ECONOMIC BURDEN OF HIP AND KNEE ARTHROPLASTY PROCEDURES IN THE MEDICARE POPULATION

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**INTRODUCTION:** Although recent studies have used population-based Medicare claims data to examine rates and outcomes of total hip and knee replacements [1,2], little detailed information is available about the associated overall costs to the U.S. economy. Previous cost analyses of primary and revision hip and knee arthroplasty procedures in the U.S. have been limited to selected clinical institutions and to a small number of patients [3-5]. The purpose of this study was to quantify the current economic burden associated with revision total hip and total knee arthroplasty (THA and TKA, respectively) in the Medicare population and to evaluate trends in charges and reimbursements associated with both primary and revision THA and TKA in persons aged 65 years and older.

**METHODS:** Medicare claims submitted by hospitals and outpatient institutions (Part A) and by physicians (Part B) were used to identify THA and TKA procedures in this population. Claims data from January 1, 1997 to December 31, 2001 based on the 5% systematic sample of Medicare beneficiaries were used in this analysis (approximately 2 million Medicare beneficiaries in total). Reimbursement amounts were based on claim payments made to the institutions/physicians. Patients who were eligible for Medicare benefits because of disability were excluded from this study, thereby retaining only those persons aged 65 years and older. Current Procedural Terminology (CPT-4) codes were used to identify both primary and revision hip and knee arthroplasty procedures. Total costs to the overall Medicare population were determined by multiplying values obtained from the 5% BEF sample by a factor of 20. Economic burden of revisions was derived annually as the reimbursements associated with revision arthroplasties relative to the total reimbursements associated with primary and revision arthroplasties.

**RESULTS:** The mean annual reimbursements for primary THA and TKA from 1997 to 2001 were $902 million and $1.7 billion, respectively, for the overall Medicare population. For revision THA and TKA, mean annual reimbursements were $223 million and $164 million, respectively. The mean charge per primary procedure ranged from $27,045 (TKA) to $27,485 (THA), whereas the mean reimbursement per primary procedure was $11,108 for TKA and $10,954 for THA (Fig. 1). Mean charges per revision procedure were $34,677 for THA and $30,328 for TKA. Mean reimbursements per revision procedure were $12,283 for THA and $11,550 for TKA. Annual reimbursements for revision THA procedures constituted 19.8% (range: 18.8-20.8%) of reimbursement for all THA procedures; for revision TKA, the mean annual economic burden (proportion of all TKA procedures) was 9.0% (range: 8.7-9.6%) (Fig. 2). When comparing overall charges and reimbursements, reimbursements were approximately 60% less than associated charges for either primary THA or TKA (Fig. 1). For revision arthroplasty, this financial difference was 64% for revision THA and 62% for revision TKA (Fig. 1). For THA, most of the reimbursements are associated with inpatient care for both primary ($795 million) and revision THA ($196 million). Thus, most charges are associated with hospitalization rather than physician charges or charges associated with procedures for which the mandatory portion of Medicare (Part A) does not apply. For TKA, a majority of reimbursements for both primary ($1.4 billion) and revision ($1.44 billion) procedures are also associated with inpatient charges.

**DISCUSSION:** The mean calculated procedural charges and reimbursements for THA and TKA in the Medicare population are similar to those estimated at a small number of institutions by other investigators [3-5], but our results represent financial values from a longer time span (five years). Results of the present study indicate a higher charge per procedure for revision THA and TKA compared to primary procedures. Further, a greater proportion of the overall THA cost is associated with revision THA than is the proportional economic burden for revision TKA. Although there is little variability in the economic burden for both revision THA and TKA, the rapidly increasing number of revision surgeries may be cause for concern as the size of the Medicare population increases. Based on discharge data from the National Hospital Discharge Survey (NHDS), the total number of revision procedures almost doubled for revision hip surgeries and tripled for revision knee surgeries between 1990 and 2002 [6]. Medicare inpatient data also indicate similar trends (range is within 7% of NHDS data). A 10% reduction in the number of revision procedures would amount to a mean of 1,840 revision THA and 1,450 revision TKA procedures, respectively, per year for the period 1997 to 2001. This would result in a mean annual reduction in charge of $64 million for revision THA and $44 million for revision TKA by the hospitals and a mean annual reimbursement reduction of $23 million (THA) and $17 million (TKA) by Medicare.