

## Cost-effectiveness of the Estonian cervical cancer screening programme: Pap versus HPV testing

### Summary

**Objectives:** To evaluate the cost-effectiveness of the organized cervical cancer screening programme in Estonia, comparing different HPV and cytology primary testing based strategies.

**Methodology:** A literature review was conducted on cervical cancer burden and early detection options (HPV and cytology testing), screening programmes in the European Union and guidelines for their quality assurance, and cost-effectiveness of different screening strategies. For the cost-effectiveness analysis of cervical cancer screening a Markov cohort model was developed. A hypothetical cohort of 10,000 30-year-old women was followed in yearly cycles for 70 years. The model input parameters were based on previously published literature, data from the Estonian Health Insurance Fund (social health insurance covering ~95% of Estonian population), Statistics Estonia, the National Institute for Health Development, and expert opinions. The model evaluated the number of pre-malignant lesions (CIN 1–3), cervical cancer cases and mortality, associated costs and quality-adjusted life-years (QALYs) for numerous strategies, varying the coverage, primary test and triage scenarios, and the testing interval. The incremental cost-effectiveness ratios (ICERs) were calculated, comparing each screening strategy to the current screening practice (a Pap-test every 5 years). In addition, budget-impact analysis from the healthcare payers' perspective was carried out.

**Results:** The analysis demonstrated that in cervical cancer prevention HPV testing might be more effective than Pap testing. Switching from Pap to HPV testing in primary screening would increase the number of premalignant lesions (CIN 1–3) diagnosed, yet a decrease in the number of cervical cancer cases would follow. Keeping the 5-year screening interval, the HPV testing based programme would be more expensive. In the base-case scenario, ICER was estimated at €9,038–9,783 per QALY, depending on patient triage in the programme. In sensitivity analysis, the ICER ranged between €5,020–11,786 per QALY. The ICER was most influenced by the discount rate, the quality of life estimate after curing cancer and the price of the HPV test. When adding one birth cohort to the current target group in the screening programme, the ICER was estimated at €2,382 per QALY, and ranged between €1,550–2,680 per QALY in the sensitivity analysis. The ICER was most influenced by the discount rate. Currently in Estonia the target group coverage is about 25% and direct screening costs €310,500 per year. When increasing the target group coverage to 70%, and adding one birth cohort and women without health insurance to the target group, the additional cost in case of primary Pap testing was estimated at €703,800 per year. When switching to primary HPV testing, the additional cost was estimated at €3,493,125 per year.

**Conclusions:** Although the ICERs are comparable to the results from previously published cost-effectiveness studies and the organized cervical cancer screening programme is likely to be an effective measure in reducing cervical cancer incidence and mortality in Estonia, no changes in the screening strategy would be justified, unless target group coverage has been improved. To reach the maximum health effect of the cervical cancer screening programme, inclusion of an additional birth cohort and women without health insurance would be needed.

**Citation:** Laisaar KT, Võrno T, Raud T, Jõers K, Meigas-Tohver D D, Kiivet RA. *Inimese papilloomiviiruse (HPV) DNA-testi ja emakakaela tsütoloogilise uuringu (Pap-testi) võrdlus emakakaelavähi sõeluuringu esmastestina*. Tartu: Tartu Ülikooli peremeditsiini ja rahvatervishoiu instituut; 2018.