

Estonian Breast Cancer Screening Programme Pre-conditions and Current Status

Report of a pre-audit assessment

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Table of Contents

1 INTRODUCTION 1
2 METHODS 1
3 SITE VISITS 1
4 RESULTS 2
5 DISCUSSION 2
6 RECOMMENDATIONS 4

List of Tables

Table 1 List of sites visited 5
Table 2 Key specialists interviewed 5

Annexes

A1 Breast cancer screening in Estonia – Background information sources A-1
A2 Breast cancer screening in Estonia – Background data A-3
A3 Synopsis of visits to breast screening units A-45
A4 Breast cancer screening in Estonia – Graphic presentation of results
2002-2010 A-50

1 Introduction

Among 40 countries in the European region, Estonia has the 28th highest breast cancer incidence – 50.2/100.000 (ASR, W). Around 600 new cases are diagnosed annually. With breast cancer mortality rate of 15.9/100.000 Estonia ranks 24th in the same comparison, and with incidence to mortality ratio 3.2 Estonia is 15th.

The breast cancer screening programme began in 2002. Currently, the Estonian Health Insurance Fund sends personal invitation letters to 50-62 year-old women who are enrolled with the Fund, encouraging them to make an appointment for biennial screening mammography. From January to October 2011, women born in 1950, 1953, 1954, 1955, 1957, 1959 and 1961 received such letters. In November-December 2011, repeat invitations were sent to those women who had not yet participated.

All seven stationary breast screening units in the country sign contracts with the Estonian Health Insurance fund to screen at least 65% of the invited women (the budgeted proportion, in 2011 the planned number of invitations was 52000 and the planned number of screening examinations was 34000). Two of the stationary units each also operate a mobile screening unit. The invitation letter asks the woman to call directly to a screening unit of her choice and make an appointment within one month. Information campaigns, brochures, newspaper articles and websites like <http://www.haigekassa.ee/ennetus> aim to increase the attendance rate.

At the request of the Estonian Cancer Screening Foundation, IARC recruited experts in breast cancer screening and management to visit all of the seven stationary breast screening units in Estonia (Table 1) and to provide on-site advice to the attending screening staff. Information was collected during the visits with the aim of conducting a preliminary assessment of pre-conditions and current status of the Estonian breast cancer screening programme.

2 Methods

To obtain background information relevant publications were collected and reviewed prior to the visits (Annex 1); screening data in tabular format was also requested (Annex 2). The site visits included interviews of key specialists (Table 2) and inspection of materials, facilities and practices in a semi-structured manner including assessment of quality of mammograms (Annex 3). Additional screening data was provided by screening units after the mission (Annex 4).

3 Site visits

The screening and mobile units of the Mammograaf Radiology Clinic in Tallinn and the screening unit of the Tartu University Hospital were visited in December 2010. The second visit in May 2011 included the remaining five stationary breast screening units in Estonia. The other mobile screening unit was not visited.

All units were sufficiently staffed with radiographers. There was no radiologist reading screening mammograms in the Narva hospital but thanks to a modern PACS system, screening mammograms are read in the North Estonia Medical Centre in Tallinn. Mammography equipment is digital, in transition from the use of phosphor plates (CR) to direct digital imaging (DR). More detailed descriptions by site are in Annex 3.

4 Results

The data provided by the screening programme are summarized in Annex 4. The participation rate has improved from 36% in 2003 to 53% in 2010. In 2006 and 2009 it was 57%. The recall rate has decreased from 5.9% in 2002 and 7.1% in 2003 to 3.2% in 2009 and 2010. The cancer detection rate has decreased from 6.6 in 2002 and 10.0 in 2003 to 4.4 cases per 1000 women screened in 2010. The proportion of early breast cancers among the screen detected cases has been over 70% since the beginning in 2002. The proportion of invasive screen-detected cancers that were up to 15 mm in size has varied between 48% (2005) and 65% (2008). In 2010 it was 54%.

The number of mammograms performed per screening unit in 2010 varied between 505 in Viimsi hospital and 7632 in the Mammograaf stationary unit. Overall, 30.6% of mammograms were performed by the two mobile units. Recall rates in 2010 by screening unit varied from 1.9% in East Viru Central Hospital to 3.9% in Narva Hospital and Mammograaf Radiology Clinic stationary unit. Cancer detection rates varied between 2.6% in Pärnu Central Hospital and 6.4% in the Tartu University Clinic stationary unit. Taken together, the stationary and mobile units had quite similar recall rates (3.2% vs. 3.0%), whereas cancer detection rate was higher in the stationary units (4.9%) than in the mobile ones (3.0%).

5 Discussion

Screening mammography in Estonia is 100% digital since 2007. The facilities of all screening units and assessment units are modern. Personnel in the units are highly skilled and motivated. Initiated by the Estonian Cancer Society, breast cancer screening is now a public health priority supported by the Health Insurance Fund. During the visits to the screening units it was evident that access to screening for the invited women is functional and there are practically no queues. Despite all efforts including mass media support and public interest, the Estonian breast cancer screening programme has not yet attained the desirable rate of participation (75 %) or even the acceptable rate of participation (70 %) as set by the European Guidelines.¹ This is likely due to barriers to participation, such as the lack of a predefined appointment in the invitation letter and the lack of an autonomous programme coordination service responsible, among other things, for centralized invitation. Furthermore, regarding other performance indicators, the recall rate meets the acceptable level of <5 % and in some years has reached the desirable level of <3 %. The proportion of stage II+ cancers of all screen-detected cancers has reached the recommended level of <25 % in most years since 2004. However, the proportion of invasive cancers ≤10 mm of all invasive cancers has not achieved the desirable level of ≥30 %. (In 2010, the proportion of invasive cancers <10 mm was 14 %.) Also the proportion of ductal in situ carcinomas (DCIS) of all screen-detected cancers (6 % in 2010) has not reached the acceptable target set by the European Guidelines (10 %), however this could be related to the performance of the pathology service and thus outside the scope of the current assessment. Due to the lack of a screening registry with individual data the above results could not be validated and additional performance indicators listed in Annex 2 were not available. Scientific studies on screening

¹ Perry N, Broeders M, de Wolf C, Törnberg S, Holland R, von Karsa L (eds) (2006). European Guidelines for Quality Assurance in Breast Cancer Screening and Diagnosis. European Commission, Luxembourg :Office for Official Publications of the European Communities.

performance and validity involving information on interval cancers and screening outcome were not available, but should be planned for the future.

Women living in Tallinn can choose between three stationary screening units (four units in 2012) and they also have the opportunity to make an appointment with a mobile screening unit. Since no more than one third of screening age women live in Tallinn, they have in relative terms easier access to mammography than women living in rural areas. For comparison, the two mobile units screen almost as many women as the three stationary units in Tallinn.

The Council Recommendation on Cancer Screening of 2 December 2003² recommends screening women aged 50-69. National guidelines may differ. For the Estonian programme, it is recommended to gradually extend the upper age limit for invitation to age 69. Most urgent of all is to extend screening to all age-eligible women resident in Estonia, regardless of their employment or insurance status.

In Estonia there appear to be two independent PACS systems for mammography images. The first was established by Mammograaf. The larger, nationwide system was started later. The two can exchange images, but this involves extra work and expense for each and every case, and the exchange must be done manually. The major obstacle to integrating the two systems appears to be financial rather than technical. Integration of the two systems would be highly desirable for the functioning of the nationwide screening program.

There is some variation among the centres concerning the image quality. A particular concern is low or suboptimal image contrast, which can make small breast cancers more difficult to detect. Image contrast can be optimised by adjusting the post-processing parameters of the digital imaging equipment, but there are no standards and few individuals have experience with this. To assure optimal performance the preferences of experienced radiologists should be taken into account in adjusting the post-processing. This is best done in conjunction with a representative of the manufacturer of the imaging equipment who has extensive experience with image adjustments. Such experience is usually lacking in most national representatives, and it would most likely be necessary to ask for an expert from the manufacturer's central European office. This was done successfully in a large number of workstations throughout Finland in 2007.

Due to limitations of time during the presently reported site visits it was not possible to evaluate the entire screening process, particularly the clinical management of screen-positive cases. In addition the overall programme organization was not the focus of the present assessment.

² Council of the European Union. Council Recommendation of 2 December 2003 on cancer screening (2003/878/EC). Off J Eur Union 2003; 34-38

6 Recommendations

- Adequate, sustainable resources for management of the programme by an autonomous centralized coordination service, including resources to assure population-based invitation and organization, as well as continuous quality improvement should be provided.
- There should be a national screening registry with permanent linkage to other registries for continuous monitoring and evaluation. These other registries include the population registry, cancer registry and cause of death registry and other registries involved in the management of breast cancer. Data of invitations, visits and all mammographic examinations, diagnostic process and management starting from the beginning of the screening programme should be entered into the screening registry using a unique individual identifier.
- Invitation coverage and screening attendance rates should be improved and budgeting should be provided for substantially higher attendance rates. Personal invitation with place and time of appointment supported by locally tailored information campaigning should be urgently developed. There should be an opportunity to change the time of appointment by telephone and preferably also through the internet. There should be a centralized reminder for non-participants.
- Programme management should have a clear mandate to coordinate activities at the national, regional and local levels to ensure that screening is implemented with a population-based approach and with appropriate quality at every step in the screening process including invitation to attend screening, diagnostic work-up of women with abnormalities detected in screening, treatment and follow-up.
- All resident women in Estonia in the eligible age range should be able to fully participate in the screening programme regardless of their employment or insurance status.
- Invitation of whole age cohorts is recommended. The upper age limit for invitation should be gradually and systematically extended to age 69.
- Training resources should be provided, especially for the Pärnu, Ida-Viru, Viimsi and Narva screening units.
- Integration of the two image archive and communication systems (PACS) into a unified system is recommended.
- Post-processing contrast resolution of mammograms should be optimised.
- International collaboration in quality control and participation in an international accreditation programme is recommended
- Publication of screening performance, quality and outcomes in peer-reviewed journals, regular statistical reports and popular press is encouraged.

Table 1: List of sites visited

English name	Estonian name	Location
Mammograaf Radiology Clinic	AS Mammograaf	Tallinn
Tartu University Hospital	Tartu Ülikooli Kliinikum	Tartu
Pärnu Hospital	Pärnu Haigla	Pärnu
East Viru Central Hospital	Ida-Viru Keskhaigla, Puru korpus	Puru
Narva Hospital	Narva Haigla	Narva
North Estonia Medical Centre	Põhja-Eesti Regionaalhaigla	Tallinn
Viimsi Hospital	Viimsi Haigla	Tallinn

Table 2: Key specialists interviewed

1. Dr Katrin Kuusemäe, Managing Director, SA Cancer Screening
2. Dr Theo Raudsepp, Radiologist, Mammograaf Radiology Clinic
3. Dr Sulev Ulp, Radiologist, Tartu University Clinic
4. Dr Vladimir Järv, Tartu University Clinic
5. Ms Ele Virolainen, radiology nurse, Tartu University Clinic
6. Dr Maret Talk, Head of Radiology Dept., North Estonia Medical Centre (NEMC)
7. Prof. Sergei Nazarenko, Director, North Estonia Medical Centre (NEMC)
8. Dr Andrus Paats, Senior Biomedical Engineer, North Estonia Medical Centre (NEMC)
9. Dr Priit Pauls, Ultrasound specialist, North Estonia Medical Centre (NEMC)
10. Dr Tiiu-Liis Tigane, Oncologist, North Estonia Medical Centre (NEMC)
11. Ms Piret Tannebaum, breast cancer screening secretary (NEMC)
12. Dr Lidia Lill, Radiologist, Viimsi Hospital
13. Dr Tiina Juckum, Radiologist, Pärnu Central Hospital
14. Ms Piret Vahtramäe, Head Radiology Nurse, Pärnu Central Hospital
15. Mr Joosep Kepler, Medical Physicist, Pärnu Central Hospital
16. Dr Igor Muhhin, Radiologist, East Viru Central Hospital
17. Ms Natalia Vilde, Head Radiology Nurse, East Viru Central Hospital
18. Dr Pille Letjuka, Head Doctor, Narva Hospital
19. Ms Galina Tišina, Radiology Nurse, Narva Hospital
20. Ms Anna Višnjova, Radiology Nurse, Narva Hospital