## Appendix I: list of included devices and corresponding manufacturers

**Hip stems:**

<table>
<thead>
<tr>
<th>Trade name</th>
<th>Manufacturer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accolade II</td>
<td>Stryker</td>
</tr>
<tr>
<td>Stelia stem</td>
<td>Stemcup medical product</td>
</tr>
<tr>
<td>QUADRA</td>
<td>Medacta</td>
</tr>
<tr>
<td>MiniHip</td>
<td>Corin</td>
</tr>
<tr>
<td>Filler 3ND</td>
<td>Biotechni</td>
</tr>
<tr>
<td>COLLO-MIS</td>
<td>LimaCorporate</td>
</tr>
<tr>
<td>C-Stem AMT Total Hip System</td>
<td>DePuy Synthes</td>
</tr>
<tr>
<td>BiContact Cementless</td>
<td>Braun</td>
</tr>
<tr>
<td>Avenir</td>
<td>Zimmer Biomet</td>
</tr>
<tr>
<td>Alloclassic Zweymuller SL</td>
<td>Zimmer Biomet</td>
</tr>
</tbody>
</table>

**Hip cups:**

<table>
<thead>
<tr>
<th>Trade name</th>
<th>Manufacturer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Versafit CC Trio</td>
<td>Medacta</td>
</tr>
<tr>
<td>RM pressfit Vitamys</td>
<td>Mathys</td>
</tr>
<tr>
<td>POLARCUPTM Cemented</td>
<td>Smith &amp; Nephew</td>
</tr>
<tr>
<td>Plasmacup SC</td>
<td>Braun</td>
</tr>
<tr>
<td>IP X-LINKed acetabular cup</td>
<td>Waldemar Link</td>
</tr>
<tr>
<td>Exceed ABT Cup</td>
<td>Zimmer Biomet</td>
</tr>
<tr>
<td>EcoFit Cementless</td>
<td>Implantcast</td>
</tr>
<tr>
<td>Cenator</td>
<td>Corin</td>
</tr>
<tr>
<td>aneXys</td>
<td>Mathys</td>
</tr>
<tr>
<td>ANA.NOVA cup</td>
<td>Implantec</td>
</tr>
</tbody>
</table>

**Knee systems:**

<table>
<thead>
<tr>
<th>Trade name</th>
<th>Manufacturer</th>
</tr>
</thead>
<tbody>
<tr>
<td>LCS Complete</td>
<td>DePuy Synthes</td>
</tr>
</tbody>
</table>
NexGen CR
ACS Unc, Unicondylar
balanSys CR
Logic RBK
Optetrak CR
Sigma High Performance Partial Knee
TREKKING CR
Vanguard CR
Innex Gender

Zimmer Biomet
Implantcast
Mathys
Exactech
Exactech
DePuy Synthes
Samo
Zimmer Biomet
Zimmer Biomet
Appendix II: searches conducted

This document lists all the searches conducted for each device with screenshots showing exactly what was entered into the search database. The title of each section contains the device name and the date on which the search was conducted. The following table summarises the information by device.

<table>
<thead>
<tr>
<th>Implant type</th>
<th>Implant name</th>
<th>Date of search</th>
<th>Embase</th>
<th>Pubmed</th>
<th>Web Science of</th>
<th>N after deduplication</th>
<th>N other sources</th>
<th>N included</th>
</tr>
</thead>
<tbody>
<tr>
<td>hip stem</td>
<td>Accolade II</td>
<td>29/09/2021</td>
<td>48</td>
<td>21</td>
<td>25</td>
<td>73</td>
<td>0</td>
<td>12</td>
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<tr>
<td>hip stem</td>
<td>Alloclassic Zweymuller SL</td>
<td>20/09/2021</td>
<td>121</td>
<td>114</td>
<td>97</td>
<td>317</td>
<td>1</td>
<td>19</td>
</tr>
<tr>
<td>hip stem</td>
<td>Avenir</td>
<td>15/09/2021</td>
<td>20</td>
<td>11</td>
<td>51</td>
<td>80</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>hip stem</td>
<td>BiContact Cementless</td>
<td>05/10/2021</td>
<td>102</td>
<td>48</td>
<td>43</td>
<td>118</td>
<td>3</td>
<td>8</td>
</tr>
<tr>
<td>hip stem</td>
<td>COLLO-MIS</td>
<td>27/09/2021</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>hip stem</td>
<td>C-Stem AMT Total Hip System</td>
<td>08/10/2021</td>
<td>69</td>
<td>31</td>
<td>34</td>
<td>80</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>hip stem</td>
<td>Filler 3ND</td>
<td>15/11/2021</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>hip stem</td>
<td>MiniHip</td>
<td>07/10/2021</td>
<td>17</td>
<td>9</td>
<td>19</td>
<td>27</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td>hip stem</td>
<td>QUADRA</td>
<td>20/09/2021</td>
<td>28</td>
<td>4</td>
<td>24</td>
<td>53</td>
<td>1</td>
<td>7</td>
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<td>hip stem</td>
<td>Stelia stem</td>
<td>15/11/2021</td>
<td>0</td>
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<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>hip cup</td>
<td>ANA.NOVA cup</td>
<td>04/01/2021</td>
<td>5</td>
<td>2</td>
<td>29</td>
<td>33</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>hip cup</td>
<td>aneXys</td>
<td>30/12/2021</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>hip cup</td>
<td>Cenator</td>
<td>30/12/2021</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>hip cup</td>
<td>EcoFit Cementless</td>
<td>30/12/2021</td>
<td>13</td>
<td>4</td>
<td>3</td>
<td>14</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Procedure</td>
<td>Device</td>
<td>Date</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>Total</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-------------------</td>
<td>-------------------</td>
<td>------------</td>
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<td>---</td>
<td>----</td>
<td>-------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hip cup</td>
<td>Exceed ABT Cup</td>
<td>30/12/2021</td>
<td>35</td>
<td>8</td>
<td>31</td>
<td>62</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hip cup</td>
<td>IP X-LINKed acetabular cup</td>
<td>04/01/2022</td>
<td>14</td>
<td>3</td>
<td>37</td>
<td>50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hip cup</td>
<td>Plasmacup SC</td>
<td>04/01/2022</td>
<td>14</td>
<td>2</td>
<td>2</td>
<td>14</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hip cup</td>
<td>Versafit CC Trio</td>
<td>30/12/2021</td>
<td>29</td>
<td>2</td>
<td>2</td>
<td>30</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hip cup</td>
<td>RM pressfit vitamys</td>
<td>01/02/2022</td>
<td>24</td>
<td>15</td>
<td>19</td>
<td>30</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Knee</td>
<td>ACS Unc, Unicondylar</td>
<td>12/10/2021</td>
<td>6</td>
<td>9</td>
<td>7</td>
<td>12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Knee</td>
<td>balanSys CR</td>
<td>12/10/2021</td>
<td>15</td>
<td>7</td>
<td>7</td>
<td>16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Knee</td>
<td>Innex Gender</td>
<td>12/10/2021</td>
<td>22</td>
<td>8</td>
<td>10</td>
<td>30</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Knee</td>
<td>LCS Complete</td>
<td>12/10/2021</td>
<td>48</td>
<td>18</td>
<td>22</td>
<td>60</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Knee</td>
<td>Logic RBK</td>
<td>17/12/2021</td>
<td>77</td>
<td>136</td>
<td>78</td>
<td>241</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Knee</td>
<td>NexGen CR</td>
<td>14/10/2021</td>
<td>371</td>
<td>132</td>
<td>113</td>
<td>385</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Knee</td>
<td>Optettrak CR</td>
<td>08/12/2021</td>
<td>25</td>
<td>14</td>
<td>13</td>
<td>24</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Knee</td>
<td>Sigma High Performance Partial Knee</td>
<td>13/10/2021</td>
<td>37</td>
<td>7</td>
<td>7</td>
<td>44</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Knee</td>
<td>TREKKING CR</td>
<td>14/10/2021</td>
<td>13</td>
<td>7</td>
<td>18</td>
<td>23</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Knee</td>
<td>Vanguard CR</td>
<td>14/10/2021</td>
<td>211</td>
<td>61</td>
<td>77</td>
<td>248</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Total             | 1432 | 687 | 782 | 2131 | 11 | 151 |


Hip stem searches
Quadra 20th September 2021

Embase: 28

PubMed: 4

Web of Science: 24

Avenir 15th September 2021
Embase: 20

PubMed: 11
(avenir) AND (hip)

Web of Science
51 results from Web of Science Core Collection for:

11 results

Filters applied: Humans. Clear all

Web of Science: 97

PubMed: 114

Filters applied: Humans, from 1976 - 2006. Clear all

Web of Science: 51
COLLO-MIS 27th September 2021

Embase: 3

PubMed: 0

The following term was not found in PubMed: collo-mis

Showing results for ((collo mis OR collo-mis OR colloidis) AND (hip)) AND (humans[MeSH Terms])

Your search for ((collo mis OR collo-mis OR colloidis) AND (hip)) AND (humans[MeSH Terms]) retrieved no results

Web of Science: 0
Accolade II: 29th September 2021
Embase: 48
(#1 was hip.mp, #2 was accolade II.mp, missing in image below)

PubMed: 21
(((accolade II OR accolade 2) AND (hip)) AND (humans[MeSH Terms])) AND
(\"2002/01/01\"[Date - Publication] : \"3000\"[Date - Publication]))

Web of Science: 25
Bicontact: 5th October 2021

Embase: 102

PubMed: 48

(((bi-contact OR bicontact) AND (hip)) AND (humans[MeSH Terms])) AND ("1978"[Date - Publication] : "2018"[Date - Publication]))

Web of Science: 43

Minihip 7th October 2021

Embase: 17

PubMed: 9

(((minihip OR mini-hip) AND (hip)) AND (humans[MeSH Terms])) AND ("1998"[Date - Publication] : "3000"[Date - Publication]))
Web of Science: 19

CSTEM 8th October 2021
Embase 69

PubMed: 31

Web of Science: 34

Filler 3ND 15th November 2021
Searches were not restricted by date or to humans as no results were returned)
Embase 0

PubMed: 0
It returns 8 but none of them include the phrases.

Web of Science: 0

Stelia 15th November 2021

Embase: 0

PubMed: 0
Cup searches

Versafit 30th December 2021

**Embase:** 29

(((versafit OR versafitcup) AND (hip)) AND (humans[MeSH Terms]) AND ("1994"[Date-Publication] : "3000"[Date-Publication]))

**PubMed:** 2

(((versafit OR versafitcup) AND (hip)) AND (humans[MeSH Terms])) AND (stella) AND (hip)

Your search for (stella) AND (hip) retrieved no results
Web of Science: 2
2 results from Science Citation Index Expanded (SCI-EXPANDED), Social Sciences Citation Index (SSCI), Arts & Humanities Citation Index (A&HCI), Book Citation Index - Science (BKCI-S), Book Citation Index - Social Sciences & Humanities (BKCI-SSH), Emerging Sources Citation Index (ESCI), Current Chemical Reactions (CCR-EXPANDED), Index Chemicus (IC):

Polar cup cemented 30th December 2021

Embase 14

PubMed: 2
((polarcup) AND (hip)) AND (humans[MeSH Terms]) AND (("2004"[Date - Publication] : "3000"[Date - Publication]))

Web of Science: 2
2 results from Science Citation Index Expanded (SCI-EXPANDED), Social Sciences Citation Index (SSCI), Arts & Humanities Citation Index (A&HCI), Book Citation Index - Science (BKCI-S), Book Citation Index - Social Sciences & Humanities (BKCI-SSH), Emerging Sources Citation Index (ESCI), Current Chemical Reactions (CCR-EXPANDED), Index Chemicus (IC):

Plasmacup 30th December 2021

Embase: 62

PubMed: 13
(((plasmacup) AND (hip)) AND (humans[MeSH Terms])) AND ("1987"[Date - Publication] : "2017"[Date - Publication]))

Web of Science: 12

Exceed ABT 30th December 2021

Embase 35

PubMed: 8
“advance bearing technology” does not match anything so pubmed changes the search to not quote it. It was therefore not searched.

(((exceed AND ABT) OR (exceed AND zimmer)) AND (hip)) AND ("1996"[Date - Publication] : "2025"[Date - Publication]))
Web of Science: 31
"advance bearing technology" also gives no results

PubMed: 1
(((anexys) AND (hip)) AND (humans[MeSH Terms])) AND ("2005"[Date - Publication] : "3000"[Date - Publication]))

Web of Science: 2
One of them is the one from pubmed and embase
Cenator 30th December 2021

Embase: 2

PubMed: 0

Web of Science: 0

Ecofit 30th December 2021

Embase: 13
PubMed: 4
(((ecofit) AND (hip)) AND (humans[MeSH Terms])) AND ("1997"[Date - Publication] : "3000"[Date - Publication]))

Web of Science: 3
3 results from Science Citation Index Expanded (SCI-EXPANDED), Social Sciences Citation Index (SSCI), Arts & Humanities Citation Index (A&HCI), Book Citation Index – Science (BKCI-S), Book Citation Index – Social Sciences & Humanities (BKCI-SSH), Emerging Sources Citation Index (ESCI), Current Chemical Reactions (CCR-EXPANDED), Index Chemicals (IC):

Embase: 14
4th Jan 2022

PubMed: 3
(((Link AND IP) AND (hip)) AND (humans[MeSH Terms])) AND ("2000"[Date - Publication] : "3000"[Date - Publication]))

Web of Science: 37
37 results from Science Citation Index Expanded (SCI-EXPANDED), Social Sciences Citation Index (SSCI), Arts & Humanities Citation Index (A&HCI), Book Citation Index – Science (BKCI-S), Book Citation Index – Social Sciences & Humanities (BKCI-SSH), Emerging Sources Citation Index (ESCI), Current Chemical Reactions (CCR-EXPANDED), Index Chemicals (IC):

Link IP

Optimisation of the drill-in behaviour of the EcoFit SC threaded cup
ANA.NOVA 4th Jan 2022

Embase: 5

“alpha cup” not found
“ana.nova” not found

(((ana AND nova) OR (ana nova)) AND (hip)) AND (humans[MeSH Terms]) AND ((("2003"[Date - Publication] : "3000"[Date - Publication]))

PubMed: 2

Web of Science: 29

RM pressfit vitamys 22nd Jan 2022
(Mathys)
Just searched RM pressfit as vitamys is a particular type

CE-marking date from Olga in “Re: Update and another question” of 2009

Embase: 24
PubMed: 15
((RM AND (pressfit OR press-fit)) AND (humans[MeSH Terms])) AND ("1999"[Date - Publication] : "3000"[Date - Publication]))

Web of Science: 19

Knee searches
Balansys CR 12th October 2021
Embase: 15

PubMed: 7
((balansys) AND (knee)) AND (humans[MeSH Terms])) AND ("1988"[Date - Publication] : "3000"[Date - Publication]))
Web of Science: 7

Sigma high performance partial knee 13th October

Embase: 37

PubMed: 7

(((knee) AND (uni OR UKA OR unicomp* OR unicond* OR "high performance")) AND (sigma)) AND (humans[MeSH Terms]) AND ("2000"[Date - Publication] : "3000"[Date - Publication]))
Web of Science: 7

(((innex) AND (knee)) AND (humans[MeSH Terms])) AND ("1996"[Date - Publication] : "3000"[Date - Publication]))

Vanguard 14th October 2021

Embase: 211
PubMed: 61
(((knee) AND (vanguard)) AND (humans[MeSH Terms])) AND ("1993"[Date - Publication] : "3000"[Date - Publication])

Web of Science: 77
Trekking CR 14th October 2021

Embase: 13

PubMed: 7
((trekking) AND (knee)) AND (humans[MeSH Terms])

Web of Science: 18
Nexgen 14<sup>th</sup> October 2021

Embase: 371

PubMed: 132

(((nexgen) AND (knee)) AND (humans[MeSH Terms])) AND ("1985"[Date - Publication] : "2015"[Date - Publication]))

Web of Science: 113

Optetrak CR 8<sup>th</sup> December

Embase: 25

PubMed: 14
((optetrak AND knee) AND (humans[MeSH Terms])) AND ("1984"[Date Publication] : "2014"[Date Publication]))

Web of Science: 13

ACS unc 17th Dec 2021

Embase: 6

PubMed: 9

(((knee) AND (uni OR UKA OR unicomp* OR unicond*)) AND (ACS)) AND (humans[MeSH Terms])

Web of Science: 7
Logic Exactech 17th December 2021

Embase: 77

PubMed: 136

(((logic) AND (knee)) AND (humans[MeSH Terms])) AND ("1999"[Date - Publication] : "3000"[Date - Publication]))

Web of Science: 78

LCS complete 18th December 2021

Embase: 48

PubMed: 18

(((LCS AND complete) OR ("Low contact stress" AND complete)) AND (knee)) AND (humans[MeSH Terms])) AND ("1996"[Date - Publication] : "3000"[Date - Publication]))
Web of Science: 22

22 results from Science Citation Index Expanded (SCI-EXPANDED), Social Sciences Citation Index (SSCI), Arts & Humanities Citation Index (A&HCI), Book Citation Index - Science (BKCI-S), Book Citation Index - Social Sciences & Humanities (BKCI-SSH), Emerging Sources Citation Index (ESCI), Current Chemical Reactions (CCR-EXPANDED), Index Chemicus (IC):

((LCS AND complete) OR ("Low contact stress" AND complete)) AND (kr)
Appendix III: List of data items that were collected

Devices
The following information will be included for each device included in the study.
- Name of device
- Manufacturer
- Implant reference number, if available
- Date of CE approval
- Date of FDA approval
- Date of first use (ODEP)

Procedure:
For knee arthroplasty:
- Stability: Cruciate ligament preserved (yes/no), Medial Pivot design, other or not recorded
- Mobility: fixed bearing /mobile bearing/ or not recorded
- Fixation (all cemented/all uncemented/other) or not recorded
- Patella resurfaced (yes/no) or not recorded

For hip arthroplasty:
- Fixation of stem/cup (cemented yes/no) or not recorded
- Type of bearing surface or not recorded

Associated stem/cup (free text)
Fixation associated (free text)
- Type of bearing or not recorded (yes/no)

Papers
This section details the data that will be extracted from each paper identified in our literature search. We will not contact authors of papers for additional information not present in the papers because we are interested in assessing the published evidence rather than evidence that may have been generated but is not published.

Meta-data:
- First author
- Date of publication (first available online if available)
- Date publication first available
- Submission (or publication) before /after CE mark date
- Submission (or publication) before /after FDA approval date
- Journal
- Study location(s) (continent)
- First and last year of recruitment

Objective (free text, copied from paper)
Key finding (free text, copied from paper)

Study characteristics
- Study type (cohort, registry-based cohort, case control, randomised controlled trial, case series or reports)
- Retrospective, prospective, both elements
- Population-based or specific population (e.g. young patients only)
- Real-world or experimental setting
- Comparative study (yes/no)
- Which comparison implant/group (e.g. established vs. new)
- Study aim (superiority/non-inferiority)
- Randomisation (yes/no)
- Blinding (select from: participant, investigator, outcome assessor)
- Type of RCT (registry-nested, other)
- Clinical trial registration ID provided (yes/no)

Patient characteristics
- Number in study
- Number in device in question arm
- Age (mean/median)
- Women (%)
- Diagnostic (% primary OA)

Investigators and sponsors:
- Author affiliations (academic, industry, mix)

Outcomes reported:
- All-cause revision as outcome (yes/no)
  o Revision rate at x years (upper CI, lower CI)
- Imaging (yes/no) if yes, which method
  ▪ Radiograph
  ▪ CT
  ▪ MRI
  ▪ EOS
  ▪ RSA
    o Migration (yes/no)
    o Osteolysis (yes/no)
    o Other (yes/no)
- Patient reported outcome measures (yes/no)
  o Oxford knee score (yes/no)
  o Knee Injury and Osteoarthritis Outcome Score (KOOS) (yes/no)
  o Oxford hip score (yes/no)
  o Hip disability and osteoarthritis outcome score (HOOS) (yes/no)
  o WOMAC (yes/no)
  o EQ-5D (yes/no)
  o SF-36/SF-12 (yes/no)
- Performance (yes/no)
  o Gait (yes/no)
  o Flexion (yes/no)
  o Posterior stability (yes/no)
Are analyses stratified or outcomes presented by gender (yes/no)
Are analyses stratified or outcomes presented by age (yes/no)

Safety:
- Did paper report safety concerns? (yes/potential/no) if yes, which:
  o Higher revision rate
  o Imaging abnormality
  o Inferior clinical results
  o PROMS
  o Biomechanical
Safety concern reported in which section of paper (e.g. abstract, discussion)

We will also record
- Mean and max. length of follow-up
- Adverse events/complications
  o Infection (N and %)
  o Dislocation (N and %)
  o Fracture (N and %)
  o Thromboembolic event (N and %)
  o Myocardial infarction (N and %)
- Mortality (N and %)

Risk of bias
Attrition
- Lost to follow-up (N and % [per group if comparative])
  o Reasons for loss mentioned yes/no

Information bias
- Exposure identification = Procedure (see above) details provided yes/no
- Outcome definition provided yes/no
- Response rate PROs (see above)

Selection bias in observational comparative studies (for RCTs bias assessed above)
- Measures used to reduce bias yes/no and which: Adjustment/Restriction/Matching

All-cause revision
The following will be extracted per device:
- Number of devices included
- Total number of observed events
- Timing of measurement (all time points available)
- Point estimates (cumulative incidence of revision or cumulative survival)
- Confidence intervals