the threshold for a MID also increases by this factor constantly. This leads to logarithmic function for quantifying outcomes. We examined a logarithmic function for MID in nursing, a combination of three health states extracted from EuroQol-5D (State A (2112), B (2112), and C (22222)) and three survival durations (10, 20, and 30 years). An online survey was conducted and 100 subjects were recruited. One-way repeated measure analysis of variance and one-way within subjects analysis of variance were applied. RESULTS: A total of 98 subjects completed the survey. In State A, the normalized mean of 10, 20, and 30 years were 0.63, 0.61, and 0.59, respectively. There were no significant differences in the means (p = 0.1102). For State B, the normalized means were 0.66, 0.68, and 0.66 for 10, 20, and 30 years, respectively, with no significant difference among three durations (p = 0.6496). Lastly, in State C, the normalized means for the 10, 20, and 30 years were 0.57, 0.55, and 0.57, respectively, and there was no statistical difference (p = 0.5440).

The impact of changing durations was not significant in all three states. CONCLUSIONS: Our findings implies that the MID is constant over proportional change in duration, indicating that the utility function of the MID follows a logarithmic function. This violation of the normative decision model implies treatment decisions based on the MID may not represent our preferences for health.

PRM11
THE RISE OF BUDGET IMPACT ANALYSIS
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OBJECTIVES: Budget impact analysis (BIA) is an important tool for assessing financial costs associated with the implementation of health care interventions. As pressure on the limited budgets of health care systems increases, the role of BIA in the reimbursement decision-making process is set to rise. Indeed, evidence suggests that in recent years BIA conducted for new healthcare interventions have increased in number and the proportion of reimbursement decisions of payers. The aim of this study was to investigate any temporal and regional trends in the rate of study publications reporting the results of a BIA over the last ten years. METHODS: PubMed searches were performed to identify publications discussing the budget impact of treatment published during the years 2000, 2005, 2008, and 2010. For each year, the number of publications including a BIA was calculated as a proportion of all publications for that year. The search findings were examined to determine if temporal or regional trends could be observed in the publication frequency of studies reporting BIA. RESULTS: From 2001 to 2005, a 3.7-fold increase was observed in the proportion of the literature discussing BIA and from 2006 to 2010, a 3.5-fold increase was observed. When the increasing temporal trend of BIA publication was examined according to region (limited to Europe and the United States), it was noted that the trend of an increase in the rate of BIA publication was greater in Europe than in the USA. CONCLUSIONS: The period of 2001 - 2011 saw an increase in the number of publications discussing BIA. This trend was more pronounced in Europe than the US and likely reflects the funding differences of healthcare systems in these regions, with more limited healthcare budgets typical within Europe compared to the United States. Future changes to the US health care system, however, may promote the increased use of BIA in this region.

PRM12
COMPARISON OF TWO APPROACHES TO COSTING NATIONAL IMMUNIZATION PROGRAMS: CENTRAL LEVEL BUDGETING VERSUS DETAILED COSTING EXERCISES USING A NOVEL PROVAC EPI COSTING TOOL IN BOLIVIA
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OBJECTIVES: To compare two different approaches to estimate the total cost Bolivia’s Expanded Program on Immunization (EPI), one using the central budget reports vs. an alternative approach using a novel ProVac EPI costing Tool. METHODS: The first approach was applied using cost data from the 2009 budget approved to the Bolivian Ministry of Health and regional sources of wage assignments. We estimated the annual cost of Bolivian national EPI following the WHO recommendations for estimating cost of immunization programs. The second approach use a new EPI costing tool developed by the PAHO ProVac Initiative and designating estimates of cost of every single component program at three administrative levels (district, state, national). A costing survey was carried out at different vaccination centers. RESULTS: The central level budgeting approach resulted in an overall EPI cost of US $1,960,000 for 2009. Using the EPI costing tool to assess the local and regional costs of vaccination produced an estimate four times higher, US $53,330,000. The most important items were the purchase of vaccines and vaccination supplies (46% of the total), followed by personnel who contributed about 28%. Cost incurred in the direct delivery of vaccine to patients were 50% of the total, with major participation of personnel and transportation supply. Other items were the vaccination supplies with this new approach and also explains the incremental difference. CONCLUSIONS: The central budget cannot be relied on for a full estimation of EPI program costs, it can lose cost details within the same level. Also, the costs incurred at lower administrative levels were not well-captured in the central budget and are important of total EPI costs. The costs of vaccination other than vaccine acquisition and vaccination supplies are very important and should be considered in cost analysis of vaccine introduction.

PRM13
SENSITIVITY ANALYSIS IN COST-EFFECTIVENESS ANALYSIS IN KOREA: A REVIEW OF INDUSTRY SUBMISSIONS TO HIRA
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OBJECTIVES: The purpose of this study is to assess the quality and characteristics of sensitivity analysis (SA) performed by Korean industry, focusing on sensitivity analysis. METHODS: Two researchers independently reviewed the 34 dossiers submitted from January 2007 to Dec. 2009. To analyze how submissions handled uncertainty, we analyzed the analysis type, assessment items, and ranges of uncertainty and so on. Their adherence to current HIRA’s recommendation was assessed. RESULTS: Thirty out of 34 dossiers performed sensitivity analysis. Deterministic sensitivity analysis, namely, univariate analysis was most frequently used, probabilistic sensitivity analysis (PSA) method was applied for only 5 cases and the grounds of the selection of parameter distributions were rarely provided; 14 cases have provided the grounds the ranges of uncertainty, 23 cases analyzed utility and effectiveness and 20 cases analyzed drug cost for assessing uncertainty. Multivariate or threshold analyses were rarely performed. CONCLUSIONS: The quality of submitted dossiers in terms of sensitivity analysis varied greatly. Revised HIRA’s guideline could specify the minimum standards to reduce variability and increase the comparability of submitted dossiers.

PRM14
TIME-DEPENDENCY FOR TREATMENT SEQUENCES IN MARKOV MODEL: A NESTED MARKOV APPROACH
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OBJECTIVES: The memory-less feature of Markov models can be a limiting factor when treatment-sequencing needs to be modeled and the transition probability in second- and subsequent-line treatments are not constant. Tunnel-states are a common approach to overcome this limitation in cohort models built in excel. As the number of treatment sequences and time-dependencies increase, however, tunnel-states can become unruly. We propose an alternative method of nested Markov modeling to allow time-dependency in treatment sequences. METHODS: The proposed method first disaggregates the model by treatment and calculates the costs and benefits for each treatment in the sequence. This effectively gives a model of each treatment, which can be rolled back in the usual way to give a net present value (NPV) of the costs and benefits after discounting. The benefits of each treatment are then combined into the treatment sequence by weighting proportionally to the time spent in the sequence, followed by further discounting to account for placement in the sequence. This method is tested by building a hypothetical model with two treatment sequences. i.e. first-line therapy and second-line therapy followed by a standard-of-care therapy as an absorbing state. Time dependency was modelled by 1) the traditional tunnel state approach, and 2) the proposed nested Markov model approach. RESULTS: Costs and quality-adjusted life-years gained (discounted to NPV) were $456 and 2.87 for first-line therapy, $915 and 3.94 for second-line and standard-of-care therapy. The two approaches gave identical results, while the time spent in each treatment was 0.76 and 0.78, respectively. CONCLUSIONS: Nested Markov modeling represents a straightforward and intuitive approach to modeling a fixed treatment sequence. It may not be suitable if the position in a sequence is inter-changeable, and treatment effectiveness depends on the position in a sequence (e.g. cancer therapies where disease progression impacts treatment effectiveness).

PRM15
USE OF CENTRALIZED NATIONAL DATA TO ESTIMATE COSTS OF EPI AT NATIONAL LEVEL: THE BOLIVIAN CASE, 2007-2009
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OBJECTIVES: To estimate the total costs of the Bolivian Expanded Program of Immunization (EPI) from the perspective of the central level of the health system and to estimate the average cost per fully immunized children (FIC) in the current Bolivian setting. METHODS: Using cost data from the 2007-2009 budget approved to the Bolivian MoH (Ministerio de la Salud y el Deporte) and regional sources of wage assignments, we estimated the annual cost of Bolivian national EPI following the WHO recommendations for estimating cost of immunization programs. Combining EPI coverage and costs, cost per FIC was estimated with adjustments for underreporting using secondary data sources. Costs are expressed in 2009 U.S. dollars. RESULTS: In 2007, 2008, and 2009 the Bolivian EPI central level expended US $1,616,108, US $1,297,322, and US $1,195,509, respectively. The most important items were vaccines purchasing and acquisition of vaccination supplies (89% in average for 3 years), followed by personnel who contributed about 8%, 9% respectively. The cost per FIC was between US $6 and $93 with basic scheme, and between $53 and $144 per FIC with basic scheme plus rotavirus. CONCLUSIONS: This is one of the few studies in LAC attempting to establish the cost of every single national EPI activity. The cost per child vaccinated in Bolivia is explained mainly by the costs of vaccines and personnel costs, however this result should be considered as a very conservative one due to lack of cost data of inferior levels of national EPI.