CENTER FOR HEALTH AND SAFETY IN THE WORKPLACE

A study by the RAND Institute for Civil Justice and RAND Health

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REPORT

RAND/UCLA Quality-of-Care Measures for Carpal Tunnel Syndrome

Appendix I: Quality Measures: Complete List of RAND/UCLA Quality Measures for Carpal Tunnel Syndrome

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Supported by the California Commission on Health and Safety and Workers' Compensation and by the Zenith Insurance Company

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Published 2011 by the RAND Corporation
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Appendix I: Quality Measures: Complete List of RAND/UCLA Quality Measures for Carpal Tunnel Syndrome

Table I-1: Measures for the Initial Evaluation of Hand and Forearm Symptoms

Measure Title	Measure Text	Denominator (Eligibility) and Numerator (Adherence)
New symptoms characteristic of CTS require detailed assessment	IF the progress notes document new paresthesias or numbness in the fingers THEN at least two of the following should be noted at the initial evaluation of those symptoms: 1. A verbal or pictorial description of the location of any pain, numbness, or paresthesias (e.g., Katz hand diagram), 2. The quality of any pain, 3. The duration of any pain, numbness, or paresthesias, 4. Onset of pain, numbness, or paresthesias. BECAUSE these factors help narrow the differential diagnosis and better guide therapy to improve symptoms.	**Denominator:** Patients who reported new paresthesias or numbness in the fingers during the designated study period AND for whom the initial evaluation of those symptoms can be identified in the medical record. **Numerator:** Among patients in the denominator, those for whom at least two of the following were documented in the medical record for the initial evaluation visit: 1. Location: a verbal or pictorial description of the location of any pain, numbness, or paresthesias (e.g., Katz hand diagram) 2. Quality: the quality of any pain, such as burning, sharp, dull, etc. 3. Duration: when any pain, numbness, or paresthesias began or how long they have been present 4. Onset: time course of any pain, numbness or paresthesias, meaning manner of onset and any changes over time
New symptoms characteristic of CTS should lead to suspicion	IF a patient complains of any of the following symptoms: Paresthesias, numbness, or tingling on 1st to 3rd fingers or palm THEN a suspicion of CTS should be documented in the medical record at the initial evaluation of those symptoms BECAUSE early diagnosis of CTS would lead to earlier intervention	**Denominator:** Patients who reported new paresthesias or numbness in the first, second and/or third fingers (or palm) during the designated study period AND for whom the initial evaluation of those symptoms can be identified in the medical record. **Numerator:** Among patients in the denominator, those for whom a suspicion of CTS was explicitly documented in the medical record at or before the visit at which a provider first evaluated the finger symptoms.

Measure Title	Measure Text	Denominator (Eligibility) and Numerator (Adherence)
New hand or forearm pain requires evaluation for "red flags"	IF patient complains of new hand or forearm pain THEN the progress notes should document the presence or absence of at least one of the following “Red flags” at the same visit: 1. Trauma, 2. Deformity, including swelling, 3. Fever. BECAUSE these symptoms may suggest a serious condition that requires immediate evaluation.	**Denominator:** Patients with explicit documentation in the progress notes of new hand or forearm pain in the study hand at a visit during the designated study period. **Numerator:** Among patients in the denominator, those for whom the progress notes from the same visit document the presence or absence of at least one of the following : 1. Trauma 2. Deformity (including swelling) 3. Fever
New symptoms inconsistent with CTS require evaluation	IF patient complains of hand or forearm pain and also has any of the following: 1. New fever, 2. New point tenderness, 3. New deformity. THEN at least one diagnosis other than CTS should be evaluated at this visit BECAUSE these physical exam findings are not typically found in CTS. Evaluation is defined as history or physical examination directed at infection, trauma, malignancy, ganglion cyst, and other diagnoses of wrist and hand; imaging of hand, wrist and c-spine; laboratory tests pertaining to infection, aspiration of wrist joint, etc.	**Denominator:** Patients complaining of hand or forearm pain AND who have new fever, new point tenderness, or new deformity in the same hand documented in the medical record for a visit during the designated study period. **Numerator:** Among patients in the denominator, those for whom the medical record from the same visit documented that at least one diagnosis other than CTS was evaluated. Evaluation includes history or physical examination directed at infection, trauma, malignancy, ganglion cyst, and other diagnoses of wrist and hand; imaging of hand, wrist and cervical spine; laboratory tests pertaining to infection, aspiration of wrist joint, etc.

Measure Title	Measure Text	Denominator (Eligibility) and Numerator (Adherence)
New CTS diagnosis requires assessment of medical risk factors	IF the progress notes document a new diagnosis of CTS, THEN a history that includes the presence or absence of at least one of the following risk factors should be documented during the first three visits: 1. Rheumatoid arthritis, 2. Diabetes mellitus, 3. Hypothyroidism, 4. Pregnancy, if female, 5. Chronic renal failure. BECAUSE these risk factors worsen CTS and recognition and treatment of them may improve CTS symptoms or direct treatment.	**Denominator:** Patients for whom the medical record indicates that CTS was diagnosed during the study period AND for whom the initial evaluation of the CTS symptoms can be identified in the medical record. **Numerator:** Among patients in the denominator, those for whom the presence or absence of at least one of the following risk factors was documented in the medical record at the initial evaluation or two subsequent CTS-related visits: 1. Rheumatoid or other arthritis 2. Diabetes mellitus 3. Hypothyroidism 4. Pregnancy (if female) 5. Chronic renal failure
New suspicion of CTS requires specific physical examination	IF the progress notes document that CTS is suspected THEN at least one of the following physical examination maneuvers should be documented at initial evaluation: 1. Testing for sensory abnormalities in median nerve distribution, 2. Testing for thenar muscle weakness, 3. Examination for thenar muscle atrophy. BECAUSE positive findings on these maneuvers are consistent with CTS and guide treatment.	**Denominator:** Patients for whom the medical record indicates that CTS was newly suspected during the designated study period AND for whom the visit at which a provider first evaluated those symptoms can be identified. **Numerator:** Among patients in the denominator, those for whom the medical record documents that at least one of the following physical examination maneuvers performed during that visit: 1. Testing for sensory abnormalities in median nerve distribution 2. Testing for thenar muscle weakness (thumb abduction or opposition) 3. Examination for thenar muscle atrophy

Measure Title	Measure Text	Denominator (Eligibility) and Numerator (Adherence)
New suspicion of CTS requires evaluation for excessive weight	IF the progress notes document that CTS is suspected THEN height and weight, or a clinical judgment about the presence or absence of obesity/overweight, should be documented at initial evaluation BECAUSE obesity is associated with increased prevalence of CTS and reduction of BMI decreases CTS symptoms.	**Denominator:** Patients for whom the medical record indicates that CTS was newly suspected during the study period AND for whom the initial evaluation of CTS symptoms can be identified. **Numerator:** Among patients in the denominator, those for whom height and weight or a clinical judgment about presence or absence of obesity/overweight are documented in the medical record for the initial evaluation visit.
Imaging should be used selectively for suspected CTS	IF the progress notes document that CTS is suspected THEN MRI or ultrasound or CT should not be the initial test for diagnosis unless a structural lesion is suspected BECAUSE these tests do not aid in the diagnosis of CTS. Reasons to consider a structural lesion include: trauma, point tenderness, deformity, palpable mass, crepitance, loss of motion, severe pain.	**Denominator:** Patients for whom the medical record indicates that CTS was ever suspected (or diagnosed) during the designated study period and the records provide at least 6 weeks of documented follow-up in the study period. **Numerator:** Among patients in the denominator, those for whom one or more of the following is documented in the medical record: 1. Subsequent to the visit at which CTS was first documented as suspected or diagnosed; NO MRI of this wrist, ultrasound of this wrist, or CT of this wrist was performed. 2. There is evidence in the medical record that the provider suspected a structural lesion in this wrist before an MRI, ultrasound, or CT was performed. 3. There is evidence in the medical record that an electrodiagnostic test was performed on this wrist before an MRI, ultrasound, or CT was ordered or performed.

Measure Title	Measure Text	Denominator (Eligibility) and Numerator (Adherence)
Symptoms should be monitored after new diagnosis of CTS	IF patient is newly diagnosed with CTS during a visit THEN at each CTS-related visit during the first three months after presentation, patient should be asked about changes in at least one of the following: 1. Pain or paresthesias in the median nerve distribution, 2. Symptoms of weakness, such as dropping things, decreased grip strength, etc. BECAUSE treatment may need to be modified according to symptoms.	**Denominator:** Visits meeting all of the following criteria: 1. After the initial diagnosis through the following three months (and before the end of the study period) 2. CTS-related 3. For which the progress notes document the evaluation or treatment of CTS **Numerator:** Among visits in the denominator, those for which the progress notes documented that the patient was asked about changes in at least one of the following: 1. Pain, paresthesias in the first through third digits 2. Symptoms of hand weakness, such as dropping things, decreased grip strength, etc.

Table I-2: Measures for Electrodiagnosis in Suspected CTS

Measure Title	Measure Text	Denominator (Eligibility) and Numerator (Adherence)
Preoperative electrodiagnostic testing for work-associated CTS	IF patient undergoes carpal tunnel release surgery and has CTS thought to be associated with their occupation, THEN the patient should undergo preoperative electrodiagnostic testing BECAUSE an incorrect diagnosis is one reason for failure of carpal tunnel release and only a history and physical examination with these findings is specific enough to adequately confirm the diagnosis before surgery.	**Denominator:** Any patient who underwent carpal tunnel surgery and who has CTS that was thought to be work-related during the 18 months before surgery. **Numerator:** Among patients in the denominator, those having documentation of electrodiagnostic testing during the 18 months before surgery.
Essential components of EDX evaluation for CTS	IF electrodiagnosis is used in evaluation for CTS, THEN it must include at a minimum all three of the following: 1. Sensory/mixed nerve conduction study of the symptomatic median nerve to include: peak latency and amplitude OR unobtainability; AND 2. Motor nerve conduction study of the symptomatic median nerve to include: distal latency, amplitude and conduction velocity OR unobtainability; AND 3. Sensory/mixed nerve conduction study of EITHER the ipsilateral ulnar or radial nerve at the same conduction distance as the median nerve to include: peak latency and amplitude. BECAUSE these elements are required to discriminate CTS from other conditions.	**Denominator:** Electrodiagnostic tests performed on the median nerve in the study hand. **Numerator:** Among tests in the denominator, those that included all of the following components: 1. Motor nerve conduction study on median nerve: Amplitude, distal latency AND nerve conduction velocity OR unobtainability were documented for the median nerve in the study hand 2. Sensory nerve conduction study on median nerve: Peak latency and amplitude OR unobtainability were documented for the median nerve in the study hand 3. Sensory nerve conduction study on ipsilateral radial or ulnar nerve: Peak latency and amplitude were documented for a sensory nerve conduction study of the ipsilateral ulnar or radial sensory nerve at the wrist
Skin temperature should be measured during EDX testing	IF limb(s) is/are tested electrodiagnostically THEN skin temperature of the tested limbs should be recorded. BECAUSE nerve impulses conduct faster at a higher body temperature.	**Denominator:** Electrodiagnostic tests performed on the median nerve in the study hand. **Numerator:** Among tests in the denominator, those that included a documentation of skin temperature.

Measure Title	Measure Text	Denominator (Eligibility) and Numerator (Adherence)
Low skin temperature normalized before EDX testing	IF limb(s) is/are tested electrodiagnostically and the skin temperature is 32 degrees Celsius or below, THEN the limbs studied should be warmed to a recorded temperature above 32 degrees Celsius BECAUSE warming the limbs reduces temperature-related variability.	**Denominator:** Electrodiagnostic tests performed on the median nerve in the study hand AND for which the first skin temperature recorded for that hand/arm less was than or equal to 32 degrees Celsius. **Numerator:** Among tests in the denominator, those that have documentation that a repeat skin temperature was at least 32 degrees Celsius before the nerve conduction studies were performed, such as due to a provider warming the skin.
Criteria for calling EDX test positive for CTS	IF an electrodiagnostic test report describes test findings as consistent with CTS, THEN the report must document either: 1. A sensory/mixed peak latency difference meeting three criteria: a. Conduction distances were the same for the median nerve and the ipsilateral radial or ulnar comparison nerve, and b. Peak latency was normal for the ipsilateral radial or ulnar comparison nerve (see list), and c. The peak latency difference value was specific for CTS (see list), OR 2. A median motor distal latency meeting three criteria: a. Sensory/mixed responses were not recordable for the median nerve, and b. Sensory/mixed peak latency was normal for the ipsilateral radial or ulnar nerve, and c. The median motor distal latency value was specific for CTS (see list). BECAUSE asymmetric latency discriminates well between CTS and polyneuropathies and better guides treatment.	**Denominator:** Electrodiagnostic tests performed on the median nerve in the study hand AND interpreted as positive for CTS. **Numerator:** Among tests in the denominator, those that meet either of the following criteria: 1. Sensory nerve conduction studies consistent with CTS: See criteria in table immediately below. 2. Sensory nerve conduction study unobtainable AND Motor nerve conduction studies consistent with CTS: See criterion in table immediately below.

<table>
<tr><th>Measure Title</th><th colspan="2">Measure Text</th><th colspan="2">Denominator (Eligibility) and Numerator (Adherence)</th></tr>
<tr><td rowspan="8"></td><td colspan="2">Sensory/Mixed Peak Latency</td><td colspan="2"></td></tr>
<tr><td>Conduction Distance</td><td>Ipsilateral Comparison Nerve</td><td>Upper Limit of Normal for Sensory/mixed Peak Latency of Comparison Nerve</td><td>Minimum Sensory/mixed Peak Latency Difference Consistent with CTS</td></tr>
<tr><td>6-8 cm</td><td>Ulnar</td><td>< 2.3 ms</td><td>>= 0.4 ms</td></tr>
<tr><td>10 cm</td><td>Radial</td><td>< 2.9 ms</td><td>>= 0.4 ms</td></tr>
<tr><td>13-14 cm</td><td>Ulnar</td><td>< 3.6 ms</td><td>>= 0.6 ms</td></tr>
<tr><td colspan="2">Median Motor Distal Latency</td><td colspan="2"></td></tr>
<tr><td colspan="2">Conduction Distance</td><td colspan="2">Minimum Median Motor Distal Latency Consistent with CTS</td></tr>
<tr><td colspan="2">6-8 cm (wrist to abductor pollicis brevis)</td><td colspan="2">>= 4.5 ms</td></tr>
<tr><td>Criteria for calling positive EDX test for CTS severe</td><td colspan="2">IF an electrodiagnostic test report describes CTS as severe, THEN at least one of the following should be documented in the report:
1. A motor nerve conduction study across the wrist demonstrating that the compound motor action potential amplitude is absent or below the lower limit of normal for the laboratory; OR
2. Needle electromyography showing both:
a. Reduction in recruitment AND
b. Motor unit action potentials of increased duration and amplitude (not required for acute CTS).
BECAUSE accurate diagnosis of severity of CTS better guides treatment and the designation severe should be reserved for cases of axonopathy.

(Note: clinically, severe CTS is defined as CTS with thenar atrophy; however, the presence or absence of thenar atrophy is not typically included in electrodiagnostic test reports)</td><td colspan="2">Denominator: Electrodiagnostic tests performed on the median nerve in the study hand AND interpreted as severe CTS.

Numerator: Among tests in the denominator, those that meet all of the following criteria:
1. Included needle electromyography performed on muscles innervated by the median nerve in the symptomatic hand
2. Needle electromyography on this hand showed reduction in recruitment
3. Needle electromyography on this hand showed motor unit action potentials (MUAPs) of increased duration and amplitude OR the CTS was of acute onset.</td></tr>
</table>

Table I-3: Measures for the Non-Operative Treatment of CTS

Measure Title	Measure Text	Denominator (Eligibility) and Numerator (Adherence)
Splints should be placed in neutral position	IF a patient with CTS is prescribed a splint, THEN the chart should document that the splint was positioned so that the wrist is neutral (neither extension >10 degrees or flexed) BECAUSE such positioning reduces pressure on the nerve and reduces symptoms.	**Denominator:** Patients for whom the medical record indicates that CTS was diagnosed before the end of the study period, for whom a provider prescribed wrist splints to treat CTS symptoms, and for whom the visit at which the splints were first prescribed can be identified in the medical record. **Numerator:** Among patients in the denominator, those for whom the medical record for the same visit documented that the splint was adjusted so that the wrist was in neutral position.
An attempt at splinting should last at least six weeks	IF a patient with CTS is prescribed a neutral splint, THEN the split should be prescribed for at least six weeks BECAUSE such duration allows time to reduce pressure on the nerve and reduce symptoms.	**Denominator:** Patients for whom the medical record indicates that CTS was diagnosed before the end of the study period, for whom a provider prescribed wrist splints to treat CTS symptoms, for whom the visit at which the splints were first prescribed can be identified in the medical record, and for whom there are at least six weeks of follow-up after the splints were prescribed. **Numerator:** Among patients in the denominator, those for whom the medical record for this visit or any subsequent ones occurring within six weeks documented that the splint was prescribed for at least six weeks.
Certain medications should not be used for CTS NSAIDs should not be used for CTS	IF a patient is diagnosed with CTS, THEN the patient should not be given NSAIDs to treat CTS symptoms.	**Denominators:** Patients for whom the medical record indicates that CTS was diagnosed at least six weeks before the end of the study period. **Numerator:** Among patients in the denominator, those for whom NO provider documented that they prescribed or recommended NSAIDs as treatment for CTS symptoms.

Measure Title	Measure Text	Denominator (Eligibility) and Numerator (Adherence)
Muscle relaxants should not be used for CTS	IF a patient is diagnosed with CTS, THEN the patient should not be given muscle relaxants to treat CTS symptoms	**Numerator:** Among patients in the denominator, those for whom NO provider documented that they prescribed muscle relaxants as treatment for CTS symptoms.
Opioids should not be used for CTS	IF a patient is diagnosed with CTS, THEN the patient should not be given opioids to treat CTS symptoms.	**Numerator:** Among patients in the denominator, those for whom NO provider documented that they prescribed opiates (opioids) as treatment for CTS symptoms.
Diuretics should not be used for CTS	IF a patient is diagnosed with CTS, THEN the patient should not be given diuretics to treat CTS symptoms. BECAUSE there is no evidence that these agents improve CTS symptoms, and they may cause harm	**Numerator:** Among patients in the denominator, those for whom NO provider documented that they prescribed diuretics as treatment for CTS symptoms.
Steroid treatment requires discussion of risks	IF a patient with CTS is prescribed oral steroids or administered a steroid injection of the carpal tunnel, THEN the medical record should document that risks of the treatment were discussed BECAUSE patients need to understand the risks and benefits of the procedure prior to proceeding for effective informed consent to occur.	**Denominator:** Patients for whom the medical record indicates that CTS was diagnosed before the end of the study period AND who were prescribed either oral steroids for their CTS symptoms or administered a steroid injection of the carpal tunnel for the first time during the study period. **Numerator:** Among patients in the denominator, those for whom one or more risks of steroids (or prior receipt of steroids) were documented in the medical record as having been discussed within six weeks before the steroids were administered or prescribed.

Measure Title	Measure Text	Denominator (Eligibility) and Numerator (Adherence)
Discuss benefits of surgery when offering steroids to patients with severe CTS	IF a patient has severe CTS, THEN the patient should not be offered a steroid injection or oral steroids without also documentation that the possibility of surgery was discussed BECAUSE, for patients with severe CTS, injections and oral steroids are ineffective and have a high relapse rate.	**Denominator:** Patients meeting all of the following criteria: 1. The medical record indicates that CTS was diagnosed before the end of the study period 2. The patient was offered a steroid injection or oral steroids 3. A provider who treats musculoskeletal disorders described the symptoms as severe CTS during the prior three months **Numerator:** Among patients in the denominator, those having documentation in the six weeks before or at this visit, by the provider who prescribed/administered the steroids, that he or she discussed surgery with the patient.
Steroids for work-associated symptoms require follow-up	IF steroid injection is performed or oral steroids are prescribed for CTS symptoms that are thought to be work associated THEN physicians should document a follow-up call to or visit with the patient within 4 weeks BECAUSE it is important for the provider to know whether the treatment reduced symptoms or caused side effects to tailor further therapy.	**Denominator:** Patients meeting all of the following criteria: 1. The CTS has been described as work-associated 2. The medical record indicates that CTS was diagnosed at least 4 weeks before the end of the study period 3. The patient was administered a steroid injection or prescribed oral steroids at least 4 weeks before the end of the study period **Numerator:** Among patients in the denominator, those for whom the physician administering or prescribing the steroids documented a follow-up call or visit with the patient within four weeks.

Measure Title	Measure Text	Denominator (Eligibility) and Numerator (Adherence)
Limit steroid injections to four	IF a steroid injection of the carpal tunnel is performed for CTS, THEN no more than 4 steroid injections should be performed total per hand, unless the provider documents that the patient has refused surgery BECAUSE surgery is more effective than steroid injections for persistent CTS symptoms.	**Denominator:** Patients who have had any steroid injections of the carpal tunnel during the study period. **Numerator:** Among patients in the denominator, those who have either of the following: 1. Four or fewer injections in the study hand before the end of the study period, 2. Five or more injections in the study hand before the end of the study period and documented refusal of surgery during the six months before the fifth injection
Laser therapy should not be used for CTS	IF patients are diagnosed with CTS, THEN low-level laser therapy should not be prescribed for or used in treatment BECAUSE laser therapy is not effective in reducing pain or improving hand function.	**Denominator:** Patients for whom the medical record indicates that CTS was diagnosed before the end of the study period. **Numerator:** Among patients in the denominator, those for whom NO provider has documented that they prescribed or administered laser therapy as treatment for CTS symptoms.

Table I-4: Measures for Addressing Activities and Functional Limitations Potentially Associated with CTS Symptoms

Measure Title	Measure Text	Denominator (Eligibility) and Numerator (Adherence)
New CTS diagnosis requires detailed occupational history	IF the progress notes document a new diagnosis of CTS, THEN at least one of the following pieces of history should be documented between the time of initial evaluation of the CTS symptoms and the second visit after the diagnosis: 1. Occupation including functional job duties, 2. Duration at given occupation, 3. Whether symptoms improve or worsen at work. BECAUSE it is important to assess activities associated with CTS symptoms so that they can be addressed. Functional job duties are specific tasks in which patients use their hands.	**Denominator:** Patients for whom the medical record indicates that CTS was diagnosed during the study period AND for whom the initial evaluation of the CTS symptoms can be identified in the medical record. **Numerator:** Among patients in the denominator, those having documentation in the medical record of at least one of the following pieces of history from the time of the initial evaluation of the CTS symptoms through the two subsequent CTS-related visits: 1. Occupation including functional job duties (including whether employed) 2. Duration at given occupation 3. Whether symptoms improve or worsen at work
New CTS diagnosis requires assessment of occupational factors	IF the progress notes document a new diagnosis of CTS, THEN during the first three visits, the presence or absence of at least one of the following factors should be documented for occupational settings: 1. Mechanical force, 2. Vibration, and 3. Frequent repetitive wrist movements. BECAUSE these factors may be associated with CTS symptoms.	**Denominator:** Patients for whom the medical record indicates that CTS was diagnosed during the study period, for whom the initial evaluation of the CTS symptoms can be identified in the medical record, AND who are employed within one month before documentation of presentation, evaluation, suspicion, diagnosis or judgment of association with work. **Numerator:** Among patients in the denominator, those for whom the presence or absence of at least one of the following occupational exacerbating factors is documented from the time of the initial evaluation of the CTS symptoms through the two subsequent CTS-related visits: 1. Mechanical force 2. Vibration 3. Frequent repetitive wrist movements

Measure Title	Measure Text	Denominator (Eligibility) and Numerator (Adherence)
New CTS diagnosis requires assessment of non-occupational factors	IF the progress notes document a new diagnosis of CTS, THEN during the first three visits, the presence or absence of at least one of the following factors should be documented for non-occupational settings: 1. Mechanical force, 2. Vibration, and 3. Frequent repetitive wrist movements. BECAUSE these factors may be associated with CTS symptoms.	**Denominator:** Patients for whom the medical record indicates that CTS was diagnosed during the study period AND for whom the initial evaluation of the CTS symptoms can be identified in the medical record. **Numerator:** Among patients in the denominator, those for whom the presence or absence of at least one of the following non-occupational exacerbating factors was documented in the medical record from the time of the initial evaluation of the CTS symptoms through the two subsequent CTS-related visits: 1. Mechanical force 2. Vibration 3. Frequent repetitive wrist movements
Exacerbating activities should be identified when symptoms limit functioning	IF a patient has a diagnosis of carpal tunnel syndrome and a provider documents that occupational or non-occupational functioning is limited by it THEN the provider should also document the specific job duties or non-occupational activities that are associated with symptoms BECAUSE functional limitations reflect how well patients are responding to therapy, and documenting the nature of these limitations is necessary to determine recommendations for modifying occupational activities, and to determine how well patients are responding to therapy.	**Denominator:** All CTS-related visits after the initial diagnosis through the following three months at which a provider documents that occupational or non-occupational functioning was limited by CTS symptoms. **Numerator:** Among visits in the denominator, those with documentation in the medical record of the specific job duties or non-occupational activities that are associated with the CTS symptoms.

Measure Title	Measure Text	Denominator (Eligibility) and Numerator (Adherence)
Rationale for work-association should be documented	IF a patient is diagnosed with CTS and is working outside the home THEN, by the first visit after the initial presentation, the medical record should document the provider's opinion regarding the probability that the CTS is work associated together with a rationale BECAUSE identifying the factors contributing to the CTS is necessary so that those factors can be mitigated, and, when workers' compensation claims are filed, insufficient documentation of work-relatedness can lead to administrative delays that can delay necessary care and thereby worsen patient outcomes.	**Denominator:** Patients who are newly diagnosed with CTS during the study period AND employed. **Numerator:** Among patients in the denominator, those who have documentation in the medical record by the second CTS-related visit after the diagnosis indicating a provider's opinion of the probability that the CTS is work associated AND a rationale for that judgment.
Patients newly diagnosed with CTS should be educated about the condition	IF carpal tunnel syndrome is newly diagnosed THEN within the first four weeks, the provider should document that they educated the patient about at least one of the following: 1. Symptoms; 2. Treatments; 3. Prognosis; 4. Exacerbating factors; 5. The rationale for a judgment of work-association; 6. That unnecessary time off work may not benefit the patient; 7. Work-site or work-activity modifications; or 8. Other issues relating to their CTS. BECAUSE patients need this information to understand the disorder, navigate the healthcare and workers' compensation systems, and understand how their behavior can influence their recovery.	**Denominator:** Patients for whom the medical record indicates that CTS was newly diagnosed during the designated study period and at least 4 weeks prior to the end of the study period. **Numerator:** Among patients in the denominator, those having documentation in the medical record that within the first four weeks after the diagnosis that a provider who treats musculoskeletal disorders educated them about at least one of the following: 1. That the hand symptoms represent CTS 2. Treatments for CTS 3. Prognosis 4. That certain activities may be exacerbating factors 5. The rationale for a judgment of work-association 6. That unnecessary time off work may not be beneficial 7. Work-site or work-activity modifications 8. Any other issues relating to CTS

Measure Title	Measure Text	Denominator (Eligibility) and Numerator (Adherence)
Exposures to vibration, force, and repetition should be minimized	IF a patient has a diagnosis of carpal tunnel syndrome and a provider documents exposure to any of the following: mechanical force, vibration, and frequent repetitive wrist movements THEN, during the same visit, the provider should document that they discussed activity modification with the patient BECAUSE symptoms are less likely to improve if known inciting factors are not minimized, and awkward postures exacerbate the effects of these inciting factors.	**Denominator:** Patients for whom the medical record indicates that CTS was diagnosed before the end of the study period AND for whom a provider who treats musculoskeletal disorders documented exposure to mechanical force, vibration, or frequent repetitive wrist movements. **Numerator:** Among patients in the denominator, those having documentation in the medical record that activity modification was discussed with the patient at the visit at which the exposures were first documented.
Work-associated CTS symptoms require prompt follow-up	IF a patient has CTS and symptoms are newly thought to be work associated THEN they should be seen for a follow-up visit within 4 weeks of initial evaluation BECAUSE treatment may need to be modified according to symptoms.	**Denominator:** Patients meeting both of the following criteria: 1. The medical record indicates that CTS was diagnosed before the end of the study period 2. The visit at which the CTS symptoms were first described as appearing work-associated can be identified in the medical record during, and at least four weeks before the end of, the designated study period. **Numerator:** Among patients in the denominator, those for whom CTS was mentioned in the progress note from a follow-up visit with a provider who treats musculoskeletal disorders within 4 weeks of the visit at which the CTS symptoms were first described as work-associated.

Measure Title	Measure Text	Denominator (Eligibility) and Numerator (Adherence)
Work status should be monitored when CTS appears work-associated	IF work associated carpal tunnel syndrome is newly diagnosed THEN the provider should document whether or not the individual is currently working at each CTS-related visit during the first three months BECAUSE this information is needed to plan return to work if not working, and to monitor work associated factors if working.	**Denominator:** Visits meeting both of the following criteria: 1. The medical record indicates that CTS was diagnosed before the end of the study period 2. A visit to a provider who treats musculoskeletal disorders that occurred from the time of the judgment that the CTS appeared work-associated through the three months following that judgment 3. CTS was mentioned in the notes from that visit **Numerator:** Among visits in the denominator, those for which notes documented whether or not the patient was currently working.
Return to work after CTS-related disability requires follow-up assessment that includes functional limitations	IF a patient diagnosed with CTS returns to work after being on temporary work associated disability for more than four weeks, THEN, within four weeks of returning to work, they should have a follow-up assessment at which the presence or absence of occupational functional limitations is documented BECAUSE functional limitations may not be apparent until after the patient returns to work, or may change following return to work.	**Denominator:** Patients meeting all of the following criteria: 1. The medical record indicates that CTS was diagnosed before the end of the study period 2. The patient was off work (i.e., on total disability) for four or more weeks due to CTS-related symptoms 3. The patient was released to return to work at least part time four or more weeks before the end of the study period **Numerator:** Among patients in the denominator, those who had a follow-up visit to a provider who treats musculoskeletal disorders within four weeks of returning to work AND for whom the provider's note for this visit documented the presence or absence of occupational functional limitations.

Measure Title	Measure Text	Denominator (Eligibility) and Numerator (Adherence)
Prolonged CTS-related disability should trigger evaluation	IF a patient is off work for four or more weeks for carpal tunnel symptoms THEN the presence or absence of one of the following: 1. Alcohol or substance abuse, 2. Depression or anxiety, or 3. Other barriers to return to work should be documented in the medical record by the next visit. BECAUSE risk factors for failure to return to work need to be identified in order to be treated or otherwise mitigated.	**Denominator:** Patients meeting both of the following criteria: 1. The medical record indicates that CTS was diagnosed before the end of the study period 2. The patient was off work (i.e., on total disability) for four or more weeks due to CTS-related symptoms **Numerator:** Among patients in the denominator, those for whom all of the following are true: 1. The patient had a visit with a provider who treats musculoskeletal disorders between the initial presentation with CTS symptoms and the first visit occurring at least four weeks after the onset of the CTS-related disability 2. The note for at least one of these visits documented the presence or absence of one or more of the following: a. Alcohol or substance abuse b. Depression or anxiety c. Other barriers to return to work

Table I-5: Measures for Determining When Carpal Tunnel Release Surgery Is Necessary (Benefits substantially exceed risks such that it must be offered to the patient)

Measure Title	Measure Text	Denominator (Eligibility) and Numerator (Adherence)
Indications for carpal tunnel surgery are not changed by diabetes	IF a diabetic patient has pain or paresthesias in the median nerve distribution consistent with CTS AND conservative management has failed to sufficiently relieve their symptoms AND a nerve conduction study is positive for median neuropathy THEN they should be offered carpal tunnel release surgery [i.e., not denied because of history of diabetes] BECAUSE diabetic patients may have relief of symptoms with carpal tunnel release although the likelihood of success is less than in the non-diabetic population.	**Denominator:** Patients with a diagnosis of CTS and a diagnosis of diabetes mellitus. **Numerator:** Among patients in the denominator, those for whom a provider who treats musculoskeletal disorders has NOT documented that carpal tunnel surgery is contra-indicated because the patient has diabetes. Interpretation Note: The essence of this measure is that the indications for surgery are unchanged by patients having diabetes, and not that this measure should supersede the measures below when considering the appropriateness of carpal tunnel surgery for diabetics.
Prompt surgery in wrist injury	IF a patient has signs and/or symptoms of carpal tunnel syndrome following a distal radius fracture or other severe wrist injury AND those symptoms worsen with closed reduction of the fracture or immobilization of the wrist injury THEN carpal tunnel release surgery should be offered within 48 hours BECAUSE permanent median nerve damage may result if pressure on the nerve is not relieved.	**Denominator:** patients with CTS symptoms that began after a severe wrist injury and that worsened after the closed reduction of a wrist fracture or immobilization of the wrist. **Numerator:** Among patients in the denominator, those who underwent carpal tunnel surgery within 48 hours, or for whom refusal of surgery was documented within 48 hours, of the reduction or immobilization.
Surgical Appropriateness:		Note: The surgical appropriateness measures involve a variety of specific categories and terms, which are defined in the Guidance Document, Section 10. Appendix VIII contains an algorithm that presents the same measures in a different format. To facilitate cross-referencing between the algorithm and the measures, the relevant pages of the algorithm are listed next to the title of each measure below.

Measure Title	Measure Text	Denominator (Eligibility) and Numerator (Adherence)
Compelling indications for surgery when CTS is MILD (Algorithm p. VIII-5)	IF a patient has MILD carpal tunnel syndrome present for any length of time AND all of the following criteria are met THEN the patient MUST be offered carpal tunnel release surgery: 1. An attempt at conservative therapy has failed, 2. The presentation is "high probability", 3. An electrodiagnostic test is positive for carpal tunnel syndrome. BECAUSE potential benefits of surgery exceed the risks by a wide margin.	**Denominator:** Patients with CTS who had all of the following characteristics: 1. The CTS was MILD 2. The presentation was "high probability" 3. An attempt at conservative therapy failed 4. An electrodiagnostic test was positive for CTS **Numerator:** Among patients in the denominator, those who underwent carpal tunnel surgery, or were offered it and declined.
Compelling indications for surgery when CTS is MODERATE, part I (Algorithm p. VIII-4)	IF a patient has MODERATE carpal tunnel syndrome present for up to 12 months AND all of the following criteria are met THEN the patient MUST be offered carpal tunnel release surgery: 1. An attempt at conservative therapy has failed, 2. The presentation is "high probability", 3. An electrodiagnostic test is positive for carpal tunnel syndrome. BECAUSE potential benefits of surgery exceed the risks by a wide margin.	**Denominator:** Patients with CTS who had all of the following characteristics: 1. The CTS was MODERATE 2. The presentation was "high probability" 3. An attempt at conservative therapy failed 4. An electrodiagnostic test was positive for CTS 5. The duration of symptoms was up to 12 months **Numerator:** Among patients in the denominator, those who underwent carpal tunnel surgery, or were offered it and declined.
Compelling indications for surgery when CTS is MODERATE, part II (Algorithm p. VIII-4 and VIII-6)	IF a patient has MODERATE carpal tunnel syndrome present for more than 12 months AND both of the following criteria are met THEN the patient MUST be offered carpal tunnel release surgery: 1. Either or both of the following: a. An attempt at conservative therapy has failed AND/OR b. The presentation is "high probability" 2. An electrodiagnostic test is positive for carpal tunnel syndrome BECAUSE potential benefits of surgery exceed the risks by a wide margin.	**Denominator:** Patients with CTS who had all of the following characteristics: 1. The CTS was MODERATE 2. Either or both of the following: a. The presentation was "high probability" AND/OR b. An attempt at conservative therapy failed 3. An electrodiagnostic test was positive for CTS 4. The duration of symptoms was more than 12 months **Numerator:** Among patients in the denominator, those who underwent carpal tunnel surgery, or were offered it and declined.

Measure Title	Measure Text	Denominator (Eligibility) and Numerator (Adherence)
Compelling indications for surgery when CTS is SEVERE, part I (Algorithm p. VIII-3)	IF a patient has SEVERE carpal tunnel syndrome present for any length of time AND both of the following criteria are met THEN the patient MUST be offered carpal tunnel release surgery: 1. The presentation is "high probability", 2. An electrodiagnostic test is positive for carpal tunnel syndrome BECAUSE potential benefits of surgery exceed the risks by a wide margin.	**Denominator:** Patients with CTS who had all of the following characteristics: 1. The CTS was SEVERE 2. The presentation was "high probability" 3. An electrodiagnostic test was positive for CTS **Numerator:** Among patients in the denominator, those who underwent carpal tunnel surgery, or were offered it and declined.
Compelling indications for surgery when CTS is SEVERE, part II (See Appendix VIII, Algorithm for Determining Appropriateness of Surgery, p. VIII-3)	IF a patient has SEVERE carpal tunnel syndrome present for less than 3 months AND all of the following criteria are met THEN the patient MUST be offered carpal tunnel release surgery: 1. An attempt at conservative therapy has failed, 2. The presentation is "high probability", 3. An electrodiagnostic test has not been performed, or has produced an indeterminate result BECAUSE potential benefits of surgery exceed the risks by a wide margin.	**Denominator:** Patients with CTS who had all of the following characteristics: 1. The CTS was SEVERE 2. An attempt at conservative therapy has failed 3. The presentation was "high probability" 4. An electrodiagnostic test has not been performed, or has produced an indeterminate result 5. Symptoms were present less than 3 months **Numerator:** Among patients in the denominator, those who underwent carpal tunnel surgery, or were offered it and declined.
Compelling indications for surgery when CTS is SEVERE, part III (See Appendix VIII, Algorithm for Determining Appropriateness of Surgery, p. VIII-3)	IF a patient has SEVERE carpal tunnel syndrome present for more than 12 months AND all of the following criteria are met THEN the patient MUST be offered carpal tunnel release surgery: 1. An attempt at conservative therapy has failed, 2. The presentation is "high probability", 3. An electrodiagnostic test has not been performed, or has produced an indeterminate result BECAUSE potential benefits of surgery exceed the risks by a wide margin.	**Denominator:** Patients with CTS who had all of the following characteristics: 1. The CTS was SEVERE 2. An attempt at conservative therapy has failed 3. The presentation was "high probability" 4. An electrodiagnostic test has not been performed, or has produced an indeterminate result 5. Symptoms were present for more than 12 months **Numerator:** Among patients in the denominator, those who underwent carpal tunnel surgery, or were offered it and declined.

Table I-6: Measures for Determining When Carpal Tunnel Release Surgery Is Inappropriate (Risks substantially exceed benefits such that it should not be provided, also see Algorithm)

Measure Title	Measure Text	Denominator (Eligibility) and Numerator (Adherence)
Avoidance of carpal tunnel surgery during pregnancy	IF a pregnant woman has carpal tunnel syndrome THEN carpal tunnel release surgery should not be performed unless all of the following are true: 1) she has intolerable pain or severe and progressive nerve impairment, 2) she has had a failed attempt at splinting, and 3) she has had a failed attempt at steroid injection, BECAUSE symptoms usually improve following delivery.	**Denominator:** Patients with CTS who were pregnant during part of the study period **Numerator:** Among patients in the denominator, those who did not undergo carpal tunnel surgery during the study period, or who had all three of the following: 1. Intolerable pain OR severe and progressive nerve impairment 2. Failed attempt at splinting 3. Failed attempt at steroid injection
Surgical Appropriateness:		Note: The surgical appropriateness measures involve a variety of specific categories and terms, which are defined in the Guidance Document, Section 10 (page 48). Appendix VIII contains an algorithm that presents the same measures in a different format. To facilitate cross-referencing between the algorithm and the measures, the relevant pages of the algorithm are listed next to each measure below.

Measure Title	Measure Text	Denominator (Eligibility) and Numerator (Adherence)
Compelling CONTRA-indications for surgery when CTS is MILD, part I (Algorithm p. VIII-5 and VIII-7)	IF a patient has MILD carpal tunnel syndrome present for any length of time AND both of the following criteria are met THEN the patient should NOT undergo carpal tunnel release surgery: 1. Either or both of the following: a. Conservative therapy has not been attempted or has adequately resolved the patient's symptoms, AND/OR b. The presentation is less than "high probability" 2. An electrodiagnostic test has not been performed, or was negative or indeterminate for carpal tunnel syndrome. BECAUSE the risks of harm exceed the potential benefits by a wide margin.	**Denominator:** Patients with CTS who had all of the following characteristics: 1. The CTS was MILD 2. Either or both of the following: a. The presentation was NOT "high probability" AND/OR b. There was NO failed attempt at conservative therapy 3. An electrodiagnostic test has not been performed, or produced a negative or indeterminate result **Numerator:** Among patients in the denominator, those who did NOT undergo carpal tunnel surgery during the study period.
Compelling CONTRA-indications for surgery when CTS is MILD, part II (Algorithm p. VIII-7)	IF a patient has MILD carpal tunnel syndrome present for up to 12 months AND all of the following criteria are met THEN the patient should NOT undergo carpal tunnel release surgery: 1. Conservative therapy has not been attempted or has adequately resolved the patient's symptoms, 2. The presentation is less than "high probability", 3. An electrodiagnostic test is positive for carpal tunnel syndrome. BECAUSE the risks of harm exceed the potential benefits by a wide margin.	**Denominator:** Patients with CTS who had all of the following characteristics: 1. The CTS was MILD 2. The presentation was NOT "high probability" 3. There was NO failed attempt at conservative therapy 4. An electrodiagnostic test was positive for CTS 5. The duration of symptoms was up to 12 months **Numerator:** Among patients in the denominator, those who did NOT undergo carpal tunnel surgery during the study period.

Measure Title	Measure Text	Denominator (Eligibility) and Numerator (Adherence)
Compelling CONTRA-indications for surgery when CTS is MODERATE, part I (See Appendix VIII, Algorithm for Determining Appropriateness of Surgery, p. VIII-5 and VIII-7)	IF a patient has MODERATE carpal tunnel syndrome present for less than 3 months AND both of the following criteria are met THEN the patient should NOT undergo carpal tunnel release surgery: 1. Either or both of the following: a. Conservative therapy has not been attempted or has adequately resolved the patient's symptoms, AND/OR b. The presentation is less than "high probability" 2. An electrodiagnostic test has not been performed, or was negative or indeterminate for carpal tunnel syndrome. BECAUSE the risks of harm exceed the potential benefits by a wide margin.	**Denominator:** Patients with CTS who had all of the following characteristics: 1. The CTS was MODERATE 2. Either or both of the following: a. The presentation is NOT "high probability" AND/OR b. There was NO failed attempt at conservative therapy 3. An electrodiagnostic test has not been performed, or was negative or indeterminate for CTS 4. The duration of symptoms was less than 3 months **Numerator:** Among patients in the denominator, those who did NOT undergo carpal tunnel surgery during the study period.
Compelling CONTRA-indications for surgery when CTS is MODERATE, part II (See Appendix VIII, Algorithm for Determining Appropriateness of Surgery, p. VIII-7)	IF a patient has MODERATE carpal tunnel syndrome present for less than 3 months AND all of the following criteria are met THEN the patient should NOT undergo carpal tunnel release surgery: 1. Conservative therapy has not been attempted or has adequately resolved the patient's symptoms, 2. The presentation is less than "high probability", 3. An electrodiagnostic test is positive for carpal tunnel syndrome BECAUSE the risks of harm exceed the potential benefits by a wide margin.	**Denominator:** Patients with CTS who had all of the following characteristics: 1. The CTS was MODERATE 2. The presentation is NOT "high probability" 3. There was NO failed attempt at conservative therapy 4. An electrodiagnostic test was positive for CTS 5. The duration of symptoms was less than 3 months **Numerator:** Among patients in the denominator, those who did NOT undergo carpal tunnel surgery during the study period.

Measure Title	Measure Text	Denominator (Eligibility) and Numerator (Adherence)
Compelling CONTRA-indications for surgery when CTS is MODERATE, part III (See Appendix VIII, Algorithm for Determining Appropriateness of Surgery, p. VIII-5 and VIII-7)	IF a patient has MODERATE carpal tunnel syndrome present for 3 months or longer AND both of the following criteria are met THEN the patient should NOT undergo carpal tunnel release surgery: 1. Either or both of the following: a. Conservative therapy has not been attempted or has adequately resolved the patient's symptoms, AND/OR b. The presentation is less than "high probability" 2. An electrodiagnostic test is negative for carpal tunnel syndrome. BECAUSE the risks of harm exceed the potential benefits by a wide margin.	**Denominator:** Patients with CTS who had all of the following characteristics: 1. The CTS was MODERATE 2. Either or both of the following: a. The presentation is NOT "high probability" AND/OR b. There was NO failed attempt at conservative therapy 3. An electrodiagnostic test was negative for CTS 4. The duration of symptoms was 3 months or longer **Numerator:** Among patients in the denominator, those who did NOT undergo carpal tunnel surgery during the study period.
Compelling CONTRA-indications for surgery when CTS is MODERATE, part IV (See Appendix VIII, Algorithm for Determining Appropriateness of Surgery, p. VIII-5 and VIII-7)	IF a patient has MODERATE carpal tunnel syndrome present for 3 months or longer AND all of the following criteria are met THEN the patient should NOT undergo carpal tunnel release surgery: 1. An attempt at conservative therapy has not been attempted or has adequately resolved the patient's symptoms, 2. An electrodiagnostic test has not been performed, or was indeterminate for carpal tunnel syndrome BECAUSE the risks of harm exceed the potential benefits by a wide margin.	**Denominator:** Patients with CTS who had all of the following characteristics: 1. The CTS was MODERATE 2. There was NO failed attempt at conservative therapy 3. An electrodiagnostic test has not been performed or was indeterminate for CTS 4. The duration of symptoms was 3 months or longer **Numerator:** Among patients in the denominator, those who did NOT undergo carpal tunnel surgery during the study period.

Table I-7: Preoperative Care Measures

Measure Title	Measure Text	Denominator (Eligibility) and Numerator (Adherence)
Recent preoperative visit with surgical team	IF a patient undergoes carpal tunnel release surgery, THEN there must be documentation of a visit between the operating surgeon (or member of the operating team) and patient within 1 month prior to the date of surgery BECAUSE the patient's CTS symptoms and co-morbid illnesses may have changed during that month, which may influence operative management. Exclude patients having subsequent carpal tunnel release surgeries (re-operation after a prior carpal tunnel surgery).	**Denominator:** Patients with CTS who underwent carpal tunnel release surgery on the study hand for the first time during part of the study period. **Numerator:** Among patients in the denominator, those for whom a provider documented a visit between the operating surgeon (or member of the operating team) and patient within 1 month prior to the date of the surgery.
Elements of general preoperative history	IF a patient undergoes carpal tunnel release surgery, THEN there must exist a detailed general medical history (or an update of a previously-taken history specifying any changes or lack thereof) updated within 1 month prior to surgery including:	**Denominator:** Patients with CTS who underwent carpal tunnel release surgery during part of the study period.
Medical co-morbidities.	1. Medical co-morbidities	**Numerator:** Among patients in the denominator, those for whom a provider documented the presence of, absence of, or changes to medical co-morbidities within 1 month prior to surgery.
Past surgical history	2. Past surgical history	**Numerator:** Among patients in the denominator, those for whom a provider documented the presence of, absence of, or changes to past surgical history within 1 month prior to surgery.
Medications	3. Medications	**Numerator:** Among patients in the denominator, those for whom a provider documented the presence of, absence of, or changes to medications within 1 month prior to surgery.
"Allergies"	4. Allergies (medication intolerances)	**Numerator:** Among patients in the denominator, those for whom a provider documented the presence of, absence of, or changes to allergies or medication intolerances within 1 month prior to surgery .

Measure Title	Measure Text	Denominator (Eligibility) and Numerator (Adherence)
General review of systems	5. General review of systems including at least two organ systems BECAUSE these elements influence decisions regarding the appropriateness of surgery, risks of complications, surgical technique, and selection of perioperative medications.	**Numerator:** Among patients in the denominator, those for whom a provider documented the presence of, absence of, or changes to symptoms affecting at least two different organ systems within 1 month prior to surgery .
Elements of CTS-specific surgical evaluation	IF a patient undergoes carpal tunnel release surgery, THEN there must be documentation by the operating surgeon (or member of the surgical team) specifically noting all three of the following: 1. Presence or absence of paresthesias and/or pain in median-nerve distribution, 2. Physical examination findings including presence or absence weakness of median-nerve- innervated muscles and/or thenar atrophy, 3. Discussion of whether electrodiagnostic testing was performed and any results BECAUSE these factors are associated with a greater probability that CTS is the correct diagnosis and improved surgical outcomes.	**Denominator:** Patients with CTS who underwent carpal tunnel release surgery during part of the study period. **Numerator:** Among patients in the denominator, those for whom the operating surgeon (or member of the surgical team) documents all three of the following in the medical record during the 18 months prior to carpal tunnel surgery: 1. History: Presence or absence of paresthesias or pain in digits 1, 2, or 3 2. Physical exam: Presence or absence of thenar muscle weakness or thenar atrophy 3. Electrodiagnostic testing: Discussion of whether such testing was performed and any results.
Documentation of prior treatments for CTS	IF a patient undergoes carpal tunnel release surgery, THEN there must be documentation by operating surgeon (or member of the operating team) specifically noting the presence or absence of history of previous treatments for carpal tunnel syndrome BECAUSE this information influences the appropriateness of surgery, and the selection of the operative technique.	**Denominator:** Patients with CTS who underwent carpal tunnel release surgery during part of the study period. **Numerator:** Among patients in the denominator, those for whom the operating surgeon (or member of the surgical team) documents the presence or absence of a history of previous treatments for CTS during the 18 months prior to carpal tunnel surgery.

Measure Title	Measure Text	Denominator (Eligibility) and Numerator (Adherence)
Preoperative evaluation of suspected cervical radiculopathy	IF a patient has carpal tunnel syndrome AND any suspected cervical radiculopathy THEN carpal tunnel release surgery should not be performed before the patient has been evaluated further with one or more of the following: 1. EMG/NCS looking for radiculopathy, 2. C-spine radiographs or MRI, or 3. Referral to neurology, neurosurgery, or physical medicine BECAUSE untreated cervical radiculopathy is one reason for failed carpal tunnel release.	**Denominator:** Patients with CTS who underwent carpal tunnel release surgery during part of the study period and cervical radiculopathy was suspected or diagnosed during the 18 months before surgery. **Numerator:** Among patients in the denominator, those for whom CTS surgery was performed after the patient was evaluated with one or more of the following: 1. Electrodiagnostic testing of nerves proximal to the carpal tunnel 2. Imaging tests of the cervical spine 3. Evaluation by a physician with expertise in neurological disorders
Consent for open procedure in planned endoscopic release	IF a patient undergoes an attempt at endoscopic carpal tunnel release surgery, THEN the patient should have been consented for possible open procedure BECAUSE there are several scenarios where the case should be converted to an open approach and patients must be informed of this possibility preoperatively.	**Denominator:** Patients with CTS who were consented for an endoscopic carpal tunnel release surgery during part of the study period. **Numerator:** Among patients in the denominator, those for whom the consent included a provision for an open approach.

Table I-8: Intra-Operative Care Measures

Measure Title	Measure Text	Denominator (Eligibility) and Numerator (Adherence)
Indications for primary open rather than endoscopic release	IF a carpal tunnel release procedure is performed AND the patient has a suspected mass lesion or one documented by MRI/CT or ultrasound within the carpal tunnel (i.e., ganglion cyst), severe rheumatoid arthritis, or severe tenosynovitis of the wrist in the medical record THEN the release should be performed open rather than endoscopically BECAUSE visualization at the time of surgery may be limited and the risk of nerve injury increases.	**Denominator:** Patients with CTS for whom the medical record for the 18 months before surgery documents a clinical suspicion of a mass lesion; a mass lesion within the carpal tunnel on CT, MRI or ultrasound; severe rheumatoid arthritis; or severe tenosynovitis of the wrist. **Numerator:** Among patients in the denominator, those for whom the surgeon used a primary open rather than endoscopic approach.
Documentation of proximal transverse incision location in endoscopic release	IF a patient undergoes endoscopic carpal tunnel release surgery, THEN there must be documentation in the operative report that the proximal transverse incision was ulnar to the palmaris longus or did not extend radial to the radial aspect of ring finger if the palmaris longus is absent BECAUSE an incision more radial than this may result in an injury to the palmar cutaneous branch of the median nerve, or the median nerve itself.	**Denominator:** Patients with CTS who underwent an endoscopic carpal tunnel release surgery during part of the study period. **Numerator:** Among patients in the denominator, those for whom there is documentation in the operative report describing the location of the incision(s) in the area of the wrist AND the incision was in a location that avoids the injury to the palmar cutaneous branch of the median nerve.
Identification of deep surface of TCL in endoscopic release	IF a patient undergoes endoscopic carpal tunnel release surgery, THEN there should be documentation in the operative report that the deep surface of the transverse carpal ligament was identified prior to transection BECAUSE failure to do so may result injury to the median nerve.	**Denominator:** Patients with CTS who underwent an endoscopic carpal tunnel release surgery during part of the study period. **Numerator:** Among patients in the denominator, those for whom there is documentation in the operative report that the deep surface of the transverse carpal ligament was identified prior to transection.
Documentation of TCL release	IF a patient undergoes carpal tunnel release surgery, THEN there must be documentation in the operative report that the transverse carpal ligament was released BECAUSE incomplete release of the median nerve may lead to failure to relieve symptoms.	**Denominator:** Patients with CTS who underwent carpal tunnel release surgery during part of the study period. **Numerator:** Among patients in the denominator, those for whom there is documentation in the operative report that the transverse carpal ligament in the wrist was transected.

Measure Title	Measure Text	Denominator (Eligibility) and Numerator (Adherence)
Limit superficial epineurotomy to specific indications	IF a patient undergoes primary open carpal tunnel release surgery, THEN superficial epineurotomy should not be performed unless specific injury or scarring of the median nerve was present BECAUSE superficial epineurotomy does not result in a statistically significant difference in sensibility, thenar muscle strength and resolution of atrophy and it increases the risk of iatrogenic injury to the nerve	**Denominator:** Patients with CTS who underwent primary open carpal tunnel release surgery during part of the study period. **Numerator:** Among patients in the denominator, those for whom either a superficial epineurotomy was NOT performed or a specific injury or scarring of the median nerve was documented in the operative report or in the medical record during the six months before surgery.
Limit internal neurolysis to specific indications	IF a patient undergoes open carpal tunnel release surgery, THEN internal neurolysis should not be performed unless specific injury or scarring of the median nerve was present BECAUSE internal neurolysis does not result in a statistically significant difference in sensibility, thenar muscle strength and resolution of atrophy and it may increase the risk of iatrogenic injury to the nerve.	**Denominator:** Patients with CTS who underwent open carpal tunnel release surgery during part of the study period. **Numerator:** Among patients in the denominator, those for whom either internal neurolysis was NOT performed or a specific injury or scarring of the median nerve was documented in the operative report or in the medical record during the six months before surgery.
Limit flexor tenosynovectomy to specific indications	IF a patient undergoes carpal tunnel release surgery and does not have concomitant severe proliferative tenosynovitis (i.e., gout, inflammatory arthritis, or infection) THEN a flexor tenosynovectomy should not be performed BECAUSE this increases the risk of postoperative hematoma and infection, which may worsen symptoms and cause adhesions between nerve and tendons.	**Denominator:** Patients with CTS who underwent carpal tunnel release surgery during part of the study period. **Numerator:** Among patients in the denominator, those for whom either a flexor tenosynovectomy was NOT performed or proliferative tenosynovitis, or a condition associated with severe proliferative tenosynovitis, was documented in the operative report or in the medical record during the six months before surgery.
Avoidance of TCL repair	IF a patient undergoes open carpal tunnel release surgery, THEN the transverse carpal ligament should not be repaired BECAUSE repair may increase the risk of complications and has not been shown to prevent the uncommon complication of flexor tendon bowstringing.	**Denominator:** Patients with CTS who underwent carpal tunnel release surgery during part of the study period. **Numerator:** Among patients in the denominator, those for whom a TCL repair was NOT performed.

Table I-9: Postoperative Care Measures

Measure Title	Measure Text	Denominator (Eligibility) and Numerator (Adherence)
Requirement for a postoperative visit	IF a patient undergoes carpal tunnel surgery, THEN they must be seen by a medical provider or physical/occupational/hand therapist for a postoperative clinic appointment within the first 2 weeks BECAUSE the response to surgery and the presence or absence of complications should be assessed so that problems can be identified and treated.	**Denominator:** Patients with CTS who underwent carpal tunnel release surgery during part of the study period and there is at least two weeks following carpal tunnel surgery within the study period. **Numerator:** Among patients in the denominator, those for whom the medical record documents that a medical provider who treats musculoskeletal disorders or a physical/occupational/hand therapist evaluated the hand during a postoperative clinic visit.
Elements of postoperative visit with surgical team	IF a patient undergoes carpal tunnel surgery and has one or more postoperative appointments with the surgical team, THEN, at the first such visit, a surgical team member should evaluate the current carpal-tunnel related symptoms BECAUSE the response to surgery and the presence or absence of complications should be assessed so that problems can be identified and treated.	**Denominator:** Patients with CTS who underwent carpal tunnel release surgery during part of the study period and have at least one or more postoperative visit with the operating surgeon or member of the operating team within three months of carpal tunnel surgery. **Numerator:** Among patients in the denominator, those for whom the medical record documents that the surgeon or a member of the operating team evaluated the current (i.e., postoperative) carpal-tunnel-related symptoms at the first postoperative visit.
Monitoring of postoperative stiffness	IF a patient undergoes a carpal tunnel release and has finger stiffness postoperatively at 2 weeks, THEN they must be re-evaluated within 2 weeks by the operative team BECAUSE early intervention for postoperative stiffness may reduce subsequent disability.	**Denominator:** Patients with CTS who underwent carpal tunnel release surgery during part of the study period, had at least one postoperative visit with a provider who treats musculoskeletal disorders between two weeks to three months after carpal tunnel surgery and had finger stiffness during one or more of the post operative visits. **Numerator:** Among patients in the denominator, those who had a second visit, specifically with the surgeon or member of the operating team, within 2 weeks of the postoperative visit at which stiffness was first documented.

Measure Title	Measure Text	Denominator (Eligibility) and Numerator (Adherence)
Management of postoperative finger stiffness	IF a patient undergoes a carpal tunnel release and has finger stiffness postoperatively at 6 weeks, THEN they must be referred for physical/occupational/hand therapy BECAUSE such therapy can help with postoperative stiffness.	**Denominator:** Patients with CTS who underwent carpal tunnel release surgery during part of the study period and had the following: 1. One or more CTS-related visits from six weeks through six months after carpal tunnel surgery 2. Finger stiffness at any of the CTS-related visits from six weeks through six months after carpal tunnel surgery 3. At least one month within the study period after the first documentation of finger stiffness **Numerator:** Among patients in the denominator, those who were referred for physical/occupational/ hand therapy within one month of the visit during which finger stiffness was first documented.
Patients who do not improve after surgery require evaluation	IF a patient undergoes a carpal tunnel release and does not experience significant improvement in symptoms during the first three months following surgery, THEN the surgeon should personally re-examine the patient at least one additional visit BECAUSE monitoring is warranted to determine whether symptoms have resolved or additional evaluation or treatment is indicated	**Denominator:** Patients with CTS who underwent carpal tunnel release surgery during part of the study period and who satisfy both of the following criteria: 1. At least three months and no more than nine months after carpal tunnel surgery, a provider who treats musculoskeletal disorders documented that the patient did NOT experience a substantial improvement in their CTS-related symptoms after surgery 2. After the visit at which lack of improvement was first documented, there were at least eight weeks remaining within the study period **Numerator:** Among patients in the denominator, those who are re-examined by the operating surgeon within 8 weeks of the visit at which the lack of improvement was first documented.

Measure Title	Measure Text	Denominator (Eligibility) and Numerator (Adherence)
Management of lack of improvement after surgery	IF a patient undergoes carpal tunnel release surgery and does not experience significant improvement in symptoms after surgery THEN the patient should be evaluated for reasons for lack of improvement (unless the patient refuses) via at least one of the following performed within one year postoperatively: 1. Ordering one or more diagnostic tests, or 2. Referring the patient to another specialist for a second opinion BECAUSE each of these methods of evaluation can identify reasons for lack of improvement.	**Denominator:** Patients with CTS who underwent carpal tunnel release surgery during part of the study period and who satisfy both of the following criteria: 1. At least three months and no more than nine months after carpal tunnel surgery, a provider who treats musculoskeletal disorders documented that the patient did NOT experience a substantial improvement in their CTS-related symptoms after surgery 2. There is at least one year within the study period after carpal tunnel surgery **Numerator:** Among patients in the denominator, those who, within one year after carpal tunnel surgery, underwent a diagnostic test of the study hand, were evaluated by a different specialist who treats musculoskeletal disorders, or refused further evaluation.