

Summary of research proposal LROI



Title:

The impact of introducing a new hip or knee design on patient-level outcomes and hospital performance

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Abstract:

Novel hip and knee implants are introduced frequently to address unmet medical need, which might mean a completely new design or that manufacturers make iterative changes to an existing design. In both cases, the introduction of such a new implant in a hospital might influence patient safety, resulting in worse outcomes for patients and worsening hospital performance. To gain a better understanding into the impact of introducing a new hip or knee implant, the aim of the present study is to assess the extent to which introduction of a new hip / knee design in a hospital is associated with worse patient-level outcomes and hospital-level performance, and to examine whether such a change is temporary or results in the hospital becoming an outlier.

As the primary outcome, we will examine the 1-year (major) revision risk (both all-cause and for specific reasons) as revision surgery is a major adverse outcome for patients and the 1-year revision risk is used as a performance measure in comparative feedback for hospitals. As a secondary outcome, PROMs will be considered.

Data from all Dutch osteoarthritis patients undergoing primary hip or knee arthroplasty in the period 2007-2022 will be included to allow identification of new implants in each hospital, but all analyses will focus on patients undergoing surgery between 2010 and 2022. All analyses will be conducted separately for hip and knee implants. We define a new implant as one that has not been used before in that hospital, so that there will be relatively little experience with that specific implant design which may influence patient safety. We will compare the outcomes between patients receiving such a new implant, with patients receiving other implants, adjusted for differences in patient characteristics. In addition, we will conduct hospital-level analyses using risk-adjusted log-likelihood Cumulative Sum (CUSUM) charts with 5 control limit to detect an odds ratio of 2 for each hospital, to assess if introduction of a new implant is associated with an increase in alerts generated and compute funnel plots to assess whether outlier hospitals more often had introduced a new implant design in that period than non-outlier hospitals.

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