

## Elite Plus Total Conventional Hip Investigation

Note: This analysis compares the Elite Plus femoral stem prosthesis with all other total conventional hip prostheses.

This prosthesis has been identified as having a significantly higher rate of revision. For a detailed explanation of the process used by the Registry that results in identification of prostheses that have a higher than anticipated rate of revision please refer to the Prostheses with Higher than Anticipated Rates of Revision chapter of the most recent AOANJRR Annual Report, <https://aoanjrr.sahmri.com/annual-reports-2026>.

Note: Procedures using metal/metal prostheses with head size larger than 32mm are excluded from the comparator. Procedures using prostheses with no recorded use in 2025 are excluded from the comparator.

**TABLE 1**

### Revision Rate of Primary Total Conventional Hip Replacement

The revision rate of the Elite Plus total conventional hip prosthesis is compared to all other total conventional hip prostheses.

**Table 1: Revision Rates of Primary Total Conventional Hip Replacement**

| Component                    | N Revised    | N Total       | Obs. Years     | Revisions/100 Obs. Yrs<br>(95% CI) |
|------------------------------|--------------|---------------|----------------|------------------------------------|
| Elite Plus                   | 281          | 2841          | 34107          | 0.82 (0.73, 0.93)                  |
| Other Total Conventional Hip | 19701        | 568612        | 3623071        | 0.54 (0.54, 0.55)                  |
| <b>TOTAL</b>                 | <b>19982</b> | <b>571453</b> | <b>3657178</b> | <b>0.55 (0.54, 0.55)</b>           |

Note: Prostheses no longer used in 2025 are excluded from the comparator. Procedures using metal/metal prostheses with head size larger than 32mm are excluded from the comparator.

TABLE 2

## Yearly Cumulative Percent Revision of Primary Total Conventional Hip Replacement

The yearly cumulative percent revision of the Elite Plus total conventional hip prosthesis is compared to all other total conventional hip prostheses.

Table 2: Yearly Cumulative Percent Revision (95% CI) of Primary Total Conventional Hip Replacement

| CPR                          | 1 Yr           | 2 Yrs          | 3 Yrs          | 4 Yrs          | 5 Yrs          | 6 Yrs          |
|------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Elite Plus                   | 1.5 (1.1, 2.0) | 2.2 (1.7, 2.8) | 2.8 (2.3, 3.5) | 3.5 (2.9, 4.3) | 4.2 (3.5, 5.1) | 4.9 (4.1, 5.8) |
| Other Total Conventional Hip | 1.7 (1.7, 1.8) | 2.1 (2.1, 2.2) | 2.5 (2.4, 2.5) | 2.8 (2.7, 2.8) | 3.0 (3.0, 3.1) | 3.3 (3.2, 3.3) |

| CPR                          | 7 Yrs          | 8 Yrs          | 9 Yrs          | 10 Yrs         | 11 Yrs          | 12 Yrs          |
|------------------------------|----------------|----------------|----------------|----------------|-----------------|-----------------|
| Elite Plus                   | 5.5 (4.7, 6.5) | 6.4 (5.5, 7.4) | 6.9 (6.0, 8.0) | 7.8 (6.8, 9.0) | 8.7 (7.6, 10.0) | 9.6 (8.4, 10.9) |
| Other Total Conventional Hip | 3.5 (3.5, 3.6) | 3.8 (3.7, 3.9) | 4.1 (4.0, 4.2) | 4.4 (4.3, 4.5) | 4.7 (4.6, 4.8)  | 5.1 (5.0, 5.2)  |

| CPR                          | 13 Yrs           | 14 Yrs            | 15 Yrs            | 16 Yrs            | 17 Yrs            | 18 Yrs            |
|------------------------------|------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| Elite Plus                   | 10.7 (9.4, 12.2) | 11.6 (10.2, 13.1) | 12.3 (10.8, 13.8) | 12.7 (11.3, 14.4) | 13.2 (11.7, 14.9) | 14.0 (12.4, 15.8) |
| Other Total Conventional Hip | 5.4 (5.3, 5.5)   | 5.8 (5.7, 5.9)    | 6.2 (6.1, 6.3)    | 6.6 (6.5, 6.7)    | 7.0 (6.8, 7.1)    | 7.3 (7.1, 7.5)    |

| CPR                          | 19 Yrs            | 20 Yrs            | 21 Yrs            | 22 Yrs            | 23 Yrs            | 24 Yrs            | 25 Yrs           |
|------------------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|------------------|
| Elite Plus                   | 14.4 (12.8, 16.2) | 15.3 (13.5, 17.3) | 15.3 (13.5, 17.3) | 15.5 (13.7, 17.5) | 16.5 (14.4, 18.8) | 17.0 (14.8, 19.5) |                  |
| Other Total Conventional Hip | 7.7 (7.5, 7.9)    | 8.0 (7.8, 8.2)    | 8.6 (8.3, 8.9)    | 9.0 (8.7, 9.4)    | 9.6 (9.1, 10.0)   | 9.6 (9.2, 10.1)   | 10.3 (9.4, 11.2) |

Note: Prostheses no longer used in 2025 are excluded from the comparator. Procedures using metal/metal prostheses with head size larger than 32mm are excluded from the comparator.

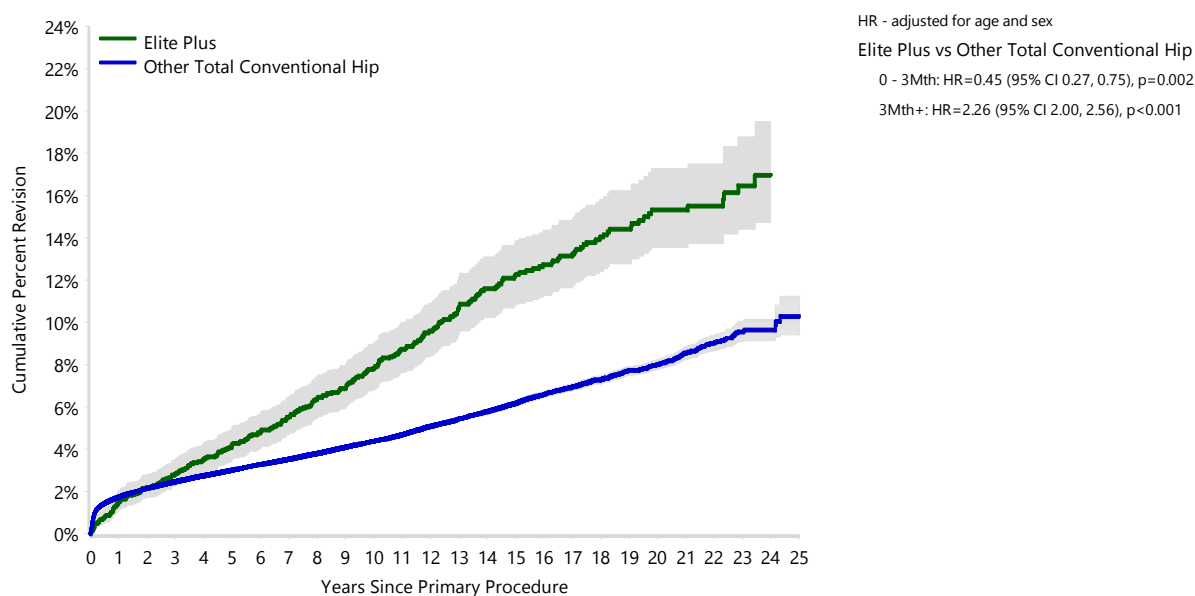
FIGURE 1

### Yearly Cumulative Percent Revision of Primary Total Conventional Hip Replacement

The yearly cumulative percent revision of the Elite Plus total conventional hip prosthesis is compared to all other total conventional hip prostheses. In addition, hazard ratios are reported.

Hazard ratios are reported for specific time periods during which the hazard ratio is constant. This is done to enable more specific and valid comparisons of the risk of revision over time. The pattern of variation in risk has important implications with respect to the underlying reasons for any difference.

**Figure 1: Cumulative Percent Revision of Primary Total Conventional Hip Replacement**



| Number at Risk               | 0 Yr   | 1 Yr   | 2 Yrs  | 3 Yrs  | 4 Yrs  | 5 Yrs  | 6 Yrs  | 7 Yrs  |
|------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|
| Elite Plus                   | 2841   | 2718   | 2614   | 2509   | 2398   | 2290   | 2167   | 2028   |
| Other Total Conventional Hip | 568612 | 501603 | 445433 | 391564 | 344389 | 299354 | 259516 | 220948 |

| Number at Risk               | 8 Yrs  | 9 Yrs  | 10 Yrs | 11 Yrs | 12 Yrs | 13 Yrs | 14 Yrs | 15 Yrs | 16 Yrs |
|------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Elite Plus                   | 1903   | 1769   | 1609   | 1470   | 1343   | 1205   | 1088   | 987    | 893    |
| Other Total Conventional Hip | 185798 | 153739 | 124848 | 99575  | 79802  | 63343  | 49730  | 38033  | 28355  |

| Number at Risk               | 17 Yrs | 18 Yrs | 19 Yrs | 20 Yrs | 21 Yrs | 22 Yrs | 23 Yrs | 24 Yrs | 25 Yrs |
|------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Elite Plus                   | 808    | 709    | 617    | 518    | 410    | 312    | 218    | 105    | 31     |
| Other Total Conventional Hip | 20437  | 14638  | 10400  | 7396   | 4859   | 2863   | 1455   | 560    | 95     |

Note: Prostheses no longer used in 2025 are excluded from the comparator. Procedures using metal/metal prostheses with head size larger than 32mm are excluded from the comparator.

**TABLE 3****Primary Diagnosis for Revised Primary Total Conventional Hip Replacement**

This table identifies the diagnosis of the primary procedure which was subsequently revised. This information is provided as there is a variation on outcome depending on the primary diagnosis. It is therefore important when considering the reasons for a higher than anticipated rate of revision that there is identification of the primary diagnosis. This information should be compared to the primary diagnosis for the revisions of all other total conventional hip prostheses.

**Table 3: Primary Diagnosis for Revised Primary Total Conventional Hip Replacement**

| Primary Diagnosis            | Elite Plus |              | Other Total Conventional Hip |              |
|------------------------------|------------|--------------|------------------------------|--------------|
|                              | Number     | Percent      | Number                       | Percent      |
| Osteoarthritis               | 246        | 87.5         | 16296                        | 82.7         |
| Fractured Neck Of Femur      | 11         | 3.9          | 1521                         | 7.7          |
| Osteonecrosis                | 12         | 4.3          | 844                          | 4.3          |
| Developmental Dysplasia      | 1          | 0.4          | 321                          | 1.6          |
| Rheumatoid Arthritis         | 7          | 2.5          | 201                          | 1.0          |
| Failed Internal Fixation     | 2          | 0.7          | 165                          | 0.8          |
| Tumour                       |            |              | 157                          | 0.8          |
| Other Inflammatory Arthritis | 2          | 0.7          | 102                          | 0.5          |
| Fracture/Dislocation         |            |              | 60                           | 0.3          |
| Other                        |            |              | 21                           | 0.1          |
| Arthrodesis Takedown         |            |              | 13                           | 0.1          |
| <b>TOTAL</b>                 | <b>281</b> | <b>100.0</b> | <b>19701</b>                 | <b>100.0</b> |

Note: Prostheses no longer used in 2025 are excluded from the comparator. Procedures using metal/metal prostheses with head size larger than 32mm are excluded from the comparator.

TABLE 4

## Reasons for Revision

This is reported in two ways: a percentage of primary procedures revised and as a percentage of all revision procedures.

**% Primaries Revised:** This shows the proportional contribution of each revision diagnosis as a percentage of the total number of primary procedures. This percentage can be used to approximate the risk of being revised for that diagnosis. Differing percentages between groups, with the same distribution of follow up time, may identify problems of concern.

**% Revisions:** The number of revisions for each diagnosis is expressed as a percentage of the total number of revisions. This shows the distribution of reasons for revision within a group but cannot be used as a comparison between groups.

Table 4: Primary Total Conventional Hip Replacement - Reason for Revision

| Revision Diagnosis                 | Number      | Elite Plus          |              | Other Total Conventional Hip |                     |              |
|------------------------------------|-------------|---------------------|--------------|------------------------------|---------------------|--------------|
|                                    |             | % Primaries Revised | % Revisions  | Number                       | % Primaries Revised | % Revisions  |
| Infection                          | 29          | 1.0                 | 10.3         | 5017                         | 0.9                 | 25.5         |
| Prosthesis Dislocation/Instability | 49          | 1.7                 | 17.4         | 4382                         | 0.8                 | 22.2         |
| Fracture                           | 29          | 1.0                 | 10.3         | 4349                         | 0.8                 | 22.1         |
| Loosening                          | 156         | 5.5                 | 55.5         | 3629                         | 0.6                 | 18.4         |
| Pain                               |             |                     |              | 340                          | 0.1                 | 1.7          |
| Leg Length Discrepancy             | 1           | 0.0                 | 0.4          | 307                          | 0.1                 | 1.6          |
| Malposition                        |             |                     |              | 282                          | 0.0                 | 1.4          |
| Implant Breakage Stem              | 5           | 0.2                 | 1.8          | 211                          | 0.0                 | 1.1          |
| Lysis                              | 7           | 0.2                 | 2.5          | 200                          | 0.0                 | 1.0          |
| Implant Breakage Acetabular Insert | 1           | 0.0                 | 0.4          | 128                          | 0.0                 | 0.6          |
| Wear Acetabular Insert             | 2           | 0.1                 | 0.7          | 112                          | 0.0                 | 0.6          |
| Incorrect Sizing                   |             |                     |              | 96                           | 0.0                 | 0.5          |
| Metal Related Pathology            |             |                     |              | 93                           | 0.0                 | 0.5          |
| Implant Breakage Acetabular        |             |                     |              | 73                           | 0.0                 | 0.4          |
| Wear Head                          |             |                     |              | 49                           | 0.0                 | 0.2          |
| Tumour                             |             |                     |              | 46                           | 0.0                 | 0.2          |
| Heterotopic Bone                   | 1           | 0.0                 | 0.4          | 26                           | 0.0                 | 0.1          |
| Implant Breakage Head              |             |                     |              | 26                           | 0.0                 | 0.1          |
| Wear Acetabulum                    | 1           | 0.0                 | 0.4          | 6                            | 0.0                 | 0.0          |
| Osteonecrosis                      |             |                     |              | 4                            | 0.0                 | 0.0          |
| Synovitis                          |             |                     |              | 2                            | 0.0                 | 0.0          |
| Progression Of Disease             |             |                     |              | 1                            | 0.0                 | 0.0          |
| Other                              |             |                     |              | 322                          | 0.1                 | 1.6          |
| <b>N Revision</b>                  | <b>281</b>  | <b>9.9</b>          | <b>100.0</b> | <b>19701</b>                 | <b>3.5</b>          | <b>100.0</b> |
| <b>N Primary</b>                   | <b>2841</b> |                     |              | <b>568612</b>                |                     |              |

Note: Prostheses no longer used in 2025 are excluded from the comparator. Procedures using metal/metal prostheses with head size larger than 32mm are excluded from the comparator.

**FIGURE 2****Cumulative Incidence Revision Diagnosis of Primary Total Conventional Hip Replacement**

This figure details the cumulative incidence of the most common reasons for revision. The five most common reasons for revision are included as long as each of these reasons account for more than 10 procedures or at least 5% of all revisions for the Elite Plus total conventional hip prosthesis. A comparative graph is provided of the cumulative incidence for the same reasons for revisions for all other total conventional hip prostheses.

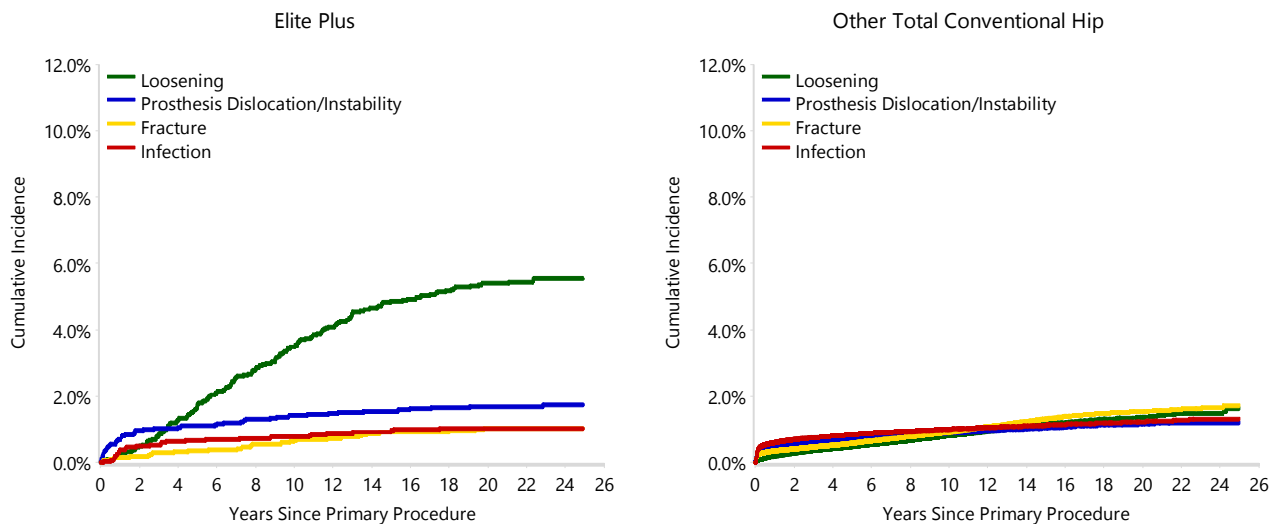
**Figure 2: Cumulative Incidence Revision Diagnosis for Primary Total Conventional Hip Replacement**

TABLE 5

**Type of Revision Performed for Primary Total Conventional Hip Replacement**

This analysis identifies the components used in the revision of the Elite Plus total conventional hip prosthesis and compares it to the components used in the revision of all other total conventional hip prostheses.

The reason this analysis is undertaken is to identify whether there is one or more components which are being replaced that differ from the components replaced for revisions of all other total conventional hip prostheses i.e. is there a difference in the type of revision undertaken for the Elite Plus total conventional hip prosthesis compared to all other total conventional hip prostheses.

**Table 5: Primary Total Conventional Hip Replacement - Type of Revision**

| Type of Revision          | Elite Plus |              | Other Total Conventional Hip |              |
|---------------------------|------------|--------------|------------------------------|--------------|
|                           | Number     | Percent      | Number                       | Percent      |
| Femoral Component         | 119        | 42.3         | 6645                         | 33.7         |
| Acetabular Component      | 43         | 15.3         | 3311                         | 16.8         |
| THR (Femoral/Acetabular)  | 62         | 22.1         | 2305                         | 11.7         |
| Cement Spacer             | 9          | 3.2          | 556                          | 2.8          |
| Removal of Prostheses     | 3          | 1.1          | 93                           | 0.5          |
| Reinsertion of Components |            |              | 27                           | 0.1          |
| Total Femoral             |            |              | 12                           | 0.1          |
| Bipolar Head and Femoral  |            |              | 10                           | 0.1          |
| <b>N Major</b>            | <b>236</b> | <b>84.0</b>  | <b>12959</b>                 | <b>65.8</b>  |
| Head/Insert               | 31         | 11.0         | 5372                         | 27.3         |
| Head Only                 | 6          | 2.1          | 914                          | 4.6          |
| Minor Components          | 6          | 2.1          | 285                          | 1.4          |
| Insert Only               | 2          | 0.7          | 168                          | 0.9          |
| Bipolar Only              |            |              | 1                            | 0.0          |
| Cement Only               |            |              | 1                            | 0.0          |
| Head/Neck/Insert          |            |              | 1                            | 0.0          |
| <b>N Minor</b>            | <b>45</b>  | <b>16.0</b>  | <b>6742</b>                  | <b>34.2</b>  |
| <b>TOTAL</b>              | <b>281</b> | <b>100.0</b> | <b>19701</b>                 | <b>100.0</b> |

Note: Prostheses no longer used in 2025 are excluded from the comparator. Procedures using metal/metal prostheses with head size larger than 32mm are excluded from the comparator.

**TABLE 6****Revision Rates of Elite Plus Primary Total Conventional Hip Replacement by Fixation**

This analysis is provided as some prostheses have more than one fixation option. Additionally there are prostheses where an alternative to the recommended approach to fixation was used e.g. a cementless prosthesis that has been cemented or vice-versa.

**Table 6: Revised Number of Elite Plus Primary Total Conventional Hip Replacement by Fixation**

| Fixation                | N Revised  | N Total     |
|-------------------------|------------|-------------|
| Cemented                | 79         | 834         |
| Cementless              | 0          | 1           |
| Hybrid (Femur Cemented) | 202        | 2006        |
| <b>TOTAL</b>            | <b>281</b> | <b>2841</b> |

**TABLE 7****Revision Rates of Elite Plus Primary Total Conventional Hip Replacement by Bearing Surface**

This analysis is provided as some prostheses are combined with a variety of bearing surfaces. All bearing surfaces used with this prosthesis are listed.

**Table 7: Revised Number of Elite Plus Primary Total Conventional Hip Replacement by Bearing Surface**

| Bearing Surface  | N Revised  | N Total     |
|------------------|------------|-------------|
| Ceramic/Ceramic  | 3          | 36          |
| Ceramic/Non XLPE | 27         | 243         |
| Ceramic/XLPE     | 2          | 61          |
| Metal/Metal      | 2          | 13          |
| Metal/Non XLPE   | 205        | 1811        |
| Metal/XLPE       | 42         | 673         |
| Unknown          | 0          | 4           |
| <b>TOTAL</b>     | <b>281</b> | <b>2841</b> |

TABLE 8

**Revision Rates of Primary Total Conventional Hip Replacement by State**

This enables a state by state variation to be identified for the Elite Plus total conventional hip prosthesis and provides the comparative data for each of the states for all other total conventional hip prostheses.

The purpose of this analysis is to determine if the higher than anticipated rate of revision has widespread distribution between states. If there is widespread distribution then the reason for the higher than anticipated rate of revision is unlikely to be surgeon specific. If the prosthesis has been used in only a small number of states it is not possible to distinguish if the higher than anticipated rate of revision is related to the prosthesis, surgeon, technique or patient.

**Table 8: Revised Number of Primary Total Conventional Hip Replacement by State**

| Component                    | State  | N Revised    | N Total       |
|------------------------------|--------|--------------|---------------|
| Elite Plus                   | NSW    | 72           | 623           |
|                              | VIC    | 81           | 796           |
|                              | QLD    | 77           | 822           |
|                              | WA     | 29           | 295           |
|                              | SA     | 21           | 210           |
|                              | TAS    | 1            | 95            |
| Other Total Conventional Hip | NSW    | 5507         | 167002        |
|                              | VIC    | 4853         | 146558        |
|                              | QLD    | 3968         | 104359        |
|                              | WA     | 2510         | 64946         |
|                              | SA     | 1887         | 52084         |
|                              | TAS    | 439          | 18269         |
|                              | ACT/NT | 537          | 15394         |
| <b>TOTAL</b>                 |        | <b>19982</b> | <b>571453</b> |

Note: Prostheses no longer used in 2025 are excluded from the comparator. Procedures using metal/metal prostheses with head size larger than 32mm are excluded from the comparator.

**TABLE 9****Number of Revisions of Elite Plus Primary Total Conventional Hip Replacement by Year of Implant**

This analysis details the number of prostheses reported each year to the Registry for the Elite Plus total conventional hip prosthesis. It also provides the subsequent number of revisions of the primaries reported in that year.

Primary procedures performed in later years have had less follow up time therefore the number revised is expected to be less than the number revised in earlier years. For example, a primary procedure performed in 2025 has a maximum of one year to be revised, whereas a primary procedure performed in 2023 has a maximum of three years to be revised.

**Table 9: Number of Revisions of Elite Plus Primary Total Conventional Hip Replacement by Year of Implant**

| Year of Implant | Number Revised | Total Number |
|-----------------|----------------|--------------|
| 1999            | 3              | 9            |
| 2000            | 20             | 213          |
| 2001            | 67             | 636          |
| 2002            | 72             | 751          |
| 2003            | 56             | 445          |
| 2004            | 33             | 353          |
| 2005            | 21             | 249          |
| 2006            | 6              | 112          |
| 2007            | 2              | 46           |
| 2008            | 1              | 26           |
| 2011            | 0              | 1            |
| <b>TOTAL</b>    | <b>281</b>     | <b>2841</b>  |

TABLE 10

**Revision Rates of Elite Plus Primary Total Conventional Hip Replacement by Catalogue Number Range**

Many prostheses have a number of catalogue ranges. The catalogue range is specific to particular design features; more than one catalogue range usually indicates a minor difference in design in a particular Elite Plus prosthesis.

This analysis has been undertaken to determine if the revision rate varies according to the catalogue number range.

| Model               | Catalogue Range     | Catalogue Description                         | Cement | Material | Fixation |
|---------------------|---------------------|-----------------------------------------------|--------|----------|----------|
| <b>Femoral Stem</b> |                     |                                               |        |          |          |
| Elite Plus          | 152201000-152214000 | ROUND BACK UNPOLISHED FEMORAL STEM            | YES    | METAL    | MATT     |
| Elite Plus          | 152202000-152205000 | FLANGED UNPOLISHED FEMORAL STEM               | YES    | METAL    | MATT     |
| Elite Plus          | 152206000-152207000 | FLANGED UNPOLISHED LONG FEMORAL STEM          | YES    | METAL    | MATT     |
| Elite Plus          | 152211000-152211000 | CDH UNPOLISHED FEMORAL STEM                   | YES    | METAL    | MATT     |
| Elite Plus          | 152222000-152225000 | FLANGED UNPOLISHED HIGH OFFSET FEMORAL STEM   | YES    | METAL    | MATT     |
| Elite Plus          | 152233000-152233000 | FLANGED UNPOLISHED REVISION FEMORAL STEM      | YES    | METAL    | MATT     |
| Elite Plus          | 152234000-152244000 | FLANGED UNPOLISHED REVISION LONG FEMORAL STEM | YES    | METAL    | MATT     |

**Table 10: Revised Number of Elite Plus Primary Total Conventional Hip Replacement by Catalogue Number Range**

| Femoral Stem Range  | N Revised  | N Total     |
|---------------------|------------|-------------|
| 152201000-152214000 | 46         | 339         |
| 152202000-152205000 | 163        | 1786        |
| 152206000-152207000 | 0          | 2           |
| 152211000-152211000 | 0          | 3           |
| 152222000-152225000 | 71         | 671         |
| 152233000-152233000 | 1          | 8           |
| 152234000-152244000 | 0          | 32          |
| <b>TOTAL</b>        | <b>281</b> | <b>2841</b> |

TABLE 11

**Revision Rates of Elite Plus Primary Total Conventional Hip Replacement by Component**

A prosthesis may be combined with multiple components. This analysis has been undertaken to determine if the revision rate varies according to the component with which it is combined.

**Table 11: Revised Number of Elite Plus Primary Total Conventional Hip Replacement by Acetabular Component**

| Acetabular Component   | N Revised  | N Total     |
|------------------------|------------|-------------|
| ABGII                  | 0          | 5           |
| Allofit                | 0          | 4           |
| Apollo                 | 13         | 52          |
| Brunswick              | 0          | 2           |
| Burch Schneider        | 0          | 1           |
| Charnley               | 5          | 82          |
| Charnley LPW           | 17         | 89          |
| Charnley Ogee          | 16         | 278         |
| Duraloc                | 138        | 1088        |
| Duraloc Option         | 4          | 59          |
| Elite Multi-Cup Ogee   | 0          | 2           |
| Elite Plus LPW         | 10         | 110         |
| Elite Plus Ogee        | 10         | 161         |
| Exeter                 | 0          | 3           |
| Fitmore                | 2          | 81          |
| Hedrocel               | 0          | 3           |
| Interseal              | 0          | 5           |
| Low Profile Cup        | 1          | 20          |
| Lubinus Cup            | 0          | 1           |
| Mallory-Head           | 9          | 125         |
| PINNACLE               | 20         | 307         |
| Reflection (Cup)       | 6          | 16          |
| Reflection (Shell)     | 1          | 13          |
| S-Rom                  | 1          | 2           |
| SPH-Blind              | 0          | 5           |
| Secur-Fit              | 4          | 21          |
| Trabecular Metal (Cup) | 1          | 32          |
| Trident (Shell)        | 19         | 214         |
| Trilogy                | 0          | 41          |
| Vitalock               | 4          | 19          |
| <b>TOTAL</b>           | <b>281</b> | <b>2841</b> |