# Recap/Recap Total Resurfacing Hip Investigation

Note: This analysis compares the Recap/Recap head/acetabular combination with all other total resurfacing hip prostheses.

This combination 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-2020.

## TABLE 1

### Revision Rate of Primary Total Resurfacing Hip Replacement

The revision rate of the Recap/Recap total resurfacing hip combination is compared to all other total resurfacing hip prostheses.

### Table 1: Revision Rates of Primary Total Resurfacing Hip Replacement

| Component | N Revised | N Total | Obs. Years | Revisions/100 Obs. Yrs (95% CI) |
|---|---|---|---|---|
| Recap/Recap | 29 | 196 | 2070 | 1.40 (0.94, 2.01) |
| Other Total Resurfacing Hip | 1818 | 18054 | 196491 | 0.93 (0.88, 0.97) |
| **TOTAL** | **1847** | **18250** | **198561** | **0.93 (0.89, 0.97)** |

## TABLE 2

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

The yearly cumulative percent revision of the Recap/Recap total resurfacing hip combination is compared to all other total resurfacing hip prostheses.

### Table 2: Yearly Cumulative Percent Revision of Primary Total Resurfacing Hip Replacement

| CPR | 1 Yr | 2 Yrs | 3 Yrs | 4 Yrs | 5 Yrs | 6 Yrs |
|---|---|---|---|---|---|---|
| Recap/Recap | 5.1 (2.8, 9.3) | 7.7 (4.7, 12.4) | 8.7 (5.5, 13.6) | 9.7 (6.3, 14.8) | 10.2 (6.7, 15.4) | 10.2 (6.7, 15.4) |
| Other Total Resurfacing Hip | 1.6 (1.5, 1.8) | 2.4 (2.2, 2.7) | 3.1 (2.9, 3.4) | 3.8 (3.6, 4.1) | 4.8 (4.5, 5.2) | 5.8 (5.4, 6.1) |

| CPR | 7 Yrs | 8 Yrs | 9 Yrs | 10 Yrs | 11 Yrs | 12 Yrs |
|---|---|---|---|---|---|---|
| Recap/Recap | 11.3 (7.6, 16.6) | 12.9 (8.9, 18.5) | 13.9 (9.8, 19.7) | 14.5 (10.2, 20.3) | 14.5 (10.2, 20.3) | 14.5 (10.2, 20.3) |
| Other Total Resurfacing Hip | 6.7 (6.3, 7.1) | 7.5 (7.1, 7.9) | 8.2 (7.8, 8.7) | 9.2 (8.8, 9.7) | 9.9 (9.4, 10.4) | 10.6 (10.1, 11.1) |

| CPR | 13 Yrs | 14 Yrs | 15 Yrs | 16 Yrs | 17 Yrs | 18 Yrs | 19 Yrs |
|---|---|---|---|---|---|---|---|
| Recap/Recap | 14.5 (10.2, 20.3) | | | | | | |
| Other Total Resurfacing Hip | 11.5 (10.9, 12.0) | 12.1 (11.5, 12.6) | 12.7 (12.1, 13.3) | 13.3 (12.7, 13.9) | 13.7 (13.1, 14.4) | 14.1 (13.3, 14.8) | 15.2 (14.0, 16.5) |

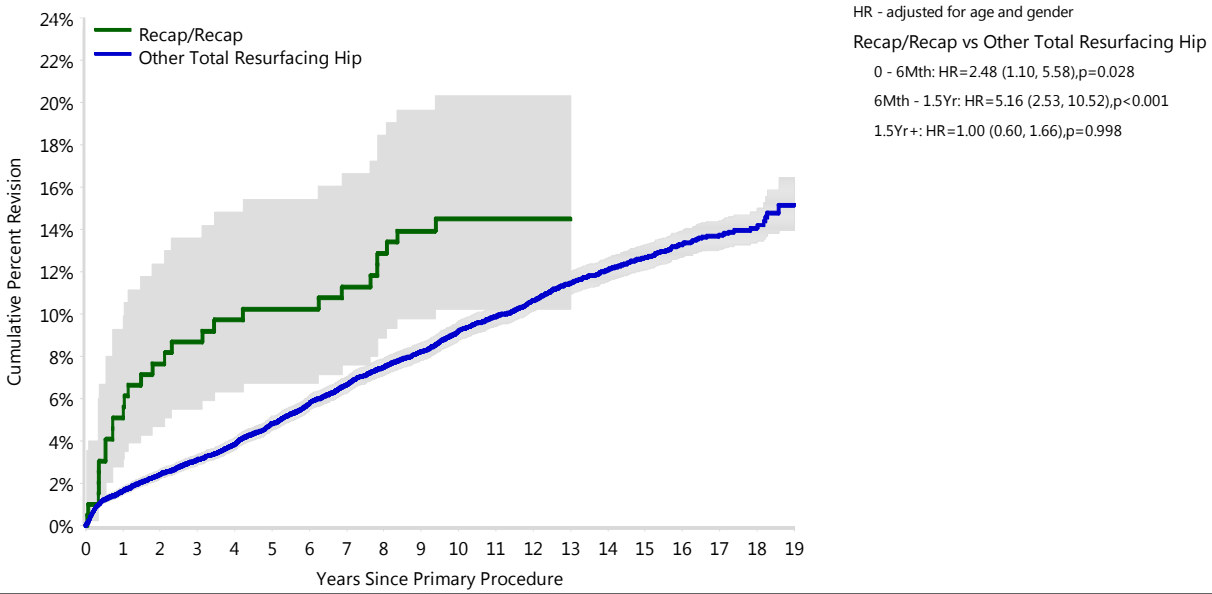
FIGURE 1

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

The yearly cumulative percent revision of the Recap/Recap total resurfacing hip combination is compared to all other total resurfacing 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 Resurfacing Hip Replacement




| Number at Risk | 0 Yr | 1 Yr | 2 Yrs | 3 Yrs | 4 Yrs | 5 Yrs | 6 Yrs | 7 Yrs | 8 Yrs | 9 Yrs |
|---|---|---|---|---|---|---|---|---|---|---|
| Recap/Recap | 196 | 186 | 180 | 177 | 174 | 171 | 171 | 168 | 165 | 159 |
| Other Total Resurfacing Hip | 18054 | 17215 | 16667 | 16130 | 15553 | 14988 | 14416 | 13836 | 13199 | 12490 |

| Number at Risk | 10 Yrs | 11 Yrs | 12 Yrs | 13 Yrs | 14 Yrs | 15 Yrs | 16 Yrs | 17 Yrs | 18 Yrs | 19 Yrs |
|---|---|---|---|---|---|---|---|---|---|---|
| Recap/Recap | 145 | 113 | 74 | 44 | 34 | 23 | 0 | 0 | 0 | 0 |
| Other Total Resurfacing Hip | 11415 | 10224 | 8856 | 7367 | 5847 | 4302 | 2923 | 1701 | 621 | 85 |

TABLE 3

## Primary Diagnosis for Revised Primary Total Resurfacing 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 resurfacing hip prostheses.

### Table 3: Primary Diagnosis for Revised Primary Total Resurfacing Hip Replacement

| | Recap/Recap | | Other Total Resurfacing Hip | |
|---|---|---|---|---|
| Primary Diagnosis | Number | Percent | Number | Percent |
| Osteoarthritis | 29 | 100.0 | 1665 | 91.6 |
| Developmental Dysplasia | | | 89 | 4.9 |
| Osteonecrosis | | | 42 | 2.3 |
| Other Inflammatory Arthritis | | | 11 | 0.6 |
| Rheumatoid Arthritis | | | 9 | 0.5 |
| Other | | | 2 | 0.1 |
| **TOTAL** | **29** | **100.0** | **1818** | **100.0** |

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 Resurfacing Hip Replacement - Reason for Revision (Follow-up Limited to 15.7 Years)

| | Recap/Recap | | | Other Total Resurfacing Hip | | |
|---|---|---|---|---|---|---|
| Revision Diagnosis | Number | % Primaries Revised | % Revisions | Number | % Primaries Revised | % Revisions |
| Metal Related Pathology | 3 | 1.5 | 10.3 | 503 | 2.8 | 28.1 |
| Loosening | 9 | 4.6 | 31.0 | 457 | 2.5 | 25.5 |
| Fracture | 6 | 3.1 | 20.7 | 305 | 1.7 | 17.0 |
| Lysis | 2 | 1.0 | 6.9 | 166 | 0.9 | 9.3 |
| Infection | 3 | 1.5 | 10.3 | 110 | 0.6 | 6.1 |
| Pain | 4 | 2.0 | 13.8 | 105 | 0.6 | 5.9 |
| Osteonecrosis | | | | 43 | 0.2 | 2.4 |
| Prosthesis Dislocation | 1 | 0.5 | 3.4 | 25 | 0.1 | 1.4 |
| Malposition | | | | 23 | 0.1 | 1.3 |
| Instability | | | | 8 | 0.0 | 0.4 |
| Implant Breakage Acetabular | | | | 5 | 0.0 | 0.3 |
| Implant Breakage Head | 1 | 0.5 | 3.4 | 5 | 0.0 | 0.3 |
| Progression Of Disease | | | | 4 | 0.0 | 0.2 |
| Tumour | | | | 4 | 0.0 | 0.2 |
| Wear Acetabulum | | | | 3 | 0.0 | 0.2 |
| Leg Length Discrepancy | | | | 2 | 0.0 | 0.1 |
| Synovitis | | | | 2 | 0.0 | 0.1 |
| Heterotopic Bone | | | | 1 | 0.0 | 0.1 |
| Incorrect Sizing | | | | 1 | 0.0 | 0.1 |
| Other | | | | 19 | 0.1 | 1.1 |
| **N Revision** | **29** | **14.8** | **100.0** | **1791** | **9.9** | **100.0** |
| **N Primary** | **196** | | | **18054** | | |

Note: This table is restricted to revisions within 15.7 years for all groups to allow a time-matched comparison of revisions.

## FIGURE 2

### Cumulative Incidence Revision Diagnosis of Primary Total Resurfacing 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 Recap/Recap total resurfacing hip combination. A comparative graph is provided of the cumulative incidence for the same reasons for revisions for all other total resurfacing hip prostheses.

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

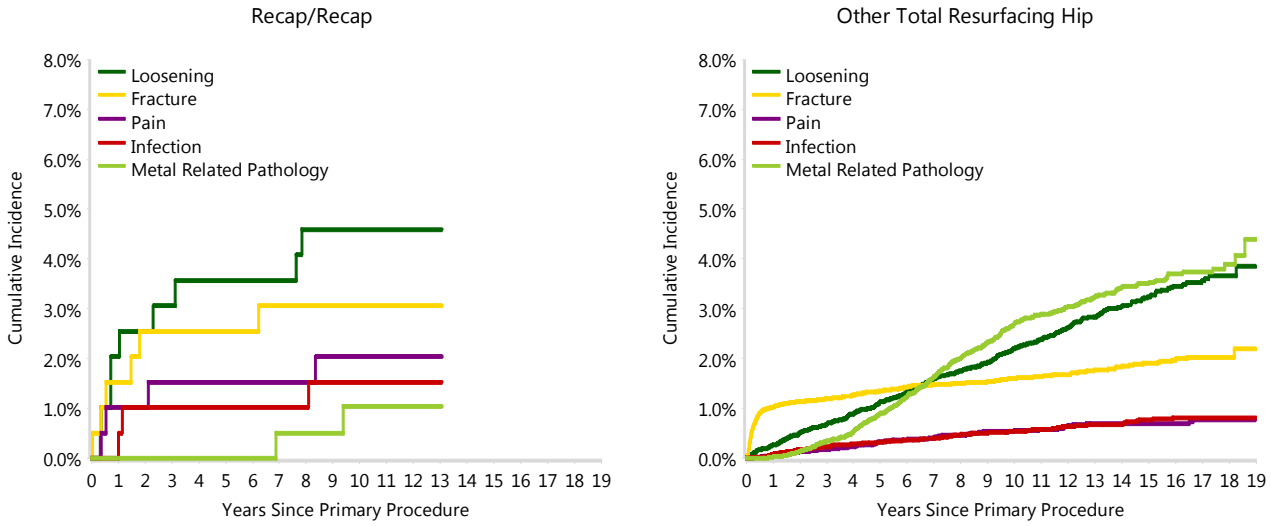


TABLE 5

## Type of Revision Performed for Primary Total Resurfacing Hip Replacement

This analysis identifies the components used in the revision of the Recap/Recap total resurfacing hip combination and compares it to the components used in the revision of all other total resurfacing 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 resurfacing hip prostheses i.e. is there a difference in the type of revision undertaken for the Recap/Recap total resurfacing hip combination compared to all other total resurfacing hip prostheses.

**Table 5: Primary Total Resurfacing Hip Replacement - Type of Revision (Follow-up Limited to 15.7 Years)**

| | Recap/Recap | | Other Total Resurfacing Hip | |
|---|---|---|---|---|
| Type of Revision | Number | Percent | Number | Percent |
| THR (Femoral/Acetabular) | 19 | 65.5 | 1289 | 72.0 |
| Femoral Component | 8 | 27.6 | 403 | 22.5 |
| Acetabular Component | 2 | 6.9 | 50 | 2.8 |
| Cement Spacer | | | 39 | 2.2 |
| Removal of Prostheses | | | 10 | 0.6 |
| **N Major** | **29** | **100.0** | **1791** | **100.0** |
| **TOTAL** | **29** | **100.0** | **1791** | **100.0** |

Note: This table is restricted to revisions within 15.7 years for all groups to allow a time-matched comparison of revisions.

## TABLE 6

### Revision Rates of Recap/Recap Primary Total Resurfacing 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: Revision Rates of Recap/Recap Primary Total Resurfacing Hip Replacement by Fixation

| Fixation | N Revised | N Total | Obs. Years | Revisions/100 Obs. Yrs (95% CI) |
|---|---|---|---|---|
| Cemented | 0 | 2 | 26 | 0.00 (0.00, 14.25) |
| Cementless | 1 | 3 | 19 | 5.24 (0.13, 29.21) |
| Hybrid (Femur Cemented) | 28 | 191 | 2025 | 1.38 (0.92, 2.00) |
| **TOTAL** | **29** | **196** | **2070** | **1.40 (0.94, 2.01)** |

## TABLE 7

### Revision Rates of Primary Total Resurfacing Hip Replacement by State

This enables a state by state variation to be identified for the Recap/Recap total resurfacing hip combination and provides the comparative data for each of the states for all other total resurfacing 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 7: Revision Rates of Primary Total Resurfacing Hip Replacement by State

| Component | State | N Revised | N Total | Obs. Years | Revisions/100 Obs. Yrs (95% CI) |
|---|---|---|---|---|---|
| Recap/Recap | NSW | 9 | 70 | 758 | 1.19 (0.54, 2.26) |
| | VIC | 19 | 120 | 1266 | 1.50 (0.90, 2.34) |
| | QLD | 1 | 6 | 47 | 2.15 (0.05, 11.96) |
| Other Total Resurfacing Hip | NSW | 518 | 5393 | 58699 | 0.88 (0.81, 0.96) |
| | VIC | 541 | 5876 | 70247 | 0.77 (0.71, 0.84) |
| | QLD | 282 | 3657 | 34143 | 0.83 (0.73, 0.93) |
| | WA | 73 | 881 | 7332 | 1.00 (0.78, 1.25) |
| | SA | 324 | 1408 | 16743 | 1.94 (1.73, 2.16) |
| | TAS | 17 | 105 | 1177 | 1.44 (0.84, 2.31) |
| | ACT/NT | 63 | 734 | 8151 | 0.77 (0.59, 0.99) |
| **TOTAL** | | **1847** | **18250** | **198561** | **0.93 (0.89, 0.97)** |

## TABLE 8

### Number of Revisions of Recap/Recap Primary Total Resurfacing Hip Replacement by Year of Implant

This analysis details the number of prostheses reported each year to the Registry for the Recap/Recap total resurfacing hip combination. 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 2019 has a maximum of one year to be revised, whereas a primary procedure performed in 2017 has a maximum of three years to be revised.

### Table 8: Number of Revisions of Recap/Recap Primary Total Resurfacing Hip Replacement by Year of Implant

| Year of Implant | Number Revised | Total Number |
|---|---|---|
| 2004 | 2 | 27 |
| 2005 | 3 | 14 |
| 2006 | 2 | 10 |
| 2007 | 10 | 42 |
| 2008 | 4 | 46 |
| 2009 | 4 | 38 |
| 2010 | 4 | 16 |
| 2011 | 0 | 3 |
| **TOTAL** | **29** | **196** |

TABLE 9

## Revision Rates of Recap/Recap Primary Total Resurfacing 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 Recap/Recap 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 | Coating | Fixation |
|---|---|---|---|---|---|---|
| **Head** | | | | | | |
| Recap | 157238-157260 | RESURFACING FEMORAL HEAD CEMENTED | YES | METAL | | |
| Recap | US157138-US157160 | RESURFACING FEMORAL HEAD PRESS FIT POROUS COAT COCRMO/TI6AL4V | NO | METAL | | |
| **Acetabular** | | | | | | |
| Recap | 130846HA-130868HA | COCR TI HA OVERSIZE SHELL | NO | METAL | HA COATED | POROUS |
| Recap | 157844-157866 | METAL ON METAL PF ACETABULAR SHELL | NO | METAL | | |
| Recap | 157944-157966 | RECAP/MAGNUM POROUS HA | NO | METAL | | |

### Table 9: Revision Rates of Recap/Recap Primary Total Resurfacing Hip Replacement by Catalogue Number Range

| Head Range | Acetabular Range | N Revised | N Total | Obs. Years | Revisions/100 Obs. Yrs (95% CI) |
|---|---|---|---|---|---|
| 157238-157260 | 130846HA-130868HA | 0 | 1 | 12 | 0.00 (0.00, 31.46) |
| | 157844-157866 | 6 | 42 | 572 | 1.05 (0.38, 2.28) |
| | 157944-157966 | 22 | 150 | 1466 | 1.50 (0.94, 2.27) |
| US157138-US157160 | 157944-157966 | 1 | 3 | 19 | 5.24 (0.13, 29.21) |
| **TOTAL** | | **29** | **196** | **2070** | **1.40 (0.94, 2.01)** |