OBJECTIVES: To estimate future scenarios of utilization of knee arthroplasty (KAT) revision surgery, costs and revenues related to KAT revision surgery during the short and long term, and its impact on primary KA utilization. METHODS: A discrete event simulation model was built to represent the utilization of KA for 20 years (2011–2030) in the Spanish National Health System, especially the burden of KA revision according to different age groups of KA patients. Data on KA utilization between 1997 and 2011 was obtained from the Spanish Minimum Data Set. Three scenarios of future utilization of primary KA were estimated: 1) fixed number since 2011; 2) fixed age span and sex adjusted rates for KAT revision from 2011; and 3) projection using a linear regression model. These three scenarios were combined with two prosthesis survival functions 1) from a study including primary KA from 1995 to 2000, and 2) from the Catalonian Registry of Arthroplasty, including primary KA from 2005 to 2010. The model was programmed using ARENA. The baseline results were analyzed at the short (2015) and long-term (2030). RESULTS: Variations in the number of revisions depended on both the primary utilization rate and the survival function applied, ranging from 8.6% increase at the 24-month revision period from the baseline to 15.9% at the long-term, percentages corresponding to the combinations of scenario 1 (low primary utilization rate) and survival function H (better survival) versus scenario 3 (high primary utilization rate) and survival function L (worse survival) per scenario 1 and 2. Percentages of patients undergoing KA revision were lower than 1% of total KA patients. CONCLUSIONS: Future KA revision scenarios are highly sensitive to changes in KA utilization and to the type of KA survival function used. The model can be used to plan the number of orthopaedic surgeons required to perform these procedures and the number of resources needed.

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CACHEXIA IN THE US HEALTH CARE SYSTEM

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OBJECTIVES: Cachexia is a medical syndrome associated with several chronic health conditions including many cancers, COPD, HIV, and kidney disease. Cachexia is a wasting type syndrome characterized as a loss in body mass or metabolic dysfunction. The loss in mass is associated with decreases in strength and functional capacity. Currently there is little research into cachexia and our objective is to characterize cachexia patients, their health care utilization and costs. METHODS: For this study we utilized one year (2009) of the Nationwide Inpatient Sample (NIS). The NIS represents all hospital stays at a random 20% sample of hospitals within the United States. We grouped cachexia individuals by primary or secondary diagnosis and then compared those with cachexia to all others in terms of length of stay (LOS) and total cost. Finally we looked into factors predicting increased LOS using a negative binomial model. RESULTS: We estimated the utilization of hospital services for cachexia related admissions at 161,898 cases. Cachexia patients were older with an average age of 67.95 versus 48.10 in their non-cachexia peers. Hospitalizations associated with cachexia had an increased LOS compared to non-cachexia patients (6 days versus 3) with average costs per stay $4,641.30 greater. Differences were seen in loss of function (LOF) with cachexia patients mostly in the major LOF category (52.60%) whereas non-cachexia patients were spread between minor, moderate, and major LOF (36.28%, 36.11%, and 21.26%). Significantly higher LOS for increased LOS among cachexia patients included urban hospital (IRR=1.21 non-teaching urban, IRR= 1.23 teaching urban), having either major (IRR=1.41) or extreme (IRR=2.64) LOF, and having a primary diagnosis of pneumonia (IRR=2.38). CONCLUSIONS: Cachexia is a diverse syndrome associated with a number of chronic diseases. We have characterized cachexia and seen it associated with increased length of stay, increased cost, and more severe loss of function compared to those without cachexia.

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INCREASED BONE MINERAL DENSITY (BMD) IN POSTMENOPAUSAL WOMEN WITH OSTEOPOROSIS TREATED WITH TWO DENOSUMAB INJECTIONS IN ROUTINE CLINICAL PRACTICE IN BULGARIA

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OBJECTIVES: To describe baseline characteristics and changes in BMD T-scores at 1 year, in postmenopausal women with OP receiving 2 denosumab injections in routine clinical practice in Bulgaria. METHODS: This retrospective observational study, conducted in 11 specialist (endocrinology or rheumatology) practices scattered geographically across Bulgaria, included postmenopausal women ≥50 years old with a clinical diagnosis of OP; who initiated denosumab 60 mg QM on or after Oct 2011 (regulatory approval of denosumab in Bulgaria) and received a follow-up injection within 7 months (until Aug 2013). All study outcomes were recorded as per databases (e.g., physician claims, inpatient records). The resulting simulation was populated with data extracted from administrative databases (e.g., physician claims, inpatient records). RESULTS: The model yields patient characteristics, OA care resource requirements, intervention costs at each stage of care over 10 years by region and patient characteristics (e.g., sex). If current practices continue, annual hip and knee replacement surgery volumes are estimated to increase by more than 5,000 between 2015 and 2025, if a 14-wk surgical wait-time is implemented in 2015, 600 additional surgeries must be performed in the first year to “catch-up” on the existing surgical queue, yet long-term surgery rates are similar to those without the wait-time target. The costs of the additional surgeries are partly offset by the savings achieved by fewer patients requiring care while awaiting surgery. CONCLUSIONS: This simulation can be used as a decision-support tool enabling policy-makers to explore policies and their effects. METHODS: We developed a system dynamics (SD) simulation of patient flow across the continuum of OA care, including the patient journey through surgical interventions, post-surgical follow-up and subsequent re-operations. The simulation was developed using SD modeling principles and an iterative, integrated knowledge translation process, including multiple workshops with clinicians and administrators to define the problem, system boundaries and current patient flow. The resulting simulation was populated with data extracted from administrative databases (e.g., physician claims, inpatient records). RESULTS: The model yields patient characteristics, OA care resource requirements, intervention costs at each stage of care over 10 years by region and patient characteristics (e.g., sex). If current practices continue, annual hip and knee replacement surgery volumes are estimated to increase by more than 5,000 between 2015 and 2025, if a 14-wk surgical wait-time is implemented in 2015, 600 additional surgeries must be performed in the first year to “catch-up” on the existing surgical queue, yet long-term surgery rates are similar to those without the wait-time target. The costs of the additional surgeries are partly offset by the savings achieved by fewer patients requiring care while awaiting surgery. CONCLUSIONS: This simulation can be used as a decision-support tool to estimate changes in patient populations, resource requirements and costs over time that may result from various OA management scenarios. Such results can equip policy makers with additional evidence to make more informed OA care policy decisions.