|  |  |
| --- | --- |
| **Supplementary Table 1:** ICD-10 Codes |  |
| **Autologous Multi-Level** | '0SG1070', '0SG1071', '0SG107J', '0SG1370', '0SG1371', '0SG137J', '0SG1470', '0SG1471', '0SG147J' |
| **Nonautologous One-Level** | '0SG00K0', '0SG00K1', '0SG00KJ', '0SG03K0', '0SG03K1', '0SG03KJ', '0SG04K0', '0SG04K1', '0SG04KJ' |
| **Nonautologous Multi-Level** | '0SG10K0', '0SG10K1', '0SG10KJ', '0SG13K0', '0SG13K1', '0SG13KJ', '0SG14K0', '0SG14K1', '0SG14KJ' |
| **Anterior Column One-Level** | '0SG0070', '0SG007J', '0SG00A0', '0SG00AJ', '0SG00J0', '0SG00JJ', '0SG00K0', '0SG037J', '0SG03A0', '0SG03AJ', '0SG03J0', '0SG03JJ', '0SG03K0', '0SG03KJ', '0SG0470', '0SG047J', '0SG04A0', '0SG04AJ', '0SG04J0', '0SG04JJ', '0SG04K0', '0SG04KJ', '0SG0370', '0SG00KJ' |
| **Anterior Column Multi-Level** | '0SG1070', '0SG107J', '0SG10A0', '0SG10AJ', '0SG10J0', '0SG10JJ', '0SG10K0', '0SG10KJ', '0SG1370', '0SG137J', '0SG13A0', '0SG13AJ', '0SG13J0', '0SG13JJ', '0SG13K0', '0SG13KJ', '0SG1470', '0SG147J', '0SG14A0', '0SG14AJ', '0SG14J0', '0SG14JJ', '0SG14K0', '0SG14KJ' |
| **Posterior Column One-Level** |  '0SG0071', '0SG00J1', '0SG00K1', '0SG0371', '0SG03J1', '0SG03K1', '0SG0471', '0SG04J1', '0SG04K1' |
| **Posterior Column Multi-Level** | '0SG1071', '0SG10J1', '0SG10K1', '0SG1371', '0SG13J1', '0SG13K1', '0SG1471', '0SG14J1', '0SG14K1' |
| **Infection** | 'T814XXA','K6811', 'T814XXA', 'T8579XA', 'T80219A', 'T80211A', 'T80212A', 'T8022XA', 'T8029XA','T880XXA', 'A419', 'R6520', 'K6811', 'K6811', 'T8130XA', 'T8132XA', 'T8131XA', 'T8189XA','T8183XA', 'T8579XA', 'T8460XA', 'T847XXA', 'K6811', 'T8579XA', 'A419', 'R6520', 'T8130XA','T8132XA', 'T8131XA', 'T8133XA', 'T8183XA', 'T847XXA' |
| **Postoperative Pain** | 'G8918', 'G8928' |
| **Wound Dehiscence** | 'T8130XA', 'T8131XA', 'T8132XA', 'T8133XA' |
| **Osteoporosis** | 'M8088XA', 'M8088XD', 'M8088XG', 'M8088XK', 'M8088XP', 'M8088XS', 'M8008XA', 'M8008XD', 'M8008XG', 'M8008XK', 'M8008XP', 'M8008XS', 'M810', 'M816', 'M818' |
| **Lumbar Vertebral Fracture** | 'S32001A','S32001B','S32001D','S32001G','S32001K','S32001S','S32019A','S32011B','S32011D','S32011G','S32011K','S32011S','S32021A','S32021B','S32021D','S32021G','S32021K','S32021S','S32031A','S32031B','S32031D','S32031G','S32031K','S32031S','S32041A','S32041B','S32041D','S32041G','S32041K','S32041S','S32051A','S32051B','S32051D','S32051G','S32051K','S32051S','S32008A','S32008B','S32008D','S32008G','S32008K','S32008S','S32018A','S32018B','S32018D','S32018G','S32018K','S32018S','S32028A','S32028B','S32028D','S32028G','S32028K','S32028S','S32038A','S32038B','S32038D','S32038G','S32038K','S32038S','S32048A','S32048B','S32048D','S32048G','S32048K','S32048S','S32058A','S32058B','S32058D','S32058G','S32058K','S32058S','S32009A','S32009B','S32009D','S32009G','S32009K','S32009S','S32019A','S32019B','S32019D','S32019G','S32019K','S32019S','S32029A','S32029B','S32029D','S32029G','S32029K','S32029S','S32039A','S32039B','S32039D','S32039G','S32039K','S32039S','S32049A','S32049B','S32049D','S32049G','S32049K','S32049S','S32059A','S32059B','S32059D','S32059G','S32059K','S32059S','S32002A','S32002B','S32002D','S32002G','S32002K','S32002S','S32012A','S32012B','S32012D','S32012G','S32012K','S32012S','S32022A','S32022B','S32022D','S32022G','S32022K','S32022S','S32032A','S32032B','S32032D','S32032G','S32032K','S32032S','S32042A','S32042B','S32042D','S32042G','S32042K','S32042S','S32052A','S32052B','S32052D','S32052G','S32052K','S32052S','S32000A','S32000B','S32000D','S32000G','S32000K','S32000S','S32010A','S32010B','S32010D','S32010G','S32010K', 'S32009S','S32020A','S32020B','S32020D','S32020G','S32020K', 'S32020S' ,'S32030A','S32030B','S32030D','S32030G','S32030K','S32030S','S32040A','S32040B','S32040D','S32040G','S32040K','S32040S','S32050A','S32050B','S32050D','S32050G','S32050K','S32050S' |
| **Hardware Failure** | 'T84216', 'T84216A', 'T84216D', 'T84216S', 'T84226', 'T84226A', 'T84226D', 'T84226S', 'T84296', 'T84296A', 'T84296D', 'T84296S', 'T84318', 'T84318A', 'T84318D', 'T84318S', 'T84328', 'T84328A', 'T84328D', 'T84328S', 'T84398', 'T84398A', 'T84398D', 'T84398S', 'T84418', 'T84418A', 'T84418D', 'T84418S', 'T84428', 'T84428A', 'T84428D', 'T84428S', 'T84498', 'T84498A', 'T84498D', 'T84498S', 'T8450', 'T8450XA', 'T8450XD', 'T8450XS', 'T8459', 'T8459XA', 'T8459XD', 'T8459XS', 'T8460', 'T8460XA', 'T8460XD', 'T8460XS', 'T8463', 'T8463XA', 'T8463XD', 'T8463XS', 'T8469', 'T8469XA', 'T8469XD', 'T8469XS', 'T847', 'T847XXA', 'T847XXD', 'T847XXS', 'T848', 'T8481', 'T8481XA', 'T8481XD', 'T8481XS', 'T8482', 'T8482XA', 'T8482XD', 'T8482XS', 'T8483', 'T8483XA', 'T8483XD', 'T8483XS', 'T8484', 'T8484XA', 'T8484XD', 'T8484XS', 'T8485', 'T8485XA', 'T8485XD', 'T8485XS', 'T8486', 'T8486XD', 'T8486XS', 'T8489', 'T8489XA', 'T8489XD', 'T8489XS', 'T849', 'T849XXA', 'T849XXD', 'T849XXS' |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Dependent variable** | **Independent variable** | **Reference** | **Adjusted OR** | **p-value** | **95% CI** |
| Single-LevelReadmission at 30 Days |  |
|  | Age | N/A | 1.01 | 0.62 | 0.98-1.03 |
|  | Sex (Female=1) | Male | 0.80 | 0.42 | 0.48-1.42 |
|  | CCI | N/A | 1.24 | 0.017 | 1.03-1.47 |
|  | Anterior vs Posterior Column (Anterior=1) | Posterior | 1.03 | 0.88 | 0.70-1.52 |
| **Dependent variable** | **Independent variable** | **Reference** | **Adjusted OR** | **p-value** | **95% CI** |
| Single-LevelReadmission at 90 Days |  |  |  |  |  |
|  | Age | N/A | 1.01 | 0.24 | 0.99-1.04 |
|  | Sex (Female=1) | Male | 0.94 | 0.78 | 0.60-1.53 |
|  | CCI | N/A | 1.22 | 0.0093 | 1.05-1.42 |
|  | Anterior vs Posterior Column (Anterior=1) | Posterior | 1.03 | 0.85 | 0.75-1.42 |
| **Dependent variable** | **Independent variable** | **Reference** | **Adjusted OR** | **p-value** | **95% CI** |
| Single-LevelReadmission at 180 Days |  |  |  |  |  |
|  | Age | N/A | 1.01 | 0.53 | 0.99-1.03 |
|  | Sex (Female=1) | Male | 0.90 | 0.67 | 0.56-1.49 |
|  | CCI | N/A | 1.40 | <0.001 | 1.19-1.64 |
|  | Anterior vs Posterior Column (Anterior=1) | Posterior | 0.91 | 0.57 | 0.65-1.27 |

**Supplementary Table 2:** Binomial logistic regression for Single-Level Readmission at 30, 90, and 180 Days

**Supplementary Table** **3:** Binomial logistic regression for Single-Level Infection at 30 Days

**Supplementary Table 4:** Gaussian generalized linear regression model for Single-Level LOS

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Dependent variable** | **Independent variable** | **Reference** | **Adjusted OR** | **p-value** | **95% CI** |
| Single-LevelInfection at 30 Days |  |
|  | Age | N/A | 0.98 | 0.27 | 0.95-1.01 |
|  | Sex (Female=1) | Male | 0.81 | 0.58 | 0.40-1.73 |
|  | CCI | N/A | 0.93 | 0.54 | 0.73-1.17 |
|  | Anterior vs Posterior Column (Anterior=1) | Posterior | 1.44 | 0.19 | 0.84-2.47 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Dependent variable** | **Independent variable** | **Reference** | **Adjusted OR** | **p-value** | **95% CI** |
| Single-LevelLOS |  |
|  | Age | N/A | 0.99 | 0.35 | 0.96-1.02 |
|  | Sex (Female=1) | Male | 0.92 | 0.80 | 0.48-1.02 |
|  | CCI | N/A | 1.89 | <0.001 | 1.52-2.37 |
|  | Anterior vs Posterior Column (Anterior=1) | Posterior | 0.95 | 0.81 | 0.62-1.46 |

**Supplementary Table** **5:** Gaussian generalized linear regression model for Single-Level Ln-Transformed Total Charge

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Dependent variable** | **Independent variable** | **Reference** | **Adjusted OR** | **p-value** | **95% CI** |
| Single-LevelLn-Transformed Total Charge |  |
|  | Age | N/A | 0.99 | <0.001 | 0.986-0.993 |
|  | Sex (Female=1) | Male | 0.87 | <0.001 | 0.80-0.95 |
|  | CCI | N/A | 1.12 | 0.0018 | 1.09-1.15 |
|  | Anterior vs Posterior Column (Anterior=1) | Posterior | 1.36 | <0.001 | 1.29-1.44 |

**Supplementary Table 6:** Binomial logistic regression for Multi-Level Readmission at 30, 90, and 180 Days

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Dependent variable** | **Independent variable** | **Reference** | **Adjusted OR** | **p-value** | **95% CI** |
| Multi-LevelReadmission at 30 Days |  |
|  | Age | N/A | 0.98 | 0.036 | 0.97-1.00 |
|  | Sex (Female=1) | Male | 0.54 | 0.0021 | 0.37-0.81 |
|  | CCI | N/A | 1.14 | 0.68 | 0.99-1.31 |
|  | Anterior vs Posterior Column (Anterior=1) | Posterior | 1.05 | 0.79 | 0.72-1.52 |
| **Dependent variable** | **Independent variable** | **Reference** | **Adjusted OR** | **p-value** | **95% CI** |
| Multi-LevelReadmission at 90 Days |  |  |  |  |  |
|  | Age | N/A | 0.99 | 0.46 | 0.98-1.01 |
|  | Sex (Female=1) | Male | 0.52 | 0.00013 | 0.37-0.73 |
|  | CCI | N/A | 1.20 | 0.0032 | 1.06-1.35 |
|  | Anterior vs Posterior Column (Anterior=1) | Posterior | 0.97 | 0.83 | 0.70-1.32 |
| **Dependent variable** | **Independent variable** | **Reference** | **Adjusted OR** | **p-value** | **95% CI** |
| Multi-LevelReadmission at 180 Days |  |  |  |  |  |
|  | Age | N/A | 1.00 | 0.78 | 0.98-1.02 |
|  | Sex (Female=1) | Male | 0.62 | 0.015 | 0.42-0.92 |
|  | CCI | N/A | 1.06 | 0.45 | 0.91-1.21 |
|  | Anterior vs Posterior Column (Anterior=1) | Posterior | 1.11 | 0.56 | 0.78-1.56 |

**Supplementary Table 7:** Binomial logistic regression for Multi-Level Infection at 30 Days

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Dependent variable** | **Independent variable** | **Reference** | **Adjusted OR** | **p-value** | **95% CI** |
| Multi-LevelInfection at 30 Days |  |
|  | Age | N/A | .0.99 | 0.30 | 0.97-1.01 |
|  | Sex (Female=1) | Male | 1.32 | 0.35 | 0.74-2.44 |
|  | CCI | N/A | 0.85 | 0.11 | 0.70-1.03 |
|  | Anterior vs Posterior Column (Anterior=1) | Posterior | 1.32 | 0.29 | 0.79-2.17 |

**Supplementary Table 8:** Gaussian generalized linear regression model for Multi-Level LOS

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Dependent variable** | **Independent variable** | **Reference** | **Adjusted OR** | **p-value** | **95% CI** |
| Multi-LevelLOS |  |
|  | Age | N/A | 0.93 | <0.001 | 0.90-0.96 |
|  | Sex (Female=1) | Male | 0.55 | 0.12 | 0.26-1.16 |
|  | CCI | N/A | 3.30 | <0.001 | 2.55-4.26 |
|  | Anterior vs Posterior Column (Anterior=1) | Posterior | 0.90 | 0.73 | 0.49-1.65 |

**Supplementary Table 9:** Gaussian generalized linear regression model for Multi-Level Ln-Transformed Total Charge

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Dependent variable** | **Independent variable** | **Reference** | **Adjusted OR** | **p-value** | **95% CI** |
| Multi-LevelLn-Transformed Total Charge |  |
|  | Age | N/A | 0.98 | <0.001 | 0.981-0.988 |
|  | Sex (Female=1) | Male | 0.95 | 0.21 | 0.87-1.03 |
|  | CCI | N/A | 1.11 | <0.001 | 1.08-1.15 |
|  | Anterior vs Posterior Column (Anterior=1) | Posterior | 1.29 | <0.001 | 1.21-1.38 |