cases cannot be used to capture self-insured cases.

It was also important to consider OIICS codes for the case definitions because multiple conditions may be reimbursed in the life of a claim by workers' compensation because (1) they are directly related to the work-related exposure or (2) the condition is delaying recovery from the primary work-related injury or condition. For example, treatment for depression may be paid for by workers' compensation within a claim for a fall-related injury to aid recovery and return to work. Therefore, the diagnosis code for depression exists in the claim for a fall-related injury. However, to classify that claim as a workers' compensation claim for depression would be misleading. Accordingly, we also require the OIICS information (i.e., the primary reason the worker first sought medical treatment) is consistent with the case we are describing. The OIICS event information is also important to consider ensuring we are only capturing cases caused by one of the WMSD events described earlier, and not a car crash or a fall, for example. Details on the codes included in each case definition are displayed in Table 18.

Claim file review results

A systematic review of workers' compensation claim files was conducted and used to develop the case inclusion and exclusion criteria described above. We reviewed the medical records of a simple random

sample of 400 State Fund claims that met the requirements for a WMSD as described above, and had the ICD-10-CM diagnosis codes related to CTS (n=100), RCS (n=100), Epicondylitis (n=100), and Sciatica (n=100). See Table 19 for diagnosis codes used for sample selection. The diagnosis codes could have appeared during any time throughout the life of the claim from medical and/or hospital bills. Diagnosis codes for procedure and visit charges that were not reimbursed by workers' compensation were not considered for inclusion.

Each sample of WMSD conditions (CTS, RCS, epicondylitis, and sciatica) was reviewed for the following:

1. Were the OIICS nature and body part codes on the ROA consistent with the current condition under evaluation?
2. Were symptoms of the condition under evaluation documented in the medical records?
3. Were the clinical findings consistent with the condition under evaluation?
4. Can the condition be confirmed by diagnostic test or specific surgical intervention?
5. What proportion of medical and hospital costs were associated with conditions unrelated to those under evaluation?

Results from the claim review are detailed in Table 20. Most claims (93%) with an RCS or sciatica diagnosis code were generally described as a shoulder or back WMSD, respectively, on the ROA indicating these conditions are the primary reason the injured worker first sought medical care. Over half (56%) of the CTS claim sample had the specific OIICS nature code for CTS, 1241, and an additional 27% had OIICS codes for general hand/wrist WMSDs such as wrist tendonitis. Approximately three-quarters (74%) of the epicondylitis claims generally described elbow WMSDs on the ROA. Symptoms of the conditions under evaluation were usually found in the medical records for all of the conditions under evaluation (84%–98%). Typically, symptoms were pain in specific areas of the body, or in response to specific types of movement.

Criteria used for positive clinical findings was specific to each condition reviewed, and developed by an occupational medicine physician. Each test or clinical finding has its own sensitivity and positive predictive value (PPV). Clinical findings here are considered to be additional information to confirm a case, but not to be used alone to evaluate the validity of the case definition. Specifically, the medical records were reviewed for the following:

1. **CTS:** tests to induce median nerve symptoms—Tinel's test, Phalen's test, or carpal compression test.
2. **Epicondylitis:** lateral epicondylitis—Cozen's, Mill's, Maudsley's, or chair lift tests; medial epicondylitis—golfer's elbow, or reverse Cozen's test. Pain in the epicondylar area induced by hand and wrist motions against resistance, such as resisted flexion, was also considered a positive clinical finding.
3. **RCS:** active range of motion limited or painful—painful arc or Apley scratch test; pain on resisted abduction or external rotation—empty can test or Jobe's test.
4. **Sciatica:** clinical tests induced pain radiating down leg or positive for sciatica—straight leg raise or Lasegue's test.

Clinical findings positive for the conditions under review were not consistently documented, see Table 20.

We used information from radiologic or electrodiagnostic tests and specific surgical interventions to confirm the condition within the sample of claims. For each separate condition, we reviewed for specific radiologic or electrodiagnostic tests and interventions determined by an occupational medicine physician, see Table 21. Using these criteria, we were able to confirm 68% of CTS cases, 12% of epicondylitis cases, 61% of RCS cases and 28% of sciatica cases. One-third (34%) of the claims pulled for the sciatica sample were confirmed to not have sciatica, therefore we will not be using this classification for WMSD claim surveillance going forward. Few epicondylitis claims were confirmed cases, because of limited criteria available to confirm.

Finally, we calculated medical and hospital bill costs by diagnosis code to determine the proportion of claim costs associated with specific conditions unrelated to the WMSDs under evaluation (e.g., a procedure charged with a back-related diagnosis code in a claim within the CTS sample), Table 20. Charges for procedures with no diagnosis codes or non-specific diagnoses were not counted as an unrelated condition cost. This calculation was not performed for the sciatica sample, as we decided not to use this surveillance definition based on the previous results. Approximately 9-18% of the medical bill costs associated with these claims were for treating conditions not related to CTS, epicondylitis, or RCS. This proportion was slightly higher for the hospital bill costs. Not all claims have hospital bills, it is typically the more severe or complex cases (e.g., those with co-occurring conditions) that require hospitalization.

Based on these results, we restricted the criteria to identify CTS, epicondylitis and RCS claims. The claim must have a diagnosis code billed to and paid by workers' compensation, as described in Table 18. The claims' ROA information, i.e., OIICS codes, must also match the condition being described. This ensures mutually exclusive categories because diagnosis codes related to multiple conditions may be paid by workers' compensation for a claim. This restriction also ensures we are describing the primary condition for which the worker first sought medical treatment. Additionally, two of the ICD-10-CM codes evaluated for RCS (S46.0 and S43.42) were excluded from the final case definition. These diagnosis codes identified claims that were less likely to be confirmed RCS cases— 61% confirmed cases when including S46.0/S43.42 versus 84% without, see Tables 20 and 22. Including these restrictions generally increased the proportion of cases confirmed and decreased the costs for unrelated conditions within the samples of claims, see Table 22.

Acknowledgements

I would like to thank several people from the Safety and Health Assessment and Research for Prevention (SHARP) program for their important contributions to this work—Amanda Robinson for thorough review of claim and medical records, Christina Rappin for formatting and editing of the report, and Darrin Adam, Dr. Stephen Bao and Dr. Dave Bonauto for their thoughtful review of this work.

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Table 1. WMSD surveillance case definition inclusion criteria.

WMSD case definition requires claim be coded with one of the following event codes AND one of the following nature codes.	Evaluated by manual review
OIICS v1.01 event	
051 Rubbed or abraded by kneeling on surface	Yes
06* All rubbed, abraded, or jarred by vibration included	No
211 Bodily reaction: bending, climbing, crawling, reaching, twisting	Yes
214 Bodily reaction: sitting	Yes
216 Bodily reaction: standing	Yes
22* All overexertion events included	No
23* All repetitive motion events included	No
OIICS v1.01 nature	
011 Traumatic injuries and disorders: dislocations of bone or cartilage	No
013 Traumatic injuries and disorders: traumatic injuries to spinal cord	No
014 Traumatic injuries and disorders: traumatic injuries to nerves, except spinal cord	No
021 Traumatic injuries and disorders: sprains, strains, tears	No
029 Traumatic injuries and disorders: injuries to muscles, tendons, ligaments, joints, etc., n.e.c.	No
0972 Traumatic injuries and disorders: back pain, hurt back	No
0973 Traumatic injuries and disorders: soreness, pain, hurt, except the back	No
1241 System diseases and disorders: Carpal Tunnel Syndrome	No
1249 System diseases and disorders: other disorders of the peripheral nervous system, n.e.c.	No
1371 Circulatory system diseases: Raynaud's syndrome or phenomenon	No
17* All musculoskeletal system and connective tissue diseases and disorders included	No
40 Symptoms, signs and ill-defined conditions: unspecified	Yes
410 Symptoms, signs and ill-defined conditions: symptoms, unspecified	Yes
4110 Symptoms, signs and ill-defined conditions: general symptoms, unspecified	Yes
4119 Symptoms, signs and ill-defined conditions: general symptoms, n.e.c.	Yes
412 Symptoms, signs and ill-defined conditions: symptoms involving nervous and musculoskeletal systems	Yes
48* Symptoms, signs and ill-defined conditions: multiple symptoms, signs, and ill-defined conditions	Yes
49 Symptoms, signs and ill-defined conditions: n.e.c.	Yes
9999 Nonclassifiable	Yes

WMSD= work-related musculoskeletal disorder; OIICS = Occupational Injury and Illness Classification System; n.e.c. = not elsewhere classifiable

*All codes in division are included

Table 2. Description of OIICS event codes included in the WMSD case definition.

OIICS v1.01 event codes	Description of OIICS event code ¹
05* Rubbed or abraded by friction or pressure	Codes in this major group apply to cases in which the injury or illness was produced by friction or pressure between the person and the source of injury or illness. Typically, the nature of the injuries or illnesses resulting from these events will involve superficial injuries such as blisters, scratches or abrasions, or they will involve damage to the nerves or circulatory system from jarring, vibration or repetition of pressure.
06* Rubbed, abraded, or jarred by vibration	Codes in this major group apply to non-impact cases in which the injury or illness was produced by vibration between the person and the source of injury or illness. Instances of damage to nerves or circulatory system due to vibration, rather than voluntary motion (e.g., Raynaud's phenomenon) should be coded here.
21* Bodily reaction	<p>Codes in this major group apply to injuries or illnesses generally resulting from a single incident of free bodily motion which imposed stress or strain upon some part of the body.</p> <p>Generally, codes in this major group apply to the occurrence of strains, sprains, ruptures, nerve damage, stress fractures, or other injuries or illnesses resulting from the assumption of an unnatural position or from voluntary or involuntary motions induced by sudden noise, fright, or efforts to recover from slips or loss of balance (not resulting in falls). This category also includes injuries and illnesses resulting from prolonged sitting, standing, or viewing.</p>
22* Overexertion	Overexertion applies to cases, usually non-impact, in which the injury or illness resulted from excessive physical effort directed at an outside source of injury or illness. The physical effort may involve lifting, pulling, pushing, turning, wielding, holding, carrying, or throwing the source of injury/illness.
23* Repetitive motion	Repetitive motion applies when an injury or illness resulted from bodily motion which imposed stress or strain upon some part of the body due to a task's repetitive nature.

WMSD= work-related musculoskeletal disorder; OIICS = Occupational Injury and Illness Classification System

*All codes in division are included

Table 3. Specific examples of common claim circumstances coded for the WMSD OIICS event codes, Washington workers' compensation system.

OIICS v1.01 event codes		Common examples from claim narratives
051	Rubbed or abraded by kneeling on surface	Kneeling on hard surfaces (e.g., concrete floor) for extended periods of time
06*	All rubbed, abraded, or jarred by vibration included	Operating heavy equipment (e.g., backhoe, bulldozer, loader, jack hammer); driving trucks, buses, fork lifts
211	Bodily reaction: bending, climbing, crawling, reaching, twisting	Bending over, or reaching up for objects
214	Bodily reaction: sitting	Prolonged sitting (e.g., in desk chair or while driving)
216	Bodily reaction: standing	Standing from sitting, squatting, or kneeling positions
22*	All overexertion events included	Lifting or transferring patients, and lifting objects
23*	All repetitive motion events included	Repetitive use of tools or mouse/keyboard

OIICS = Occupational Injury and Illness Classification System

*All codes in division are included

Table 4. Frequencies of claims with the OIICS event codes included in WMSD case definition, Washington workers' compensation system, State Fund and self-insured claims, 2006–2018.

OIICS v1.01 event code		All accepted claims		
		Total (n)	Annual average	Percent of total (1,638,733)
051	Rubbed or abraded by kneeling on surface	2,028	169	0.1%
06*	All rubbed, abraded, or jarred by vibration included	1,973	164	0.1%
211	Bodily reaction: bending, climbing, crawling, reaching, twisting	36,693	3,058	2.2%
214	Bodily reaction: sitting	570	48	0.0%
216	Bodily reaction: standing	1,315	110	0.1%
22*	All overexertion events included	295,507	24,626	18.0%
23*	All repetitive motion events included	47,702	3,975	2.9%
Total	All WMSD events	385,788	32,149	23.5%

OIICS v1.01 event code		Medical aid only claims**		
		Total (n)	Annual average	Percent of total (1,151,551)
051	Rubbed or abraded by kneeling on surface	1,130	94	0.1%
06*	All rubbed, abraded, or jarred by vibration included	833	69	0.1%
211	Bodily reaction: bending, climbing, crawling, reaching, twisting	18,324	1,527	1.6%
214	Bodily reaction: sitting	283	24	0.0%
216	Bodily reaction: standing	560	47	0.0%
22*	All overexertion events included	150,878	12,573	13.1%
23*	All repetitive motion events included	18,837	1,570	1.6%
Total	All WMSD events	190,845	15,904	16.6%

OIICS v1.01 event code		Compensable claims		
		Total (n)	Annual average	Percent of total (487,182)
051	Rubbed or abraded by kneeling on surface	898	75	0.2%
06*	All rubbed, abraded, or jarred by vibration included	1,140	95	0.2%
211	Bodily reaction: bending, climbing, crawling, reaching, twisting	18,369	1,531	3.8%
214	Bodily reaction: sitting	287	24	0.1%
216	Bodily reaction: standing	755	63	0.2%
22*	All overexertion events included	144,629	12,052	29.7%
23*	All repetitive motion events included	28,865	2,405	5.9%
Total	All WMSD events	194,943	16,245	40.0%

WMSD= work-related musculoskeletal disorder; OIICS = Occupational Injury and Illness Classification System

*All codes in chapter included

**The majority of self-insured medical aid only claims have blank or unclassifiable OIICS event codes (98%)

Table 5. OIICS event codes evaluated, and excluded from the WMSD case definition.

OIICS v1.01 event codes	WMSD indicator exclusions
210	Bodily reaction: unspecified
213	Bodily reaction: running—without other incident
217	Bodily reaction: walking—without other incident
219	Bodily reaction: n.e.c
9999	Unclassifiable

WMSD= work-related musculoskeletal disorder; OIICS = Occupational Injury and Illness Classification System; n.e.c. = not elsewhere classifiable

Table 6. Frequencies of claims with the OIICS event codes evaluated and excluded from the WMSD case definition, Washington workers' compensation system, State Fund and self-insured claims, 2006–2018.

OIICS v1.01 event code		All accepted claims		
		Total (n)	Annual average	Percent of total (1,638,733)
210	Bodily reaction: unspecified	3,650	304	0.2%
213	Bodily reaction: running-- without other incident	1,910	159	0.1%
217	Bodily reaction: walking-- without other incident	4,714	393	0.3%
219	Bodily reaction: n.e.c.	43,664	3,639	2.7%
9999	Unclassifiable	42,289	3,524	2.6%

OIICS v1.01 event code		Medical aid only claims		
		Total (n)	Annual average	Percent of total (1,151,551)
210	Bodily reaction: unspecified	1,949	162	0.2%
213	Bodily reaction: running-- without other incident	906	76	0.1%
217	Bodily reaction: walking-- without other incident	2,297	191	0.2%
219	Bodily reaction: n.e.c.	21,269	1,772	1.8%
9999	Unclassifiable	17,992	1,499	1.6%

OIICS v1.01 event code		Compensable claims		
		Total (n)	Annual average	Percent of total (487,182)
210	Bodily reaction: unspecified	1,701	142	0.3%
213	Bodily reaction: running-- without other incident	1,004	84	0.2%
217	Bodily reaction: walking-- without other incident	2,417	201	0.5%
219	Bodily reaction: n.e.c.	22,395	1,866	4.6%
9999	Unclassifiable	24,497	2,041	5.0%

OIICS = Occupational Injury and Illness Classification System; WMSD= work-related musculoskeletal disorder; n.e.c. = not elsewhere classifiable

Table 7. Description of OIICS nature codes included in the WMSD case definition.

OIICS v1.01 nature codes	OIICS description of nature code
011 Traumatic injuries and disorders: dislocations of bone or cartilage	This nature group classifies displacement of bone or cartilage. Includes: subluxations; slipped, ruptured, or herniated disc; partial displacement; fractured or broken cartilage; and pinched nerves resulting from a dislocation.
013 Traumatic injuries and disorders: traumatic injuries to spinal cord	This nature group classifies traumatic injuries to the spinal cord. Includes: severed spinal cord, nonfatal severed spinal cord resulting from a gunshot wound, traumatic transient paralysis, anterior cord syndrome, lesion of spinal cord, and central cord syndrome, and pinched nerves involving the spinal cord.
014 Traumatic injuries and disorders: traumatic injuries to nerves, except spinal cord	This nature group classifies traumatic injuries to nerves other than the spinal cord. Cranial nerves, peripheral nerve of the shoulder or pelvic girdle, and nerves of the limb are possible locations for injuries in this nature group. Pinched nerves in these locations are coded in this category unless a dislocation or herniated disc is specified. Diseases or disorders of the nervous system that occur over time as a result of repetitive activity, such as carpal tunnel syndrome, are usually classified in major group 12. Sciatica is coded 1721, and pinched nerves in the neck resulting from a repetitive or prolonged activity are coded 1729. Includes: division of nerve, lesion in continuity, traumatic neuroma, and pinched nerve, except for those resulting from a dislocation or those involving the spinal cord.
021 Traumatic injuries and disorders: sprains, strains, tears	This nature group classifies cases of sprains and strains of muscles, joints tendons, and ligaments. Diseases or disorders affecting the musculoskeletal system, including tendonitis and bursitis, which generally occur over time as a result of repetitive activity should be coded in Musculoskeletal system and connective tissue diseases and disorders, major group 17. Includes: avulsion, hemarthrosis, "pull", rupture, strain, sprain, or tear of joint capsule, ligament, muscle, or tendon; and unspecified "twists".
029 Traumatic injuries and disorders: injuries to muscles, tendons, ligaments, joints, etc., n.e.c.	This nature group classifies injuries to muscles, tendons, ligaments, etc. that are not classified elsewhere in this major group.
0972 Traumatic injuries and disorders: back pain, hurt back	These nature groups classify nonspecified traumatic injuries and disorders where some description of the manifestation of the trauma is provided and generally where the part of body has been identified. For example, sore neck, hurt arm, pain in shoulder, back went out.
0973 Traumatic injuries and disorders: soreness, pain, hurt, except the back	Includes: hurt back (0972), backache (0972), low back pain (0972), back that "went out" (0972), "popped" knee (0973), back spasms (0972), spasms, except of back (0973); and inflammation (0972, 0973).
1241 System diseases and disorders: Carpal Tunnel Syndrome	These nature groups classify disorders of the peripheral nervous system, which includes the nerves and ganglia located outside the brain and spinal cord.
1249 System diseases and disorders: other disorders of the peripheral nervous system, n.e.c.	Includes: Bell's palsy (1249), carpal tunnel syndrome (1241), tarsal tunnel syndrome (1249); other mononeuritis of the extremities (1249), non-traumatic lesion of the median, ulnar and radial nerves (1249), and muscular dystrophies (1249).

Table 7. Description of OIICS nature codes included in the WMSD case definition, continued.

OIICS v1.01 nature codes	OIICS description of nature code
1371 Circulatory system diseases: Raynaud's syndrome or phenomenon	This code is specific to Raynaud's syndrome or phenomenon.
17* All musculoskeletal system and connective tissue diseases and disorders	This major group classifies diseases of the musculoskeletal system and connective tissue. Includes: arthropathies (171); dorsopathies (172); rheumatism, except affecting the back (173); rheumatism affecting the back (1729); and osteopathies, chondropathies, and acquired musculoskeletal deformities (174).
40 Symptoms, signs and ill-defined conditions: unspecified	This division classifies symptoms, signs, or abnormal results from laboratory or investigative medical tests or procedures. It includes those ill-defined conditions that can not be classified elsewhere. Codes from this division should be used when no specific diagnosis is named and cannot be inferred from information found on the source document. This division includes sick building syndrome.
410 Symptoms, signs and ill-defined conditions: symptoms, unspecified	
4110 Symptoms, signs and ill-defined conditions: general symptoms, unspecified	
4119 Symptoms, signs and ill-defined conditions: general symptoms, n.e.c.	
412 Symptoms, signs and ill-defined conditions: symptoms involving nervous and musculoskeletal systems	
48 Symptoms, signs and ill-defined conditions: multiple symptoms, signs, and ill-defined conditions	
49 Symptoms, signs and ill-defined conditions: n.e.c.	
9999 Nonclassifiable	This code is used for cases where there is insufficient information to select even an unspecified code at the division level or if there appears to be no injury or illness. For example, this code would be selected if there was an exposure to tuberculosis, but TB test results were negative.

WMSD= work-related musculoskeletal disorder; OIICS = Occupational Injury and Illness Classification System; n.e.c. = not elsewhere classifiable

*All codes in division are included

Table 8. Specific examples of common claim natures included in the WMSD case definition, among those with a WMSD event code, Washington workers' compensation system, State Fund and self-insured claims, 2006–2018.

OIICS v1.01 nature codes		Specific examples from claim narratives
011	Traumatic injuries and disorders: dislocations of bone or cartilage	Cervical, thoracic and lumbar subluxations; knee derangement; herniated disc; dislocated fingers or shoulders.
013	Traumatic injuries and disorders: traumatic injuries to spinal cord	Spinal nerve root compression or impingement; spinal cord compression.
014	Traumatic injuries and disorders: traumatic injuries to nerves, except spinal cord	Acute cervical, thoracic or lumbar radiculopathies.
021	Traumatic injuries and disorders: sprains, strains, tears	Sprains and strains of the cervical, thoracic and lumbar regions of the back; shoulders; wrists; and knees.
029	Traumatic injuries and disorders: injuries to muscles, tendons, ligaments, joints, etc., n.e.c.	Shoulder impingement syndrome; epicondylitis; knee derangement; tendonitis in various regions of body.
0972	Traumatic injuries and disorders: back pain, hurt back	Pain and muscle spasms in all regions of the back, but especially lumbar.
0973	Traumatic injuries and disorders: soreness, pain, hurt, except the back	Pain, muscle spasms and vague injury in various regions of the body, such as the shoulders, knees, and wrists.
1241	System diseases and disorders: Carpal Tunnel Syndrome	Carpal Tunnel Syndrome.
1249	System diseases and disorders: other disorders of the peripheral nervous system, n.e.c.	Cubital Tunnel Syndrome; lumbar radiculopathy; and ulnar radiculopathy.
1371	Circulatory system diseases: Raynaud's syndrome or phenomenon	Raynaud's syndrome or Raynaud's phenomenon.
17*	All musculoskeletal system and connective tissue diseases and disorders	Rotator Cuff Syndrome/Tendonitis; Dequervain's tenosynovitis; shoulder impingement syndrome; wrist tendonitis; medial or lateral epicondylitis; trigger finger.

Table 8. Specific examples of common claim natures included in the WMSD case definition, among those with a WMSD event code, Washington workers' compensation system, State Fund and self-insured claims, 2006–2018, continued.

OIICS v1.01 nature codes	Specific examples from claim narratives
40	Symptoms, signs and ill-defined conditions: unspecified
410	Symptoms, signs and ill-defined conditions: symptoms, unspecified
4110	Symptoms, signs and ill-defined conditions: general symptoms, unspecified
4119	Symptoms, signs and ill-defined conditions: general symptoms, n.e.c.
412	Symptoms, signs and ill-defined conditions: symptoms involving nervous and musculoskeletal systems
48	Symptoms, signs and ill-defined conditions: multiple symptoms, signs, and ill-defined conditions
49	Symptoms, signs and ill-defined conditions: n.e.c.
9999	Nonclassifiable
Most are blank, or insufficient information to code (e.g., listing body part only).	

WMSD= work-related musculoskeletal disorder; OIICS = Occupational Injury and Illness Classification System; n.e.c. = not elsewhere classifiable
 *All codes in division are included

Table 9. Frequencies of claims with the OIICS nature codes included in WMSD case definition among those with a WMSD event code, all accepted claims included, Washington workers' compensation system, State Fund and self-insured claims, 2006–2018.

OIICS v1.01 nature code		Total (n)	Annual average	Percent of total (1,638,733)
011	Traumatic injuries and disorders: dislocations of bone or cartilage	11,905	992	0.7%
013	Traumatic injuries and disorders: traumatic injuries to spinal cord	29	2	0.0%
014	Traumatic injuries and disorders: traumatic injuries to nerves, except spinal cord	1,355	113	0.1%
021	Traumatic injuries and disorders: sprains, strains, tears	223,754	18,646	13.7%
029	Traumatic injuries and disorders: injuries to muscles, tendons, ligaments, joints, etc., n.e.c.	11,309	942	0.7%
0972	Traumatic injuries and disorders: back pain, hurt back	12,918	1,077	0.8%
0973	Traumatic injuries and disorders: soreness, pain, hurt, except the back	21,853	1,821	1.3%
1241	System diseases and disorders: Carpal Tunnel Syndrome	15,367	1,281	0.9%
1249	System diseases and disorders: other disorders of the peripheral nervous system, n.e.c.	487	41	0.0%
1371	Circulatory system diseases: Raynaud's syndrome or phenomenon	3	0	0.0%
17*	All musculoskeletal system and connective tissue diseases and disorders	23,453	1,954	1.4%
40	Symptoms, signs and ill-defined conditions: unspecified	2,167	181	0.1%
410	Symptoms, signs and ill-defined conditions: symptoms, unspecified	2	0	0.0%
4110	Symptoms, signs and ill-defined conditions: general symptoms, unspecified	131	11	0.0%
4119	Symptoms, signs and ill-defined conditions: general symptoms, n.e.c.	475	40	0.0%
412	Symptoms, signs and ill-defined conditions: symptoms involving nervous and musculoskeletal systems	456	38	0.0%
48	Symptoms, signs and ill-defined conditions: multiple symptoms, signs, and ill-defined conditions	62	5	0.0%
49	Symptoms, signs and ill-defined conditions: n.e.c.	40	3	0.0%
9999	Nonclassifiable	24,093	2,008	1.5%
Total	All WMSD natures	349,859	29,155	21.3%

WMSD= work-related musculoskeletal disorder; OIICS = Occupational Injury and Illness Classification System; n.e.c. = not elsewhere classifiable; ergonomic hazard refers to any OIICS event code listed in Table 3

*All codes in division are included

Table 10. Frequencies of claims with the OIICS nature codes included in WMSD case definition among those with a WMSD event code, medical aid only claims*, Washington workers' compensation system, State Fund and self-insured claims, 2006–2018.

OIICS v1.01 nature code		Total (n)	Annual average	Percent of total (1,151,551)
011	Traumatic injuries and disorders: dislocations of bone or cartilage	6,296	525	0.5%
013	Traumatic injuries and disorders: traumatic injuries to spinal cord	14	1	0.0%
014	Traumatic injuries and disorders: traumatic injuries to nerves, except spinal cord	521	43	0.0%
021	Traumatic injuries and disorders: sprains, strains, tears	133,451	11,121	8.1%
029	Traumatic injuries and disorders: injuries to muscles, tendons, ligaments, joints, etc., n.e.c.	6,133	511	0.4%
0972	Traumatic injuries and disorders: back pain, hurt back	3,333	278	0.2%
0973	Traumatic injuries and disorders: soreness, pain, hurt, except the back	5,689	474	0.3%
1241	System diseases and disorders: Carpal Tunnel Syndrome	4,694	391	0.3%
1249	System diseases and disorders: other disorders of the peripheral nervous system, n.e.c.	204	17	0.0%
1371	Circulatory system diseases: Raynaud's syndrome or phenomenon	0	0	0.0%
17**	All musculoskeletal system and connective tissue diseases and disorders	13,017	1,085	0.8%
40	Symptoms, signs and ill-defined conditions: unspecified	130	11	0.0%
410	Symptoms, signs and ill-defined conditions: symptoms, unspecified	1	0	0.0%
4110	Symptoms, signs and ill-defined conditions: general symptoms, unspecified	60	5	0.0%
4119	Symptoms, signs and ill-defined conditions: general symptoms, n.e.c.	172	14	0.0%
412	Symptoms, signs and ill-defined conditions: symptoms involving nervous and musculoskeletal systems	249	21	0.0%
48	Symptoms, signs and ill-defined conditions: multiple symptoms, signs, and ill-defined conditions	18	2	0.0%
49	Symptoms, signs and ill-defined conditions: n.e.c.	20	2	0.0%
9999	Nonclassifiable	1,248	104	0.1%
Total	All WMSD natures	175,250	14,604	10.7%

WMSD= work-related musculoskeletal disorder; OIICS = Occupational Injury and Illness Classification System; n.e.c. = not elsewhere classifiable; ergonomic hazard refers to any OIICS event code listed in Table 3

*The majority of self-insured medical aid only claims have blank or unclassifiable OIICS event codes (98%)

**All codes in division are included

Table 11. Frequencies of claims with the OIICS nature codes included in WMSD case definition among those with a WMSD event code, compensable claims only, Washington workers' compensation system, State Fund and self-insured claims, 2006–2018.

OIICS v1.01 nature code		Total (n)	Annual average	Percent of total (487,182)
011	Traumatic injuries and disorders: dislocations of bone or cartilage	5,609	467	1.2%
013	Traumatic injuries and disorders: traumatic injuries to spinal cord	15	1	0.0%
014	Traumatic injuries and disorders: traumatic injuries to nerves, except spinal cord	834	70	0.2%
021	Traumatic injuries and disorders: sprains, strains, tears	90,303	7,525	18.5%
029	Traumatic injuries and disorders: injuries to muscles, tendons, ligaments, joints, etc., n.e.c.	5,176	431	1.1%
0972	Traumatic injuries and disorders: back pain, hurt back	9,585	799	2.0%
0973	Traumatic injuries and disorders: soreness, pain, hurt, except the back	16,164	1,347	3.3%
1241	System diseases and disorders: Carpal Tunnel Syndrome	10,673	889	2.2%
1249	System diseases and disorders: other disorders of the peripheral nervous system, n.e.c.	283	24	0.1%
1371	Circulatory system diseases: Raynaud's syndrome or phenomenon	3	0	0.0%
17*	All musculoskeletal system and connective tissue diseases and disorders	10,436	870	2.1%
40	Symptoms, signs and ill-defined conditions: unspecified	2,037	170	0.4%
410	Symptoms, signs and ill-defined conditions: symptoms, unspecified	1	0	0.0%
4110	Symptoms, signs and ill-defined conditions: general symptoms, unspecified	71	6	0.0%
4119	Symptoms, signs and ill-defined conditions: general symptoms, n.e.c.	303	25	0.1%
412	Symptoms, signs and ill-defined conditions: symptoms involving nervous and musculoskeletal systems	207	17	0.0%
48	Symptoms, signs and ill-defined conditions: multiple symptoms, signs, and ill-defined conditions	44	4	0.0%
49	Symptoms, signs and ill-defined conditions: n.e.c.	20	2	0.0%
9999	Nonclassifiable	22,845	1,904	4.7%
Total	All WMSD natures	174,609	14,551	35.8%

WMSD= work-related musculoskeletal disorder; OIICS = Occupational Injury and Illness Classification System; n.e.c. = not elsewhere classifiable; ergonomic hazard refers to any OIICS event code listed in Table 3

*All codes in division are included

Table 12. Claim frequencies for those meeting both nature and event criteria for the WMSD case definition, Washington workers' compensation system, State Fund and self-insured claims, 2006–2018.

Claim type	WMSD total	WMSD annual	
		average	Percent of total
All accepted claims	349,859	29,155	21%
Medical aid only claims*	175,250	14,604	15%
Compensable claims	174,609	14,551	36%

WMSD = work-related musculoskeletal disorder

*The majority of self-insured medical aid only claims have blank or unclassifiable OIICS event codes (98%)

Table 13. WMSD claims by body region, all accepted claims, Washington workers' compensation system, State Fund and self-insured claims, 2006–2018.

Body region	n	Percent
Lumbar region	101,150	25.9
Shoulder, including clavicle, scapula	60,214	15.4
Wrist(s)	38,570	9.9
Multiple back regions	22,962	5.9
Multiple body parts	22,901	5.9
Knee(s)	21,963	5.6
Thoracic region	14,153	3.6
Back, including spine, spinal cord, n.e.c.	12,561	3.2
Back, including spine, spinal cord, unspecified	12,106	3.1
Elbow(s)	11,788	3.0
Multiple trunk locations	7,503	1.9
Finger(s), fingernail(s)	7,420	1.9
Neck, except internal location of diseases or disorders	7,157	1.8
Multiple upper extremities locations, n.e.c.	6,023	1.5
Hand(s), except finger(s)	5,488	1.4
Abdomen, except internal location of diseases or disorders	4,035	1.0
Chest, except internal location of diseases or disorders	3,870	1.0
Upper arm(s)	3,812	1.0
Ankle(s)	3,248	0.8
Other	24,155	6.2
TOTAL	391,079	100.0

WMSD= work-related musculoskeletal disorder

Table 14. Mutually exclusive body region categories by specific OIICS body part codes.

Body region	OIICS v1.01 body part codes included
Neck	10, 'neck except internal location of diseases or disorders'
Shoulder	21, 'shoulder, including clavicle, scapula'
Arm(s)	31, 'arm(s)'
Wrist(s)/hand(s)/finger(s)	32, 'wrist(s)' 33, 'hand(s), except fingers' 34, 'finger(s), fingernail(s)' 381, 'hand(s) and finger(s)' 382, 'hand(s) and wrist(s)'
Middle and upper back	232, 'thoracic'
Low back	231, 'lumbar'
Other back	230, 'back, including spine, spinal cord, unspecified' 233, 'sacral region' 234, 'coccygeal region' 238, 'multiple back regions' 239, 'back, including spine, spinal cord, n.e.c.'
Knee(s)	412, 'knee(s)'
Multiple body parts	8, 'multiple body parts' 28, 'multiple trunk locations' 380, 'multiple upper extremities locations, unspecified' 383, 'hand(s) and arm(s)' 389, 'multiple upper extremities locations, n.e.c.' 48, 'multiple lower extremities locations'
Other	All other body part codes

OIICS = Occupational Injury and Illness Classification System

Table 15. Top ten OIICS body part codes classified into the “other” WMSD body region, Washington workers’ compensation system, State Fund and self-insured claims, 2006–2018.

OIICS v1.01		
body part code	OIICS description	Percent
240	Abdomen, except internal location of diseases or disorders	16.6%
220	Chest, except internal location of diseases or disorders	15.9%
42	Ankles	13.4%
254	Groin	13.0%
251	Hip(s)	9.0%
430	Foot (feet), except toe(s), unspecified	7.0%
413	Lower leg(s)	5.6%
411	Thigh(s)	3.6%
410	Leg(s), unspecified	2.5%
9999	Unclassifiable	2.0%

OIICS = Occupational Injury and Illness Classification System; WMSD = work-related musculoskeletal disorder

Table 16. WMSD claim frequencies by body region and claim type, Washington workers' compensation system, State Fund and self-insured claims, 2006–2018.

Body region	Total accepted (n)	Annual average	Percent of accepted WMSD claims (349,859)
Neck	6,540	545	1.9%
Shoulder	53,067	4,422	15.2%
Arm(s)	19,588	1,632	5.6%
Wrist(s)/hand(s)/finger(s)	49,342	4,112	14.1%
Middle and upper back	12,755	1,063	3.6%
Low back	90,130	7,511	25.8%
Other back	44,531	3,711	12.7%
Knee(s)	19,969	1,664	5.7%
Multiple body parts	32,001	2,667	9.1%
Other	21,517	1,793	6.2%

Body region	Total medical aid only (n)	Annual average	Percent of medical aid only WMSD claims (175,250)
Neck	3,505	292	2.0%
Shoulder	23,682	1,974	13.5%
Arm(s)	10,926	911	6.2%
Wrist(s)/hand(s)/finger(s)	24,793	2,066	14.1%
Middle and upper back	8,724	727	5.0%
Low back	46,793	3,899	26.7%
Other back	22,776	1,898	13.0%
Knee(s)	8,258	688	4.7%
Multiple body parts	13,988	1,166	8.0%
Other	11,757	980	6.7%

Body region	Total compensable (n)	Annual average	Percent of total compensable claims (174,609)
Neck	3,035	253	1.7%
Shoulder	29,385	2,449	16.8%
Arm(s)	8,662	722	5.0%
Wrist(s)/hand(s)/finger(s)	24,549	2,046	14.1%
Middle and upper back	4,031	336	2.3%
Low back	43,337	3,611	24.8%
Other back	21,755	1,813	12.5%
Knee(s)	11,711	976	6.7%
Multiple body parts	18,013	1,501	10.3%
Other	9,814	818	5.6%

WMSD= work-related musculoskeletal disorder

Percent totals don't add to 100%, due to WMSD claims with missing body part codes and rounding

Table 17. Claim frequencies for the overexertion hernia indicator by OIICS nature code, Washington workers' compensation system, State Fund and self-insured claims, 2006–2018.

OIICS v1.01		All overexertion* accepted claims		
		Total (n)	Annual average	Percent of total (295,507)
Nature: 1530	Digestive system diseases and disorders: hernia, unspecified	518	43	0.2%
Nature: 1531	Digestive system diseases and disorders: inguinal hernia	6,582	549	2.2%
Nature: 1533	Digestive system diseases and disorders: ventral hernia	1,490	124	0.5%
Nature: 1539	Digestive system diseases and disorders: hernia, n.e.c.	950	79	0.3%
Total	All overexertion hernia	9,540	795	3.2%

OIICS v1.01 nature code		Overexertion* medical aid only claims		
		Total (n)	Annual average	Percent of total (150,878)
1530	Digestive system diseases and disorders: hernia, unspecified	79	7	0.1%
1531	Digestive system diseases and disorders: inguinal hernia	1,427	119	0.9%
1533	Digestive system diseases and disorders: ventral hernia	340	28	0.2%
1539	Digestive system diseases and disorders: hernia, n.e.c.	223	19	0.1%
Total	All overexertion hernia	2,069	172	1.4%

OIICS v1.01 nature code		Overexertion* compensable claims		
		Total (n)	Annual average	Percent of total (144,629)
1530	Digestive system diseases and disorders: hernia, unspecified	439	37	0.3%
1531	Digestive system diseases and disorders: inguinal hernia	5,155	430	3.6%
1533	Digestive system diseases and disorders: ventral hernia	1,150	96	0.8%
1539	Digestive system diseases and disorders: hernia, n.e.c.	727	61	0.5%
Total	All overexertion hernia	7,471	623	5.2%

OIICS = Occupational Injury and Illness Classification System; n.e.c. = not elsewhere classifiable

*Overexertion claims defined by OIICS nature event= 22

Table 18. Inclusion criteria for carpal tunnel syndrome, rotator cuff syndrome and epicondylitis case definitions.

	Carpal Tunnel Syndrome (CTS)	Rotator Cuff Syndrome (RCS)	Epicondylitis- medial and lateral
1. Diagnosis	354.0 (ICD-9-CM) G56.0* (ICD-10-CM)	726.13 (ICD-9-CM) 727.61 (ICD-9-CM) M75.1 (ICD-10-CM)	726.31 (ICD-9-CM) 726.32 (ICD-9-CM) M77.0* (ICD-10-CM) M77.1* (ICD-10-CM)
2. OIICS-based WMSD indicator	Y	Y	Y
3. OIICS body part	32, 'wrist(s)' 33, 'hand(s), except finger(s)' 34, 'finger(s), fingernail(s)' 38, 'multiple upper extremities locations' 8, 'multiple body parts'	21, 'shoulder, including clavicle, scapula' 311, 'upper arms' 28, 'multiple trunk locations' 8, 'multiple body parts'	31, 'arm(s)' 380, 'multiple upper extremities locations, unspecified' 383, 'hand(s) and arm(s)' 389, 'multiple upper extremities locations, n.e.c.' 8, 'multiple body parts'

OIICS = Occupational Injury and Illness Classification System; WMSD = work-related musculoskeletal disorder; ICD-9-CM = International Classification of Diseases with Clinical Modification, 9th revision; ICD-10-CM = International Classification of Diseases with Clinical Modification, 10th revision

*All codes in division are included

Table 19. ICD-10-CM codes used to identify claims for evaluation.

	Carpal tunnel syndrome (CTS)	Epicondylitis-medial and lateral	Rotator cuff syndrome (RCS)	Sciatica
ICD-10-CM codes used to identify claims for evaluation	G56.0	M77.0 M77.1	M75.1 S46.0 S43.42	M54.3 M45.4

ICD-10-CM = International Classification of Diseases with Clinical Modification, 10th revision

Table 20. Medical record review results for carpal tunnel syndrome, epicondylitis, rotator cuff syndrome and sciatica, Washington workers' compensation system, State Fund claims only, 2006–2018.

	Carpal tunnel syndrome (CTS) % (n=100)	Epicondylitis (medial and lateral) % (n=100)	Rotator cuff syndrome (RCS) % (n=100)	Sciatica % (n=100)
1. Did the OIICS codes on the ROA describe the condition under evaluation?				
Yes	83	74	93	93
2. Were symptoms of the condition under evaluation documented in the medical records?				
Yes	88	94	98	84
3. Were the clinical findings consistent with the condition under evaluation?				
Yes	62	74	52	43
4. Condition confirmed by radiologic or electrodiagnostic test, or surgical intervention?				
Yes, case confirmed	68	12	61	28
No, confirmed not a case	13	0	28	34
Unknown (no test results available for review, no surgical intervention documented)	19	88	11	38
5. Proportion of costs associated with conditions <u>unrelated</u> to those under evaluation.				
Medical bills:	18	17	9	*
Hospital bills:	31	36	11	*

OIICS = Occupational Injury and Illness Classification System; ROA = report of accident

Table 21. Radiologic or electrodiagnostic and surgical intervention procedures used to confirm cases.

	Radiologic or electrodiagnostic tests		Surgical interventions	
	Description	CPT codes	Description	CPT codes
Carpal tunnel syndrome	Nerve conduction tests	95900	Endoscopic release of the carpal ligament	29848
		95903 95904 95907-95913	Neuroplasty and/or transposition of the median nerve at the carpal tunnel and includes open release of the carpal ligament	64271
Epicondylitis	None		Tendon division	24357 24358 24359
Rotator cuff syndrome	Magnetic Resonance Imaging (MRI)	73221-73223	Repair, revision, and/or reconstruction procedures on the shoulder	23410 23412 23415 23420
Sciatica	Magnetic Resonance Imaging (MRI)	72195	Arthroscopic rotator cuff repair	29827
	Computerized tomography (CT) scan	72193	Laminotomy with decompression of nerve root	63035

CPT = Current Procedural Terminology

Table 22. Abbreviated medical record review results among cases that fit restricted criteria, Washington workers' compensation system, State Fund claims only, 2006–2018.

	Carpal tunnel syndrome (CTS) %	Epicondylitis (medial and lateral) %	Rotator cuff syndrome (RCS) %
Case confirmed by radiologic or electrodiagnostic test or surgical intervention?	71	15	84
Proportion of costs associated with conditions <u>unrelated</u> to those under evaluation.			
Medical bills:	11	10	12
Hospital bills:	17	23	38