

# **MARCQI 2012-2016 report chapter 4 and 5 specifications**

# Chapter 4. Total hip arthroplasty statistics, devices, and revisions

**Figure 8: Primary THA cases over time.**

Description of figure	Line drawing showing cumulative THA cases (primary + revision) over time by year.
Inclusion criteria	All primary THA cases, including conversion and resurfacing
Exclusion criteria	All TKA cases
Time window	2/15/2012 to 12/31/16
Analytical file format	Long

**Figure 9: Percent of THA arthroplasty cases by primary or revision.**

Description of figure	This is a pie chart that gives the percentage of primary and revision THA cases. It is used to give the reader a general sense of this breakdown before we clearly state that the rest of the chapter will focus on primary procedures and – where appropriate – time to first revision.
Inclusion criteria	All THA cases
Exclusion criteria	All TKA cases
Time window	2/15/2012 to 12/31/16
Analytical file format	Long

**Figure 10: Percent of primary THA cases by sex.**

Description of figure	Percent of primary THA cases by sex.
Inclusion criteria	All primary THA cases
Exclusion criteria	(1) TKA cases, (2) revision hip cases, (3) UKA cases, (4) PFJ cases
Time window	2/15/2012 to 12/31/16
Analytical file format	wide

**Figure 11: Age distribution of primary THA cases by sex.**

Description of figure	Histogram showing percentage breakdown of THA cases by sex over age. X-axis is age. Plot three lines: male, female, and unknown. Unknown may be so small we should exclude it (approx. 0.06% overall). Denominator for each line is the number of that sex. For example, the point at 20 years of age for males would be the number of males aged 20 divided by the total number of males.
Inclusion criteria	All primary THA cases, including conversion and resurfacing
Exclusion criteria	(1) All TKA cases, (2) revision THA cases
Time window	2/15/2012 to 12/31/16
Analytical file format	wide

**Figure 12: Percent of primary THA cases by approach.**

Description of figure	Bar chart. Percent of THA cases using approach. Categories are: anterior, anterolateral, posterior, transtrochanteric, and unknown/other
Inclusion criteria	All primary THA cases, including conversion and resurfacing
Exclusion criteria	(1) All TKA cases, (2) revision THA cases
Time window	2/15/2012 to 12/31/16
Analytical file format	wide

**Figure 13: Percent of primary THA cases by diagnosis.**

Description of figure	Bar chart showing percent of THA cases by diagnosis. Categories include: avascular necrosis, diagnosis coding missing, error, excluded cases, inflammatory arthritis, osteoarthritis, other, post-infection arthritis, revision diagnosis, secondary arthritis, and traumatic arthritis.
Inclusion criteria	All primary THA cases, including conversion and resurfacing
Exclusion criteria	(1) All TKA cases, (2) revision THA cases
Time window	2/15/2012 to 12/31/16
Analytical file format	wide

**Figure 14: Percent of primary THA cases by ASA class.**

Description of figure	Bar chart showing percent of THA cases by ASA class. Categories are ASA I, ASA II, ASA III, ASA IV, ASA V, and Unknown
Inclusion criteria	All primary THA cases, including conversion and resurfacing
Exclusion criteria	(1) All TKA cases, (2) revision THA cases
Time window	2/15/2012 to 12/31/16
Analytical file format	wide

**Figure 15: Percent of primary THA patients (frist case) by thrombosis prophylaxis between 10/1/2016 and 12/31/2016 (this time window is shorter than the rest of figures because of significant change over time).**

Description of figure	Pie chart showing percent of patients (frist case) by thrombosis prophylaxis. Categories include aspirin, anticoagulation, and both. Note “none” category included.
Inclusion criteria	All primary THA cases being the first primary THA case for each patient, including conversion and resurfacing. Note this means
Exclusion criteria	(1) All TKA cases, (2) revision THA cases, (3) primary THA cases that are not the first primary THA for the patient
Time window	10/1/16 to 12/31/16 (last three months of 2016)
Analytical file format	wide

**Figure 16: Percent of primary THA cases by procedure.**

Description of figure	Percent of THA cases by type of procedure. Categories include conventional, conversion, and resurfacing.
Inclusion criteria	All primary THA cases, including conversion and resurfacing
Exclusion criteria	(1) All TKA cases, (2) revision THA cases
Time window	10/1/15 to 12/31/16
Analytical file format	wide
Note	Data element for this was changed in January of 2015 to include conversion.

**Table 1: Ten most commonly used femoral components in primary total conventional THA.**

Description of figure	Top 10 most commonly used femoral THA components used in primary conventional THA cases.
Inclusion criteria	All primary conventional THA cases, including conversions
Exclusion criteria	(1) All TKA cases, (2) revision THA cases, and (3) resurfacing THA cases
Time window	2/15/2012 to 12/31/16
Analytical file format	wide

**Table 2: Ten most commonly used acetabular components in primary total conventional THA.**

Description of figure	Top 10 most commonly used acetabular shells used in primary conventional THA cases.
Inclusion criteria	All primary conventional THA cases, including conversions
Exclusion criteria	(1) All TKA cases, (2) revision THA cases, (3) resurfacing THA cases
Time window	2/15/2012 to 12/31/16
Analytical file format	wide

**Table 3: Ten most commonly used femoral/acetabular component combinations used in primary total conventional THA.**

Description of figure	Top ten most commonly used stem/cup combinations used in primary conventional THA cases.
Inclusion criteria	All primary conventional THA cases, including conversions
Exclusion criteria	(1) All TKA cases, (2) revision THA cases, (3) resurfacing THA cases
Time window	2/15/2012 to 12/31/16
Analytical file format	wide

**Figure 17: Percentage of polyethylene liners by type of polyethylene for primary conventional THA.**

Description of figure	Distribution of type of polyethylene in liners used in primary conventional THA cases.
Inclusion criteria	All primary conventional THA cases, including conversions
Exclusion criteria	All TKA cases, (2) revision THA cases, and (3) resurfacing THA cases
Time window	2/15/2012 to 12/31/16
Analytical file format	wide

**Figure 18: Percentage of bearing surface couple for primary conventional THA.**

Description of figure	Percentage of bearing surface couple for conventional hip replacement, including MoP, CoP, CoC and dual mobility
Inclusion criteria	All primary conventional THA cases, including conversions
Exclusion criteria	All TKA cases, (2) revision THA cases, and (3) resurfacing THA cases
Time window	2/15/2012 to 12/31/16
Analytical file format	wide

**Figure 19: Distribution of head sizes for primary conventional THA, excluding dual mobility cases.**

Description of figure	Distribution of head sizes for primary conventional THA.
Inclusion criteria	All primary conventional THA cases (including conversions) but not including dual mobility cases.
Exclusion criteria	All TKA cases, (2) revision THA cases, and (3) resurfacing THA cases, (5) dual mobility cases.
Time window	2/15/2012 to 12/31/16
Analytical file format	wide

**Table 4: Most common reasons for first revision following primary conventional THA.**

Description of figure	Reasons for first revision following primary THA
Inclusion criteria	All first revision cases following primary conventional THA, including conversions
Exclusion criteria	(1) TKA cases, (2) revision THA cases after first revision, (3) resurfacing cases
Time window	2/15/2012 to 12/31/16 for primary and 1/1/14 to 12/31/16 for 1 <sup>st</sup> revision.
Analytical file format	wide

**Table 5: Most common reasons for first revision following primary conventional THA in first year post-operatively.**

Description of figure	Reasons for first revision following primary THA for revisions occurring within 365 days of the primary procedure
Inclusion criteria	All first revision cases following primary conventional THA (including conversions) performed within 365 days of the primary procedure
Exclusion criteria	(1) TKA cases, (2) revision THA cases after first revision, (3) resurfacing cases
Time window	2/15/2012 to 12/31/16 for primary and 1/1/14 to 12/31/16 for 1 <sup>st</sup> revision.
Analytical file format	wide

**Table 6: Most common reasons for first revision following primary conventional THA in second year post-operatively.**

Description of figure	Reasons for first revision following primary THA for revisions occurring between 366 and 730 days of the primary procedure
Inclusion criteria	All first revision cases following primary conventional THA (including conversions) performed between 366 days and within 730 days of the primary procedure
Exclusion criteria	(1) TKA cases, (2) revision THA cases after first revision, (3) resurfacing cases
Time window	2/15/2012 to 12/31/16 for primary and 1/1/14 to 12/31/16 for 1 <sup>st</sup> revision.
Analytical file format	wide

**Table 7: Most common reasons for first revision following primary conventional THA in third year post-operatively.**

Description of figure	Reasons for first revision following primary THA for revisions occurring within 731 days of the primary procedure
Inclusion criteria	All first revision cases following primary conventional THA (including conversions) performed between 731 days and within 1095 days of the primary procedure
Exclusion criteria	(1) TKA cases, (2) revision THA cases after first revision, (3) resurfacing cases
Time window	2/15/2012 to 12/31/16 for primary and 1/1/14 to 12/31/16 for 1 <sup>st</sup> revision.
Analytical file format	wide

**Figure 20: Most common reasons for first revision following primary conventional THA (Pareto chart).**

Description of figure	Reasons for first revision following primary THA
Inclusion criteria	All first revision cases following primary conventional THA (including conversions)
Exclusion criteria	(1) TKA cases, (2) revision THA cases after first revision, (3) resurfacing cases
Time window	2/15/2012 to 12/31/16 for primary and 1/1/14 to 12/31/16 for 1 <sup>st</sup> revision.
Analytical file format	wide

**Figure 21: Cumulative percent revision for primary conventional THA.**

Description of figure	CPR curve for all primary conventional THA cases.
Inclusion criteria	All primary conventional THA cases, including conversions
Exclusion criteria	All TKA cases, (2) revision THA cases, and (3) resurfacing THA cases
Time window	2/15/2012 to 12/31/16
Analytical file format	wide



**Table 8: Cumulative percent revision for primary conventional THA (numerical values).**

Description of figure	CPR curve for all primary conventional THA cases.
Inclusion criteria	All primary conventional THA cases, including conversions
Exclusion criteria	All TKA cases, (2) revision THA cases, and (3) resurfacing THA cases
Time window	2/15/2012 to 12/31/16
Analytical file format	wide

**Figure 22: Cumulative percent revision for primary conventional THA by diagnosis.**

Description of figure	CPR curves for OA vs non-OA (one curve for each)
Inclusion criteria	All primary conventional THA cases, including conversions
Exclusion criteria	All TKA cases, (2) revision THA cases, and (3) resurfacing THA cases
Time window	2/15/2012 to 12/31/16
Analytical file format	wide

**Table 9: Cumulative percent revision for primary conventional THA by diagnosis (numerical values).**

Description of figure	CPR data for OA vs non-OA (one curve for each) in tabular format.
Inclusion criteria	All primary conventional THA cases, including conversions
Exclusion criteria	(1) All TKA cases, (2) revision THA cases, and (3) resurfacing THA cases
Time window	2/15/2012 to 12/31/16
Analytical file format	wide

**Figure 23: Cumulative percent revision for primary conventional THA by sex for osteoarthritis diagnosis.**

Description of figure	CPR curve for primary conventional THA cases having OA diagnosis by sex. There are two lines and corresponding CI's: male and female.
Inclusion criteria	All primary conventional THA cases, including conversions
Exclusion criteria	(1) All TKA cases, (2) revision THA cases, and (3) resurfacing THA cases
Time window	2/15/2012 to 12/31/16
Analytical file format	wide

**Table 10: Cumulative percent revision for primary conventional THA by sex for osteoarthritis diagnosis (numerical values).**

Description of figure	CPR curve for primary conventional THA cases having OA diagnosis by sex.
Inclusion criteria	All primary conventional THA cases, including conversions
Exclusion criteria	(1) All TKA cases, (2) revision THA cases, and (3) resurfacing THA cases
Time window	2/15/2012 to 12/31/16
Analytical file format	wide

**Table 11: Summary of cumulative percent revision for stem/cup combinations having at least 500 cases, sorted alphabetically.**

Description of figure	CPR data for stem/cup combinations having more than 500 cases. This should be ordered alphabetically.
Inclusion criteria	All conventional primary THA cases having at least 500 primary cases, including conversions
Exclusion criteria	(1) THA resurfacing cases, (2) THA revision cases, (2) TKA cases, (3) fewer than 500 cases having each specific stem/cup combination
Time window	2/15/2012 to 12/31/16
Analytical file format	wide

## ***Revision risk for implant combinations***

This section contains Figures 24 through 40 and Tables 12 through 96.

It reports on each stem/cup implant combination having 500 or more cases. Each set of two pages (for each implant) will follow the same format, which is described below.

The two pages begins with information on surgeon and hospital volume for this implant combination. The table below shows the criteria used for this text.

Description of figure	Top ten most commonly used stem/cup combinations used in primary conventional THA cases.
Inclusion criteria	All primary conventional THA cases, including conversions
Exclusion criteria	(1) All TKA cases, (2) revision THA cases, and (3) resurfacing THA cases
Time window	2/15/2012 to 12/31/16
Analytical file format	wide

**Caption: Cumulative percent revision curve for <Cup>/<Stem> combination compared to all conventional THA implants (numerical values).**

Description of figure	<p>This figure presents the cumulative percent revision (CPR), which is 100 minus the Kaplan-Meier estimate of survival curve for time-to-revision data for this implant. It presents two lines:</p> <ol style="list-style-type: none"> <li>1. CPR for cup/stem combination under specific consideration (pink), with pink 95% confidence interval shading</li> <li>2. CPR for all conventional hips (blue), with light blue 95% confidence interval shading</li> </ol>
Inclusion criteria	<p>Inclusion:</p> <ol style="list-style-type: none"> <li>1. Line 1 above, the inclusion should be all primary THA cases (including conversions) done in the data window that use the cup/stem combination being presented. For example, if we are analyzing the Accolade II/Trident combination than for a case to be included it would need to have an Accolade II stem <i>and</i> Trident cup and be a primary THA case (conventional doesn't need to be specified here because it is redundant with the use of Accolade II/Trident).</li> <li>2. For line 2 above, the inclusion criteria should be all primary conventional THA cases, including conversions. This should be determined by the procedure coding.</li> </ol>
Exclusion criteria	<p>Exclusion: (1) revision cases, (2) cases not using this stem/cup combination, (3) case done after the end of the data window. This means:</p> <ol style="list-style-type: none"> <li>1. Line 1 above, all TKA cases, all THA resurfacing cases, THA revision cases, any THA case that does not use either the stem or cup under consideration</li> <li>2. For line 2 above, all TKA cases, all THA revision cases, and THA resurfacing cases</li> </ol>
Time window	2/15/2012 to 12/31/16
Analytical file format	wide

**Caption: Cumulative percent revision for <Stem>/<Cup> combination compared to all other conventional THA implants (numerical values).**

Description of figure	This table gives the CPR for this stem/cup combination at 1, 2, and 3 years. It also gives the number of cases, N.
Inclusion criteria	All conventional THA cases, including conversions
Exclusion criteria	(1) All TKA cases, (2) revision THA cases, and (3) resurfacing THA cases
Time window	2/15/2012 to 12/31/16
Analytical file format	wide

**Caption: Descriptive statistics on cases receiving <Stem>/<Cup> combination.**

Description of figure	Descriptive statistics for those patients having this stem/cup combination.
Inclusion criteria	Primary THA cases using this stem/cup combination, including conversions
Exclusion criteria	(1) revision THA cases, (2) primary THA cases not using this stem/cup combination, (3) THA resurfacing cases, (4) TKA cases
Time window	2/15/2012 to 12/31/16
Analytical file format	wide

**Caption: Distribution of head size for <Stem>/<Cup> combination.**

Description of figure	This is a histogram of the sizes of heads used with this stem/cup combination. Head size is given in mm. Note that a head size of 22.25 mm should be lumped with 22 mm.
Inclusion criteria	All primary THA cases using this stem/cup combination (including conversions) but does not include dual mobility cases
Exclusion criteria	(1) revision THA cases, (2) primary THA cases not using this stem/cup combination, (3) THA resurfacing cases, (4) TKA cases, (5) dual mobility cases
Time window	2/15/2012 to 12/31/16
Analytical file format	wide

**Caption: Bearing surface for <Stem>/<Cup> combination.**

Description of figure	This table gives the breakdown of bearing surface combinations in percentages.
Inclusion criteria	Primary THA cases (including conversions) using this stem/cup combination.
Exclusion criteria	(1) revision THA cases, (2) primary THA cases not using this stem/cup combination, (3) THA resurfacing cases, (4) TKA cases
Time window	2/15/2012 to 12/31/16
Analytical file format	wide

**Caption: Distribution of approach used for <Stem>/<Cup> combination.**

Description of figure	This table gives the percentage breakdown of approaches used for cases using this stem/cup combination.
Inclusion criteria	Primary THA cases using this stem/cup combination, including conversions
Exclusion criteria	(1) revision THA cases, (2) primary THA cases not using this stem/cup combination, (3) THA resurfacing cases, (4) TKA cases
Time window	2/15/2012 to 12/31/16
Analytical file format	wide

## Chapter 5. Total knee arthroplasty statistics, devices, and revisions

**Figure 41: All knee cases over time.**

Description of figure	All knee cases over time. There should be one line on this plot. Because this should go back to 2012 and the procedure coding changed in 2015, we should not specify what kind of cases these are. This is just to show growth for knees over time.
Inclusion criteria	(1) THA cases, (2) UKA cases, (3) PFJ cases, (4) other knee cases,
Exclusion criteria	
Time window	2/15/2012 to 12/31/16
Analytical file format	long

**Figure 42: Percent of knee arthroplasty cases by primary or revision.**

Description of figure	This is a pie chart that gives the percentage of primary and revision knee cases. It is used to give the reader a general sense of this breakdown before we clearly state that the rest of the chapter will focus on primary procedures and – where appropriate – time to first revision.
Inclusion criteria	Primary and all revision knee cases (TKA, UKA, PFJ, other). Note: this includes all revisions, not just first revisions.
Exclusion criteria	THA cases
Time window	2/15/2012 to 12/31/16
Analytical file format	Long

**Figure 43: Percent of primary TKA cases performed as TKA, UKA, PFJ.**

Description of figure	Percent of primary knee cases performed as TKA, UKA, PFJ
Inclusion criteria	All primary TKA, UKA, PFJ, other knee cases
Exclusion criteria	(1) THA cases, (2) all revision knee cases
Time window	2/15/2012 to 12/31/16
Analytical file format	wide

**Figure 44: Primary TKA cases over time.**

Description of figure	Primary TKA cases over time. There should be one line on this plot: number of primary cases over time. Because this should go back to 2012 and the procedure coding changed in 2015, we should not specify what kind of cases these are. This is just to show primary case growth for knees over time.
Inclusion criteria	primary TKA cases
Exclusion criteria	(1) THA cases, (2) UKA cases, (3) PFJ cases, (4) other knee cases, (4) revision knee arthroplasty cases.
Time window	2/15/2012 to 12/31/16
Analytical file format	wide

**Figure 45: Percent of primary TKA cases by sex.**

Description of figure	Percent of primary TKA cases by sex.
Inclusion criteria	All primary TKA cases
Exclusion criteria	(1) THA cases, (2) revision knee cases, (3) UKA cases, (4) PFJ cases
Time window	2/15/2012 to 12/31/16
Analytical file format	wide



**Figure 46: Age distribution of primary TKA cases by sex.**

Description of figure	Histogram showing percentage breakdown of TKA cases by sex over age. X-axis is age. Plot three lines: male, female, and unknown. Unknown may be so small we should exclude it (approx. 0.06% overall). Denominator for each line is the number of that sex. For example, the point at 20 years of age for males would be the number of males aged 20 divided by the total number of males.
Inclusion criteria	All primary TKA cases
Exclusion criteria	(2) All THA cases, (2) revision TKA cases, (3) UKA cases, (4) PFJ cases
Time window	2/15/2012 to 12/31/16
Analytical file format	wide

**Figure 47: Percent of primary TKA cases by approach.**

Description of figure	Percent of primary TKA cases using approach.
Inclusion criteria	All primary TKA cases
Exclusion criteria	(1) THA cases, (2) revision knee cases, (3) UKA cases, (4) PFJ cases
Time window	2/15/2012 to 12/31/16
Analytical file format	wide

**Figure 48: Percent of primary TKA cases by diagnosis.**

Description of figure	Percent of primary TKA cases by diagnosis.
Inclusion criteria	All primary TKA cases
Exclusion criteria	(1) THA cases, (2) revision knee cases, (3) UKA cases, (4) PFJ cases
Time window	2/15/2012 to 12/31/16
Analytical file format	wide

**Figure 49: Percent of primary TKA cases by ASA class.**

Description of figure	Percent of primary TKA cases by ASA class.
Inclusion criteria	All primary TKA cases
Exclusion criteria	(1) THA cases, (2) revision knee cases, (3) UKA cases, (4) PFJ cases
Time window	2/15/2012 to 12/31/16
Analytical file format	wide

**Figure 50: Percent of primary TKA patients (first case) by thrombosis prophylaxis between 10/1/2016 and 12/31/2016 (this time window is shorter than the rest of figures because of significant change over time).**

Description of figure	Percent of primary TKA patients (first case) by thrombosis pharmacoprophylaxis.
Inclusion criteria	All primary TKA cases being the first primary TKA case for each patient
Exclusion criteria	(1) THA cases, (2) revision knees cases, (3) UKA cases, (4) PFJ cases, (5) primary TKA cases that are not the first primary TKA for the patient
Time window	10/1/16 to 12/31/16 (last three months of 2016)
Analytical file format	wide

**Table 97: Ten most commonly used femoral components in primary TKA.**

Description of figure	Ten most commonly used femoral components in primary TKA.
Inclusion criteria	All primary TKA cases
Exclusion criteria	(1) THA cases, (2) revision knee cases, (3) UKA cases, (4) PFJ cases
Time window	2/15/2012 to 12/31/16
Analytical file format	wide

**Table 98: Ten most commonly used tibial components in primary TKA.**

Description of figure	Ten most commonly used tibial components in primary
Inclusion criteria	All primary TKA cases
Exclusion criteria	(1) THA cases, (2) revision knee cases, (3) UKA cases, (4) PFJ cases
Time window	2/15/2012 to 12/31/16
Analytical file format	wide

**Table 99: Ten most commonly used femoral/tibial component combinations in primary TKA.**

Description of figure	Ten most commonly used femoral/tibial component combinations in primary TKA.
Inclusion criteria	All primary TKA cases
Exclusion criteria	(1) THA cases, (2) revision knee cases, (3) UKA cases, (4) PFJ cases
Time window	2/15/2012 to 12/31/16
Analytical file format	wide

**Figure 51: Percentage of polyethylene inserts by type of polyethylene in primary TKA.**

Description of figure	Percentage of polyethylene inserts by type of polyethylene in primary TKA.
Inclusion criteria	All primary TKA cases
Exclusion criteria	(1) THA cases, (2) revision knee cases, (3) UKA cases, (4) PFJ cases
Time window	2/15/2012 to 12/31/16
Analytical file format	wide

**Table 100: Most common reasons for first revision following primary TKA.**

Description of figure	Reasons for first revision following primary TKA
Inclusion criteria	All first revision cases following primary TKA
Exclusion criteria	(1) THA cases, (2) PFJ cases, (3) UKA cases, (4) other knee cases, (5) primary knee cases
Time window	2/15/2012 to 12/31/16 for primary and 1/1/14 to 12/31/16 for 1 <sup>st</sup> revision.
Analytical file format	wide

**Table 101: Most common reasons for first revision following TKA in first year post-operatively.**

Description of figure	Reasons for first revision following primary TKA for revisions occurring within 365 days of the primary procedure
Inclusion criteria	All first revision cases following primary TKA performed within 365 days of the primary procedure
Exclusion criteria	(1) THA cases, (2) PFJ cases, (3) UKA cases, (4) other knee cases, (5) primary knee cases, (6) revision performed more than 1 year later than primary
Time window	2/15/2012 to 12/31/16 for primary and 1/1/14 to 12/31/16 for 1 <sup>st</sup> revision.
Analytical file format	wide

**Table 102: Most common reasons for first revision following TKA in second year post-operatively.**

Description of figure	Reasons for first revision following primary TKA for revisions occurring between 366 and 730 days of the primary procedure
Inclusion criteria	All first revision cases following primary TKA performed between 366 days and within 730 days of the primary procedure
Exclusion criteria	(1) THA cases, (2) PFJ cases, (3) UKA cases, (4) other knee cases, (5) primary knee cases, (6) revision performed more than 1 year later than primary
Time window	2/15/2012 to 12/31/16 for primary and 1/1/14 to 12/31/16 for 1 <sup>st</sup> revision.
Analytical file format	wide

**Table 103: Most common reasons for first revision following TKA in third year post-operatively.**

Description of figure	Reasons for first revision following primary TKA for revisions occurring within 731 days of the primary procedure
Inclusion criteria	All first revision cases following primary TKA performed between 731 days and within 1095 days of the primary procedure
Exclusion criteria	(1) THA cases, (2) PFJ cases, (3) UKA cases, (4) other knee cases, (5) primary knee cases, (6) revision performed more than 1 year later than primary
Time window	2/15/2012 to 12/31/16 for primary and 1/1/14 to 12/31/16 for 1 <sup>st</sup> revision.
Analytical file format	wide

**Figure 52: Most common reasons for first revision following primary TKA (Pareto chart).**

Description of figure	Reasons for first revision following primary TKA
Inclusion criteria	All first revision cases following primary TKA
Exclusion criteria	(1) THA cases, (2) PFJ cases, (3) UKA cases, (4) other knee cases, (5) primary knee cases
Time window	2/15/2012 to 12/31/16 for primary and 1/1/14 to 12/31/16 for 1 <sup>st</sup> revision.
Analytical file format	wide

**Table 104: Cumulative percent revision for primary TKA (numerical values).**

Description of figure	Cumulative percent revision for primary TKA.
Inclusion criteria	All primary TKA cases, with notation of whether a first revision occurred and the time-to-first-revision data.
Exclusion criteria	(1) THA cases, (2) UKA cases, (3) PFJ cases. Note: Revision cases don't have separate record in the wide format; the first revision data (event and time from primary) are included as data elements.
Time window	2/15/2012 to 12/31/16
Analytical file format	wide

**Figure 54: Cumulative percent revision for primary TKA by diagnosis.**

Description of figure	Cumulative percent revision for primary TKA by diagnosis.
Inclusion criteria	All primary TKA cases, with data on first revision event and time-to-first-revision as data fields.
Exclusion criteria	(1) THA cases, (2) UKA cases, (3) PFJ cases. Note: Revision cases don't have separate record in the wide format; the first revision data (event and time from primary) are included as data elements.
Time window	2/15/2012 to 12/31/16
Analytical file format	wide

**Table 105: Cumulative percent revision for primary TKA by diagnosis (numerical values).**

Description of figure	Cumulative percent revision for primary TKA by diagnosis.
Inclusion criteria	All primary TKA cases, with data on first revision event and time-to-first-revision as data fields.
Exclusion criteria	(1) THA cases, (2) UKA cases, (3) PFJ cases. Note: Revision cases don't have separate record in the wide format; the first revision data (event and time from primary) are included as data elements.
Time window	2/15/2012 to 12/31/16
Analytical file format	wide

**Figure 55: Cumulative percent revision for primary TKA by sex for osteoarthritis diagnosis.**

Description of figure	Cumulative percent revision for primary TKA by sex for OA diagnosis.
Inclusion criteria	All primary TKA cases having a diagnosis of OA, with notation of whether a first revision occurred and the time-to-first-revision data.
Exclusion criteria	(1) diagnosis other than OA, (2) UKA cases, (3) PFJ cases, (4) THA cases. Note: Revision cases don't have separate record in the wide format; the first revision data (event and time from primary) are included as data elements.
Time window	2/15/2012 to 12/31/16
Analytical file format	wide

**Table 106: Cumulative percent revision for primary TKA by sex for osteoarthritis diagnosis (numerical values).**

Description of figure	Cumulative percent revision for primary TKA by sex for OA diagnosis.
Inclusion criteria	All primary TKA cases having a diagnosis of OA, with notation of whether a first revision occurred and the time-to-first-revision data.
Exclusion criteria	(1) diagnosis other than OA, (2) UKA cases, (3) PFJ cases, (4) THA cases. Note: Revision cases don't have separate record in the wide format; the first revision data (event and time from primary) are included as data elements.
Time window	2/15/2012 to 12/31/16
Analytical file format	wide

**Table 107: Cumulative percent revision for femoral/tibial combinations having at least 500 primary cases, sorted alphabetically.**

Description of figure	Summary of CPR for femoral/tibial combinations having at least 500 primary cases.
Inclusion criteria	All primary UKA cases for implant combinations having at least 500 primary cases, with notation of whether a first revision occurred and the time-to-first-revision data.
Exclusion criteria	(1) THA cases, (2) UKA cases, (3) PFJ cases, (4) not having at least 500 primary cases using each femoral/tibial component pair listed in the table. Note: Revision cases don't have separate record in the wide format; the first revision data (event and time from primary) are included as data elements.
Time window	2/15/2012 to 12/31/16
Analytical file format	wide

### ***Implant-specific revision risk***

This portion of the report contains Figure 56 through 76 and Tables 108 through 170.

It reports on each femoral/tibial implant combination having 500 or more cases. Each set of two pages (for each implant) will follow the same format, which is described below.

The two pages begins with information on surgeon and hospital volume for this implant combination. The table below shows the criteria used for this text.

Description of figure	This will just be text rather than a figure or table. The text would be located in the right column to fill up some of the white space.
Inclusion criteria	All primary TKA cases
Exclusion criteria	(1) THA cases, (2) revision knee cases, (3) UKA cases, (4) PFJ cases, (5) other
Time window	2/15/2012 to 12/31/16
Analytical file format	Wide



**Caption: Cumulative percent revision curve for <Femur>/<Tibia> combination compared to all other TKA implants.**

Description of figure	<p>This figure presents the cumulative percent revision (CPR), which is 100 minus the Kaplan-Meier estimate of survival curve for time-to-revision data for this implant. It presents two lines:</p> <ol style="list-style-type: none"> <li>1. CPR for femur/tibia combination under specific consideration (pink), with pink 95% confidence interval shading.</li> <li>2. CPR for all TKA's (blue) not using this femur/tibia combination, with light blue 95% confidence interval shading.</li> </ol> <p>Note: this means we are doing a comparison to all other TKA cases and not including UKA or PFJ cases in this comparison group.</p>
Inclusion criteria	<p>Line 1. Inclusion criteria for this line: primary TKA cases done that use the femur/tibia combination being presented if there are at least 500 cases of this combination. For example, if we are analyzing the LCS PS/LCS combination than for a case to be included it would need to have an LCS PS femoral component <i>and</i> LCS tibial component and be a primary TKA.</p> <p>Line 2. Inclusion criteria for this line: primary TKA cases done that do not use the femur/tibia combination being presented.</p>
Exclusion criteria	<p>Line 1. Exclusion criteria for this line: (1) THA cases, (2) primary TKA cases not using this combination, (2) UKA cases, (3) PFJ cases, (4) cases done outside, (5) less than 500 cases using this combination.</p> <p>Line 2. Exclusion criteria for this line: (1) THA cases, (2) UKA cases, (3) PFJ cases, (3) TKA revision cases, (4) any primary TKA case that does not use either the femur or tibial components under consideration.</p>
Time window	2/15/2012 to 12/31/16
Analytical file format	wide

**Caption: Cumulative percent revision for <Femur>/<Tibia> combination compared to all other TKA implants (numerical values).**

Description of figure	This table gives the CPR for this femur/tibia combination at 1, 2, and 3 years for femur/tibia combinations having at least 500 cases. It also gives the number of cases, N.
Inclusion criteria	All primary TKA cases using this femur/tibia combination if there are at least 500 of these combinations. Note first revision data (event and time-to-revision) are included as data elements.
Exclusion criteria	(1) THA cases, (2) TKA cases not using this femur/tibia combination, (3) UKA cases, (4) PFJ cases, (5) less than 500 cases having this femur/tibia combination
Time window	2/15/2012 to 12/31/16
Analytical file format	wide

**Caption: Descriptive statistics on cases using <Femur>/<Tibia> combination.**

Description of figure	Descriptive statistics for those patients using this femur/tibia combination.
Inclusion criteria	Primary TKA cases using this femur/tibia combination.
Exclusion criteria	(1) all revision knee cases, (2) primary TKA cases not using this femur/tibia combination, (3) UKA cases, (4) PFJ cases, (5) THA cases.
Time window	2/15/2012 to 12/31/16
Analytical file format	wide

**Caption: Distribution of approach used for <Femur>/<Tibia> combination.**

Description of figure	This table gives the percentage breakdown of approaches used for cases using this femur/tibia combination.
Inclusion criteria	Primary TKA cases using this femur/tibia combination.
Exclusion criteria	(1) revision THA cases, (2) primary TKA cases not using this femur/tibia combination, (3) UKA cases, (4) PFJ cases, (5) THA cases.
Time window	2/15/2012 to 12/31/16
Analytical file format	wide

**Figure 77: Primary UKA cases over time.**

Description of figure	UKA primary and revision cases over time. There should be one line on this plot: number of primary UKA cases over time.
Inclusion criteria	All UKA cases
Exclusion criteria	(1) THA cases, (2) TKA cases, (3), PJF cases, (4) all revision knee cases
Time window	2/15/2012 to 12/31/16
Analytical file format	wide

**Figure 78: Age distribution of primary TKA cases by sex.**

Description of figure	Histogram showing percentage breakdown of TKA cases by sex over age. X-axis is age. Plot three lines: male, female, and unknown. Unknown may be so small we should exclude it (approx. 0.06% overall). Denominator for each line is the number of that sex. For example, the point at 20 years of age for males would be the number of males aged 20 divided by the total number of males.
Inclusion criteria	All primary TKA cases
Exclusion criteria	(1) All THA cases, (2) revision TKA cases, (3) UKA cases, (4) PFJ cases
Time window	2/15/2012 to 12/31/16
Analytical file format	wide

**Figure 79: Percent of primary UKA cases by sex.**

Description of figure	Percent of primary UKA cases by sex.
Inclusion criteria	All primary UKA cases
Exclusion criteria	(1) THA cases, (2) TKA cases, (3) PFJ cases, (4) all revision knee cases.
Time window	2/15/2012 to 12/31/16
Analytical file format	wide

**Figure 80: Percent of primary UKA cases by approach.**

Description of figure	Percent of primary UKA cases using approach.
Inclusion criteria	All primary UKA cases
Exclusion criteria	(1) THA cases, (2) UKA cases, (3) PFJ cases, (4) all revision knee cases.
Time window	wide

**Figure 81: Percent of primary UKA cases by diagnosis.**

Description of figure	Percent of primary UKA cases by diagnosis.
Inclusion criteria	All primary UKA cases
Exclusion criteria	(1) THA cases, (2) TKA cases, (3) PFJ cases, (4) all revision knee cases.
Time window	2/15/2012 to 12/31/16
Analytical file format	wide

**Figure 82: Percent of primary UKA cases by ASA class.**

Description of figure	Percent of primary UKA cases by ASA class.
Inclusion criteria	All primary UKA cases
Exclusion criteria	(1) THA cases, (2) TKA cases, (3) PFJ cases, (4) all revision knee cases.
Time window	2/15/2012 to 12/31/16
Analytical file format	wide

**Figure 83: Percent of primary UKA patients (first case) by thrombosis pharmacoprophylaxis between 10/1/2016 and 12/31/2016 (this time window is shorter than rest of figures because of significant change over time).**

Description of figure	Percent of primary UKA patients (first case) by thrombosis pharmacoprophylaxis.
Inclusion criteria	All primary TKA cases being the first primary UKA case for each patient
Exclusion criteria	(1) THA cases, (2) TKA cases, (3) PFJ cases, (4) all revision knee cases, (5) primary UKA cases that are not the first primary UKA case for the patient
Time window	10/1/16 to 12/31/16 (last three months of 2016)
Analytical file format	wide

**Table 171: Ten most commonly used femoral components in primary UKA.**

Description of figure	Ten most commonly used femoral components in primary UKA replacement.
Inclusion criteria	All primary UKA cases
Exclusion criteria	(1) THA cases, (2) UKA cases, (4) PFJ cases, (5) all revision knee cases.
Time window	2/15/2012 to 12/31/16
Analytical file format	wide

**Table 172: Ten most commonly used tibial components in primary UKA.**

Description of figure	Ten most commonly used femoral components in primary TKA replacement.
Inclusion criteria	All primary UKA cases
Exclusion criteria	(1) THA cases, (2) TKA cases, (3) PFJ cases, (4) all revision knee cases.
Time window	2/15/2012 to 12/31/16
Analytical file format	wide

**Table 173: Ten most commonly used femoral/tibial component combinations in primary UKA.**

Description of figure	Ten most commonly used femoral components in primary TKA replacement.
Inclusion criteria	All primary UKA cases
Exclusion criteria	(1) THA cases, (2) TKA cases, (3) PFJ cases, (4) all revision knee cases.
Time window	2/15/2012 to 12/31/16
Analytical file format	wide

**Figure 84: Percentage of polyethylene inserts by type of polyethylene in primary UKA.**

Description of figure	Percentage of polyethylene inserts by type of polyethylene in primary UKA.
Inclusion criteria	All primary UKA cases
Exclusion criteria	(1) THA cases, (2) revision UKA cases, (3) TKA cases, (4) PFJ cases
Time window	2/15/2012 to 12/31/16
Analytical file format	wide

**Table 174: Most common reasons for first revision following primary UKA.**

Description of figure	Reasons for first revision following primary UKA
Inclusion criteria	All first revision cases following primary UKA
Exclusion criteria	(1) THA cases, (2) PFJ cases, (3) TKA cases, (4) other knee cases, (5) primary knee cases
Time window	2/15/2012 to 12/31/16 for primary and 1/1/14 to 12/31/16 for 1 <sup>st</sup> revision.
Analytical file format	wide

**Table 175: Most common reasons for first revision following UKA in first year post-operatively.**

Description of figure	Reasons for first revision following primary UKA for revisions occurring within 365 days of the primary procedure
Inclusion criteria	All first revision cases following primary UKA performed within 365 days of the primary procedure
Exclusion criteria	(1) THA cases, (2) PFJ cases, (3) TKA cases, (4) other knee cases, (5) primary knee cases, (6) revision performed more than 1 year later than primary
Time window	2/15/2012 to 12/31/16 for primary and 1/1/14 to 12/31/16 for 1 <sup>st</sup> revision.
Analytical file format	wide

**Table 176: Most common reasons for first revision following UKA in second year post-operatively.**

Description of figure	Reasons for first revision following primary UKA for revisions occurring between 366 and 730 days of the primary procedure
Inclusion criteria	All first revision cases following primary UKA performed between 365.5 days and within 731 ( $\leq 731$ ) days of the primary procedure
Exclusion criteria	(1) THA cases, (2) PFJ cases, (3) TKA cases, (4) other knee cases, (5) primary knee cases, (6) revision performed more than 1 year later than primary
Time window	2/15/2012 to 12/31/16 for primary and 1/1/14 to 12/31/16 for 1 <sup>st</sup> revision.
Analytical file format	wide

**Table 177: Most common reasons for first revision following UKA in third year post-operatively.**

Description of figure	Reasons for first revision following primary UKA for revisions occurring within 731 days of the primary procedure
Inclusion criteria	All first revision cases following primary UKA performed between 731 days (>731) and within 1095 days (<=1095) of the primary procedure.
Exclusion criteria	(1) THA cases, (2) PFJ cases, (3) TKA cases, (4) other knee cases, (5) primary knee cases, (6) revision performed more than 1 year later than primary
Time window	2/15/2012 to 12/31/16 for primary and 1/1/14 to 12/31/16 for 1 <sup>st</sup> revision.
Analytical file format	wide

**Figure 85: Most common reasons for first revision following primary UKA (Pareto chart).**

Description of figure	Reasons for first revision following primary UKA
Inclusion criteria	All first revision cases following primary UKA
Exclusion criteria	(1) THA cases, (2) PFJ cases, (3) TKA cases, (4) other knee cases, (5) primary knee cases
Time window	2/15/2012 to 12/31/16 for primary and 1/1/14 to 12/31/16 for 1 <sup>st</sup> revision.
Analytical file format	wide

**Figure 86: Cumulative percent revision for primary UKA.**

Description of figure	Cumulative percent revision for primary UKA.
Inclusion criteria	All primary UKA cases, with notation of whether a first revision occurred and the time-to-first-revision data.
Exclusion criteria	(1) THA cases, (2) TKA cases, (3) PFJ cases, (4) all revision knee cases. Note: Revision cases don't have separate record in the wide format; the first revision data (event and time from primary) are included as data elements.
Time window	2/15/2012 to 12/31/16
Analytical file format	wide

**Table 178: Cumulative percent revision for primary UKA (numerical values).**

Description of figure	Cumulative percent revision for primary UKA.
Inclusion criteria	All primary UKA cases, with notation of whether a first revision occurred and the time-to-first-revision data.
Exclusion criteria	(1) THA cases, (2) TKA cases, (3) PFJ cases, (4) all revision knee cases. Note: Revision cases don't have separate record in the wide format; the first revision data (event and time from primary) are included as data elements.
Time window	2/15/2012 to 12/31/16
Analytical file format	wide

**Figure 87: Cumulative percent revision for primary UKA by sex for osteoarthritis diagnosis.**

Description of figure	Cumulative percent revision for primary UKA by sex for OA diagnosis.
Inclusion criteria	All primary TKA cases having a diagnosis of OA in the data window, with notation of whether a first revision occurred and the time-to-first-revision data.
Exclusion criteria	(1) diagnosis other than OA, (2) TKA cases, (3) PFJ cases, (4) THA cases, (5) all revision knee cases. Note: Revision cases don't have separate record in the wide format; the first revision data (event and time from primary) are included as data elements.
Time window	2/15/2012 to 12/31/16
Analytical file format	wide

**Table 179: Cumulative percent revision for primary UKA by sex for osteoarthritis diagnosis (numerical values).**

Description of figure	Cumulative percent revision for primary UKA by sex for OA diagnosis.
Inclusion criteria	All primary TKA cases having a diagnosis of OA in the data window, with notation of whether a first revision occurred and the time-to-first-revision data.
Exclusion criteria	(1) diagnosis other than OA, (2) TKA cases, (3) PFJ cases, (4) THA cases, (5) all revision knee cases. Note: Revision cases don't have separate record in the wide format; the first revision data (event and time from primary) are included as data elements.
Time window	2/15/2012 to 12/31/16
Analytical file format	wide



**Table 180: Summary of cumulative percent revision for femoral/tibial combinations in primary UKA having at least 500 cases, sorted alphabetically.**

Description of figure	Summary of CPR for femoral/tibial combinations having at least 500 primary cases.
Inclusion criteria	All primary UKA cases for implant combinations having at least 500 primary cases, with notation of whether a first revision occurred and the time-to-first-revision data.
Exclusion criteria	(1) THA cases, (2) TKA cases, (3) PFJ cases, (4) not having at least 500 primary cases using each femoral/tibial component pair listed in the table. Note: Revision cases don't have separate record in the wide format; the first revision data (event and time from primary) are included as data elements.
Time window	2/15/2012 to 12/31/16
Analytical file format	wide

### ***Implant-specific revision risk***

The UKA section on implant revision risk contains Figures 88 through 90 and Tables 181 through 189.

It reports on each femoral/tibial implant combination having 500 or more cases. Each set of two pages (for each implant) will follow the same format, which is described below.

The two pages begins with information on surgeon and hospital volume for this implant combination. The table below shows the criteria used for this text.

Description of figure	This will just be text rather than a figure or table. The text would be located in the right column to fill up some of the white space.
Inclusion criteria	All primary UKA cases
Exclusion criteria	(1) THA cases, (2) revision knee cases, (3) TKA cases, (4) PFJ cases, (5) other
Time window	2/15/2012 to 12/31/16
Analytical file format	Wide

**Caption: Cumulative percent revision curve for <Femur>/<Tibia> combination compared to all other UKA implants.**

Description of figure	<p>This figure presents the cumulative percent revision (CPR), which is 100 minus the Kaplan-Meier estimate of survival curve for time-to-revision data for this implant. It presents two lines:</p> <ol style="list-style-type: none"> <li>1. CPR for femur/tibia combination under specific consideration (pink), with pink 95% confidence interval shading.</li> <li>2. CPR for all TKA's (blue) not using this femur/tibia combination, with light blue 95% confidence interval shading.</li> </ol> <p>Note: this means we are doing a comparison to all other UKA cases and not including TKA or PFJ cases in this comparison group.</p>
Inclusion criteria	<p>Line 1. Inclusion criteria for this line: primary UKA cases done that use the femur/tibia combination being presented. For example, if we are analyzing the Oxford 3/Oxford combination than for a case to be included it would need to have an Oxford 3 femoral component <i>and</i> Oxford tibial component and be a primary UKA.</p> <p>Line 2. Inclusion criteria for this line: primary UKA cases done that do not use the femur/tibia combination being presented.</p>
Exclusion criteria	<p>Line 1. Exclusion criteria for this line: (1) THA cases, (2) primary UKA cases not using this combination, (2) TKA cases, (3) PFJ cases.</p> <p>Line 2. Exclusion criteria for this line: (1) THA cases, (2) TKA cases, (3) PFJ cases, (4) UKA revision cases, (5) any primary UKA case that does not use either the femur or tibial components under consideration.</p>
Time window	2/15/2012 to 12/31/16
Analytical file format	wide

**Caption: Cumulative percent revision for <Femur>/<Tibia> combination compared to all other UKA implants (numerical values).**

Description of figure	This table gives the CPR for this femur/tibia combination at 1, 2, and 3 years. It also gives the number of cases, N.
Inclusion criteria	All primary UKA cases using this femur/tibia combination. Note first revision data (event and time-to-revision) are included as data elements.
Exclusion criteria	(1) THA cases, (2) UKA cases not using this femur/tibia combination, (3) TKA cases, (4) PFJ cases.
Time window	2/15/2012 to 12/31/16
Analytical file format	wide

**Caption: Descriptive statistics on cases receiving <Femur>/<Tibia> combination.**

Description of figure	Descriptive statistics for those patients having this femur/tibia combination.
Inclusion criteria	Primary UKA cases using this femur/tibia combination.
Exclusion criteria	(1) revision UKA cases, (2) primary UKA cases not using this femur/tibia combination, (3) TKA cases, (4) PFJ cases, (5) THA cases.
Time window	2/15/2012 to 12/31/16
Analytical file format	wide

**Caption: Distribution of approaches used for <Femur>/<Tibia> combination.**

Description of figure	This table gives the percentage breakdown of approaches used for cases using this femur/tibia combination.
Inclusion criteria	Primary UKA cases using this femur/tibia combination.
Exclusion criteria	(1) revision UKA cases, (2) primary UKA cases not using this femur/tibia combination, (3) TKA cases, (4) PFJ cases, (5) THA cases.
Time window	2/15/2012 to 12/31/16
Analytical file format	wide