

The cost-effectiveness of pneumococcal vaccination in Estonia

Summary

Objectives: Current HTA report evaluates the impact of pneumococcal vaccination with 10- and 13-valent vaccines by analysing the costs and cost-effectiveness of the nationwide vaccination of children under age of 1 year in Estonia compared with non-vaccination.

Methods: Literature reviews for evidence on effectiveness, safety and cost-effectiveness of pneumococcal vaccination of infants were carried out in relevant databases. An independent Markov cohort model was constructed to compare the cost-effectiveness of vaccination with 10- and 13-valent vaccines to no vaccination. The annual birth cohort of 13 500 children was followed until the age of five with the costs and the loss in quality of life due to long lasting implications (e.g. hearing loss and neurological sequelae after meningitis) accounted for in the life expectancy perspective (77 years). Vaccine coverage was assumed to be 95%. Data for epidemiology of the meningitis, hearing loss, neurological sequelae, pneumonia (inpatient and outpatient), otitis (inpatient and outpatient) were calculated based on Estonian data. Data for effectiveness and quality of life outcomes was obtained from the published literature. Costs were calculated based on Estonian data and expert opinions. Costs and effects were discounted using an annual discount rate of 5%. The model evaluated the number of avoidable pneumococcal cases and differences in costs and quality-adjusted life-years (QALYs) using incremental cost-effectiveness ratios (ICER). Additional budget impact analysis for the pneumococcal vaccination within national immunization programme was performed.

Results: In the base-case scenario, vaccination reduced invasive infection cases, long term sequelae and deaths caused by invasive diseases by 60%; cases of inpatient pneumonia and otitis by 27% and 12% respectively; outpatient pneumonia and otitis cases by 6%. Reduction in pneumococcal-related cases was slightly higher for 13-valent vaccine compared to 10-valent vaccine with 34 and 32 QALYs gained respectively. ICER was estimated at €51,722 (10-valent) and €61,515 (13-valent) per QALY ranging between €9,088 – 68,017 (10-valent) and €11,182 – 80,506 (13-valent) in sensitivity analysis. The results were most influenced by introduction of herd immunity in the model, vaccine efficacy and vaccine prices. The yearly costs of vaccination programme for a birth cohort with 10-valent vaccine were €1,808,325 and with 13-valent vaccine were €2,231,550. Vaccination with 10-valent vaccine would reduce the pneumococcal-related costs by €35,700 compared to €37,400 with the use of 13-valent vaccine.

Conclusions: Adding pneumococcal vaccination into national immunization programme would prevent considerable number of otitis, pneumonia, invasive infection cases and the sequelae after meningitis. Although the ICER varies substantially for both 10- and 13-valent vaccine, their cost-effectiveness ratios in Estonia are comparable to results from previously published data. Budget impact analysis indicated that the costs of vaccination will substantially exceed the savings from the treatment costs. The results of current HTA serve as a guidance to decision makers in future reassessments of national vaccination plans.

Citation: Juus E, Männisalu A, Oona M, Tamm E, Reile R. *Pneumokokkinfektsioonivastase vaktsineerimise kulutõhusus*. Tartu: Tartu Ülikooli tervishoiu instituut; 2015.