Cost-effectiveness of pneumococcal vaccines in Estonia

Objectives: To evaluate the cost-effectiveness of vaccination with 7-, 10- and 13-valent pneumococcal vaccine in Estonia compared with non-vaccination.

Methods: Using Markov model an approximate annual birth cohort of 16 000 was followed until the age of five. Vaccine coverage was assumed to be 95%. In the base-case scenario the effectiveness of PCV7 against out-patient otitis and pneumonia was assumed to be 6%, in-patient otitis 12% and pneumonia 27%, against invasive infections and associated death cases 58%. Due to more serotypes included in PCV10 and PCV13, the effectiveness of these vaccines was assumed to be 5% and 10% higher than for PCV7. In- and out-patient treatment episodes of otitis and pneumonia were used as outcome measures. Based on quality of life lost in association with pneumococcal diseases, quality adjusted life years (QALY) were calculated for vaccinated and non-vaccinated cohorts. Costs were considered from the perspective of third party payer and included treatment expenses, prescription drugs, parent's temporary work incapacity benefits and vaccine costs. Costs and effects were discounted using an annual discount rate of 5%.

Results: In case of vaccination about 1500 out-patient and 79 in-patient otitis, 150 out-patient and 150 in-patient pneumonia and 10 invasive infection cases would be avoided per Estonian annual birth cohort of 16 000 children. As compared with non-vaccination 35-37 QALY could be gained. In most likely scenarios incremental cost-effectiveness ratio (ICER) would be 29 000–55 000 € per QALY. The key impact factors on cost-effectiveness estimate were price of vaccines and the probability of mortality.

Conclusions: Vaccinating against pneumococcal infection would prevent considerable number of otitis, pneumonia and invasive infection cases. However, the costs of vaccination substantially exceed the savings from treatment costs. In most likely scenarios ICER in case of vaccination will be 29 000–62 000 € per QALY as compared to non-vaccination.

Citation: University of Tartu. Cost-effectiveness of pneumococcal vaccines in Estonia. Tallinn: Ministry of Social Affairs; 2011.