

Accuracy of Hospital Discharge Data in Reporting Knee Arthroplasty Procedures: A study of the Italian Arthroplasty

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Introduction

The Italian Arthroplasty Registry (RIAP) data collection flow uses Hospital Discharge Data (HDD) integrated by an additional Minimum Data Set (MDS) including information referring to the procedure and the implanted devices. HDD are mandatory and routinely collected for all the admissions performed by public and private structures. Extending our previous validity study of HDD's reporting of hip arthroplasty procedures, the current study aims at testing the validity of HDD in reporting procedure type for knee arthroplasties using the homologous information collected by RIAP in MDS as gold standard.

Results

- As shown in Table 2, experimental results generally show high accuracy of HDD in reporting knee procedures, with reference to the corresponding MDS value. This is especially true if we consider *general accuracy*, i.e. any knee related procedure, or if we use one level of precision –primary or revision. Accuracy levels tend to drop with more detailed categories.
- We note that the accuracy of "Primary" equals that of "Primary total". This is explained by the fact that all primary procedures in the dataset are total replacements.
- The last record in Table 2, "Revision Removal", shows remarkably low accuracy. However, since the number of records available for testing this category is relatively very small (n=35), we cannot draw a strong conclusion from this result, which we report for the sake of completeness.

ICD-9 Code	Brief Description	RIAP Code
8154	Primary Total	A1*, A2*, A3-A9**
8155, 8457+8155	Revision	C, D, F, E, E1
0080, 8457+0080	Total Revision	D
0081,0082,0083,0084	Partial Revision	C, F
8006+8456, 8006	Removal Revision	E, E1
8457+8456	Spacer Substitution	S

Table 1: Mapping ICD-9 code(s) to their corresponding RIAP code(s).

* Total Knee Arthroplasty (TKA)
** Unicompartmental Knee Arthroplasty (UKA)

Procedure Type	Accuracy
General Accuracy	100.00 %
Primary	99.18 %
Revision	94.80 %
Primary Total	99.18 %
Revision Total	72.34 %
Revision Partial	69.12 %
Revision Removal	25.71 %

Table 2: Accuracy of HDD in reporting different knee procedures

Materials and methods

- Each HDD record includes eleven fields related to the procedures (1 principal, 10 secondary).
- All knee arthroplasties (primary and revision) collected by RIAP in 2019 and passing quality check were considered for analysis (n=26,297).
- For each record, the procedure collected in MDS was compared with the ICD9-codes registered in all eleven HDD procedures' fields. Specifically, we computed *accuracy* as the ratio of records where any of HDD's procedure fields signaled the true type, to the records where MDS reported that type. The true procedure is assumed to be that reported by MDS, which is the gold standard.
- For the purposes of this study, we had to create a mapping between ICD-9 codes used in HDD to denote different types of knee procedures, and their corresponding alphanumeric codes used in MDS. Its important to note that MDS coding gives a more detailed description of knee procedures. So the mapping is neither one-to-one nor is it directly evident. (See Table 1)

Discussion/Conclusion

Our analysis indicates that HDD data on knee replacements is highly accurate on a macro level (knee procedures in general). We have noticed a similar trend in a previous study on hip procedures reported in HDD.

Further analyses, preferably with larger sets, are required to verify accuracy for certain classes of knee procedures (e.g. "Revision Partial" and "Revision Removal").

One possible hypothesis that could explain the significant drop in accuracy from "Revision" to "Revision Total" and "Revision Partial", might be that some surgeons are using the code 8155 even for the latter two categories. If this is indeed the case, we would recommend further training to encourage the use of the more specific codes 0080-0084.

Finally, as evident from Table 1, RIAP gives more detailed coding of procedure types than ICD-9, highlighting the importance of registry data. On the other hand, HDD remains valuable in the sense that it provides wider coverage at the national level.