OBJECTIVES: The credibility of models rests on their validity. An age-structured decision analytic model, Economic Varicella Vaccination Tool for Analysis (EVITA), has been developed to examine the epidemiologic and economic effects of universal varicella (chicken pox) vaccination in Germany. EVITA combines a varicella transmission module describing the spread of infection in a population over time with a second module describing the course of disease in case of an infection. Any vaccination strategy can be assessed dependent on coverage levels and targeted age group. Model input data include epidemiologic, clinical, and economic information, which were mainly derived from actual varicella cases (retrospective survey). The objective of this study was to illustrate the efforts undertaken to validate the EVITA model. METHODS: We assess the descriptive validity, i.e., whether the model provides an adequate picture of the reality and covers all relevant aspects of the spread of varicella and the course of disease. Analyzing the consistency of the model results with observable data does technical verification. Face validity, i.e., the consistency with the underlying theoretical basis of the spread of varicella, is analyzed with respect to results on possible age shifts and elimination of varicella. Tests of corroboration, or convergent validity, are performed by comparisons with other models. RESULTS: Without vaccination, the
EVITA model predicts undiscounted, indirect costs of 154 million euros, nearly 40,000 complications and 5,700 hospitalizations per year owing to varicella. These results, especially the distribution of complications and hospitalizations, fit well with population-based survey data. The development of the EVITA model is based on an established epidemiologic model and on real-life data from the survey, ensuring descriptive validity. Results on age shifts and elimination show face validity. Although other models differ considerably with respect to methods applied, the economic results of EVITA, i.e., a benefit-cost ratio of 4.12 when vaccinating young children, lies in the range found in other studies. This underscores its convergent validity. Comparable with other studies, discount rates and price of vaccine proved to be most sensitive variables. CONCLUSIONS: EVITA provides a powerful tool to simulate the highly complex processes associated with varicella infections and the impact of vaccination. The results of EVITA provide a reliable tool for informed decision making and should enhance the acceptance of such models.