**Appendix 1: Spinal Fusion Admission Procedure Confirmation**

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| --- | --- |
| **Spinal fusion** | **CPT-4 code** |
| Cervical spinal fusion | 22548, 22551, 22554, 22590, 22595, 22600 |
| Thoracic spinal fusion | 22532, 22556, 22610 |
| Lumbar spinal fusion | 22533, 22558, 22586, 22612, 22630, 22633 |
| Spinal fusion for deformity | 22800, 22802, 22804, 22808, 22810, 22812, 22818, 22819 |
| Spinal fusion add-on codes | 22534, 22552, 22585, 22614, 22632, 22634 |

Abbreviations: CPT-4= Current Procedural Terminology, 4th edition.

**Appendix Table 2: Spinal Fusion Admission Exclusions**

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| --- | --- | --- |
| **Description** | **ICD-9-CM diagnosis code** | **Antibiotic name** |
| Gunshot wound | E922.0–E922.3, E922.8, E922.9, E928.7, E965.0–E965.4, E970, E979.4, E985.x–E985.4 |  |
| Motor vehicle accident | E810.x-E825.9, E968.5, E988.5 |  |
| Surgical site infectiona | 324.x, 478.21-478.24, 478.29, 536.41, 730.0x–730.2x, 730.8x, 730.9x, 996.6x, 998.5x |  |
| Cellulitis/skin and soft tissue infections | 681.x, 682.x, 683, 684, 685.0, 686.x, 728.0, 728.86, 958.3, 997.62 |  |
| Pneumonia | 481, 482.xx, 483.x, 485, 486, 510.0, 510.9, 513.0, 997.31, 997.32 |  |
| Urinary tract, pyelonephritis, prostatitis, genitourinary infection | 590.0x, 590.1x, 590.2, 590.80, 590.9, 595.0, 598.0x, 599.0, 601.0, 616.3, 616.4 |  |
| Gastrointestinal infection | 566, 567.1, 567.2x, 567.3x, 567.9, 569.5, 572.0 |  |
| Sepsis/sterile site infection | 038.x, 320.x, 711.0x, 711.9x, 785.52, 790.7, 995.91, 995.92, 999.3x |  |
| Upper respiratory infections | 380.1x, 382.0x, 382.4, 382.9, 383.0x, 383.9, 461.x, 463, 466.0, 475, 491.1, 522.5, 528.3 |  |
| Intravenous route for discharge antibiotic |  | amikacin, ampicillin, ampicillin-sulbactam, azithromycin, aztreonam, cefazolin, cefepime, cefotaxime, ceftaroline, ceftazidime, ceftazidime-avibactam, ceftolozane-tazobactam, ceftriaxone, cefuroxime, ciprofloxacin, clindamycin, colistin/polymyxin B, dalbavancin, daptomycin, doripenem, doxycycline, ertapenem, gentamicin, imipenem, levofloxacin, linezolid, meropenem, metronidazole, moxifloxacin, nafcillin, oritavancin, oxacillin, penicillin, piperacillin-tazobactam, tedizolid, tigecycline, tobramycin, trimethoprim-sulfamethoxazole, vancomycin |

Abbreviations: CPT-4= Current Procedural Terminology, 4th edition; ICD-9-CM= International Classification of Diseases, 9th Revision, Clinical Modification.

a We excluded fusion admissions coded for an SSI. There were 154 coded for an infection that would be consistent with a spinal SSI (ICD-9-CM diagnosis 324.1 (epidural abscess), 478.24 (retropharyngeal abscess), 730.08, 730.18, 730.28, 730.98 (all codes for osteomyelitis), 998.5x (surgical site infection), 996.67 (infection d/t prosthetic device)). Of these admissions, 95 were only coded for osteomyelitis, epidural abscess, or bone infection, all of which would likely have been present on admission and the reason for the spinal fusion rather than an incident infection after surgery. Of the 59 admissions with one of the remaining diagnosis codes, 23 had the infection coded as the primary diagnosis for the admission (13 coded with 996.67, 10 coded with 998.59), and 3 were coded for infection but the length of stay was <= 3 days, and thus the infection was almost certainly pre-existing. That left 33 potential SSIs during the index admission (with length of stay 5 or more days), for an SSI rate of 33/9267 (0.36%) among fusions that met inclusion criteria.

**Appendix Table 3: Patient Comorbidities and Spinal Fusion Operative Factors Coded During the Index Admission**

|  |  |  |
| --- | --- | --- |
| **Description** | **ICD-9-CM diagnosis code** | **ICD-9-CM procedure code** |
| **Patient comorbidities** | | |
| Spinal trauma (spinal fracture/dislocation or fall) | 733.13, 805.x, 806.x, 839.00–839.59, E880.0–E888.9 |  |
| **Operative factors** | | |
| Anterior surgical approach |  | 81.02, 81.04, 81.06, 81.32, 81.34, 81.36 |
| Posterior surgical approach |  | 81.01, 81.03, 81.05, 81.07, 81.08, 81.31, 81.33, 81.35, 81.37, 81.38 |
| Cervical spinal regiona | 353.2, 721.0, 721.1, 722.0, 722.4, 722.71, 722.81, 722.91, 723.0, 739.1, 805.0x, 805.1x, 806.0x, 806.1x, 839.0x, 839.1x, 847.0 | 81.01–81.03, 81.31–81.33 |
| Lumbar spinal regiona | 344.1, 344.30–344.32, 353.1, 353.4, 355.0, 721.3, 721.42, 722.10, 722.52, 722.73, 722.83, 722.93, 724.02, 724.2, 724.3, 724.6, 739.3, 756.11, 805.4, 805.5, 806.4, 806.5, 839.20, 839.30, 846.x, 847.2 | 81.06–81.08, 81.36–81.38 |
| Thoracic spinal regiona | 353.3, 721.2, 721.41, 722.11, 722.51, 722.72, 722.82, 722.92, 724.01, 724.1, 739.2, 805.2, 805.3, 806.2x, 806.3x, 839.21, 839.31, 847.1 | 81.04, 81.05, 81.34, 81.35 |
| 1–2 spinal levelsb |  | 81.62 |
| 3–7 spinal levelsb |  | 81.63 |
| ≥ 8 spinal levelsb |  | 81.64 |
| Bone morphogenetic protein |  | 84.52 |
| Dural tear | 349.31, 349.39 |  |
| Hemorrhagec | 998.11 | 39.98 |
| Hematoma/seroma | 998.12, 998.13 |  |
| Dehiscence/necrosis | 998.32, 998.83 |  |

a Region of the spine was determined hierarchically using procedure codes when available. When nonspecific spinal fusion procedure codes were used (i.e., 81.00, 81.30, 81.39), diagnosis codes were used to determine the spinal region.

b If no code 81.62–81.64 was listed during the index admission, the number of codes for spinal fusion were summed to determine the number of spinal levels during the index admission.

c Diagnosis and/or procedure code.