

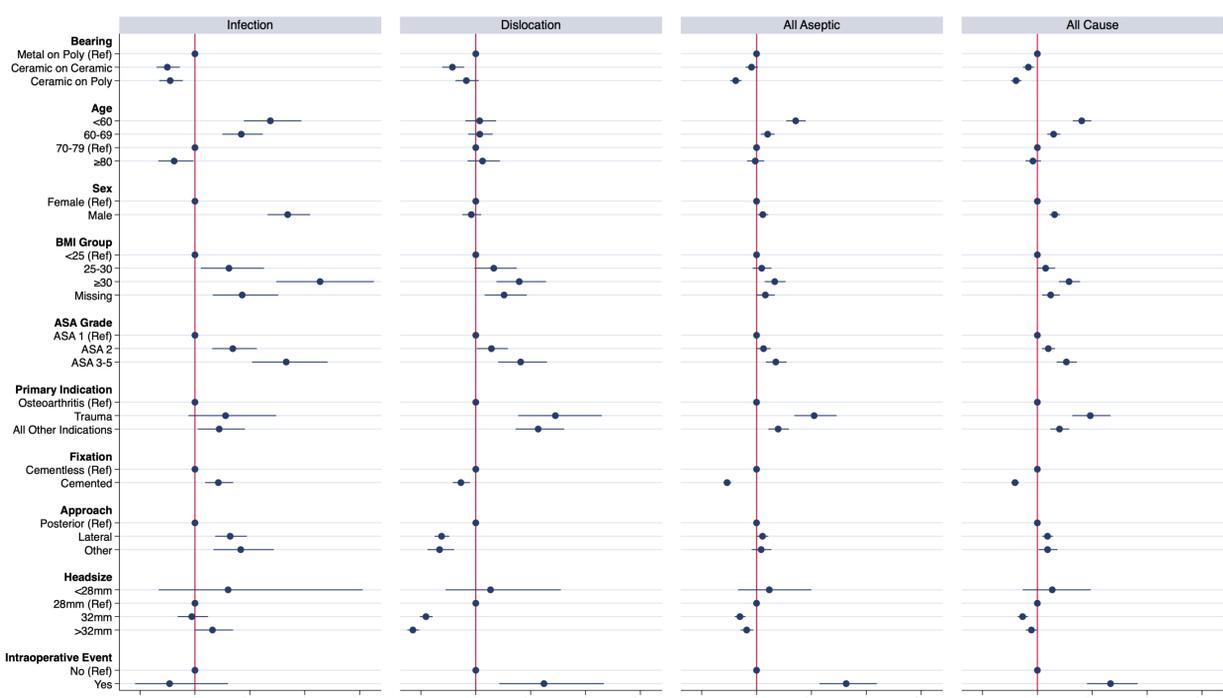
Table 1 - Variables by Bearing Group

| Variable | Bearing Surface | | | Overall | Between Group p value |
|-------------------------------|-------------------------------|------------------------------|------------------------------|-------------------------------|---------------------------|
| | Metal on Poly | Ceramic on Ceramic | Ceramic on Poly | | |
| n | 228,786 (50.1%) | 128,403 (28.1%) | 99,268 (21.7%) | 456,457 (100%) | |
| PATIENT FAC to RS | | | | | |
| Mean Age (SD) | 71.9 (9.1) | 59.8 (10.9) | 64.7 (10.3) | 66.9 (11.2) | <0.0001**** (ANOVA) |
| Age Group | | | | | <0.0001**** (Chi-Squared) |
| <60 | 20,392 (8.9%) | 57,469 (44.8%) | 27,389 (27.6%) | 105,250 (23.1%) | |
| 60-69 | 63,341 (27.7%) | 49,296 (38.4%) | 40,428 (40.7%) | 153,065 (33.5%) | |
| 70-79 | 99,601 (43.5%) | 18,588 (14.5%) | 25,093 (25.3%) | 143,282 (31.4%) | |
| >80 | 45,452 (19.9%) | 3,050 (2.4%) | 6,358 (6.4%) | 54,860 (12.0%) | |
| Sex | | | | | <0.0001**** (Chi-Squared) |
| Female | 141,046 (61.6%) | 69,312 (54.0%) | 56,665 (57.1%) | 267,023 (58.5%) | |
| Male | 87,740 (38.4%) | 59,091 (46.0%) | 42,603 (42.9%) | 189,434 (41.5%) | |
| Mean BMI (SD) | 28.6 (5.2); n=139,604 (61.0%) | 29.0 (5.4); n=79,211 (61.7%) | 28.9 (5.3); n=66,724 (67.2%) | 28.8 (5.3); n=285,539 (62.6%) | <0.0001**** (ANOVA) |
| BMI Group | | | | | <0.0001**** (Chi-Squared) |
| <25 | 30,053 (13.1%) | 15,716 (12.2%) | 13,272 (13.4%) | 59,041 (12.9%) | |
| 25-30 | 55,754 (24.4%) | 30,814 (24.0%) | 26,192 (26.4%) | 112,760 (24.7%) | |
| >=30 | 53,797 (23.5%) | 32,681 (25.5%) | 27,260 (27.5%) | 113,738 (24.9%) | |
| Missing | 89,182 (39.0%) | 49,192 (38.3%) | 32,544 (32.8%) | 170,918 (37.4%) | |
| ASA Grade | | | | | <0.0001**** (Chi-Squared) |
| ASA 1 | 25,662 (11.2%) | 33,587 (26.2%) | 19,213 (19.4%) | 78,462 (17.2%) | |
| ASA 2 | 162,080 (70.8%) | 84,566 (65.9%) | 68,557 (69.1%) | 315,203 (69.1%) | |
| ASA 3-5 | 41,044 (17.9%) | 10,250 (8.0%) | 11,498 (11.6%) | 62,792 (13.8%) | |
| SURGICAL FAC to RS | | | | | |
| Primary Indication | | | | | <0.0001**** (Chi-Squared) |
| Osteoarthritis | 207,338 (90.6%) | 113,828 (88.6%) | 89,866 (90.5%) | 411,032 (90.0%) | |
| Trauma | 8,612 (3.8%) | 1,561 (1.2%) | 2,045 (2.1%) | 12,218 (2.7%) | |
| Avascular Necrosis | 4,475 (2.0%) | 4,201 (3.3%) | 2,465 (2.5%) | 11,141 (2.4%) | |
| Hip Dysplasia | 1,823 (0.8%) | 4,471 (3.5%) | 2,052 (2.1%) | 8,346 (1.8%) | |
| Inflammatory Arthropathy | 2,657 (1.2%) | 2,086 (1.6%) | 1,401 (1.4%) | 6,144 (1.3%) | |
| Other | 3,881 (1.7%) | 2,256 (1.8%) | 1,439 (1.4%) | 7,576 (1.7%) | |
| Head Size | | | | | <0.0001**** (Chi-Squared) |
| <28mm | 1,744 (0.8%) | 0 (0.0%) | 14 (0.0%) | 1,758 (0.4%) | |
| 28mm | 88,019 (38.5%) | 16,083 (12.5%) | 26,961 (27.2%) | 131,063 (28.7%) | |
| 32mm | 87,668 (38.3%) | 40,396 (31.5%) | 41,268 (41.6%) | 169,332 (37.1%) | |
| >32mm | 51,355 (22.4%) | 71,924 (56.0%) | 31,025 (31.3%) | 154,304 (33.8%) | |
| Stem Fixation | | | | | <0.0001**** (Chi-Squared) |
| Cementless | 127,087 (55.5%) | 106,217 (82.7%) | 62,252 (62.7%) | 295,556 (64.8%) | |
| Cemented | 101,699 (44.5%) | 22,186 (17.3%) | 37,016 (37.3%) | 160,901 (35.2%) | |
| Adverse Intra-operative Event | | | | | <0.0001**** (Chi-Squared) |
| No | 226,218 (98.9%) | 126,490 (98.5%) | 98,250 (99.0%) | 450,958 (98.8%) | |
| Yes | 2,568 (1.1%) | 1,913 (1.5%) | 1,018 (1.0%) | 5,499 (1.2%) | |
| Date of Implantation | | | | | <0.0001**** (Chi-Squared) |
| Early | 63,835 (27.9%) | 33,085 (25.8%) | 17,195 (17.3%) | 114,115 (25.0%) | |
| Mid - Early | 55,548 (24.3%) | 41,817 (32.6%) | 16,749 (16.9%) | 114,114 (25.0%) | |
| Mid - Recent | 54,687 (23.9%) | 32,471 (25.3%) | 26,956 (27.2%) | 114,114 (25.0%) | |
| Recent | 54,716 (23.9%) | 21,030 (16.4%) | 38,368 (38.7%) | 114,114 (25.0%) | |
| REVISION OUTCOMES | | | | | |
| Revision Outcome | | | | | <0.0001**** (Chi-Squared) |
| Not Revised | 223,665 (97.8%) | 125,242 (97.5%) | 97,580 (98.3%) | 446,487 (97.8%) | |
| Revised | | | | | |
| Dislocation | 1,323 (0.6%) | 460 (0.4%) | 429 (0.4%) | 2,212 (0.5%) | |
| Aseptic Loosening | 876 (0.4%) | 774 (0.6%) | 315 (0.3%) | 1,965 (0.4%) | |
| Periprosthetic Fracture | 1,062 (0.5%) | 388 (0.3%) | 277 (0.3%) | 1,727 (0.4%) | |
| Infection | 837 (0.4%) | 449 (0.3%) | 300 (0.3%) | 1,586 (0.3%) | |
| Malalignment | 210 (0.1%) | 201 (0.2%) | 78 (0.1%) | 489 (0.1%) | |
| Implant Fracture | 103 (0.0%) | 302 (0.2%) | 39 (0.0%) | 444 (0.1%) | |
| Pain | 152 (0.1%) | 209 (0.2%) | 77 (0.1%) | 438 (0.1%) | |
| Other | 168 (0.1%) | 183 (0.1%) | 65 (0.1%) | 416 (0.1%) | |
| Wear | 147 (0.1%) | 50 (0.0%) | 43 (0.0%) | 240 (0.1%) | |
| Liner Dissociation | 98 (0.0%) | 53 (0.0%) | 36 (0.0%) | 187 (0.0%) | |
| Reaction to Particle Debris | 89 (0.0%) | 52 (0.0%) | 11 (0.0%) | 152 (0.0%) | |
| Lysis | 29 (0.0%) | 13 (0.0%) | 11 (0.0%) | 53 (0.0%) | |
| Incorrect Sizing | 27 (0.0%) | 27 (0.0%) | 7 (0.0%) | 61 (0.0%) | |

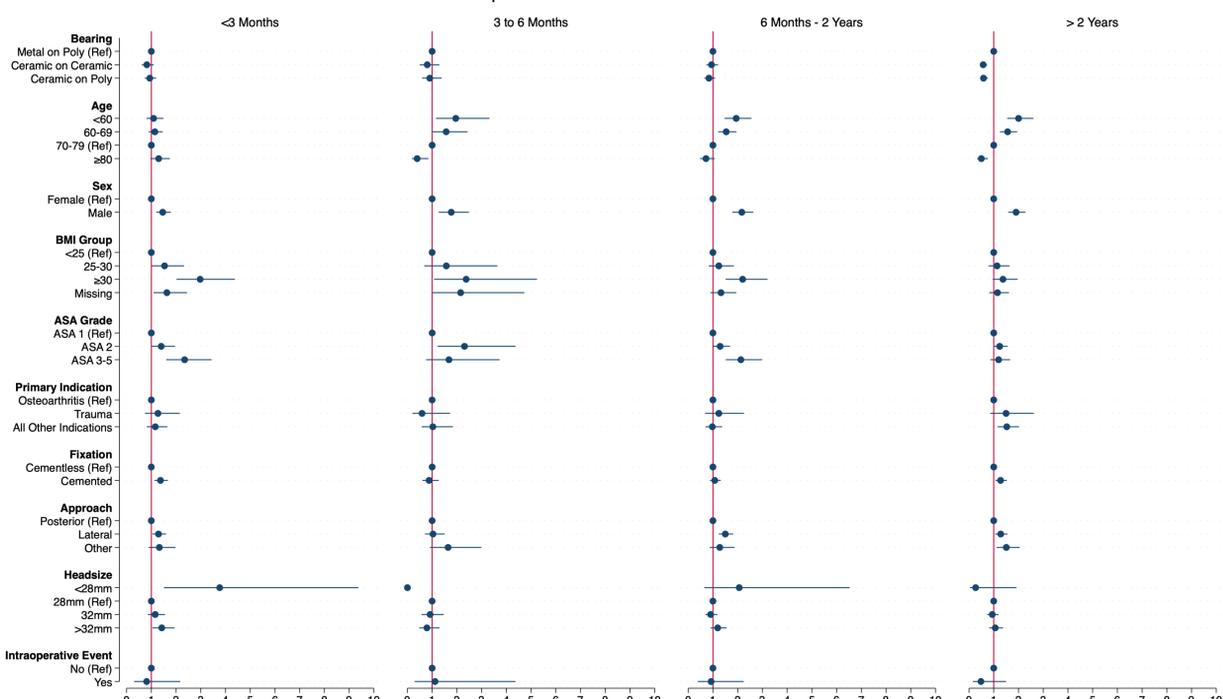
Table 2 - Univariable Incidence Rates by Factor and Bearing Surface

| Revision Indication | Group | Variable | BEARING SURFACE | | | | | | | | | | Overall | |
|---------------------|-------------------------------|--------------------------|-----------------|--------------|---------------------------------------|--------------------|--------------|---------------------------------------|-----------------|--------------|---------------------------------------|---------------|--------------|---------------------------------------|
| | | | Metal on Poly | | | Ceramic on Ceramic | | | Ceramic on Poly | | | | | |
| | | | Revisions (n) | Person-years | Incidence / 1000 Person-years (95%CI) | Revisions (n) | Person-years | Incidence / 1000 Person-years (95%CI) | Revisions (n) | Person-years | Incidence / 1000 Person-years (95%CI) | Revisions (n) | Person-years | Incidence / 1000 Person-years (95%CI) |
| INFECTION | | | | | | | | | | | | | | |
| | Age Group | <60 | 114 | 117,219 | 0.973 (0.809 to 1.169) | 219 | 337,514 | 0.649 (0.568 to 0.741) | 102 | 121,404 | 0.840 (0.692 to 1.020) | 435 | 576,138 | 0.755 (0.687 to 0.829) |
| | | 60-69 | 294 | 376,023 | 0.782 (0.697 to 0.877) | 167 | 302,884 | 0.551 (0.474 to 0.642) | 133 | 193,014 | 0.689 (0.581 to 0.817) | 594 | 871,922 | 0.681 (0.629 to 0.738) |
| | | 70-79 | 311 | 538,389 | 0.578 (0.517 to 0.646) | 55 | 107,971 | 0.509 (0.391 to 0.663) | 57 | 117,652 | 0.484 (0.374 to 0.628) | 423 | 764,012 | 0.554 (0.503 to 0.609) |
| | | >80 | 118 | 208,621 | 0.566 (0.472 to 0.677) | 8 | 15,377 | 0.520 (0.260 to 1.040) | 8 | 26,150 | 0.306 (0.153 to 0.612) | 134 | 250,148 | 0.536 (0.452 to 0.635) |
| | Sex | Female | 373 | 775,657 | 0.481 (0.434 to 0.532) | 179 | 423,114 | 0.423 (0.365 to 0.490) | 121 | 267,842 | 0.452 (0.378 to 0.540) | 673 | 1,466,613 | 0.459 (0.425 to 0.495) |
| | | Male | 464 | 464,595 | 0.999 (0.912 to 1.094) | 270 | 340,634 | 0.793 (0.704 to 0.893) | 179 | 190,378 | 0.940 (0.812 to 1.089) | 913 | 995,606 | 0.917 (0.859 to 0.978) |
| | ASA Grade | ASA 1 | 80 | 163,622 | 0.489 (0.393 to 0.609) | 91 | 210,214 | 0.433 (0.352 to 0.532) | 46 | 96,618 | 0.476 (0.357 to 0.636) | 217 | 470,454 | 0.461 (0.404 to 0.527) |
| | | ASA 2 | 581 | 888,096 | 0.654 (0.603 to 0.710) | 292 | 497,149 | 0.587 (0.524 to 0.659) | 200 | 312,947 | 0.639 (0.556 to 0.734) | 1,073 | 1,698,192 | 0.632 (0.595 to 0.671) |
| | | ASA 3-5 | 176 | 188,535 | 0.934 (0.805 to 1.082) | 66 | 56,384 | 1.171 (0.920 to 1.490) | 54 | 48,655 | 1.110 (0.850 to 1.439) | 296 | 293,574 | 1.008 (0.900 to 1.130) |
| | BMI Group | <25 | 57 | 143,596 | 0.397 (0.306 to 0.515) | 31 | 84,044 | 0.369 (0.259 to 0.524) | 23 | 52,713 | 0.436 (0.290 to 0.657) | 111 | 280,353 | 0.396 (0.329 to 0.477) |
| | | 25-30 | 165 | 266,081 | 0.620 (0.532 to 0.722) | 82 | 163,101 | 0.503 (0.405 to 0.624) | 63 | 103,738 | 0.607 (0.474 to 0.777) | 310 | 532,921 | 0.582 (0.520 to 0.650) |
| | | >=30 | 264 | 251,155 | 1.051 (0.932 to 1.186) | 160 | 169,025 | 0.947 (0.811 to 1.105) | 120 | 104,793 | 1.145 (0.958 to 1.369) | 544 | 524,973 | 1.036 (0.953 to 1.127) |
| | | Missing | 351 | 579,421 | 0.606 (0.546 to 0.673) | 176 | 347,576 | 0.506 (0.437 to 0.587) | 94 | 196,976 | 0.477 (0.390 to 0.584) | 621 | 1,123,973 | 0.553 (0.511 to 0.598) |
| | Primary Indication | Osteoarthritis | 745 | 1,139,782 | 0.654 (0.608 to 0.702) | 389 | 676,994 | 0.575 (0.520 to 0.635) | 262 | 417,285 | 0.628 (0.556 to 0.709) | 1,396 | 2,234,060 | 0.625 (0.593 to 0.659) |
| | | Trauma | 26 | 33,550 | 0.775 (0.528 to 1.138) | 13 | 8,535 | 1.523 (0.884 to 2.623) | 7 | 7,580 | 0.924 (0.440 to 1.937) | 46 | 49,665 | 0.926 (0.694 to 1.237) |
| | | Avascular Necrosis | 26 | 23,421 | 1.110 (0.756 to 1.630) | 18 | 24,457 | 0.736 (0.464 to 1.168) | 14 | 11,037 | 1.268 (0.751 to 2.142) | 58 | 58,915 | 0.984 (0.789 to 1.231) |
| | | Hip Dysplasia | 5 | 10,235 | 0.489 (0.203 to 1.174) | 13 | 26,694 | 0.487 (0.283 to 0.839) | 2 | 9,268 | 0.216 (0.054 to 0.863) | 20 | 46,197 | 0.433 (0.279 to 0.671) |
| | | Inflammatory Arthropathy | 11 | 14,150 | 0.777 (0.431 to 1.404) | 7 | 12,965 | 0.540 (0.257 to 1.133) | 8 | 6,728 | 1.189 (0.595 to 2.378) | 26 | 33,843 | 0.768 (0.523 to 1.128) |
| | | Other | 24 | 19,115 | 1.256 (0.842 to 1.873) | 9 | 14,103 | 0.638 (0.332 to 1.227) | 7 | 6,321 | 1.107 (0.528 to 2.323) | 40 | 39,540 | 1.012 (0.742 to 1.379) |
| | Approach | Posterior | 449 | 706,513 | 0.636 (0.579 to 0.697) | 250 | 462,070 | 0.541 (0.478 to 0.612) | 161 | 253,350 | 0.635 (0.545 to 0.742) | 860 | 1,421,933 | 0.605 (0.566 to 0.647) |
| | | Lateral | 330 | 445,934 | 0.740 (0.684 to 0.824) | 164 | 246,647 | 0.665 (0.571 to 0.775) | 110 | 171,161 | 0.843 (0.533 to 1.275) | 604 | 863,743 | 0.699 (0.646 to 0.757) |
| | | Other | 58 | 87,806 | 0.661 (0.511 to 0.854) | 35 | 55,029 | 0.636 (0.457 to 0.886) | 29 | 33,709 | 0.860 (0.598 to 1.238) | 122 | 176,544 | 0.691 (0.579 to 0.825) |
| | Stem Fixation | Cementless | 433 | 693,709 | 0.624 (0.568 to 0.686) | 372 | 614,305 | 0.606 (0.547 to 0.670) | 184 | 310,658 | 0.592 (0.513 to 0.684) | 989 | 1,618,672 | 0.611 (0.574 to 0.650) |
| | | Cemented | 404 | 546,543 | 0.739 (0.671 to 0.815) | 77 | 149,442 | 0.515 (0.412 to 0.644) | 116 | 147,562 | 0.786 (0.655 to 0.943) | 597 | 843,548 | 0.708 (0.653 to 0.767) |
| | Head Size | <28mm | 9 | 11,897 | 0.757 (0.394 to 1.454) | 0 | 0 | - | 0 | 98 | - | 9 | 11,995 | 0.750 (0.390 to 1.442) |
| | | 28mm | 343 | 606,799 | 0.565 (0.508 to 0.628) | 57 | 129,318 | 0.441 (0.340 to 0.571) | 88 | 181,910 | 0.484 (0.393 to 0.596) | 488 | 918,028 | 0.532 (0.486 to 0.581) |
| | | 32mm | 279 | 377,080 | 0.740 (0.658 to 0.832) | 111 | 246,708 | 0.450 (0.374 to 0.542) | 105 | 162,992 | 0.644 (0.532 to 0.780) | 495 | 786,780 | 0.629 (0.576 to 0.687) |
| | | >32mm | 206 | 244,477 | 0.843 (0.735 to 0.966) | 281 | 387,721 | 0.725 (0.645 to 0.815) | 107 | 113,219 | 0.945 (0.782 to 1.142) | 594 | 745,417 | 0.797 (0.735 to 0.864) |
| | Adverse Intra-operative Event | No | 829 | 1,226,404 | 0.676 (0.631 to 0.724) | 444 | 752,620 | 0.590 (0.538 to 0.647) | 299 | 453,307 | 0.660 (0.589 to 0.739) | 1,572 | 2,432,331 | 0.646 (0.615 to 0.679) |
| | | Yes | 8 | 13,849 | 0.578 (0.289 to 1.155) | 5 | 11,127 | 0.449 (0.187 to 1.080) | 1 | 4,913 | 0.204 (0.029 to 1.445) | 14 | 29,889 | 0.468 (0.277 to 0.791) |
| | Date of Implantation | Early | 302 | 569,232 | 0.531 (0.474 to 0.594) | 132 | 314,408 | 0.420 (0.354 to 0.498) | 67 | 165,523 | 0.405 (0.319 to 0.514) | 501 | 1,049,164 | 0.478 (0.437 to 0.521) |
| | | Mid - Early | 228 | 338,760 | 0.673 (0.591 to 0.766) | 160 | 267,726 | 0.598 (0.512 to 0.698) | 49 | 105,195 | 0.486 (0.382 to 0.616) | 437 | 711,682 | 0.614 (0.559 to 0.674) |
| | | Mid - Recent | 157 | 218,752 | 0.718 (0.614 to 0.839) | 101 | 135,870 | 0.743 (0.612 to 0.903) | 81 | 108,333 | 0.748 (0.601 to 0.930) | 339 | 462,955 | 0.732 (0.658 to 0.815) |
| | | Recent | 150 | 113,508 | 1.321 (1.126 to 1.551) | 56 | 45,742 | 1.224 (0.942 to 1.591) | 103 | 79,169 | 1.301 (1.073 to 1.578) | 309 | 238,419 | 1.296 (1.159 to 1.449) |
| DISLOCATION | | | | | | | | | | | | | | |
| | Age Group | <60 | 122 | 117,219 | 1.041 (0.872 to 1.243) | 206 | 337,514 | 0.610 (0.532 to 0.700) | 135 | 121,404 | 1.112 (0.939 to 1.316) | 463 | 576,138 | 0.804 (0.734 to 0.880) |
| | | 60-69 | 421 | 376,023 | 1.120 (1.018 to 1.232) | 163 | 302,884 | 0.538 (0.462 to 0.627) | 156 | 193,014 | 0.808 (0.691 to 0.946) | 740 | 871,922 | 0.849 (0.790 to 0.912) |
| | | 70-79 | 539 | 538,389 | 1.001 (0.920 to 1.089) | 74 | 107,971 | 0.685 (0.546 to 0.861) | 104 | 117,652 | 0.884 (0.729 to 1.071) | 717 | 764,012 | 0.938 (0.872 to 1.010) |
| | | >80 | 241 | 208,621 | 1.155 (1.018 to 1.311) | 17 | 15,377 | 1.106 (0.687 to 1.778) | 34 | 26,150 | 1.300 (0.929 to 1.820) | 292 | 250,148 | 1.167 (1.041 to 1.309) |
| | Sex | Female | 855 | 775,657 | 1.102 (1.031 to 1.179) | 263 | 423,114 | 0.622 (0.551 to 0.701) | 283 | 267,842 | 1.057 (0.940 to 1.187) | 1,401 | 1,466,613 | 0.955 (0.907 to 1.007) |
| | | Male | 468 | 464,595 | 1.007 (0.920 to 1.103) | 197 | 340,634 | 0.578 (0.503 to 0.665) | 146 | 190,378 | 0.767 (0.652 to 0.902) | 811 | 995,606 | 0.815 (0.760 to 0.873) |
| | ASA Grade | ASA 1 | 154 | 163,622 | 0.941 (0.804 to 1.102) | 98 | 210,214 | 0.466 (0.382 to 0.568) | 76 | 96,618 | 0.787 (0.628 to 0.985) | 328 | 470,454 | 0.697 (0.626 to 0.777) |
| | | ASA 2 | 899 | 888,096 | 1.012 (0.948 to 1.081) | 306 | 497,149 | 0.616 (0.550 to 0.688) | 296 | 312,947 | 0.946 (0.844 to 1.060) | 1,501 | 1,698,192 | 0.884 (0.840 to 0.930) |
| | | ASA 3-5 | 270 | 188,535 | 1.432 (1.271 to 1.614) | 56 | 56,384 | 0.993 (0.764 to 1.291) | 57 | 48,655 | 1.172 (0.904 to 1.519) | 383 | 293,574 | 1.305 (1.180 to 1.442) |
| | BMI Group | <25 | 133 | 143,596 | 0.926 (0.781 to 1.098) | 41 | 84,044 | 0.488 (0.359 to 0.663) | 39 | 52,713 | 0.740 (0.541 to 1.013) | 213 | 280,353 | 0.760 (0.664 to 0.869) |
| | | 25-30 | 251 | 266,081 | 0.943 (0.834 to 1.068) | 79 | 163,101 | 0.484 (0.389 to 0.604) | 107 | 103,738 | 1.031 (0.853 to 1.247) | 437 | 532,921 | 0.820 (0.747 to 0.901) |
| | | >=30 | 300 | 251,155 | 1.194 (1.067 to 1.338) | 123 | 169,025 | 0.728 (0.610 to 0.868) | 104 | 104,793 | 0.992 (0.819 to 1.203) | 527 | 524,973 | 1.004 (0.922 to 1.093) |
| | | Missing | 639 | 579,421 | 1.103 (1.021 to 1.192) | 217 | 347,576 | 0.624 (0.547 to 0.713) | 179 | 196,976 | 0.909 (0.785 to 1.052) | 1,035 | 1,123,973 | 0.921 (0.866 to 0.979) |
| | Primary Indication | Osteoarthritis | 1,133 | 1,139,782 | 0.994 (0.938 to 1.054) | 391 | 676,994 | 0.578 (0.523 to 0.638) | 364 | 417,285 | 0.872 (0.787 to 0.967) | 1,888 | 2,234,060 | 0.845 (0.808 to 0.884) |
| | | Trauma | 60 | 33,550 | 1.788 (1.389 to 2.303) | 10 | 8,535 | 1.172 (0.630 to 2.178) | 17 | 7,580 | 2.243 (1.394 to 3.608) | 87 | 49,665 | 1.752 (1.420 to 2.161) |
| | | Avascular Necrosis | 35 | 23,421 | 1.494 (1.073 to 2.081) | 19 | 24,457 | 0.777 (0.496 to 1.218) | 22 | 11,037 | 1.993 (1.312 to 3.027) | 76 | 58,915 | 1.290 (1.030 to 1.615) |
| | | Hip Dysplasia | 19 | 10,235 | 1.856 (1.184 to 2.910) | 19 | 26,694 | 0.712 (0.454 to 1.116) | 10 | 9,268 | 1.079 (0.581 to 2.005) | 48 | 46,197 | 1.039 (0.783 to 1.379) |
| | | Inflammatory Arthropathy | 38 | 14,150 | 2.686 (1.954 to 3.691) | 10 | 12,965 | 0.771 (0.415 to 1.434) | 7 | 6,728 | 1.040 (0.496 to 2.182) | 55 | 33,843 | 1.625 (1.248 to 2.117) |
| | | Other | 38 | 19,115 | 1.988 (1.446 to 2.732) | 11 | 14,103 | 0.780 (0.432 to 1.408) | 9 | 6,321 | 1.424 (0.741 to 2.736) | 58 | 39,540 | 1.467 (1.134 to 1.897) |
| | Approach | Posterior | 849 | 706,513 | 1.202 (1.124 to 1.285) | 303 | 462,070 | 0.656 (0.586 to 0.734) | 260 | 253,350 | 1.026 (0.909 to 1.159) | 1,412 | 1,421,933 | 0.993 (0.943 to 1.046) |
| | | Lateral | 399 | 445,934 | 0.895 (0.811 to 0.987) | 132 | 246,647 | 0.535 (0.451 to 0.635) | 138 | 171,161 | 0.806 (0.682 to 0.953) | 669 | 863,743 | 0.775 (0.718 to 0.836) |
| | | Other | 75 | 87,806 | 0.854 (0.681 to 1.071) | 25 | 55,029 | 0.454 (0.307 to 0.672) | 31 | 33,709 | 0.920 (0.647 to 1.308) | 131 | 176,544 | 0.742 (0.625 to 0.881) |
| | Stem Fixation | Cementless | 762 | 693,709 | 1.098 (1.023 to 1.179) | 385 | 614,305 | 0.627 (0.567 to 0.693) | 283 | 310,658 | 0.911 (0.811 to 1.024) | 1,430 | 1,618,672 | 0.883 (0.839 to 0.930) |
| | | Cemented | 561 | 546,543 | 1.026 (0.945 to 1.115) | 75 | 149,442 | 0.502 (0.400 to 0.629) | 146 | 1 | | | | |

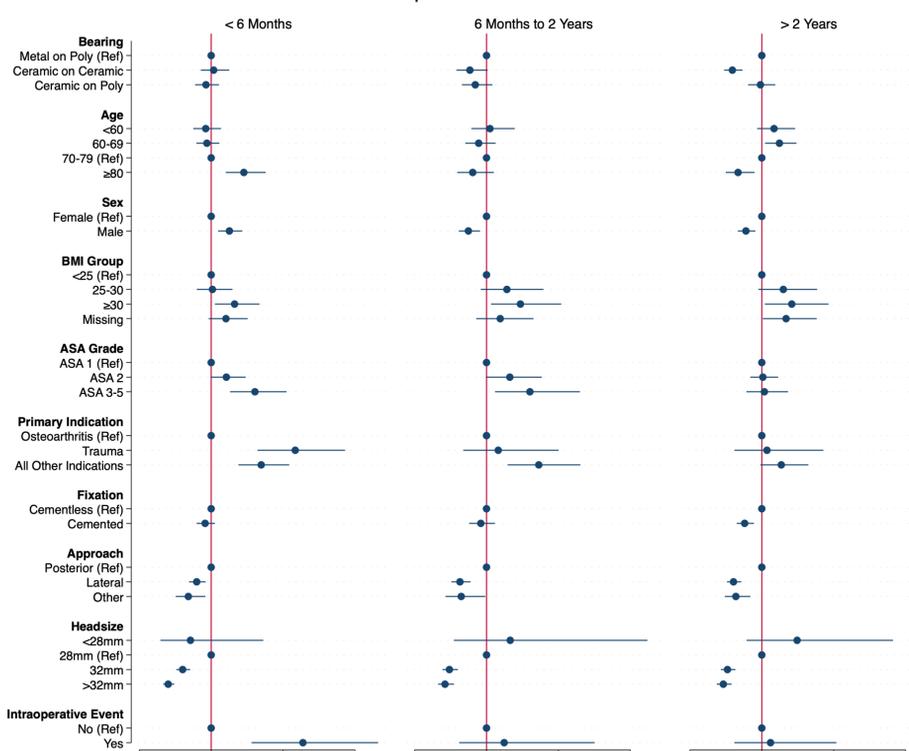
Multivariable Model - All Revision Outcomes



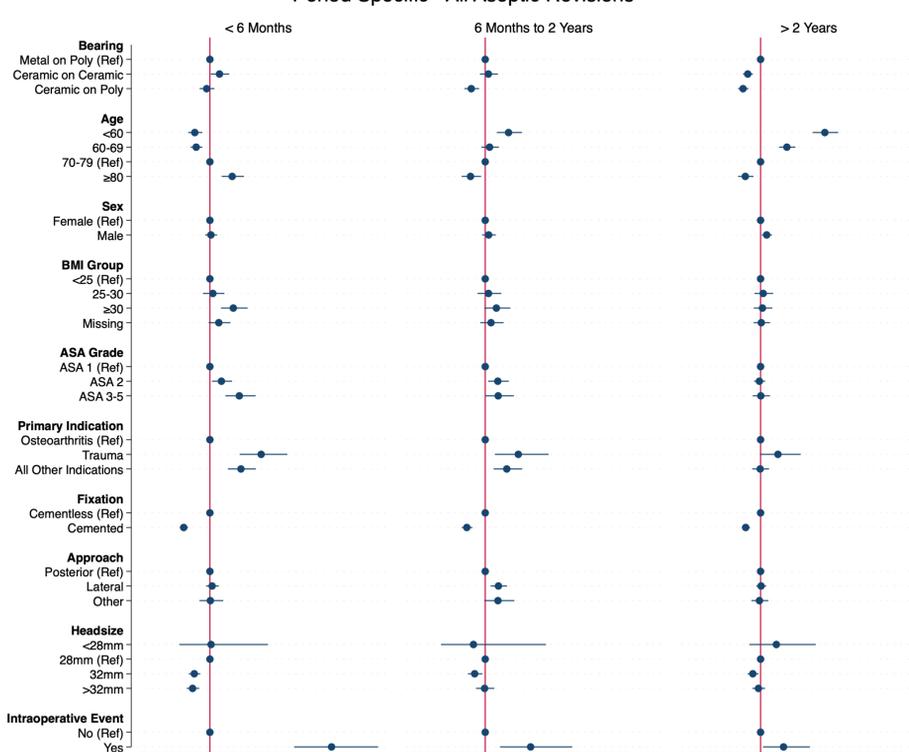
Period Specific Risk for Revision for Infection



Period Specific - Dislocation



Period Specific - All Aseptic Revisions



Period Specific - All Cause Revision

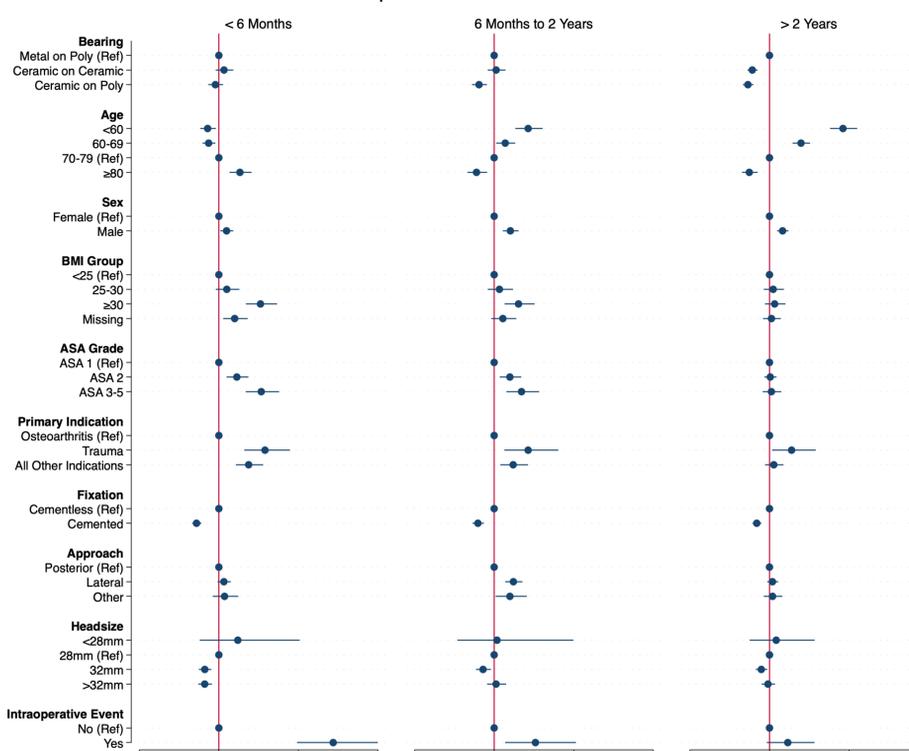


Table 3 - Competing Risks Model (All Time Periods)

| Variable | Predictors of Revision (Risk Ratio, (95%CI), p value) | | | |
|------------------------------|---|------------------------------------|------------------------------------|------------------------------------|
| | Infection | Dislocation | All Aseptic Revisions | All Cause Revision |
| Bearing | | | | |
| Metal on Poly | Reference | Reference | Reference | Reference |
| Ceramic on Ceramic | 0.748***, (0.649 to 0.861), 0.0001 | 0.787***, (0.694 to 0.893), 0.0002 | 0.954, (0.899 to 1.013), 0.1234 | 0.918**, (0.869 to 0.970), 0.0024 |
| Ceramic on Poly | 0.775***, (0.675 to 0.890), 0.0003 | 0.915, (0.815 to 1.028), 0.1358 | 0.810***, (0.760 to 0.863), 0.0000 | 0.806***, (0.761 to 0.854), 0.0000 |
| Age | | | | |
| <60 | 1.683***, (1.442 to 1.965), 0.0000 | 1.033, (0.903 to 1.182), 0.6353 | 1.356***, (1.270 to 1.448), 0.0000 | 1.404***, (1.322 to 1.492), 0.0000 |
| 60-69 | 1.421***, (1.249 to 1.617), 0.0000 | 1.036, (0.930 to 1.153), 0.5199 | 1.101***, (1.040 to 1.165), 0.0009 | 1.148***, (1.090 to 1.209), 0.0000 |
| 70-79 | Reference | Reference | Reference | Reference |
| >80 | 0.811*, (0.666 to 0.987), 0.0365 | 1.062, (0.925 to 1.220), 0.3939 | 0.988, (0.913 to 1.070), 0.7708 | 0.960, (0.892 to 1.033), 0.2701 |
| Sex | | | | |
| Female | Reference | Reference | Reference | Reference |
| Male | 1.844***, (1.660 to 2.049), 0.0000 | 0.959, (0.877 to 1.048), 0.3554 | 1.057*, (1.011 to 1.106), 0.0157 | 1.157***, (1.110 to 1.205), 0.0000 |
| BMI Group | | | | |
| <25 | Reference | Reference | Reference | Reference |
| 25-30 | 1.309*, (1.053 to 1.628), 0.0154 | 1.163, (0.986 to 1.372), 0.0725 | 1.047, (0.964 to 1.137), 0.2748 | 1.076, (0.996 to 1.162), 0.0628 |
| >=30 | 2.135***, (1.737 to 2.625), 0.0000 | 1.393***, (1.186 to 1.636), 0.0001 | 1.165***, (1.075 to 1.264), 0.0002 | 1.289***, (1.196 to 1.389), 0.0000 |
| Missing | 1.430***, (1.162 to 1.759), 0.0007 | 1.258**, (1.080 to 1.465), 0.0031 | 1.080*, (1.001 to 1.166), 0.0469 | 1.121**, (1.044 to 1.204), 0.0017 |
| ASA Grade | | | | |
| ASA 1 | Reference | Reference | Reference | Reference |
| ASA 2 | 1.343***, (1.155 to 1.563), 0.0001 | 1.142*, (1.008 to 1.292), 0.0366 | 1.064*, (1.003 to 1.128), 0.0383 | 1.100***, (1.041 to 1.161), 0.0006 |
| ASA 3-5 | 1.829***, (1.517 to 2.205), 0.0000 | 1.407***, (1.202 to 1.647), 0.0000 | 1.175***, (1.085 to 1.274), 0.0001 | 1.264***, (1.174 to 1.360), 0.0000 |
| Primary Indication | | | | |
| Osteoarthritis | Reference | Reference | Reference | Reference |
| Trauma | 1.273, (0.936 to 1.731), 0.1243 | 1.722***, (1.383 to 2.144), 0.0000 | 1.525***, (1.343 to 1.730), 0.0000 | 1.482***, (1.318 to 1.666), 0.0000 |
| All Other Indications | 1.218*, (1.022 to 1.452), 0.0279 | 1.567***, (1.361 to 1.803), 0.0000 | 1.197***, (1.107 to 1.293), 0.0000 | 1.201***, (1.119 to 1.290), 0.0000 |
| Stem Fixation | | | | |
| Cementless | Reference | Reference | Reference | Reference |
| Cemented | 1.216***, (1.095 to 1.351), 0.0003 | 0.866**, (0.791 to 0.949), 0.0020 | 0.732***, (0.696 to 0.769), 0.0000 | 0.796***, (0.762 to 0.833), 0.0000 |
| Approach | | | | |
| Posterior | Reference | Reference | Reference | Reference |
| Lateral | 1.320***, (1.184 to 1.471), 0.0000 | 0.688***, (0.625 to 0.758), 0.0000 | 1.054*, (1.005 to 1.106), 0.0300 | 1.093***, (1.046 to 1.141), 0.0001 |
| Other | 1.418***, (1.170 to 1.720), 0.0004 | 0.671***, (0.561 to 0.804), 0.0000 | 1.042, (0.956 to 1.135), 0.3501 | 1.093*, (1.011 to 1.183), 0.0261 |
| Head Size | | | | |
| <28mm | 1.303, (0.671 to 2.530), 0.4343 | 1.135, (0.726 to 1.776), 0.5791 | 1.116, (0.831 to 1.499), 0.4652 | 1.135, (0.867 to 1.487), 0.3560 |
| 28mm | Reference | Reference | Reference | Reference |
| 32mm | 0.972, (0.844 to 1.120), 0.6933 | 0.546***, (0.491 to 0.607), 0.0000 | 0.848***, (0.801 to 0.899), 0.0000 | 0.866***, (0.821 to 0.913), 0.0000 |
| >32mm | 1.160, (0.998 to 1.347), 0.0528 | 0.426***, (0.376 to 0.483), 0.0000 | 0.910**, (0.854 to 0.969), 0.0034 | 0.946, (0.892 to 1.002), 0.0601 |
| Intraoperative Event | | | | |
| No | Reference | Reference | Reference | Reference |
| Yes | 0.761, (0.450 to 1.288), 0.3094 | 1.615**, (1.209 to 2.158), 0.0012 | 1.816***, (1.574 to 2.096), 0.0000 | 1.667***, (1.452 to 1.913), 0.0000 |
| Date of Implantation | | | | |
| Early | Reference | Reference | Reference | Reference |
| Mid - Early | 1.052, (0.914 to 1.212), 0.4794 | 0.850**, (0.757 to 0.955), 0.0061 | 0.866***, (0.817 to 0.918), 0.0000 | 0.892***, (0.845 to 0.941), 0.0000 |
| Mid - Recent | 0.959, (0.817 to 1.124), 0.6040 | 0.868*, (0.762 to 0.989), 0.0339 | 0.797***, (0.744 to 0.853), 0.0000 | 0.821***, (0.771 to 0.874), 0.0000 |
| Recent | 1.140, (0.964 to 1.349), 0.1253 | 0.907, (0.788 to 1.044), 0.1722 | 0.770***, (0.712 to 0.834), 0.0000 | 0.834***, (0.777 to 0.895), 0.0000 |
| Number in Model | 456457.000 | 456457.000 | 456457.000 | 456457.000 |
| AIC | 40143.176 | 55859.943 | 211324.406 | 251717.544 |

Table 4 - Period Specific Competing Risks Models. (Risk Ratio, (95%CI), p value)

| Variable | Infection | | | | Dislocation | | | Aseptic Revision | | | All Cause Revision | | |
|------------------------------|------------------------------------|------------------------------------|------------------------------------|------------------------------------|------------------------------------|------------------------------------|------------------------------------|------------------------------------|------------------------------------|------------------------------------|------------------------------------|------------------------------------|------------------------------------|
| | <3 Months | 3 - 6 Months | 6 Months - 2 Years | >2 Years | <6 Months | 6 months - 2 Years | >2 Years | <6 Months | 6 months - 2 Years | >2 Years | <6 Months | 6 months - 2 Years | >2 Years |
| Bearing | | | | | | | | | | | | | |
| Metal on Poly | Reference |
| Ceramic on Ceramic | 0.819, (0.612 to 1.094), 0.1765 | 0.802, (0.498 to 1.291), 0.3634 | 0.941, (0.735 to 1.204), 0.6277 | 0.572***, (0.449 to 0.731), 0.0000 | 1.034, (0.856 to 1.250), 0.7259 | 0.769, (0.581 to 1.016), 0.0648 | 0.591***, (0.477 to 0.732), 0.0000 | 1.136*, (1.013 to 1.273), 0.0294 | 1.044, (0.925 to 1.179), 0.4826 | 0.819***, (0.752 to 0.891), 0.0000 | 1.065, (0.960 to 1.181), 0.2355 | 1.025, (0.919 to 1.143), 0.6579 | 0.784***, (0.723 to 0.849), 0.0000 |
| Ceramic on Poly | 0.936, (0.735 to 1.193), 0.5946 | 0.905, (0.594 to 1.379), 0.6431 | 0.840, (0.648 to 1.088), 0.1869 | 0.587***, (0.451 to 0.765), 0.0001 | 0.928, (0.777 to 1.109), 0.4101 | 0.844, (0.658 to 1.082), 0.1813 | 0.982, (0.811 to 1.191), 0.8564 | 0.954, (0.855 to 1.064), 0.3975 | 0.802***, (0.705 to 0.914), 0.0009 | 0.752***, (0.683 to 0.828), 0.0000 | 0.956, (0.868 to 1.053), 0.3635 | 0.810***, (0.721 to 0.909), 0.0004 | 0.729***, (0.665 to 0.798), 0.0000 |
| Age | | | | | | | | | | | | | |
| <60 | 1.092, (0.802 to 1.486), 0.5780 | 1.957*, (1.155 to 3.316), 0.0126 | 1.938***, (1.470 to 2.556), 0.0000 | 1.996***, (1.536 to 2.595), 0.0000 | 0.924, (0.751 to 1.137), 0.4566 | 1.048, (0.789 to 1.392), 0.7468 | 1.165, (0.931 to 1.457), 0.1832 | 0.786***, (0.693 to 0.892), 0.0002 | 1.330***, (1.164 to 1.520), 0.0000 | 1.910***, (1.738 to 2.099), 0.0000 | 0.859**, (0.767 to 0.962), 0.0085 | 1.427***, (1.265 to 1.609), 0.0000 | 1.923***, (1.760 to 2.102), 0.0000 |
| 60-69 | 1.143, (0.894 to 1.463), 0.2862 | 1.566*, (1.009 to 2.432), 0.0457 | 1.535***, (1.209 to 1.949), 0.0004 | 1.558***, (1.251 to 1.941), 0.0001 | 0.940, (0.794 to 1.113), 0.4754 | 0.891, (0.705 to 1.126), 0.3336 | 1.242*, (1.044 to 1.478), 0.0147 | 0.806***, (0.727 to 0.893), 0.0000 | 1.062, (0.945 to 1.193), 0.3135 | 1.373***, (1.262 to 1.493), 0.0000 | 0.872**, (0.795 to 0.956), 0.0035 | 1.139*, (1.026 to 1.264), 0.0147 | 1.396***, (1.291 to 1.510), 0.0000 |
| 70-79 | Reference |
| >80 | 1.297, (0.965 to 1.744), 0.0846 | 0.395*, (0.183 to 0.851), 0.0176 | 0.720, (0.481 to 1.075), 0.1084 | 0.500**, (0.326 to 0.768), 0.0015 | 1.454***, (1.203 to 1.758), 0.0001 | 0.809, (0.593 to 1.102), 0.1791 | 0.670**, (0.498 to 0.901), 0.0081 | 1.315***, (1.167 to 1.481), 0.0000 | 0.792**, (0.666 to 0.941), 0.0079 | 0.784***, (0.682 to 0.901), 0.0006 | 1.265***, (1.134 to 1.411), 0.0000 | 0.778**, (0.664 to 0.912), 0.0019 | 0.746***, (0.654 to 0.851), 0.0000 |
| Sex | | | | | | | | | | | | | |
| Female | Reference |
| Male | 1.462***, (1.196 to 1.787), 0.0002 | 1.773***, (1.265 to 2.486), 0.0009 | 2.167***, (1.785 to 2.631), 0.0000 | 1.902***, (1.586 to 2.281), 0.0000 | 1.253***, (1.097 to 1.433), 0.0009 | 0.748**, (0.615 to 0.910), 0.0038 | 0.778**, (0.666 to 0.909), 0.0015 | 1.014, (0.934 to 1.102), 0.7334 | 1.048, (0.956 to 1.149), 0.3192 | 1.087*, (1.018 to 1.161), 0.0130 | 1.097*, (1.019 to 1.181), 0.0144 | 1.204***, (1.109 to 1.307), 0.0000 | 1.165***, (1.095 to 1.239), 0.0000 |
| BMI Group | | | | | | | | | | | | | |
| <25 | Reference |
| 25-30 | 1.535*, (1.015 to 2.321), 0.0422 | 1.574, (0.681 to 3.637), 0.2886 | 1.239, (0.832 to 1.845), 0.2909 | 1.133, (0.785 to 1.636), 0.5037 | 1.017, (0.799 to 1.295), 0.8883 | 1.284, (0.920 to 1.791), 0.1413 | 1.298, (0.953 to 1.769), 0.0982 | 1.042, (0.901 to 1.205), 0.5780 | 1.046, (0.891 to 1.228), 0.5838 | 1.037, (0.913 to 1.178), 0.5736 | 1.100, (0.961 to 1.258), 0.1657 | 1.066, (0.919 to 1.237), 0.3988 | 1.047, (0.928 to 1.180), 0.4572 |
| >=30 | 2.973***, (2.019 to 4.377), 0.0000 | 2.375*, (1.076 to 5.238), 0.0322 | 2.202***, (1.513 to 3.204), 0.0000 | 1.372, (0.958 to 1.964), 0.0844 | 1.324*, (1.050 to 1.670), 0.0176 | 1.471*, (1.062 to 2.038), 0.0203 | 1.416*, (1.042 to 1.925), 0.0263 | 1.331***, (1.157 to 1.532), 0.0001 | 1.158, (0.988 to 1.356), 0.0693 | 1.027, (0.904 to 1.167), 0.6845 | 1.523***, (1.339 to 1.732), 0.0000 | 1.306***, (1.131 to 1.508), 0.0003 | 1.065, (0.944 to 1.200), 0.3078 |
| Missing | 1.629*, (1.086 to 2.444), 0.0184 | 2.153, (0.981 to 4.727), 0.0558 | 1.325, (0.902 to 1.944), 0.1512 | 1.153, (0.822 to 1.616), 0.4092 | 1.205, (0.964 to 1.506), 0.1006 | 1.191, (0.858 to 1.653), 0.2966 | 1.339*, (1.015 to 1.764), 0.0386 | 1.126, (0.982 to 1.291), 0.0892 | 1.082, (0.929 to 1.260), 0.3113 | 1.010, (0.901 to 1.134), 0.8590 | 1.199**, (1.055 to 1.362), 0.0053 | 1.109, (0.963 to 1.278), 0.1514 | 1.025, (0.919 to 1.143), 0.6605 |
| ASA Grade | | | | | | | | | | | | | |
| ASA 1 | Reference |
| ASA 2 | 1.399*, (1.000 to 1.958), 0.0499 | 2.310*, (1.220 to 4.372), 0.0102 | 1.289, (0.984 to 1.690), 0.0658 | 1.240, (0.982 to 1.565), 0.0701 | 1.210, (0.990 to 1.479), 0.0620 | 1.324, (0.990 to 1.769), 0.0581 | 1.013, (0.838 to 1.225), 0.8910 | 1.163*, (1.030 to 1.312), 0.0145 | 1.178**, (1.041 to 1.333), 0.0096 | 0.983, (0.908 to 1.065), 0.6790 | 1.226***, (1.097 to 1.371), 0.0003 | 1.197**, (1.070 to 1.340), 0.0017 | 1.009, (0.936 to 1.089), 0.8077 |
| ASA 3-5 | 2.346***, (1.603 to 3.433), 0.0000 | 1.679, (0.757 to 3.728), 0.2026 | 2.129***, (1.519 to 2.984), 0.0000 | 1.196, (0.862 to 1.660), 0.2836 | 1.608***, (1.263 to 2.048), 0.0001 | 1.602*, (1.118 to 2.297), 0.0103 | 1.034, (0.785 to 1.363), 0.8110 | 1.416***, (1.219 to 1.646), 0.0000 | 1.183, (0.996 to 1.405), 0.0556 | 1.004, (0.889 to 1.133), 0.9546 | 1.533***, (1.337 to 1.757), 0.0000 | 1.344***, (1.154 to 1.565), 0.0001 | 1.024, (0.914 to 1.147), 0.6842 |
| Primary Indication | | | | | | | | | | | | | |
| Osteoarthritis | Reference |
| Trauma | 1.266, (0.746 to 2.149), 0.3812 | 0.593, (0.204 to 1.724), 0.3370 | 1.239, (0.681 to 2.253), 0.4834 | 1.496, (0.856 to 2.616), 0.1575 | 2.169***, (1.643 to 2.862), 0.0000 | 1.163, (0.676 to 2.001), 0.5864 | 1.069, (0.618 to 1.850), 0.8118 | 1.726***, (1.421 to 2.096), 0.0000 | 1.468**, (1.136 to 1.897), 0.0033 | 1.246, (0.990 to 1.568), 0.0608 | 1.580***, (1.318 to 1.893), 0.0000 | 1.426**, (1.127 to 1.805), 0.0031 | 1.278*, (1.033 to 1.581), 0.0239 |
| All Other Indications | 1.158, (0.815 to 1.645), 0.4124 | 1.029, (0.575 to 1.841), 0.9228 | 0.975, (0.693 to 1.372), 0.8860 | 1.527**, (1.154 to 2.022), 0.0031 | 1.695***, (1.378 to 2.085), 0.0000 | 1.726***, (1.293 to 2.304), 0.0002 | 1.270, (0.980 to 1.647), 0.0707 | 1.440***, (1.255 to 1.651), 0.0000 | 1.305***, (1.119 to 1.522), 0.0007 | 0.994, (0.883 to 1.120), 0.9268 | 1.374***, (1.214 to 1.556), 0.0000 | 1.239**, (1.077 to 1.425), 0.0027 | 1.054, (0.945 to 1.176), 0.3468 |
| Stem Fixation | | | | | | | | | | | | | |
| Cementless | Reference |
| Cemented | 1.371**, (1.126 to 1.669), 0.0017 | 0.877, (0.606 to 1.268), 0.4841 | 1.075, (0.879 to 1.315), 0.4794 | 1.279**, (1.069 to 1.530), 0.0072 | 0.917, (0.798 to 1.053), 0.2175 | 0.921, (0.760 to 1.117), 0.4045 | 0.762***, (0.651 to 0.891), 0.0007 | 0.629***, (0.574 to 0.690), 0.0000 | 0.739***, (0.668 to 0.818), 0.0000 | 0.789***, (0.734 to 0.848), 0.0000 | 0.719***, (0.664 to 0.780), 0.0000 | 0.796***, (0.727 to 0.871), 0.0000 | 0.840***, (0.786 to 0.898), 0.0000 |
| Approach | | | | | | | | | | | | | |
| Posterior | Reference |
| Lateral | 1.291*, (1.047 to 1.591), 0.0169 | 1.035, (0.710 to 1.509), 0.8577 | 1.498***, (1.238 to 1.813), 0.0000 | 1.283*, (1.060 to 1.554), 0.0107 | 0.799**, (0.691 to 0.923), 0.0023 | 0.630***, (0.511 to 0.777), 0.0000 | 0.605***, (0.514 to 0.712), 0.0000 | 1.032, (0.946 to 1.125), 0.4828 | 1.187***, (1.077 to 1.308), 0.0006 | 1.007, (0.939 to 1.080), 0.8372 | 1.064, (0.983 to 1.150), 0.1228 | 1.242***, (1.139 to 1.354), 0.0000 | 1.038, (0.972 to 1.108), 0.2711 |
| Other | 1.325, (0.889 to 1.975), 0.1674 | 1.644, (0.905 to 2.987), 0.1024 | 1.276, (0.869 to 1.873), 0.2136 | 1.513**, (1.116 to 2.052), 0.0077 | 0.682*, (0.506 to 0.920), 0.0120 | 0.649*, (0.428 to 0.982), 0.0407 | 0.641**, (0.488 to 0.843), 0.0014 | 1.007, (0.852 to 1.189), 0.9391 | 1.180, (0.986 to 1.412), 0.0703 | 0.984, (0.871 to 1.111), 0.7955 | 1.071, (0.924 to 1.243), 0.3626 | 1.198*, (1.018 to 1.409), 0.0294 | 1.038, (0.927 to 1.162), 0.5151 |
| Head Size | | | | | | | | | | | | | |
| <28mm | 3.768***, (1.514 to 9.382), 0.0044 | 0.000***, (0.000 to 0.000), 0.0000 | 2.062, (0.651 to 6.527), 0.2183 | 0.267, (0.037 to 1.918), 0.1896 | 0.712, (0.294 to 1.724), 0.4517 | 1.330, (0.546 to 3.238), 0.5302 | 1.492, (0.788 to 2.825), 0.2196 | 1.016, (0.567 to 1.821), 0.9563 | 0.833, (0.373 to 1.860), 0.6560 | 1.224, (0.841 to 1.780), 0.2918 | 1.238, (0.760 to 2.016), 0.3906 | 1.036, (0.537 to 1.996), 0.9163 | 1.084, (0.750 to 1.567), 0.6668 |
| 28mm | Reference |
| 32mm | 1.157, (0.860 to 1.558), 0.3348 | 0.919, (0.576 to 1.466), 0.7217 | 0.908, (0.700 to 1.178), 0.4665 | 0.941, (0.740 to 1.196), 0.6176 | 0.604***, (0.515 to 0.707), 0.0000 | 0.484***, (0.389 to 0.603), 0.0000 | 0.521***, (0.430 to 0.633), 0.0000 | 0.779***, (0.702 to 0.864), 0.0000 | 0.850**, (0.755 to 0.958), 0.0079 | 0.890**, (0.817 to 0.970), 0.0080 | 0.824***, (0.749 to 0.906), 0.0001 | 0.860**, (0.772 to 0.959), 0.0066 | 0.897***, (0.827 to 0.973), 0.0084 |
| >32mm | 1.424*, (1.044 to 1.941), 0.0254 | 0.789, (0.478 to 1.301), 0.3524 | 1.190, (0.911 to 1.555), 0.2015 | 1.059, (0.815 to 1.376), 0.6668 | 0.402***, (0.333 to 0.486), 0.0000 | 0.422***, (0.326 to 0.547), 0.0000 | 0.464***, (0.372 to 0.578), 0.0000 | 0.755***, (0.673 to 0.848), 0.0000 | 0.991, (0.870 to 1.128), 0.8884 | 0.970, (0.885 to 1.063), 0.5179 | 0.822***, (0.741 to 0.913), 0.0003 | 1.024, (0.911 to 1.151), 0.6882 | 0.981, (0.900 to 1.070), 0.6619 |
| Intraoperative Event | | | | | | | | | | | | | |
| No | Reference |
| Yes | 0.807, (0.302 to 2.159), 0.6697 | 1.120, (0.287 to 4.370), 0.8705 | 0.924, (0.382 to 2.235), 0.8605 | 0.482, (0.156 to 1.493), 0.2060 | 2.272***, (1.558 to 3.314), 0.0000 | 1.245, (0.619 to 2.502), 0.5385 | 1.120, (0.617 to 2.034), 0.7094 | 2.722***, (2.192 to 3.380), 0.0000 | 1.642**, (1.209 to 2.231), 0.0015 | 1.325*, (1.034 to 1.699), 0.0260 | 2.437***, (1.982 to 2.996), 0.0000 | 1.518**, (1.137 to 2.027), 0.0046 | 1.230, (0.966 to 1.566), 0.0935 |
| Date of Implantation | | | | | | | | | | | | | |
| Early | Reference |
| Mid - Early | 1.828**, (1.251 to 2.670), 0.0018 | 0.876, (0.530 to 1.448), 0.6053 | 1.031, (0.796 to 1.336), 0.8159 | 0.947, (0.763 to 1.174), 0.6181 | 1.091, (0.906 to 1.313), 0.3593 | 0.863, (0.662 to 1.124), 0.2752 | 0.664***, (0.550 to 0.801), 0.0000 | 1.111, (0.989 to 1.247), 0.0749 | 1.026, (0.908 to 1.159), 0.6825 | 0.723***, (0.666 to 0.785), 0.0000 | 1.145*, (1.029 to 1.275), 0.0132 | 1.028, (0.921 to 1.148), 0.6212 | 0.748***, (0.693 to 0.808), 0.0000 |
| Mid - Recent | 2.072***, (1.407 to 3.051), 0.0002 | 1.091, (0.659 to 1.804), 0.7358 | 0.806, (0.607 to 1.070), 0.1353 | 0.687*, (0.509 to 0.928), 0.0145 | 1.038, (0.853 to 1.263), 0.7110 | 1.009, (0.769 to 1.325), 0.9467 | 0.607***, (0.467 to 0.791), 0.0002 | 1.112, (0.985 to 1.257), 0.0870 | 0.910, (0.796 to 1.040), 0.1672 | 0.578***, (0.515 to 0.650), 0.0000 | 1.175**, (1.050 to 1.314), 0.0048 | 0.890, (0.788 to 1.004), 0.0582 | 0.591***, (0.530 to 0.659), 0.0000 |
| Recent | 2.976***, (2.044 to 4.333), 0.0000 | 0.976, (0.572 to 1.664), 0.9277 | 0.547**, (0.382 to 0.784), 0.0010 | 0.720, (0.399 to 1.299), 0.2751 | 1.065, (0.874 to 1.299), 0.5316 | 0.853, (0.622 to 1.169), 0.3236 | 0.440**, (0 | | | | | | |

Table 5 - Sensitivity Analysis No. 1

| Variable | Predictors of Revision for Infection (Risk Ratio, (95%CI), p value) | | | |
|------------------------------|---|------------------------------------|------------------------------------|------------------------------------|
| | Final Model | Model 1 | Model 2 | Model 3 |
| Bearing | | | | |
| Metal on Poly | Reference | Reference | Reference | Reference |
| Ceramic on Ceramic | 0.748***, (0.649 to 0.861), 0.0001 | 0.742***, (0.645 to 0.854), 0.0000 | 0.742***, (0.645 to 0.853), 0.0000 | 0.786***, (0.689 to 0.896), 0.0003 |
| Ceramic on Poly | 0.775***, (0.675 to 0.890), 0.0003 | 0.782***, (0.682 to 0.898), 0.0005 | 0.782***, (0.682 to 0.898), 0.0005 | 0.791***, (0.690 to 0.906), 0.0007 |
| Age | | | | |
| <60 | 1.683***, (1.442 to 1.965), 0.0000 | 1.686***, (1.444 to 1.967), 0.0000 | 1.686***, (1.445 to 1.968), 0.0000 | 1.674***, (1.434 to 1.954), 0.0000 |
| 60-69 | 1.421***, (1.249 to 1.617), 0.0000 | 1.420***, (1.248 to 1.616), 0.0000 | 1.420***, (1.248 to 1.617), 0.0000 | 1.413***, (1.242 to 1.608), 0.0000 |
| 70-79 | Reference | Reference | Reference | Reference |
| >80 | 0.811*, (0.666 to 0.987), 0.0365 | 0.812*, (0.667 to 0.988), 0.0379 | 0.812*, (0.667 to 0.988), 0.0374 | 0.820*, (0.674 to 0.998), 0.0481 |
| Sex | | | | |
| Female | Reference | Reference | Reference | Reference |
| Male | 1.844***, (1.660 to 2.049), 0.0000 | 1.843***, (1.659 to 2.047), 0.0000 | 1.845***, (1.661 to 2.050), 0.0000 | 1.904***, (1.722 to 2.107), 0.0000 |
| BMI Group | | | | |
| <25 | Reference | Reference | Reference | Reference |
| 25-30 | 1.309*, (1.053 to 1.628), 0.0154 | 1.311*, (1.054 to 1.630), 0.0150 | 1.311*, (1.054 to 1.631), 0.0148 | 1.315*, (1.057 to 1.635), 0.0138 |
| >=30 | 2.135***, (1.737 to 2.625), 0.0000 | 2.140***, (1.741 to 2.631), 0.0000 | 2.141***, (1.742 to 2.632), 0.0000 | 2.150***, (1.750 to 2.643), 0.0000 |
| Missing | 1.430***, (1.162 to 1.759), 0.0007 | 1.418***, (1.155 to 1.741), 0.0008 | 1.418***, (1.155 to 1.741), 0.0008 | 1.404**, (1.144 to 1.723), 0.0012 |
| ASA Grade | | | | |
| ASA 1 | Reference | Reference | Reference | Reference |
| ASA 2 | 1.343***, (1.155 to 1.563), 0.0001 | 1.346***, (1.158 to 1.565), 0.0001 | 1.346***, (1.158 to 1.565), 0.0001 | 1.349***, (1.161 to 1.568), 0.0001 |
| ASA 3-5 | 1.829***, (1.517 to 2.205), 0.0000 | 1.837***, (1.524 to 2.213), 0.0000 | 1.834***, (1.522 to 2.210), 0.0000 | 1.846***, (1.533 to 2.224), 0.0000 |
| Primary Indication | | | | |
| Osteoarthritis | Reference | Reference | Reference | Reference |
| Trauma | 1.273, (0.936 to 1.731), 0.1243 | 1.286, (0.949 to 1.742), 0.1049 | 1.284, (0.948 to 1.740), 0.1065 | 1.315, (0.973 to 1.778), 0.0747 |
| All Other Indications | 1.218*, (1.022 to 1.452), 0.0279 | 1.218*, (1.021 to 1.452), 0.0281 | 1.214*, (1.018 to 1.447), 0.0309 | 1.215*, (1.019 to 1.449), 0.0298 |
| Stem Fixation | | | | |
| Cementless | Reference | Reference | Reference | Reference |
| Cemented | 1.216***, (1.095 to 1.351), 0.0003 | 1.218***, (1.097 to 1.353), 0.0002 | 1.219***, (1.098 to 1.354), 0.0002 | 1.211***, (1.091 to 1.344), 0.0003 |
| Approach | | | | |
| Posterior | Reference | Reference | Reference | Reference |
| Lateral | 1.320***, (1.184 to 1.471), 0.0000 | 1.315***, (1.180 to 1.466), 0.0000 | 1.315***, (1.180 to 1.466), 0.0000 | 1.289***, (1.160 to 1.432), 0.0000 |
| Other | 1.418***, (1.170 to 1.720), 0.0004 | 1.416***, (1.167 to 1.717), 0.0004 | 1.416***, (1.168 to 1.717), 0.0004 | 1.394***, (1.151 to 1.688), 0.0007 |
| Head Size | | | | |
| <28mm | 1.303, (0.671 to 2.530), 0.4343 | 1.302, (0.670 to 2.527), 0.4362 | 1.302, (0.670 to 2.528), 0.4359 | Eliminated |
| 28mm | Reference | Reference | Reference | |
| 32mm | 0.972, (0.844 to 1.120), 0.6933 | 0.986, (0.863 to 1.127), 0.8357 | 0.986, (0.863 to 1.127), 0.8407 | |
| >32mm | 1.160, (0.998 to 1.347), 0.0528 | 1.177*, (1.022 to 1.356), 0.0241 | 1.177*, (1.022 to 1.356), 0.0239 | |
| Intraoperative Event | | | | |
| No | Reference | Reference | Eliminated | Eliminated |
| Yes | 0.761, (0.450 to 1.288), 0.3094 | 0.760, (0.449 to 1.286), 0.3059 | | |
| Date of Implantation | | | | |
| Early | Reference | Eliminated | Eliminated | Eliminated |
| Mid - Early | 1.052, (0.914 to 1.212), 0.4794 | | | |
| Mid - Recent | 0.959, (0.817 to 1.124), 0.6040 | | | |
| Recent | 1.140, (0.964 to 1.349), 0.1253 | | | |
| Number in Model | 456457.000 | 456457.000 | 456457.000 | 456457.000 |
| AIC | 40143.176 | 40142.301 | 40141.448 | 40144.672 |

Table 6 - Sensitivity Analysis No. 2 - Demographics

| Variable | Group | | | Overall | Between Group p value |
|--------------------------------------|------------------------------|------------------------------|-------------------------------|-------------------------------|---------------------------|
| | Ceramic Head Preference | Metal Head Preference | All Other | | |
| n | 59,262 (13.1%) | 57,981 (12.8%) | 335,113 (74.1%) | 452,356 (100%) | |
| PATIENT FAC to RS | | | | | |
| Mean Age (SD) | 63.4 (11.8) | 69.5 (9.7) | 67.1 (11.1) | 66.9 (11.2) | <0.0001**** (ANOVA) |
| Age Group | | | | | <0.0001**** (Chi-Squared) |
| <60 | 19,951 (33.7%) | 8,224 (14.2%) | 75,587 (22.6%) | 103,762 (22.9%) | |
| 60-69 | 21,032 (35.5%) | 19,523 (33.7%) | 111,646 (33.3%) | 152,201 (33.6%) | |
| 70-79 | 13,901 (23.5%) | 21,703 (37.4%) | 106,685 (31.8%) | 142,289 (31.5%) | |
| >80 | 4,378 (7.4%) | 8,531 (14.7%) | 41,195 (12.3%) | 54,104 (12.0%) | |
| Sex | | | | | <0.0001**** (Chi-Squared) |
| Female | 33,176 (56.0%) | 35,314 (60.9%) | 196,070 (58.5%) | 264,560 (58.5%) | |
| Male | 26,086 (44.0%) | 22,667 (39.1%) | 139,043 (41.5%) | 187,796 (41.5%) | |
| Mean BMI (SD) | 28.8 (5.3); n=39,685 (67.0%) | 28.7 (5.1); n=36,791 (63.5%) | 28.8 (5.3); n=206,522 (61.6%) | 28.8 (5.3); n=282,998 (62.6%) | <0.0001**** (ANOVA) |
| BMI Group | | | | | <0.0001**** (Chi-Squared) |
| <25 | 8,297 (14.0%) | 7,566 (13.0%) | 42,534 (12.7%) | 58,397 (12.9%) | |
| 25-30 | 15,771 (26.6%) | 14,832 (25.6%) | 81,200 (24.2%) | 111,803 (24.7%) | |
| >=30 | 15,617 (26.4%) | 14,393 (24.8%) | 82,788 (24.7%) | 112,798 (24.9%) | |
| Missing | 19,577 (33.0%) | 21,190 (36.5%) | 128,591 (38.4%) | 169,358 (37.4%) | |
| ASA Grade | | | | | <0.0001**** (Chi-Squared) |
| ASA 1 | 12,977 (21.9%) | 7,844 (13.5%) | 56,899 (17.0%) | 77,720 (17.2%) | |
| ASA 2 | 40,101 (67.7%) | 42,418 (73.2%) | 230,001 (68.6%) | 312,520 (69.1%) | |
| ASA 3-5 | 6,184 (10.4%) | 7,719 (13.3%) | 48,213 (14.4%) | 62,116 (13.7%) | |
| SURGICAL FAC to RS | | | | | |
| Primary Indication | | | | | <0.0001**** (Chi-Squared) |
| Osteoarthritis | 53,461 (90.2%) | 54,172 (93.4%) | 299,919 (89.5%) | 407,552 (90.1%) | |
| Trauma | 663 (1.1%) | 1,015 (1.8%) | 10,380 (3.1%) | 12,058 (2.7%) | |
| Avascular Necrosis | 1,583 (2.7%) | 993 (1.7%) | 8,415 (2.5%) | 10,991 (2.4%) | |
| Hip Dysplasia | 1,754 (3.0%) | 481 (0.8%) | 6,008 (1.8%) | 8,243 (1.8%) | |
| Inflamma to ry Arthropathy | 882 (1.5%) | 569 (1.0%) | 4,618 (1.4%) | 6,069 (1.3%) | |
| Other | 919 (1.6%) | 751 (1.3%) | 5,773 (1.7%) | 7,443 (1.6%) | |
| Head Size | | | | | <0.0001**** (Chi-Squared) |
| <28mm | 7 (0.0%) | 296 (0.5%) | 1,390 (0.4%) | 1,693 (0.4%) | |
| 28mm | 9,647 (16.3%) | 23,481 (40.5%) | 96,757 (28.9%) | 129,885 (28.7%) | |
| 32mm | 19,460 (32.8%) | 22,607 (39.0%) | 125,690 (37.5%) | 167,757 (37.1%) | |
| >32mm | 30,148 (50.9%) | 11,597 (20.0%) | 111,276 (33.2%) | 153,021 (33.8%) | |
| Stem Fxiation | | | | | <0.0001**** (Chi-Squared) |
| Cementless | 42,495 (71.7%) | 35,844 (61.8%) | 214,699 (64.1%) | 293,038 (64.8%) | |
| Cemented | 16,767 (28.3%) | 22,137 (38.2%) | 120,414 (35.9%) | 159,318 (35.2%) | |
| Adverse Intra-operative Event | | | | | <0.0001**** (Chi-Squared) |
| No | 58,415 (98.6%) | 57,537 (99.2%) | 330,957 (98.8%) | 446,909 (98.8%) | |
| Yes | 847 (1.4%) | 444 (0.8%) | 4,156 (1.2%) | 5,447 (1.2%) | |
| Date of Implantation | | | | | <0.0001**** (Chi-Squared) |
| Early | 10,966 (18.5%) | 18,583 (32.1%) | 83,660 (25.0%) | 113,209 (25.0%) | |
| Mid - Early | 13,946 (23.5%) | 12,736 (22.0%) | 86,459 (25.8%) | 113,141 (25.0%) | |
| Mid - Recent | 17,051 (28.8%) | 13,324 (23.0%) | 82,551 (24.6%) | 112,926 (25.0%) | |
| Recent | 17,299 (29.2%) | 13,338 (23.0%) | 82,443 (24.6%) | 113,080 (25.0%) | |
| REVISION OUTCOMES | | | | | |
| Revision Outcome | | | | | <0.0001**** (Chi-Squared) |
| Not Revised | 58,181 (98.2%) | 56,634 (97.7%) | 327,682 (97.8%) | 442,497 (97.8%) | |
| Revised | | | | | |
| Dislocation | 194 (0.3%) | 322 (0.6%) | 1,669 (0.5%) | 2,185 (0.5%) | |
| Aseptic Loosening | 241 (0.4%) | 271 (0.5%) | 1,430 (0.4%) | 1,942 (0.4%) | |
| Periprosthetic Fracture | 184 (0.3%) | 275 (0.5%) | 1,252 (0.4%) | 1,711 (0.4%) | |
| Infection | 165 (0.3%) | 212 (0.4%) | 1,191 (0.4%) | 1,568 (0.3%) | |
| Malalignment | 49 (0.1%) | 57 (0.1%) | 381 (0.1%) | 487 (0.1%) | |
| Implant Fracture | 62 (0.1%) | 27 (0.0%) | 348 (0.1%) | 437 (0.1%) | |
| Pain | 63 (0.1%) | 37 (0.1%) | 333 (0.1%) | 433 (0.1%) | |
| Other | 61 (0.1%) | 57 (0.1%) | 293 (0.1%) | 411 (0.1%) | |
| Wear | 17 (0.0%) | 35 (0.1%) | 186 (0.1%) | 238 (0.1%) | |
| Liner Dissociation | 16 (0.0%) | 23 (0.0%) | 147 (0.0%) | 186 (0.0%) | |
| Reaction to Particle Debris | 14 (0.0%) | 20 (0.0%) | 113 (0.0%) | 147 (0.0%) | |
| Lysis | 5 (0.0%) | 6 (0.0%) | 42 (0.0%) | 53 (0.0%) | |
| Incorrect Sizing | 10 (0.0%) | 5 (0.0%) | 46 (0.0%) | 61 (0.0%) | |

Table 7 - Sensitivity Analysis No. 2 - Competing Risks Model (All Time Periods)

| Variable | Predictors of Revision (Risk Ratio, (95%CI), p value) | | | |
|--------------------------------|---|------------------------------------|------------------------------------|------------------------------------|
| | Infection | Dislocation | All Aseptic Revisions | All Cause Revision |
| Bearing | | | | |
| Ceramic Head Preference | 0.723**, (0.588 to 0.891), 0.0023 | 0.840, (0.700 to 1.009), 0.0618 | 0.825***, (0.755 to 0.902), 0.0000 | 0.808***, (0.745 to 0.878), 0.0000 |
| Metal Head Preference | Reference | Reference | Reference | Reference |
| All Other | 0.927, (0.799 to 1.075), 0.3134 | 1.029, (0.912 to 1.161), 0.6449 | 0.955, (0.896 to 1.019), 0.1633 | 0.952, (0.897 to 1.009), 0.0976 |
| Age | | | | |
| <60 | 1.517***, (1.311 to 1.755), 0.0000 | 0.949, (0.835 to 1.079), 0.4227 | 1.332***, (1.252 to 1.417), 0.0000 | 1.360***, (1.285 to 1.440), 0.0000 |
| 60-69 | 1.346***, (1.186 to 1.526), 0.0000 | 1.003, (0.903 to 1.114), 0.9534 | 1.083**, (1.025 to 1.145), 0.0047 | 1.122***, (1.067 to 1.181), 0.0000 |
| 70-79 | Reference | Reference | Reference | Reference |
| >80 | 0.834, (0.685 to 1.016), 0.0721 | 1.094, (0.952 to 1.257), 0.2049 | 1.006, (0.929 to 1.089), 0.8843 | 0.979, (0.909 to 1.053), 0.5657 |
| Sex | | | | |
| Female | Reference | Reference | Reference | Reference |
| Male | 1.858***, (1.671 to 2.066), 0.0000 | 0.970, (0.887 to 1.061), 0.5051 | 1.059*, (1.012 to 1.108), 0.0128 | 1.160***, (1.113 to 1.209), 0.0000 |
| BMI Group | | | | |
| <25 | Reference | Reference | Reference | Reference |
| 25-30 | 1.316*, (1.057 to 1.638), 0.0139 | 1.181, (0.999 to 1.396), 0.0509 | 1.055, (0.971 to 1.146), 0.2095 | 1.084*, (1.003 to 1.171), 0.0417 |
| >=30 | 2.138***, (1.737 to 2.631), 0.0000 | 1.410***, (1.198 to 1.659), 0.0000 | 1.172***, (1.080 to 1.272), 0.0001 | 1.296***, (1.202 to 1.398), 0.0000 |
| Missing | 1.395**, (1.132 to 1.718), 0.0018 | 1.279**, (1.096 to 1.492), 0.0017 | 1.091*, (1.010 to 1.178), 0.0268 | 1.127**, (1.048 to 1.211), 0.0012 |
| ASA Grade | | | | |
| ASA 1 | Reference | Reference | Reference | Reference |
| ASA 2 | 1.356***, (1.165 to 1.578), 0.0001 | 1.152*, (1.017 to 1.305), 0.0261 | 1.061*, (1.000 to 1.125), 0.0492 | 1.098***, (1.040 to 1.160), 0.0008 |
| ASA 3-5 | 1.855***, (1.538 to 2.237), 0.0000 | 1.408***, (1.201 to 1.649), 0.0000 | 1.171***, (1.081 to 1.269), 0.0001 | 1.263***, (1.173 to 1.359), 0.0000 |
| Primary Indication | | | | |
| Osteoarthritis | Reference | Reference | Reference | Reference |
| Trauma | 1.344, (0.989 to 1.826), 0.0588 | 1.729***, (1.387 to 2.157), 0.0000 | 1.519***, (1.337 to 1.726), 0.0000 | 1.489***, (1.323 to 1.676), 0.0000 |
| All Other Indications | 1.206*, (1.009 to 1.441), 0.0399 | 1.541***, (1.336 to 1.777), 0.0000 | 1.193***, (1.103 to 1.290), 0.0000 | 1.196***, (1.113 to 1.285), 0.0000 |
| Stem Fixation | | | | |
| Cementless | Reference | Reference | Reference | Reference |
| Cemented | 1.261***, (1.135 to 1.401), 0.0000 | 0.882**, (0.806 to 0.967), 0.0071 | 0.734***, (0.698 to 0.771), 0.0000 | 0.803***, (0.768 to 0.840), 0.0000 |
| Approach | | | | |
| Posterior | Reference | Reference | Reference | Reference |
| Lateral | 1.309***, (1.174 to 1.461), 0.0000 | 0.687***, (0.624 to 0.757), 0.0000 | 1.050*, (1.001 to 1.102), 0.0476 | 1.088***, (1.041 to 1.137), 0.0002 |
| Other | 1.418***, (1.169 to 1.720), 0.0004 | 0.661***, (0.551 to 0.792), 0.0000 | 1.036, (0.950 to 1.130), 0.4218 | 1.089*, (1.006 to 1.178), 0.0355 |
| Head Size | | | | |
| <28mm | 1.093, (0.517 to 2.314), 0.8152 | 1.196, (0.764 to 1.871), 0.4330 | 1.143, (0.845 to 1.547), 0.3843 | 1.128, (0.852 to 1.493), 0.3996 |
| 28mm | Reference | Reference | Reference | Reference |
| 32mm | 0.926, (0.806 to 1.065), 0.2819 | 0.523***, (0.470 to 0.581), 0.0000 | 0.849***, (0.802 to 0.899), 0.0000 | 0.859***, (0.815 to 0.906), 0.0000 |
| >32mm | 1.094, (0.950 to 1.260), 0.2140 | 0.396***, (0.351 to 0.448), 0.0000 | 0.925**, (0.872 to 0.981), 0.0099 | 0.950, (0.899 to 1.003), 0.0636 |
| Intraoperative Event | | | | |
| No | Reference | Reference | Reference | Reference |
| Yes | 0.716, (0.415 to 1.237), 0.2311 | 1.631***, (1.220 to 2.179), 0.0010 | 1.851***, (1.604 to 2.136), 0.0000 | 1.689***, (1.471 to 1.939), 0.0000 |
| Date of Implantation | | | | |
| Early | Reference | Reference | Reference | Reference |
| Mid - Early | 1.051, (0.912 to 1.211), 0.4897 | 0.856**, (0.762 to 0.962), 0.0090 | 0.873***, (0.824 to 0.925), 0.0000 | 0.898***, (0.851 to 0.948), 0.0001 |
| Mid - Recent | 0.962, (0.821 to 1.127), 0.6302 | 0.887, (0.778 to 1.011), 0.0716 | 0.789***, (0.737 to 0.845), 0.0000 | 0.816***, (0.766 to 0.868), 0.0000 |
| Recent | 1.134, (0.961 to 1.337), 0.1364 | 0.938, (0.816 to 1.078), 0.3658 | 0.754***, (0.697 to 0.815), 0.0000 | 0.818***, (0.762 to 0.878), 0.0000 |
| Number in Model | 452356.000 | 452356.000 | 452356.000 | 452356.000 |
| AIC | 39668.355 | 55134.849 | 208852.698 | 248761.287 |

Table 8 - Sensitivity Analysis No.2 - Regression by time-period. (Risk Ratio, (95%CI), p value)

| Variable | Infection | | | | Dislocation | | | Aseptic Revision | | | All Cause Revision | | |
|--------------------------------|------------------------------------|------------------------------------|------------------------------------|------------------------------------|------------------------------------|------------------------------------|------------------------------------|------------------------------------|------------------------------------|------------------------------------|------------------------------------|------------------------------------|------------------------------------|
| | <3 Months | 3 - 6 Months | 6 Months - 2 Years | >2 Years | <6 Months | 6 months - 2 Years | >2 Years | <6 Months | 6 months - 2 Years | >2 Years | <6 Months | 6 months - 2 Years | >2 Years |
| Group | | | | | | | | | | | | | |
| Ceramic Head Preference | 0.648*, (0.434 to 0.967), 0.0338 | 0.910, (0.417 to 1.989), 0.8139 | 1.016, (0.710 to 1.453), 0.9305 | 0.501***, (0.339 to 0.740), 0.0005 | 0.979, (0.738 to 1.298), 0.8816 | 0.862, (0.586 to 1.267), 0.4493 | 0.714*, (0.524 to 0.971), 0.0320 | 1.048, (0.889 to 1.235), 0.5793 | 0.802*, (0.670 to 0.961), 0.0169 | 0.721***, (0.632 to 0.822), 0.0000 | 0.975, (0.840 to 1.132), 0.7437 | 0.843*, (0.718 to 0.991), 0.0382 | 0.693***, (0.612 to 0.784), 0.0000 |
| Metal Head Preference | Reference |
| All Other | 0.888, (0.671 to 1.176), 0.4065 | 1.384, (0.781 to 2.454), 0.2659 | 0.958, (0.722 to 1.272), 0.7660 | 0.837, (0.658 to 1.064), 0.1455 | 1.166, (0.959 to 1.418), 0.1238 | 1.081, (0.829 to 1.408), 0.5654 | 0.874, (0.723 to 1.057), 0.1663 | 1.113, (0.983 to 1.259), 0.0899 | 0.954, (0.834 to 1.092), 0.4948 | 0.860**, (0.785 to 0.941), 0.0011 | 1.088, (0.974 to 1.215), 0.1355 | 0.955, (0.846 to 1.078), 0.4569 | 0.857***, (0.787 to 0.933), 0.0003 |
| Age | | | | | | | | | | | | | |
| <60 | 1.014, (0.754 to 1.365), 0.9252 | 1.790*, (1.093 to 2.934), 0.0208 | 1.872***, (1.444 to 2.426), 0.0000 | 1.661***, (1.296 to 2.129), 0.0001 | 0.918, (0.754 to 1.118), 0.3958 | 0.952, (0.732 to 1.238), 0.7133 | 0.993, (0.799 to 1.233), 0.9481 | 0.812***, (0.722 to 0.914), 0.0006 | 1.349***, (1.191 to 1.527), 0.0000 | 1.794***, (1.640 to 1.963), 0.0000 | 0.867**, (0.780 to 0.965), 0.0090 | 1.434***, (1.282 to 1.604), 0.0000 | 1.780***, (1.635 to 1.937), 0.0000 |
| 60-69 | 1.115, (0.877 to 1.418), 0.3734 | 1.507, (0.983 to 2.310), 0.0602 | 1.486***, (1.177 to 1.876), 0.0009 | 1.427**, (1.150 to 1.770), 0.0012 | 0.941, (0.798 to 1.109), 0.4686 | 0.847, (0.676 to 1.061), 0.1487 | 1.179, (0.993 to 1.399), 0.0596 | 0.818***, (0.740 to 0.904), 0.0001 | 1.052, (0.939 to 1.178), 0.3807 | 1.326***, (1.220 to 1.440), 0.0000 | 0.877**, (0.802 to 0.959), 0.0042 | 1.124*, (1.016 to 1.244), 0.0240 | 1.339***, (1.239 to 1.446), 0.0000 |
| 70-79 | Reference |
| >80 | 1.308, (0.970 to 1.764), 0.0787 | 0.395*, (0.183 to 0.852), 0.0178 | 0.735, (0.492 to 1.097), 0.1321 | 0.534**, (0.348 to 0.820), 0.0041 | 1.483***, (1.226 to 1.793), 0.0000 | 0.834, (0.612 to 1.137), 0.2518 | 0.699*, (0.520 to 0.940), 0.0180 | 1.315***, (1.167 to 1.482), 0.0000 | 0.806*, (0.679 to 0.958), 0.0146 | 0.807**, (0.702 to 0.927), 0.0025 | 1.267***, (1.135 to 1.414), 0.0000 | 0.793**, (0.677 to 0.929), 0.0041 | 0.772***, (0.676 to 0.881), 0.0001 |
| Sex | | | | | | | | | | | | | |
| Female | Reference |
| Male | 1.461***, (1.192 to 1.792), 0.0003 | 1.742**, (1.238 to 2.452), 0.0014 | 2.171***, (1.789 to 2.636), 0.0000 | 1.935***, (1.612 to 2.325), 0.0000 | 1.248**, (1.091 to 1.427), 0.0012 | 0.758**, (0.622 to 0.923), 0.0058 | 0.802**, (0.686 to 0.938), 0.0056 | 1.008, (0.928 to 1.096), 0.8462 | 1.045, (0.952 to 1.146), 0.3544 | 1.098**, (1.027 to 1.173), 0.0059 | 1.091*, (1.013 to 1.175), 0.0219 | 1.202***, (1.107 to 1.305), 0.0000 | 1.177***, (1.106 to 1.252), 0.0000 |
| BMI Group | | | | | | | | | | | | | |
| <25 | Reference |
| 25-30 | 1.575*, (1.036 to 2.396), 0.0338 | 1.541, (0.668 to 3.558), 0.3107 | 1.236, (0.830 to 1.840), 0.2972 | 1.132, (0.784 to 1.634), 0.5072 | 1.043, (0.816 to 1.332), 0.7387 | 1.309, (0.937 to 1.830), 0.1149 | 1.290, (0.944 to 1.763), 0.1098 | 1.049, (0.906 to 1.215), 0.5202 | 1.049, (0.892 to 1.233), 0.5666 | 1.048, (0.922 to 1.192), 0.4715 | 1.110, (0.969 to 1.271), 0.1331 | 1.069, (0.920 to 1.242), 0.3840 | 1.057, (0.936 to 1.193), 0.3720 |
| >=30 | 3.026***, (2.041 to 4.487), 0.0000 | 2.241*, (1.015 to 4.949), 0.0458 | 2.202***, (1.513 to 3.205), 0.0000 | 1.369, (0.956 to 1.960), 0.0869 | 1.335*, (1.054 to 1.690), 0.0167 | 1.496*, (1.078 to 2.077), 0.0161 | 1.431*, (1.050 to 1.950), 0.0233 | 1.331***, (1.155 to 1.535), 0.0001 | 1.174*, (1.001 to 1.376), 0.0489 | 1.031, (0.906 to 1.172), 0.6476 | 1.525***, (1.339 to 1.737), 0.0000 | 1.323***, (1.144 to 1.529), 0.0002 | 1.068, (0.947 to 1.206), 0.2846 |
| Missing | 1.561*, (1.030 to 2.365), 0.0357 | 2.084, (0.949 to 4.576), 0.0672 | 1.304, (0.888 to 1.915), 0.1759 | 1.123, (0.800 to 1.576), 0.5024 | 1.240, (0.989 to 1.555), 0.0622 | 1.202, (0.864 to 1.672), 0.2739 | 1.340*, (1.014 to 1.770), 0.0395 | 1.135, (0.988 to 1.303), 0.0728 | 1.101, (0.944 to 1.284), 0.2198 | 1.016, (0.905 to 1.142), 0.7837 | 1.200***, (1.055 to 1.366), 0.0054 | 1.123, (0.974 to 1.295), 0.1106 | 1.027, (0.920 to 1.146), 0.6351 |
| ASA Grade | | | | | | | | | | | | | |
| ASA 1 | Reference |
| ASA 2 | 1.434*, (1.016 to 2.024), 0.0401 | 2.323**, (1.232 to 4.381), 0.0092 | 1.288, (0.983 to 1.687), 0.0661 | 1.259, (0.998 to 1.589), 0.0525 | 1.208, (0.987 to 1.477), 0.0664 | 1.333, (0.998 to 1.780), 0.0518 | 1.034, (0.854 to 1.251), 0.7339 | 1.147*, (1.016 to 1.294), 0.0263 | 1.177*, (1.039 to 1.333), 0.0103 | 0.985, (0.909 to 1.067), 0.7032 | 1.216***, (1.087 to 1.359), 0.0006 | 1.197**, (1.069 to 1.340), 0.0018 | 1.013, (0.939 to 1.092), 0.7472 |
| ASA 3-5 | 2.385***, (1.616 to 3.518), 0.0000 | 1.692, (0.767 to 3.733), 0.1924 | 2.124***, (1.517 to 2.975), 0.0000 | 1.238, (0.893 to 1.717), 0.2006 | 1.567***, (1.229 to 1.998), 0.0003 | 1.612**, (1.125 to 2.308), 0.0092 | 1.063, (0.804 to 1.405), 0.6700 | 1.374***, (1.183 to 1.597), 0.0000 | 1.172, (0.986 to 1.393), 0.0710 | 1.021, (0.904 to 1.153), 0.7376 | 1.497***, (1.306 to 1.717), 0.0000 | 1.334***, (1.145 to 1.554), 0.0002 | 1.044, (0.931 to 1.170), 0.4609 |
| Primary Indication | | | | | | | | | | | | | |
| Osteoarthritis | Reference |
| Trauma | 1.355, (0.801 to 2.292), 0.2566 | 0.567*, (0.194 to 1.656), 0.2995 | 1.281, (0.705 to 2.327), 0.4170 | 1.603, (0.919 to 2.797), 0.0967 | 2.120***, (1.601 to 2.806), 0.0000 | 1.185, (0.688 to 2.040), 0.5403 | 1.112, (0.642 to 1.926), 0.7047 | 1.693***, (1.391 to 2.060), 0.0000 | 1.393*, (1.072 to 1.810), 0.0133 | 1.287*, (1.023 to 1.620), 0.0315 | 1.564***, (1.303 to 1.877), 0.0000 | 1.373**, (1.079 to 1.745), 0.0098 | 1.325**, (1.071 to 1.640), 0.0094 |
| All Other Indications | 1.115, (0.773 to 1.609), 0.5605 | 1.045, (0.586 to 1.864), 0.8812 | 0.955, (0.676 to 1.350), 0.7945 | 1.537**, (1.159 to 2.036), 0.0028 | 1.677***, (1.358 to 2.069), 0.0000 | 1.737***, (1.303 to 2.317), 0.0002 | 1.220, (0.936 to 1.589), 0.1419 | 1.426***, (1.241 to 1.638), 0.0000 | 1.333***, (1.143 to 1.554), 0.0002 | 0.982, (0.871 to 1.108), 0.7696 | 1.359***, (1.198 to 1.542), 0.0000 | 1.256**, (1.091 to 1.445), 0.0015 | 1.044, (0.935 to 1.166), 0.4446 |
| Stem Fixation | | | | | | | | | | | | | |
| Cementless | Reference |
| Cemented | 1.424***, (1.170 to 1.734), 0.0004 | 0.909, (0.623 to 1.326), 0.6205 | 1.089, (0.892 to 1.328), 0.4033 | 1.361***, (1.137 to 1.628), 0.0008 | 0.908, (0.790 to 1.043), 0.1736 | 0.941, (0.778 to 1.138), 0.5304 | 0.788**, (0.673 to 0.922), 0.0030 | 0.618***, (0.564 to 0.678), 0.0000 | 0.726***, (0.657 to 0.803), 0.0000 | 0.808***, (0.752 to 0.868), 0.0000 | 0.713***, (0.658 to 0.773), 0.0000 | 0.787***, (0.719 to 0.861), 0.0000 | 0.864***, (0.808 to 0.923), 0.0000 |
| Approach | | | | | | | | | | | | | |
| Posterior | Reference |
| Lateral | 1.254*, (1.014 to 1.549), 0.0364 | 1.047, (0.716 to 1.532), 0.8125 | 1.485***, (1.226 to 1.798), 0.0001 | 1.289**, (1.064 to 1.563), 0.0097 | 0.800**, (0.691 to 0.925), 0.0027 | 0.625***, (0.506 to 0.772), 0.0000 | 0.611***, (0.520 to 0.719), 0.0000 | 1.031, (0.945 to 1.125), 0.4941 | 1.171**, (1.061 to 1.293), 0.0017 | 1.008, (0.940 to 1.082), 0.8224 | 1.060, (0.980 to 1.147), 0.1454 | 1.227***, (1.124 to 1.340), 0.0000 | 1.039, (0.973 to 1.110), 0.2553 |
| Other | 1.366, (0.918 to 2.031), 0.1239 | 1.698, (0.934 to 3.089), 0.0828 | 1.233, (0.835 to 1.823), 0.2925 | 1.519**, (1.120 to 2.060), 0.0071 | 0.672**, (0.497 to 0.909), 0.0098 | 0.644*, (0.425 to 0.974), 0.0373 | 0.640**, (0.486 to 0.842), 0.0014 | 1.016, (0.859 to 1.202), 0.8539 | 1.166, (0.973 to 1.398), 0.0959 | 0.979, (0.867 to 1.107), 0.7397 | 1.084, (0.934 to 1.259), 0.2867 | 1.179*, (1.001 to 1.390), 0.0491 | 1.035, (0.924 to 1.159), 0.5548 |
| Head Size | | | | | | | | | | | | | |
| <28mm | 2.366, (0.741 to 7.555), 0.1458 | 0.000***, (0.000 to 0.000), 0.0000 | 2.197, (0.695 to 6.946), 0.1802 | 0.307, (0.043 to 2.194), 0.2390 | 0.739, (0.305 to 1.789), 0.5022 | 1.430, (0.587 to 3.479), 0.4310 | 1.600, (0.845 to 3.031), 0.1490 | 1.062, (0.593 to 1.902), 0.8393 | 0.904, (0.405 to 2.016), 0.8045 | 1.244, (0.843 to 1.836), 0.2712 | 1.128, (0.671 to 1.895), 0.6491 | 1.121, (0.582 to 2.159), 0.7331 | 1.113, (0.760 to 1.630), 0.5827 |
| 28mm | Reference |
| 32mm | 1.132, (0.841 to 1.524), 0.4129 | 0.891, (0.560 to 1.417), 0.6247 | 0.888, (0.686 to 1.150), 0.3673 | 0.854, (0.678 to 1.075), 0.1794 | 0.593***, (0.506 to 0.695), 0.0000 | 0.475***, (0.382 to 0.592), 0.0000 | 0.471***, (0.389 to 0.570), 0.0000 | 0.782***, (0.705 to 0.868), 0.0000 | 0.867*, (0.770 to 0.977), 0.0194 | 0.874**, (0.804 to 0.951), 0.0017 | 0.821***, (0.746 to 0.903), 0.0000 | 0.871*, (0.782 to 0.971), 0.0125 | 0.872***, (0.806 to 0.944), 0.0007 |
| >32mm | 1.414*, (1.048 to 1.909), 0.0235 | 0.756, (0.471 to 1.212), 0.2449 | 1.175, (0.912 to 1.513), 0.2127 | 0.940, (0.737 to 1.199), 0.6169 | 0.402***, (0.334 to 0.483), 0.0000 | 0.400***, (0.310 to 0.517), 0.0000 | 0.385***, (0.310 to 0.479), 0.0000 | 0.785***, (0.704 to 0.876), 0.0000 | 1.056, (0.934 to 1.194), 0.3881 | 0.944, (0.867 to 1.028), 0.1880 | 0.843***, (0.763 to 0.931), 0.0008 | 1.076, (0.964 to 1.202), 0.1929 | 0.944, (0.870 to 1.023), 0.1597 |
| Intraoperative Event | | | | | | | | | | | | | |
| No | Reference |
| Yes | 0.630, (0.201 to 1.970), 0.4271 | 1.073, (0.274 to 4.212), 0.9191 | 0.932, (0.386 to 2.254), 0.8765 | 0.489, (0.158 to 1.513), 0.2143 | 2.310***, (1.583 to 3.370), 0.0000 | 1.246, (0.619 to 2.507), 0.5380 | 1.129, (0.622 to 2.050), 0.6902 | 2.774***, (2.234 to 3.445), 0.0000 | 1.683***, (1.239 to 2.286), 0.0009 | 1.349*, (1.053 to 1.729), 0.0179 | 2.457***, (1.996 to 3.025), 0.0000 | 1.552**, (1.162 to 2.072), 0.0029 | 1.251, (0.982 to 1.593), 0.0694 |
| Date of Implantation | | | | | | | | | | | | | |
| Early | Reference |
| Mid - Early | 1.854**, (1.261 to 2.726), 0.0017 | 0.843, (0.507 to 1.403), 0.5117 | 1.021, (0.788 to 1.324), 0.8723 | 0.961, (0.776 to 1.192), 0.7195 | 1.093, (0.907 to 1.318), 0.3494 | 0.865, (0.664 to 1.127), 0.2828 | 0.675***, (0.558 to 0.815), 0.0000 | 1.118, (0.995 to 1.256), 0.0598 | 1.041, (0.920 to 1.177), 0.5266 | 0.728***, (0.671 to 0.791), 0.0000 | 1.150*, (1.033 to 1.281), 0.0110 | 1.038, (0.929 to 1.160), 0.5117 | 0.755***, (0.698 to 0.815), 0.0000 |
| Mid - Recent | 2.094***, (1.412 to 3.105), 0.0002 | 1.108, (0.673 to 1.826), 0.6871 | 0.794, (0.599 to 1.052), 0.1077 | 0.700*, (0.519 to 0.944), 0.0194 | 1.031, (0.846 to 1.257), 0.7616 | 1.016, (0.774 to 1.333), 0.9091 | 0.654**, (0.502 to 0.851), 0.0016 | 1.098, (0.971 to 1.242), 0.1363 | 0.899, (0.786 to 1.028), 0.1204 | 0.579***, (0.516 to 0.651), 0.0000 | 1.164**, (1.040 to 1.304), 0.0083 | 0.878*, (0.778 to 0.991), 0.0350 | 0.593***, (0.533 to 0.661), 0.0000 |
| Recent | 3.015***, (2.062 to 4.408), 0.0000 | 0.997, (0.582 to 1.709), 0.9912 | 0.523***, (0.368 to 0 | | | | | | | | | | |

Table 9 - Sensitivity Analysis No. 3 - Age 60-69 & ASA 2

| | Revision For Infection - ASA 2, Age 60-69 years. (Risk Ratio, (95%CI), p value) | | | |
|------------------------------|---|----------------------------------|----------------------------------|----------------------------------|
| | <3 Months | 3 - 6 Months | 6 Months - 2 Years | >2 Years |
| Bearing | | | | |
| Metal on Poly (Ref) | Reference | Reference | Reference | Reference |
| Ceramic on Ceramic | 0.681, (0.397to1.169), 0.1633 | 0.662, (0.279to1.572), 0.3505 | 0.823, (0.524to1.293), 0.3971 | 0.504**, (0.333to0.765), 0.0013 |
| Ceramic on Poly | 0.937, (0.577to1.523), 0.7934 | 0.853, (0.417to1.745), 0.6638 | 0.958, (0.617to1.489), 0.8498 | 0.557*, (0.357to0.870), 0.0100 |
| Sex | | | | |
| Female (Ref) | Reference | Reference | Reference | Reference |
| Male | 1.519, (0.991to2.329), 0.0553 | 1.834, (0.960to3.502), 0.0663 | 2.282***, (1.550to3.360), 0.0000 | 1.569**, (1.126to2.185), 0.0077 |
| BMI Group | | | | |
| <25 (Ref) | Reference | Reference | Reference | Reference |
| 25-30 | 1.106, (0.396to3.090), 0.8480 | 1.207, (0.238to6.119), 0.8206 | 2.140, (0.745to6.142), 0.1574 | 1.207, (0.605to2.405), 0.5933 |
| ≥30 | 3.725**, (1.470to9.440), 0.0056 | 2.232, (0.508to9.803), 0.2874 | 4.832**, (1.757to13.290), 0.0023 | 1.181, (0.596to2.341), 0.6328 |
| Missing | 1.304, (0.486to3.503), 0.5980 | 1.906, (0.415to8.758), 0.4072 | 2.562, (0.916to7.164), 0.0729 | 1.160, (0.604to2.230), 0.6552 |
| Primary Indication | | | | |
| Osteoarthritis (Ref) | Reference | Reference | Reference | Reference |
| Trauma | 2.603, (0.851to7.960), 0.0935 | 0.570, (0.075to4.312), 0.5863 | 0.000***, (0.000to0.000), 0.0000 | 1.182, (0.371to3.768), 0.7780 |
| All Other Indications | 0.000***, (0.000to0.000), 0.0000 | 1.030, (0.304to3.495), 0.9623 | 0.777, (0.289to2.088), 0.6164 | 1.148, (0.564to2.334), 0.7036 |
| Fixation | | | | |
| Cementless (Ref) | Reference | Reference | Reference | Reference |
| Cemented | 1.253, (0.821to1.913), 0.2957 | 1.415, (0.734to2.727), 0.2995 | 1.070, (0.718to1.595), 0.7404 | 1.134, (0.814to1.580), 0.4576 |
| Approach | | | | |
| Posterior (Ref) | Reference | Reference | Reference | Reference |
| Lateral | 1.114, (0.709to1.750), 0.6388 | 0.811, (0.404to1.625), 0.5538 | 1.456*, (1.020to2.078), 0.0384 | 1.795**, (1.267to2.544), 0.0010 |
| Other | 1.348, (0.588to3.090), 0.4799 | 2.147, (0.820to5.623), 0.1199 | 1.894, (0.999to3.589), 0.0502 | 1.911*, (1.074to3.400), 0.0276 |
| Head Size | | | | |
| <28mm | 6.502, (0.869to48.633), 0.0682 | 0.000***, (0.000to0.000), 0.0000 | 0.000***, (0.000to0.000), 0.0000 | 0.000***, (0.000to0.000), 0.0000 |
| 28mm (Ref) | Reference | Reference | Reference | Reference |
| 32mm | 1.614, (0.873to2.983), 0.1271 | 1.068, (0.490to2.329), 0.8684 | 1.033, (0.638to1.673), 0.8939 | 1.061, (0.678to1.660), 0.7948 |
| >32mm | 1.988*, (1.026to3.852), 0.0418 | 0.799, (0.314to2.035), 0.6378 | 1.400, (0.847to2.312), 0.1890 | 1.055, (0.652to1.707), 0.8273 |
| Intraoperative Event | | | | |
| No (Ref) | Reference | Reference | Reference | Reference |
| Yes | 1.088, (0.153to7.727), 0.9328 | 0.000***, (0.000to0.000), 0.0000 | 0.000***, (0.000to0.000), 0.0000 | 0.000***, (0.000to0.000), 0.0000 |
| N | 109798.000 | 109162.000 | 108868.000 | 95578.000 |
| aic | 2245.216 | 731.549 | 2947.271 | 3427.106 |

