**Supplemental Table S1**

**Procedures, procedural codes, and associated diagnoses used to query the 5% Medicare sample database**

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| --- | --- | --- | --- |
| **Surgery** | **CPT Code(s)** | **ICD-9 Procedure Code(s)** | **ICD-9 Codes for Degenerative Spine Disease-Related Diagnoses** |
| Anterior Cervical Discectomy and Fusion | 22551 | 81.00 81.02 | 721.00: Cervical Spondylosis without Myelopathy  721.1: Cervical Spondylosis with Myelopathy  722.71: Intervertebral Disc Disorder with Myelopathy,  Cervical Region  723.0: Spinal Stenosis in Cervical Region  723.1: Cervicalgia  723.4: Brachial Neuritis or Radiculitis, not Otherwise  Specified |
| Posterior Cervical Fusion | 22600 | 81.01 81.03 | 721.0: Cervical Spondylosis without Myelopathy  721.1: Cervical Spondylosis with Myelopathy  723.0: Spinal Stenosis in Cervical Region  723.1: Cervicalgia  723.4: Brachial Neuritis or Radiculitis, not Otherwise  Specified |
| 360o Cervical Fusion | 22551 AND 22600 | (81.00 OR 81.02) AND  (81.01 OR 81.03) | Same as ICD-9 codes for anterior cervical discectomy and fusion and posterior cervical fusion |
| Lumbar Microdiscectomy | 63030 | 80.51 | 721.3: Lumbosacral Spondylosis without Myelopathy  721.42: Spondylosis with Myelopathy, Lumbar Region  722.1: Displacement of Lumbar Intervertebral Disc without Myelopathy  722.52: Degeneration of Lumbar or Lumbosacral  Intervertebral Disc  722.73: Intervertebral Disc Disorder with Myelopathy,  Lumbar Region  724.02: Spinal Stenosis, Lumbar Region, without  Neurogenic Claudication  724.2: Lumbago  724.4: Thoracic or Lumbosacral Neuritis or Radiculitis,  Unspecified |
| Lumbar Laminectomy | 63047 | 3.09 | 721.3: Lumbosacral Spondylosis without Myelopathy  721.42: Spondylosis with Myelopathy, Lumbar Region  722.5: Degeneration of Thoracic or Lumbar Intervertebral  Disc  722.73: Intervertebral Disc Disorder with Myelopathy,  Lumbar Region  724.03: Spinal Stenosis, Lumbar Region, with Neurogenic  Claudication  724.20: Lumbago |
| Lumbar Fusion, Posterior Approach | 22630 22612 22633 | 81.07 81.08 | 721.3: Lumbosacral Spondylosis without Myelopathy  721.42: Spondylosis with Myelopathy, Lumbar Region  722.1: Displacement of Lumbar Intervertebral Disc without Myelopathy  722.52: Degeneration of Lumbar or Lumbosacral  Intervertebral Disc  722.73: Intervertebral Disc Disorder with Myelopathy,  Lumbar Region  724.02: Spinal Stenosis, Lumbar Region, without  Neurogenic Claudication  724.2: Lumbago  724.3: Sciatica  724.4: Thoracic or Lumbosacral Neuritis or Radiculitis,  Unspecified |
| Lumbar Fusion, Anterior Approach | 22558 22585 | 81.04 81.06 | Same as ICD-9 codes for lumbar fusion, posterior approach |
| 360o Lumbar Fusion | (22558 OR 22585) AND (22630 OR 22612 OR 22633) | (81.04 OR 81.06) AND  (81.07 OR 81.08) | Same as ICD-9 codes for lumbar fusion, posterior approach |

*CPT, Current Procedural Terminology; ICD, International Classification of Diseases*