

## Mammography screening for breast cancer

### Summary

**Objectives:** To evaluate the effectiveness and cost-effectiveness of breast cancer screening carried out in Estonia and to make suggestions for better screening procedures.

**Methodology:** In order to receive an overview of scientific articles about assessing the efficiency of using mammography in different age groups, cost-effectiveness and solving the problem of false-positive results, searches were conducted in MEDLINE and Cochrane Reviews databases. In addition, searches were performed on websites of health technology assessment organizations and websites of breast cancer prevention programs of various countries to find information on the structure of screening programs.

To carry out the analysis, the Cancer Registry data in Estonia were linked together with the 3217 diagnosed breast cancer cases in the years 2004–2008, as well as with these women's Health Insurance Fund bills and also with the bills of 30 114 women who participated in the screening in 2008. This made it possible to assess the effectiveness of screening and the costs associated with it, and to link this with women's participation in the screening.

**Results:** 32% of women targeted for screening (50–62 y/o) attended the screening in 2008, and 1/3 of those who attended were not invited to the screening that year. 807 women (83.7%) who attended the screening were excluded from the diagnosis of cancer after detailed tests, and the total number of tumors found was 157, with cancer treatments started for 119 women. After initial suspicions, the diagnosis was confirmed within three months for 88% of the women. Treatment was initiated for half of the women within one month, and for the majority (90%) of the women within three months after breast cancer diagnosis.

The total cost of necessary follow-up tests to rule out false-positive mammographies in 2008 was 4.8 million kroons, and together with the cost of screening (12.5 million kroons) and programme management (1.7 million kroons), 632 kroons were spent on each woman attending the screening.

The treatment costs of breast cancer cases detected as a result of screening in 2004–2008 came up to a total of 49 million euros, which was 15% of all breast cancer treatment costs. To find one case of breast cancer, 250 women had to be screened in Estonia in 2008, and the cost of detecting one case was 10 227 euros. The cost of one year of life gained through screening was 23 785 euros, based on the results of treatment and the prices in 2008.

The comparison between the women who received a breast cancer diagnosis during the screening, and the target group women who were invited to the screening but did not participate in it, revealed that the risk of death in the latter group was 2.9 times higher (HR=2.9, 95% CI 2.0 to 4.1). During a five-year monitoring period, an average of 0.43 additional years of life were gained per woman screened, compared with the target group women who were invited to the screening but did not attend.

**Conclusions:** The breast cancer cases detected during screening are less advanced and therefore the treatment of these women is cheaper.

In Estonia, only 14% of the breast cancer cases diagnosed in 2004–2008 originated from screening. 32% of women diagnosed with breast cancer were in the target age group, with 18% being younger and 50% older than the target screening group. Extending the target age limits for screening and/or for the invitations to targeted screening should be considered, as the screening taking place in Estonia (if organized properly) can only affect a third of the women in Estonia in regard to their breast cancer prognosis.

**Reference:** Võrno T, Kuusemäe K, Valvere V, Padrik P, Ulp S, Pisarev H, Zegulova A, Puusepp M, Lipus H, Kiivet R-A. Mammograafia rinnavähi sõeluuringus. Tartu: Tartu Ülikooli tervishoiu instituut; 2013.