Title: USE OF SIMULATION MODEL TO STUDY THE COST-EFFECTIVENESS OF DIFFERENT STRATEGIES FOR CELIAC DISEASE SCREENING IN CHILDHOOD

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Abstract

Most celiac disease (CeD) patients remain unrecognized or suffer from a long diagnostic delay, predisposing them to various complications. Screening could improve the underdiagnosis, but the cost-effectiveness of different screening strategies remains unclear.

A simulation model was utilized to compare the cost-effectiveness of various screening strategies. Issues considered included serological testing at different ages in childhood, single vs. repeated screening, and genetic testing to narrow down the at-risk population. The resulting 272 separate strategies were compared to no-screening alternative using the incremental cost-effectiveness ratio calculated from societal costs and quality-adjusted life years. Simulations were performed using a probabilistic Markov model that included estimates on probabilities to be genetically predisposed to CeD, develop CeD and symptoms, clinical prevalence of CeD in routine practice, treatment success, quality of life, mortality, and costs. Data was gathered primarily from Sweden, where several population-based screening studies have been executed.

Untargeted serological testing at a single age point was more cost-effective than repeated screening or combined use of genetic testing. Cost-effectiveness of single-time screening improved significantly from age 3 to 7, increased modestly up to age 12 and remained stable thereafter. There was significant uncertainty in how screening affects quality of life, and the results were sensitive to changes with respect to adopted assumptions.

Based on the simulation model, the most cost-effective population screening strategy for CeD is single-time untargeted serological screening at the age of 12. However, the characteristics of the population to be screened affect this.