

## Annex 1: Breast cancer screening in Estonia

### Background information sources

The following sources were consulted to obtain background information relevant to the Estonian breast cancer screening programme prior to the site visits:

1. Estonian Health Insurance Fund website <http://www.haigekassa.ee/>
2. Estonian Cancer Society website <http://www.cancer.ee/>
3. First Report on the implementation of the Council recommendation on cancer screening "Cancer Screening in the European Union", European Communities, 2008
4. Koppel & al. (2008) Estonia: Health System Review. *Health Systems in Transition* 10(1): 1-230
5. Aaviksoo & al. (2007). Rinnavähi sõeluuringu programme hindamise tulemused. [Results of breast cancer screening programme audit]. *Eesti Arst*, 86(11):791–796
6. Innos & al. (2010) Place of residence predicts breast cancer stage at diagnosis in Estonia. *Eur J Public Health*
7. Leinsalu & al. (2004) Increasing ethnic differences in mortality in Estonia after the collapse of the Soviet Union. *J Epidemiol Community Health* 58: 583-589.
8. Sant & al. (2006) Time trends of breast cancer survival in Europe in relation to incidence and mortality. *Int J Cancer* 119: 2417-2422.
9. Estonian Health Insurance Fund Annual Report 2009  
[http://www.haigekassa.ee/uploads/userfiles/file/ENG/Eesti\\_Haigekassa\\_majandusaa\\_sta\\_aruanne\\_2009\\_eng.pdf](http://www.haigekassa.ee/uploads/userfiles/file/ENG/Eesti_Haigekassa_majandusaa_sta_aruanne_2009_eng.pdf)
10. Ulp & al. (2010) 10 aastat rinnavähi sõeluuringut Eestis: samm-sammult pusititatu eesmarkide poole. [10 years of breast cancer screening in Estonia: achieving set aims step-by-step] *Eesti Arst*, 89(7-8): 493-501.
11. Rosso & al. (2010) Up-to-date estimates of breast cancer survival for the years 2000-2004 in 11 European countries: the role of screening and a comparison with data from the United States. *Eur J Cancer* 46(18): 3351-3357.
12. Allemani & al. (2010) Variation in "standard care" for breast cancer across Europe: a EURO CARE-3 high resolution study. *Eur J Cancer* 46(9): 1528-1536.
13. Summary of Actions in 2009 under the Implementation Plan 2009-2013 for the National Health Plan 2009-2020.  
[http://www.sm.ee/fileadmin/meedia/Dokumendid/Tervisevaldkond/Rahvatervis/RTA/RTA\\_2009\\_tegevusaruanne\\_english.pdf](http://www.sm.ee/fileadmin/meedia/Dokumendid/Tervisevaldkond/Rahvatervis/RTA/RTA_2009_tegevusaruanne_english.pdf)
14. Eesti Statistika Kvartalikirj [Quarterly Bulletin of Statistics Estonia] 4/2010  
[http://www.stat.ee/publication-download-pdf?publication\\_id=19984](http://www.stat.ee/publication-download-pdf?publication_id=19984)
15. Ferlay J, Shin HR, Bray F, Forman D, Mathers C and Parkin DM. GLOBOCAN 2008 v1.2, Cancer Incidence and Mortality Worldwide: IARC CancerBase No. 10 [Internet]. Lyon, France: International Agency for Research on Cancer; 2010. Available from: <http://globocan.iarc.fr>, accessed on 12/12/2011.
16. Estonian Health Insurance Fund Annual Report 2003  
[http://www.haigekassa.ee/files/eng\\_ehif\\_annual/annual\\_report2003.pdf](http://www.haigekassa.ee/files/eng_ehif_annual/annual_report2003.pdf)
17. Estonian Health Insurance Fund Annual Report 2004  
[http://www.haigekassa.ee/files/eng\\_ehif\\_annual/aruanne\\_EN.pdf](http://www.haigekassa.ee/files/eng_ehif_annual/aruanne_EN.pdf)
18. Estonian Health Insurance Fund Annual Report 2005  
[http://veeb.haigekassa.ee/files/eng\\_ehif\\_annual/2005.Maj.a.aruanne-ENG.pdf](http://veeb.haigekassa.ee/files/eng_ehif_annual/2005.Maj.a.aruanne-ENG.pdf)

19. Estonian Health Insurance Fund Annual Report 2006  
[http://www.haigekassa.ee/files/eng\\_ehif\\_annual/EHIF\\_Annual%20Report\\_2006.pdf](http://www.haigekassa.ee/files/eng_ehif_annual/EHIF_Annual%20Report_2006.pdf)
20. Estonian Health Insurance Fund Annual Report 2007  
[http://www.haigekassa.ee/files/eng\\_ehif\\_annual/EHIF\\_Annual\\_Report\\_2007.pdf](http://www.haigekassa.ee/files/eng_ehif_annual/EHIF_Annual_Report_2007.pdf)
21. Estonian Health Insurance Fund Annual Report 2008  
[http://www.haigekassa.ee/uploads/userfiles/Majandusaasta%20aruanne%202008\\_ENG.pdf](http://www.haigekassa.ee/uploads/userfiles/Majandusaasta%20aruanne%202008_ENG.pdf)

## Annex 2: Breast cancer screening in Estonia

### Background data

The pre-audit consists of field visits, interviews and review of essential process descriptions and work instructions, such as the Quality Manual. The following tables characterize the screening programme and its performance. They are intended to be filled in by the screening programme staff before the auditors' visit.

The tables are modified from: 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

In addition to the tables, a free-form written description of the screening programme including legal, organizational and scientific aspects will be greatly appreciated. This would include further specifications of the programme in order to interpret the tables. Preliminary information has also been gathered by the auditors from public sources (see Annex 1).

**Table A2.1a: Baseline conditions at the beginning of the breast screening programme**

|   |  |
|---|--|
| Name of region/country  | Estonia  |
| Year that the programme started   | 2002   |
| Age group targeted  | (45)50 – 62(65) [45-59 2002-2004; 2005-2007 50-59; 2008 - 50-62(65)] |
| Size of target population*  | ca 125 000   |
| Sources of demographic data*  | Population registry  |
| Population-based (yes/no)*  | Yes (women with health insurance)                                    |
| Type of cohort (fixed/dynamic)*   | Dynamic  |
| Proportion of target population covered by opportunistic screening* (%) | about 9% of women aged 50-69 in 2006                                 |
| Source of data for the above estimate                                   |  |

\* cf Glossary of terms

\*\* [Source: EC survey DG SANCO (2007), IARC (ECN / EUNICE 2007)]

**Table A2.1b: Conditions of the breast screening programme in the year 2010**

|                              |  |
|------------------------------|--|
| Name of region/country       | Estonia  |
| Age group targeted           | 50 – 65 (in fact 50 – 62, since 2007)                        |
| Age cohorts invited          | 1948, 1949, 1951, 1952, 1956, 1958, 1960                     |
| Size of target population*   | 125 000  |
| Sources of demographic data* | Population registry, National Health Insurance Fund registry |
| Population-based (yes/no)*   | Yes (women with health insurance)                            |



**Table A2.3a: Breast cancer incidence: absolute numbers of cases per year and age group (INCLUDING INVASIVE BREAST CANCERS AND DCIS)**

| Year | Age group |       |       |       |       |       |       |       |       |       | Total |       |     |
|------|-----------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-----|
|      | 0-29      | 30-34 | 35-39 | 40-44 | 45-49 | 50-54 | 55-59 | 60-64 | 65-69 | 70-74 |       | 75-79 | 80- |
| 1990 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 1991 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 1992 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 1993 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 1994 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 1995 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 1996 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 1997 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 1998 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 1999 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 2000 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 2001 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 2002 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 2003 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 2004 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 2005 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 2006 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 2007 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 2008 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 2009 |           |       |       |       |       |       |       |       |       |       |       |       |     |

**Table A2.3b: Breast cancer incidence rate per 100 000 women per year and age group  
(MAKE TABLES FOR CRUDE AND AGE ADJUSTED INCIDENCE RATES)**

| Year | Age group |       |       |       |       |       |       |       |       |       | Total |       |     |
|------|-----------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-----|
|      | 0-29      | 30-34 | 35-39 | 40-44 | 45-49 | 50-54 | 55-59 | 60-64 | 65-69 | 70-74 |       | 75-79 | 80- |
| 1990 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 1991 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 1992 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 1993 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 1994 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 1995 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 1996 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 1997 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 1998 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 1999 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 2000 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 2001 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 2002 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 2003 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 2004 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 2005 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 2006 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 2007 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 2008 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 2009 |           |       |       |       |       |       |       |       |       |       |       |       |     |

**Table A2.3c: Invasive breast cancer incidence rate per 100 000 women per year and age group  
(MAKE TABLES FOR CRUDE AND AGE ADJUSTED INCIDENCE RATES)**

| Year | Age group |       |       |       |       |       |       |       |       |       | Total |       |     |
|------|-----------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-----|
|      | 0-29      | 30-34 | 35-39 | 40-44 | 45-49 | 50-54 | 55-59 | 60-64 | 65-69 | 70-74 |       | 75-79 | 80- |
| 1990 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 1991 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 1992 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 1993 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 1994 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 1995 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 1996 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 1997 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 1998 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 1999 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 2000 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 2001 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 2002 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 2003 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 2004 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 2005 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 2006 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 2007 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 2008 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 2009 |           |       |       |       |       |       |       |       |       |       |       |       |     |

**Table A2.3d: Invasive localized breast cancer incidence rate per 100 000 women per year and age group (describe which TNM/stage classifications are included)  
(MAKE TABLES FOR CRUDE AND AGE ADJUSTED INCIDENCE RATES)**

| Year | Age group |       |       |       |       |       |       |       |       |       | Total |       |     |
|------|-----------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-----|
|      | 0-29      | 30-34 | 35-39 | 40-44 | 45-49 | 50-54 | 55-59 | 60-64 | 65-69 | 70-74 |       | 75-79 | 80- |
| 1990 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 1991 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 1992 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 1993 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 1994 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 1995 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 1996 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 1997 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 1998 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 1999 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 2000 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 2001 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 2002 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 2003 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 2004 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 2005 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 2006 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 2007 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 2008 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 2009 |           |       |       |       |       |       |       |       |       |       |       |       |     |

**Table A2.3e: Advanced breast cancer incidence rate per 100 000 women per year and age group  
(MAKE TABLES FOR CRUDE AND AGE ADJUSTED INCIDENCE RATES)**

| Year | Age group |       |       |       |       |       |       |       |       |       | Total |       |     |
|------|-----------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-----|
|      | 0-29      | 30-34 | 35-39 | 40-44 | 45-49 | 50-54 | 55-59 | 60-64 | 65-69 | 70-74 |       | 75-79 | 80- |
| 1990 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 1991 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 1992 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 1993 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 1994 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 1995 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 1996 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 1997 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 1998 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 1999 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 2000 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 2001 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 2002 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 2003 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 2004 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 2005 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 2006 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 2007 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 2008 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 2009 |           |       |       |       |       |       |       |       |       |       |       |       |     |

**Table A2.3f: Breast cancer mortality: absolute numbers of cases per year and age group (describe if data is based on linkage with cancer registry or not)**

| Year | Age group |       |       |       |       |       |       |       |       |       | Total |       |     |
|------|-----------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-----|
|      | 0-29      | 30-34 | 35-39 | 40-44 | 45-49 | 50-54 | 55-59 | 60-64 | 65-69 | 70-74 |       | 75-79 | 80- |
| 1990 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 1991 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 1992 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 1993 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 1994 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 1995 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 1996 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 1997 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 1998 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 1999 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 2000 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 2001 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 2002 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 2003 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 2004 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 2005 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 2006 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 2007 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 2008 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 2009 |           |       |       |       |       |       |       |       |       |       |       |       |     |

**Table A2.3g: Breast cancer mortality rate per 100.000 women per year and age group  
(MAKE TABLES FOR CRUDE AND AGE ADJUSTED MORTALITY RATES)**

| Year | Age group |       |       |       |       |       |       |       |       |       | Total |       |     |
|------|-----------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-----|
|      | 0-29      | 30-34 | 35-39 | 40-44 | 45-49 | 50-54 | 55-59 | 60-64 | 65-69 | 70-74 |       | 75-79 | 80- |
| 1990 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 1991 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 1992 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 1993 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 1994 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 1995 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 1996 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 1997 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 1998 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 1999 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 2000 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 2001 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 2002 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 2003 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 2004 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 2005 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 2006 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 2007 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 2008 |           |       |       |       |       |       |       |       |       |       |       |       |     |
| 2009 |           |       |       |       |       |       |       |       |       |       |       |       |     |

**Table A2.4: Fees paid for the screening examination and recall**

Fees paid by the woman herself (in Euros):

- For the screening examination 0.-
- To receive the results 0.-
- For further investigations after the recall 0.-

Third party payment (% of costs covered):

- Through vouchers
- Through reimbursement system
- Directly to screening unit\* 100%

Additional information

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\* cf Glossary of terms

**Table A2.5: Potential conditions for/against screening**

Please specify any conditions that may have worked for or against screening in your screening programme:

For :

- 1) Estonian Cancer Society initiative
- 2) Health Insurance priority
- 3) Mass media support
- 4) Public interest

Against :

- 1) Lack of correct population registry
- 2) Low knowledge of women about screening (at first)
- 3) Insufficient funding
- 4) Lack of screening registry
- 5) Data protection law (corrupted Screening registry)

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**Table A2.6a: Sources and accuracy of target population data in 2002-2004**

| <b>Data source</b>           | <b>Target*<br/>Population<br/>(n)</b> | <b>Eligible**<br/>population<br/>identified (n)</b> | <b>Eligible<br/>population<br/>identified (%)</b> | <b>Coverage*** of<br/>information on<br/>target population (%)</b> |
|------------------------------|---------------------------------------|---|---|--|
| Population register          |                                       |   |   |  |
| Electoral register           |                                       |   |   |  |
| Other registers              |                                       |   |   |  |
| Self-registration*           |                                       |   |   |  |
| Other, please specify which: |                                       |   |   |  |

\* cf Glossary of terms  
\*\* Specify criteria of eligibility:  
\*\*\* Estimated proportion of screening age population included in target population (indicate sources)

**Table A2.6b: Sources and accuracy of target population data in 2005-2006**

| <b>Data source</b>           | <b>Target*<br/>Population<br/>(n)</b> | <b>Eligible**<br/>population<br/>identified (n)</b> | <b>Eligible<br/>population<br/>identified (%)</b> | <b>Coverage*** of<br/>information on<br/>target population (%)</b> |
|------------------------------|---------------------------------------|---|---|--|
| Population register          |                                       |   |   |  |
| Electoral register           |                                       |   |   |  |
| Other registers              |                                       |   |   |  |
| Self-registration*           |                                       |   |   |  |
| Other, please specify which: |                                       |   |   |  |

\* cf Glossary of terms  
\*\* Specify criteria of eligibility:  
\*\*\* Estimated proportion of screening age population included in target population (indicate sources)

**Table A2.6c: Sources and accuracy of target population data in 2007 or later**

| Data source                  | Target*<br>Population<br>(n) | Eligible**<br>population<br>identified (n) | Eligible<br>population<br>identified (%) | Coverage*** of<br>information on<br>target population (%) |
|------------------------------|------------------------------|--|--|---|
| Population register          |                              |  |  |   |
| Electoral register           |                              |  |  |   |
| Other registers              |                              |  |  |   |
| Self-registration*           |                              |  |  |   |
| Other, please specify which: |                              |  |  |   |

\* cf Glossary of terms  
 \*\* Specify criteria of eligibility:  
 \*\*\* Estimated proportion of screening age population included in target population (indicate sources)

**Table A2.7: Maintenance of the screening register**

Estimate of screening register:

- Completeness (%)
- Accuracy (%)

Sources of screening register updates (yes/no):

- Census data/population register
- Cancer registry
- Death registry
- Health care data/health insurance data
- Social insurance/tax records
- Data on population migration
- Returned invitations
- Other:

Frequency with which screening register is updated

In case there is no screening register, please indicate any plans of creating one, timetables etc.  
 Pending – in process 2012?)

Cancer Screening Foundation is collecting aggregated data from screening units. Every screening unit has their own data programs for individual data.

There is no system in place for quality control of data collection.

According to EUNICE tables, until 2006 there were no centrally agreed procedures to statistically analyse the screening data regularly. Currently statistical analysis of data is carried out on a yearly basis.

**Table A2.8a: Mode of invitation**

| Mode of invitation   | First screening round |                   |                   | Subsequent screening round   |                   |                   |
|--|-----------------------|-------------------|-------------------|------------------------------|-------------------|-------------------|
|  | Invitation (yes/no)   | Reminder (yes/no) | Interval* (weeks) | Invitation (yes/no)          | Reminder (yes/no) | Interval* (weeks) |
| Personal letter  | yes                   | yes               | 24                | yes                          | yes               | 24                |
| • By mail  |                       |                   |                   |                              |                   |                   |
| • Other (specify) _____  |                       |                   |                   |                              |                   |                   |
| • Fixed appointment time and date  | no                    | no                |                   | no                           | no                |                   |
| Personal oral invitation   |                       |                   |                   |                              |                   |                   |
| • By screening unit*   |                       |                   |                   |                              |                   |                   |
| • Other (specify) _____  |                       |                   |                   |                              |                   |                   |
| • Fixed appointment time and date  |                       |                   |                   |                              |                   |                   |
| Non-personal invitation  |                       |                   |                   |                              |                   |                   |
| • Letter   |                       |                   |                   |                              |                   |                   |
| • Public announcement  |                       |                   |                   |                              |                   |                   |
| Additional information:  |                       |                   |                   | In mass media (mobile units) |                   |                   |
| The Health Insurance Fund sends personal invitations to insured women.   |                       |                   |                   |                              |                   |                   |
| Is there an electronic mailing system in place?  |                       |                   |                   | No invitations by e-mail     |                   |                   |
| Who has signed the invitation letter?  |                       |                   |                   | Health Insurance CEO         |                   |                   |
| If there are changes in the invitation practices over time, please explain separately for each period.<br>In 2002 no personal invitations (through mass media); since 2003 personal invitations by letters.  |                       |                   |                   |                              |                   |                   |
| Describe the media campaigning (TV, radio, press, internet, other) parallel with the invitations in the national and regional levels.  |                       |                   |                   |                              |                   |                   |
| <ol style="list-style-type: none"> <li>1. Screening campaign every Spring by Cancer Society and Health Insurance Fund</li> <li>2. Cancer Society breast cancer screening publications (leaflets)</li> <li>3. Publications in press</li> <li>4. TV and radio presentations during campaign</li> <li>5. Regional press publications prior to mobile unit visits</li> </ol> |                       |                   |                   |                              |                   |                   |

\* cf Glossary of terms

**Table A2.8b: Personal invitations and reminders by mail\***

| Year | Total target (n) | Eligib group (n) | Number of invitations sent (n) | % of women who received the invitation | Number of reminders sent | % of women who received the reminder | Number of invited and screened | N of** self-reg. |
|------|------------------|------------------|--------------------------------|--|--------------------------|--------------------------------------|--------------------------------|------------------|
| 2002 |                  |                  |                                |  |                          |                                      |                                |                  |
| 2003 |                  |                  |                                |  |                          |                                      |                                |                  |
| 2004 |                  |                  |                                |  |                          |                                      |                                |                  |
| 2005 |                  |                  |                                |  |                          |                                      |                                |                  |
| 2006 |                  |                  |                                |  |                          |                                      |                                |                  |
| 2007 |                  |                  |                                |  |                          |                                      |                                |                  |
| 2008 |                  |                  |                                |  |                          |                                      |                                |                  |
| 2009 |                  |                  |                                |  |                          |                                      |                                |                  |
| 2010 |                  |                  |                                |  |                          |                                      |                                |                  |

\* Until 2005 there was first screening round for all invited cohorts. The estimated percentage of women re-invited within the specified screening interval depends of amount of money, allocated from financers to screening tests. (Source: EUNICE 2005 data)

\*\*This column includes those target group women who were screened but did not receive the invitation because of incorrect address. If possible, separate from these women who had diagnostic mammography or opportunistic screening into additional columns.

Describe in detail the primary invitations (from which address databases, and which period of time from the latest updating the invitation is sent, and specify if linkage to vital status has been done) and separately the reminder sending process. Is there a possibility to opt-out of screening (reminders included) and which is the recommended procedure?

If any significant differences were seen between age groups, please indicate possible reasons.

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**Table A2.10a: Screening facilities**

| Screening facilities | Number |      |      |      |      | Dedicated* |      |      |      |
|----------------------|--------|------|------|------|------|------------|------|------|------|
|                      | 2002   | 2003 | 2004 | 2005 | 2006 | 2007       | 2008 | 2009 | 2010 |
| Mammography machines | 6      | 6    | 7    | 7    | 7    | 7          | 8    | 9    | 9    |
| Static units         | 5      | 5    | 5    | 5    | 5    | 5          | 6    | 7    | 7    |
| Semi-mobile units    |        |      |      |      |      |            |      |      |      |
| Mobile units         | 1      | 1    | 2    | 2    | 2    | 2          | 2    | 2    | 2    |
| Other units          |        |      |      |      |      |            |      |      |      |
| Assessment centres   | 2      | 2    | 2    | 2    | 2    | 2          | 2    | 2    | 2    |

\* cf Glossary of terms

**Table A2.10b: Mammography facilities\*\* and volume (multiple tables for each area/county/unit may be necessary).**

| Facilities | All          |                | Screening    |                | Dedicated*   |                |
|------------|--------------|----------------|--------------|----------------|--------------|----------------|
|            | Machines (n) | Mammograms (n) | Machines (n) | Mammograms (n) | Machines (n) | Mammograms (n) |
| 2002       |              |                |              |                |              |                |
| 2003       |              |                |              |                |              |                |
| 2004       |              |                |              |                |              |                |
| 2005       |              |                |              | 5              |              |                |
| 2006       |              |                |              | 5              |              |                |
| 2007       |              |                |              |                |              |                |
| 2008       |              |                |              |                |              |                |
| 2009       |              |                |              |                |              |                |
| 2010       |              |                |              |                |              |                |

\* cf Glossary of terms

\*\*Please describe the history of enlargement of mammographic capacity in different screening units.

Please describe assessment centres and possible additional capacity in view of future enlargement of target population.



**Table A2.12: Invitation outcomes\*\***

|                          | 50-54 | 55-59 | Age group<br>60-64 | 65-69 | Total |
|--------------------------|-------|-------|--------------------|-------|-------|
| Target population* (n)   |       |       |                    |       |       |
| Eligible population* (n) |       |       |                    |       |       |
| Invitation coverage (%)* |       |       |                    |       |       |
| Women invited* (n)       |       |       |                    |       |       |
| Women screened* (n)      |       |       |                    |       |       |
| Participation rate (%)*  |       |       |                    |       |       |

n = number

\* How many women were invited in a 2-year interval; How many women were screened at least once in a 2-year interval. Preferably assess coverage using the personal identifier.

If available specify by region and by first and subsequent screening round.

\*\* If available report for each year separately

**Table A2.13: Screening outcomes (MULTIPLE TABLES BY YEAR)**

|   | 50-54 | 55-59 | Age group<br>60-64 | 65-69 | Total |
|---|-------|-------|--------------------|-------|-------|
| Women screened* (n)                           |       |       |                    |       |       |
| Outcome of the screening test:** (n)          |       |       |                    |       |       |
| • Negative                                    |       |       |                    |       |       |
| • Intermediate mammogram following screening* |       |       |                    |       |       |
| • Repeat screening test*                      |       |       |                    |       |       |
| - recommended                                 |       |       |                    |       |       |
| - performed                                   |       |       |                    |       |       |
| • Further assessment*                         |       |       |                    |       |       |
| - recommended                                 |       |       |                    |       |       |
| - performed                                   |       |       |                    |       |       |
| • Unknown/not available                       |       |       |                    |       |       |

\* cf Glossary of terms

\*\* after repeat screening test if necessary

**Table A2.14: Screening outcomes: further investigations (MULTIPLE TABLES BY YEAR)**

| Investigations after screening   | 50-54 | 55-59 | Age group<br>60-64 | 65-69 | Total |
|--|-------|-------|--------------------|-------|-------|
| Repeat screening test* (n)   |       |       |                    |       |       |
| <ul style="list-style-type: none"> <li>• At screening</li> <li>• On recall*</li> </ul>   |       |       |                    |       |       |
| Additional imaging* (n)  |       |       |                    |       |       |
| <ul style="list-style-type: none"> <li>• At screening</li> <li>• On recall*</li> </ul>   |       |       |                    |       |       |
| Types of additional imaging* (n)   |       |       |                    |       |       |
| <ul style="list-style-type: none"> <li>• Repeat views (medical)</li> <li>• Cranio-caudal view</li> <li>• Other views</li> <li>• Ultrasound</li> <li>• MRI</li> </ul> |       |       |                    |       |       |
| Clinical examination* (n)  |       |       |                    |       |       |
| <ul style="list-style-type: none"> <li>• At screening</li> <li>• On recall*</li> </ul>   |       |       |                    |       |       |
| Cytology* (n)  |       |       |                    |       |       |
| <ul style="list-style-type: none"> <li>• Recommended</li> <li>• Performed</li> </ul>   |       |       |                    |       |       |
| Core biopsy* (n)   |       |       |                    |       |       |
| <ul style="list-style-type: none"> <li>• Recommended</li> <li>• Performed</li> </ul>   |       |       |                    |       |       |
| Open biopsy* (n)   |       |       |                    |       |       |
| <ul style="list-style-type: none"> <li>• Recommended</li> <li>• Performed</li> </ul>   |       |       |                    |       |       |
| Repeat screening test rate* (%)  |       |       |                    |       |       |
| Additional imaging rate* (%)   |       |       |                    |       |       |
| Recall rate* (%)   |       |       |                    |       |       |
| Further assessment rate* (%)   |       |       |                    |       |       |

\* cf Glossary of terms

n = number

**Table A2.15: Outcome of screening process after assessment (MULTIPLE TABLES BY YEAR)**

|  | 50-54 | 55-59 | Age group |       | Total |
|--|-------|-------|-----------|-------|-------|
|  |       |       | 60-64     | 65-69 |       |
| Outcome of screening process (n):              |       |       |           |       |       |
| • Negative                                     |       |       |           |       |       |
| • Intermediate mammogram following assessment* |       |       |           |       |       |
| • Breast cancers detected:                     |       |       |           |       |       |
| • - DCIS                                       |       |       |           |       |       |
| • - invasive cancers                           |       |       |           |       |       |
| • Unknown/not available                        |       |       |           |       |       |
| Breast cancers detected (n):                   |       |       |           |       |       |
| • At routine screen                            |       |       |           |       |       |
| • At intermediate mammography*                 |       |       |           |       |       |
| Breast cancer detection rate*                  |       |       |           |       |       |
| Background breast cancer incidence rate*       |       |       |           |       |       |
| Age-specific detection ratio*                  |       |       |           |       |       |

\* cf Glossary of terms n = number

**Table A2.16: Positive predictive value of specific interventions in screening for breast cancer, age group 50-69 (MULTIPLE TABLES BY 5-YEAR AGE GROUP AND YEAR)**

| Outcome of the intervention        | Breast cancer detected |    | PPV* |
|------------------------------------|------------------------|----|------|
|                                    | Yes                    | No |      |
| Screening test* Positive           |                        |    |      |
| Recall* Positive                   |                        |    |      |
| Cytology* Positive (=malignant)    |                        |    |      |
| Core biopsy* Positive (=malignant) |                        |    |      |
| Open biopsy* NA                    |                        |    | NA   |

\* cf Glossary of terms

NA = not applicable

**Table A2.17: Primary treatment\* of screen-detected ductal carcinoma in situ  
(MULTIPLE TABLES PER YEAR)**

|  | 50-54<br>Total | 55-59 | Age group |       |
|--|----------------|-------|-----------|-------|
|  |                |       | 60-64     | 65-69 |
| Breast conserving surgery <sup>1</sup> (n) |                |       |           |       |
| • Sentinel node procedure                  |                |       |           |       |
| • Axillary dissection performed            |                |       |           |       |
| Mastectomy (n)                             |                |       |           |       |
| • Sentinel node procedure                  |                |       |           |       |
| • Axillary dissection performed            |                |       |           |       |
| Treatment refusal/unknown (n)              |                |       |           |       |
| TOTAL (n)                                  |                |       |           |       |

<sup>1</sup> less than mastectomy; n = number \* cf Glossary of terms

**Table A2.18: Primary treatment\* of screen-detected invasive breast cancers  
(MULTIPLE TABLES PER YEAR)**

|  | 50-54 | 55-59 | Age group |       | Total |
|--|-------|-------|-----------|-------|-------|
|  |       |       | 60-64     | 65-69 |       |
| Neo-adjuvant therapy* (n)                  |       |       |           |       |       |
| Breast conserving surgery <sup>1</sup> (n) |       |       |           |       |       |
| • Sentinel node procedure                  |       |       |           |       |       |
| • Axillary dissection performed            |       |       |           |       |       |
| Mastectomy (n)                             |       |       |           |       |       |
| • Sentinel node procedure                  |       |       |           |       |       |
| • Axillary dissection performed            |       |       |           |       |       |
| Treatment refusal/unknown (n)              |       |       |           |       |       |
| TOTAL (n)                                  |       |       |           |       |       |

<sup>1</sup> less than mastectomy; n = number \* cf Glossary of terms

**Table A2.19: Primary treatment\* of screen-detected breast cancers according to stage at Diagnosis**

|  | Stage at diagnosis |   |     |     |      |      |    |         |
|--|--------------------|---|-----|-----|------|------|----|---------|
|  | 0                  | I | IIA | IIB | IIIA | IIIB | IV | Unknown |
| Neo-adjuvant therapy* (n)                  |                    |   |     |     |      |      |    |         |
| Breast conserving surgery <sup>1</sup> (n) |                    |   |     |     |      |      |    |         |
| • Sentinel node procedure                  |                    |   |     |     |      |      |    |         |
| • Axillary dissection performed            |                    |   |     |     |      |      |    |         |
| Mastectomy (n)                             |                    |   |     |     |      |      |    |         |
| • Sentinel node procedure                  |                    |   |     |     |      |      |    |         |
| • Axillary dissection performed            |                    |   |     |     |      |      |    |         |
| No operation: specify reason               |                    |   |     |     |      |      |    |         |
| • Treatment refusal                        |                    |   |     |     |      |      |    |         |
| • Medical condition                        |                    |   |     |     |      |      |    |         |
| • Other/unknown (n)                        |                    |   |     |     |      |      |    |         |
| TOTAL (n)                                  |                    |   |     |     |      |      |    |         |

1 less than mastectomy; n = number \* cf Glossary of terms

**Table A2.20: Primary treatment\* of breast cancers diagnosed outside screening according to stage at diagnosis (OPTIONAL)**

|  | Stage at diagnosis |   |     |     |      |      |    |         |
|--|--------------------|---|-----|-----|------|------|----|---------|
|  | 0                  | I | IIA | IIB | IIIA | IIIB | IV | Unknown |
| Neo-adjuvant therapy* (n)                  |                    |   |     |     |      |      |    |         |
| Breast conserving surgery <sup>1</sup> (n) |                    |   |     |     |      |      |    |         |
| • Sentinel node procedure                  |                    |   |     |     |      |      |    |         |
| • Axillary dissection performed            |                    |   |     |     |      |      |    |         |
| Mastectomy (n)                             |                    |   |     |     |      |      |    |         |
| • Sentinel node procedure                  |                    |   |     |     |      |      |    |         |
| • Axillary dissection performed            |                    |   |     |     |      |      |    |         |
| No operation: specify reason               |                    |   |     |     |      |      |    |         |
| • Treatment refusal                        |                    |   |     |     |      |      |    |         |
| • Medical condition                        |                    |   |     |     |      |      |    |         |
| • Other/unknown (n)                        |                    |   |     |     |      |      |    |         |
| TOTAL (n)                                  |                    |   |     |     |      |      |    |         |

1 less than mastectomy; n = number \* cf Glossary of terms

**Table A2.21: Size and nodal status of screen-detected cancers (MULTIPLE TABLES PER YEAR)**

|          | 50-54<br>Total | 55-59 | Age group<br>60-64 | 65-69 |
|----------|----------------|-------|--------------------|-------|
| pTis     |                |       |                    |       |
| • pN-    |                |       |                    |       |
| • pN+    |                |       |                    |       |
| • pNx    |                |       |                    |       |
| pT1micab |                |       |                    |       |
| • pN-    |                |       |                    |       |
| • pN+    |                |       |                    |       |
| • pNx    |                |       |                    |       |
| pT1c     |                |       |                    |       |
| • pN-    |                |       |                    |       |
| • pN+    |                |       |                    |       |
| • pNx    |                |       |                    |       |
| pT2      |                |       |                    |       |
| • pN-    |                |       |                    |       |
| • pN+    |                |       |                    |       |
| • pNx    |                |       |                    |       |
| pT3      |                |       |                    |       |
| • pN-    |                |       |                    |       |
| • pN+    |                |       |                    |       |
| • pNx    |                |       |                    |       |
| pT4      |                |       |                    |       |
| • pN-    |                |       |                    |       |
| • pN+    |                |       |                    |       |
| • pNx    |                |       |                    |       |
| pTx      |                |       |                    |       |
| • pN-    |                |       |                    |       |
| • pN+    |                |       |                    |       |
| • pNx    |                |       |                    |       |

pN- = axillary node negative (pN0) pN+ = axillary node positive (any node positive; pN1-3)  
pNx = nodal status cannot be assessed (e.g. previously removed, not done)

**Table A2.22: Disease stage of screen-detected cancers (MULTIPLE TABLES PER YEAR)**

|   | 50-54<br>Total | 55-59 | Age group<br>60-64 | 65-69 |
|---|----------------|-------|--------------------|-------|
| Stage 0<br>• pTis pN0M0   |                |       |                    |       |
| Stage I<br>• pT1 pN0M0  |                |       |                    |       |
| Stage IIA<br>• pT0 pN1M0<br>• pT1 pN1M0<br>• pT2 pN0M0                                |                |       |                    |       |
| Stage IIB<br>• pT2 pN1M0<br>• pT3 pN0M0   |                |       |                    |       |
| Stage IIIA<br>• pT0 pN2M0<br>• pT1 pN2M0<br>• pT2 pN2M0<br>• pT3 pN1M0<br>• pT3 pN2M0 |                |       |                    |       |
| Stage IIIB<br>• pT4 any pNM0<br>• Any pT pN3M0  |                |       |                    |       |
| Stage IV<br>• Any pT any pNM1   |                |       |                    |       |
| Unknown   |                |       |                    |       |

**Please include National guidelines of breast cancer diagnostics and treatment (and follow-up) if available.**

**If national guidelines are not available, please describe the current practices.**

**Table A2.23: Post-surgical treatment\* of screen-detected breast cancers (MULTIPLE TABLES PER YEAR)**

|                             | 50-54<br>Total | 55-59 | Age group |       |
|-----------------------------|----------------|-------|-----------|-------|
|                             |                |       | 60-64     | 65-69 |
| Ductal carcinoma in situ    |                |       |           |       |
| • Radiotherapy              |                |       |           |       |
| • Treatment refusal/unknown |                |       |           |       |
| Invasive cancers            |                |       |           |       |
| • Chemotherapy              |                |       |           |       |
| • Radiotherapy              |                |       |           |       |
| • to the breast             |                |       |           |       |
| • to the chest wall         |                |       |           |       |
| • to the lymph stations     |                |       |           |       |
| • Hormonal therapy          |                |       |           |       |
| • Other treatments          |                |       |           |       |
| • Treatment refusal/unknown |                |       |           |       |

\* cf Glossary of terms

**Table A2.24: Post-surgical treatment\* of screen-detected breast cancers according to stage at diagnosis (MULTIPLE TABLES PER YEAR)**

|                           | Stage at diagnosis |   |     |     |      |      |    |
|---------------------------|--------------------|---|-----|-----|------|------|----|
|                           | 0                  | I | IIA | IIB | IIIA | IIIB | IV |
|                           | Unknown            |   |     |     |      |      |    |
| Chemotherapy              |                    |   |     |     |      |      |    |
| Radiotherapy              |                    |   |     |     |      |      |    |
| • to the breast           |                    |   |     |     |      |      |    |
| • to the chest wall       |                    |   |     |     |      |      |    |
| • to the lymph stations   |                    |   |     |     |      |      |    |
| Hormonal therapy          |                    |   |     |     |      |      |    |
| Other treatments          |                    |   |     |     |      |      |    |
| Treatment refusal/unknown |                    |   |     |     |      |      |    |

\* cf Glossary of terms

**Table A2.25: Post-surgical treatment\* of breast cancers diagnosed outside screening according to stage at diagnosis (OPTIONAL)**

|                           | Stage at diagnosis |   |     |     |      |      |    |
|---------------------------|--------------------|---|-----|-----|------|------|----|
|                           | 0<br>Unknown       | I | IIA | IIB | IIIA | IIIB | IV |
| Chemotherapy              |                    |   |     |     |      |      |    |
| Radiotherapy              |                    |   |     |     |      |      |    |
| • to the breast           |                    |   |     |     |      |      |    |
| • to the chest wall       |                    |   |     |     |      |      |    |
| • to the lymph stations   |                    |   |     |     |      |      |    |
| Hormonal therapy          |                    |   |     |     |      |      |    |
| Other treatments          |                    |   |     |     |      |      |    |
| Treatment refusal/unknown |                    |   |     |     |      |      |    |

\* cf Glossary of terms

**Table A2.26: Total waiting time: number of days between screening and surgery or screening and final assessment (age group 50 - 59 years for 2002-2006; age group 50-62 from 2007 onwards) for screen-detected cancers (MULTIPLE TABLES PER YEAR)**

|  | Percentiles |     |     |     |     |
|--|-------------|-----|-----|-----|-----|
|  | 5%          | 25% | 50% | 75% | 95% |
| Day of screening - initial day of offered assessment |             |     |     |     |     |
| Day of screening - day of offered surgery*           |             |     |     |     |     |
| Day of screening – day of final offered assessment   |             |     |     |     |     |

\*In case a cancer is detected at intermediate mammography, which is by definition a screen-detected cancer, the day of screening should be replaced by the day that the intermediate mammogram was performed.

**Table A2.27: Methods of follow up for cancer occurrence**

| Data source<br>Persons<br>invited   | Participants | Non-<br>Participants<br>not |
|-------------------------------------|--------------|-----------------------------|
| Screening programme register        |              |                             |
| Cancer / pathology register         |              |                             |
| Breast care / clinical records      |              |                             |
| Death register / certificate review |              |                             |
| Other, specify:                     |              |                             |
| Specify method of record linkage:   |              |                             |
|                                     |              |                             |
|                                     |              |                             |
|                                     |              |                             |
|                                     |              |                             |
|                                     |              |                             |
|                                     |              |                             |
|                                     |              |                             |
|                                     |              |                             |
|                                     |              |                             |
|                                     |              |                             |
|                                     |              |                             |

**Table A2.28: Relationship of breast cancers in the target population to tumour size, regional lymph node involvement and stage at diagnosis (MULTIPLE TABLES PER YEAR)**

| <b>Size of primary tumour</b> | <b>SD</b> | <b>IC</b> | <b>NP</b> | <b>NI</b> |
|-------------------------------|-----------|-----------|-----------|-----------|
| pTis                          |           |           |           |           |
| pT1mic                        |           |           |           |           |
| pT1a                          |           |           |           |           |
| pT1b                          |           |           |           |           |
| pT1c                          |           |           |           |           |
| pT2                           |           |           |           |           |
| pT3                           |           |           |           |           |
| pT4                           |           |           |           |           |
| pTx                           |           |           |           |           |
| TOTAL                         |           |           |           |           |
| <b>Regional lymph node</b>    | <b>SD</b> | <b>IC</b> | <b>NP</b> | <b>NI</b> |
| pN-                           |           |           |           |           |
| pN+                           |           |           |           |           |
| pNx                           |           |           |           |           |
| TOTAL                         |           |           |           |           |
| <b>Stage at diagnosis</b>     | <b>SD</b> | <b>IC</b> | <b>NP</b> | <b>NI</b> |
| Stage 0                       |           |           |           |           |
| Stage I                       |           |           |           |           |
| Stage II                      |           |           |           |           |
| Stage III                     |           |           |           |           |
| Stage IV                      |           |           |           |           |
| Stage unknown                 |           |           |           |           |
| TOTAL                         |           |           |           |           |

SD= screen-detected cancer IC = interval cancer  
 NP = cancer in non-participant NI = cancer in not invited

**Table A2.29a: Classification of interval cancers by size and lymph node involvement in defined time periods following initial screening examinations (first round)**

|          | Time since screening examination (months) |       |     |
|----------|---|-------|-----|
|          | 0-11<br>Total                             | 12-23 | 24+ |
| pTis     |   |       |     |
| • pN-    |   |       |     |
| • pN+    |   |       |     |
| • pNx    |   |       |     |
| pT1micab |   |       |     |
| • pN-    |   |       |     |
| • pN+    |   |       |     |
| • pNx    |   |       |     |
| pT1c     |   |       |     |
| • pN-    |   |       |     |
| • pN+    |   |       |     |
| • pNx    |   |       |     |
| pT2      |   |       |     |
| • pN-    |   |       |     |
| • pN+    |   |       |     |
| • pNx    |   |       |     |
| pT3      |   |       |     |
| • pN-    |   |       |     |
| • pN+    |   |       |     |
| • pNx    |   |       |     |
| pT4      |   |       |     |
| • pN-    |   |       |     |
| • pN+    |   |       |     |
| • pNx    |   |       |     |
| pTx      |   |       |     |
| • pN-    |   |       |     |
| • pN+    |   |       |     |
| • pNx    |   |       |     |

pN- = axillary node negative (pN0)

pN+ = axillary node positive (any node positive; pN1-3)

pNx = nodal status cannot be assessed (e.g. previously removed, not done)

**Table A2.29b: Classification of interval cancers by size and lymph node involvement in defined time periods following second round screening examinations.**

|          | Time since screening examination (months) |       |     |
|----------|---|-------|-----|
|          | 0-11<br>Total                             | 12-23 | 24+ |
| pTis     |   |       |     |
| • pN-    |   |       |     |
| • pN+    |   |       |     |
| • pNx    |   |       |     |
| pT1micab |   |       |     |
| • pN-    |   |       |     |
| • pN+    |   |       |     |
| • pNx    |   |       |     |
| pT1c     |   |       |     |
| • pN-    |   |       |     |
| • pN+    |   |       |     |
| • pNx    |   |       |     |
| pT2      |   |       |     |
| • pN-    |   |       |     |
| • pN+    |   |       |     |
| • pNx    |   |       |     |
| pT3      |   |       |     |
| • pN-    |   |       |     |
| • pN+    |   |       |     |
| • pNx    |   |       |     |
| pT4      |   |       |     |
| • pN-    |   |       |     |
| • pN+    |   |       |     |
| • pNx    |   |       |     |
| pTx      |   |       |     |
| • pN-    |   |       |     |
| • pN+    |   |       |     |
| • pNx    |   |       |     |

pN- = axillary node negative (pN0)

pN+ = axillary node positive (any node positive; pN1-3)

pNx = nodal status cannot be assessed (e.g. previously removed, not done)

**Table A2.30a: Classification of interval cancers by size, lymph node and age group following initial (first round) screening examinations**

|          | 50-54<br>Total | 55-59 | Age group<br>60-64 | 65-69 |
|----------|----------------|-------|--------------------|-------|
| pTis     |                |       |                    |       |
| • pN-    |                |       |                    |       |
| • pN+    |                |       |                    |       |
| • pNx    |                |       |                    |       |
| pT1micab |                |       |                    |       |
| • pN-    |                |       |                    |       |
| • pN+    |                |       |                    |       |
| • pNx    |                |       |                    |       |
| pT1c     |                |       |                    |       |
| • pN-    |                |       |                    |       |
| • pN+    |                |       |                    |       |
| • pNx    |                |       |                    |       |
| pT2      |                |       |                    |       |
| • pN-    |                |       |                    |       |
| • pN+    |                |       |                    |       |
| • pNx    |                |       |                    |       |
| pT3      |                |       |                    |       |
| • pN-    |                |       |                    |       |
| • pN+    |                |       |                    |       |
| • pNx    |                |       |                    |       |
| pT4      |                |       |                    |       |
| • pN-    |                |       |                    |       |
| • pN+    |                |       |                    |       |
| • pNx    |                |       |                    |       |
| pTx      |                |       |                    |       |
| • pN-    |                |       |                    |       |
| • pN+    |                |       |                    |       |
| • pNx    |                |       |                    |       |

pN- = axillary node negative (pN0)

pN+ = axillary node positive (any node positive; pN1-3)

pNx = nodal status cannot be assessed (e.g. previously removed, not done)

**Table A2.30b: Classification of interval cancers by size, lymph node and age group following second round screening examinations**

|          | 50-54<br>Total | 55-59 | Age group<br>60-64 | 65-69 |
|----------|----------------|-------|--------------------|-------|
| pTis     |                |       |                    |       |
| • pN-    |                |       |                    |       |
| • pN+    |                |       |                    |       |
| • pNx    |                |       |                    |       |
| pT1micab |                |       |                    |       |
| • pN-    |                |       |                    |       |
| • pN+    |                |       |                    |       |
| • pNx    |                |       |                    |       |
| pT1c     |                |       |                    |       |
| • pN-    |                |       |                    |       |
| • pN+    |                |       |                    |       |
| • pNx    |                |       |                    |       |
| pT2      |                |       |                    |       |
| • pN-    |                |       |                    |       |
| • pN+    |                |       |                    |       |
| • pNx    |                |       |                    |       |
| pT3      |                |       |                    |       |
| • pN-    |                |       |                    |       |
| • pN+    |                |       |                    |       |
| • pNx    |                |       |                    |       |
| pT4      |                |       |                    |       |
| • pN-    |                |       |                    |       |
| • pN+    |                |       |                    |       |
| • pNx    |                |       |                    |       |
| pTx      |                |       |                    |       |
| • pN-    |                |       |                    |       |
| • pN+    |                |       |                    |       |
| • pNx    |                |       |                    |       |

pN- = axillary node negative (pN0)

pN+ = axillary node positive (any node positive; pN1-3)

pNx = nodal status cannot be assessed (e.g. previously removed, not done)

**Table A2.31: Relationship of observed interval cancer rate, by time since last negative screening examination, to background incidence rate**

| Time since<br>cancers<br>last negative<br>screening<br>examination | First round of screening examinations<br>exams |                                    |     | 2nd round of screening<br>exams  |                         |
|--|--|------------------------------------|-----|----------------------------------|-------------------------|
|  | Background<br>O/E<br>incidence/<br>Year        | Interval<br>cancers<br>(O)<br>Year | O/E | Background<br>incidence/<br>Year | Interval<br>(O)<br>Year |
| 0-11 months  | 10,000<br>(E)<br>Year                          | 10,000<br>(O)<br>Year              |     | 10,000<br>(E)<br>Year            | 10,000<br>(O)<br>Year   |
| 12-23 months   |  |                                    |     |                                  |                         |
| 24+ months   |  |                                    |     |                                  |                         |
| TOTAL<br>All ICs   |  |                                    |     |                                  |                         |

IC = interval cancer

**Table A2.32a: Indicators\*\* by which the performance of a breast screening programme is assessed (YEARS 2002-2009)**

| Performance<br>programme 50-62<br>indicator          | 2008 | 2009 | Accept<br>level | Desir<br>level | Screening programme 50-59 |      |      |      |      | Screening |  |
|--|------|------|-----------------|----------------|---------------------------|------|------|------|------|-----------|--|
|  |      |      |                 |                | 2002                      | 2003 | 2004 | 2005 | 2006 | 2007      |  |
| Participation rate*                                  |      |      | > 70%           | > 75%          |                           |      |      |      |      |           |  |
| Technical repeat rate*                               |      |      | < 3%            | < 1%           |                           |      |      |      |      |           |  |
| Recall rate* (Initial screening)                     |      |      | < 7%            | < 5%           |                           |      |      |      |      |           |  |
| Subsequent screening                                 |      |      | < 5%            | < 3%           | NA                        |      |      |      |      |           |  |
| Additional imaging rate at<br>the time of screening* |      |      |                 | < 5%           | < 1%                      |      |      |      |      |           |  |
| Benign to malignant biopsy ratio*                    |      |      |                 | ≤1:2           | ≤1:4                      |      |      |      |      |           |  |

\* cf Glossary of terms

\*\* The indicators are for the 50-69 years age group. There are no indicators specific for other age groups.

**Table A2.32b: Indicators\* by which the performance of a breast screening programme is assessed: reinvitation rate**

| Performance<br>50-62<br>indicator   | Accept |       | Desir | Screening programme 50-59 |      |      |      |      | S.P. |
|---|--------|-------|-------|---------------------------|------|------|------|------|------|
|   | level  | level | 2005  | 2006                      | 2007 | 2008 | 2009 | 2009 |      |
| Eligible women reinvited within the specified screening interval (%)            | > 95%  | 100%  | NA**  |                           |      |      |      |      |      |
| Eligible women reinvited within the specified screening interval + 6 months (%) | > 98%  | 100%  | NA**  |                           |      |      |      |      |      |

\* The indicators are for the 50-69 years age group. There are no indicators specific for other age groups.

\*\* NA = data not available (According to EUNICE data for 2005)

**Table A2.32c: Indicators\*\* by which the impact of a breast screening programme is assessed: (Tables per year and screening age group)**

| Surrogate<br>Screening<br>indicator<br>programme  | Acceptable | Desirable   |
|---|------------|-------------|
|   | level      | level       |
| Interval cancer rate* /Background incidence rate* (%)   |            |             |
| • 0-11 months   | 30%        | < 30%       |
| • 12-23 months  | 50%        | < 50%       |
| Breast cancer detection rate*   |            |             |
| • Initial screening   | 3xIR       | > 3xIR      |
| • Subsequent-regular screening  | 1.5xIR     | > 1.5xIR    |
| Stage II+/Total cancers screen-detected (%)   |            |             |
| • Initial screening   | NA         | < 30%       |
| • Subsequent-regular screening  | 25%        | < 25%       |
| Invasive cancers ≤10 mm/total invasive cancers screen-detected (%)  |            |             |
| • Initial screening   | 20%        | ≥ 25%       |
| • Subsequent-regular screening  | ≥ 25%      | ≥ 30%       |
| Invasive cancers/total cancers screen-detected (%)  | 90%        | 80-90%      |
| DCIS as a proportion of all screen-detected cancers   | 10%        | > 15%       |
| Node-negative cancers/total invasive cancers screen-detected (%)  |            |             |
| • Initial screening   | NA         | > 70        |
| • Subsequent-regular screening  | 75%        | > 75%       |
| Proportion of screen-detected breast cancer with a non-operative diagnosis of malignancy (FNAC or core biopsy reported as definitely malignant) |            | > 70% > 90% |
| Proportion of image-guided FNAC procedures with an insufficient result  |            | < 25% < 15% |

|  |       |        |
|--|-------|--------|
| Proportion of image-guided FNAC procedures from lesions subsequently proven to be malignant, with an insufficient result | < 10% |        |
| Proportion of image-guided core/vacuum procedures with an insufficient result (B1)                                       | < 20% | < 10 % |
| Proportion of screened women subjected to early recall following diagnostic assessment                                   | < 1 % | 0      |
| Proportion of localised impalpable lesions successfully excised at the first operation                                   | > 90% | > 95%  |
| Proportion of wires placed within 1 cm of an impalpable lesion prior to excision   | 90%   | > 90%  |
| Delay between screening and result   | 15 wd | 10 wd  |
| Delay between result and day of assessment appointment offered to the woman  | 5 wd  | 3 wd   |

\* cf Glossary of terms

\*\* The indicators are for the 50-69 years age group. There are no indicators specific for other age groups.

IR = background incidence

NA = not applicable

wd= working days

**Table A2.33: Additional auditable outcomes of the breast screening programme**

**Client satisfaction: is there a permanent client satisfaction monitoring system where verbal and written complaints or compliments are taken into account? (yes/no)**

| programme  | Acceptable level | Desirable level | Screening |
|--|------------------|-----------------|-----------|
| Women informed by the radiographer how and when they will receive their results. | >97%             | 100%            |           |
|  |                  |                 |           |
|  |                  |                 |           |
|  |                  |                 |           |

**Table A2.34: Evaluations of validity of mammograms**

|                          |   |
|--------------------------|---|
| Blinded double reading % |   |
| Quality Control          | (monitoring, evaluation, and maintenance at optimum levels of all characteristics of performance that can be defined, measured, and controlled) |
| Quality Assurance        | Is the local Quality Assurance manual based on the EU guidelines? (yes/no)  |

**Table A2.35: Classification of interval cancers\***

| Categories                  | Subtypes                 | Screening mammogram              | Ma<br>mmogram |
|-----------------------------|--------------------------|----------------------------------|---------------|
| Diagnostic                  |                          |                                  |               |
| True interval Positive      |                          | Negative                         |               |
| Occult Negative             |                          | Negative                         |               |
| Minimal signs Minimal signs |                          | Minimal signs                    | or positive   |
| False negative Positive     | Reading error            | Positive                         |               |
|                             | Technical error Positive | Negative (for technical reasons) |               |
| Unclassifiable available    |                          | Any                              | Not           |

\* Based on the UK Quality Assurance Guidelines for Radiologists, NHSBSP May 1997, page 50. European

**Table A2.36: Evaluation of screening outcome available (or in process)?**

|                                     |
|-------------------------------------|
| Mortality outcome                   |
| - Whole population                  |
| - Invited (cohort linkage)          |
| - Screened (cohort linkage)         |
| - Other methods (e.g. case control) |
| Optional: overdiagnosis             |
| - screened (cohort linkage)         |

## Glossary of terms

**Additional imaging:** additional imaging required for medical reasons, after evaluation of the screening mammogram. This may take the form of repeat mammography, specialised views (e.g. magnification, extended craniocaudal, paddle views), ultrasound or magnetic resonance imaging (MRI). **Additional radiology includes additional views taken at the time of the screening mammogram, as well as those carried out on recall.** It does not include repeat mammograms for technical reasons. It also does not include intermediate mammograms. On the basis of additional imaging, a woman may be dismissed, or may be recommended to have cytology or biopsy. Please note the difference between additional imaging and an intermediate mammogram.

**Additional imaging rate:** the number of women who have an additional imaging investigation as a proportion of all women who have a screening test. This includes additional images taken at the time of the screening test, as well as imaging for which women are recalled. The additional imaging rate does not include repeat mammography for technical reasons. It also does not include intermediate mammograms. Within the group with additional imaging, the rates of individual imaging procedures may be derived.

**Adjuvant therapy:** additional treatment after primary treatment in order to prevent recurrent disease.

**Advanced breast cancer:** breast cancers with more than 2 cm in greatest dimension (i.e. pT2 or more) or positive lymph node status (i.e. pN1 or more).

**Age-specific detection ratio:** the breast cancer detection rate in a specified age group divided by the background (invasive) incidence of breast cancer in that same age group.

**Benign to malignant biopsy ratio:** the ratio of pathologically-proven benign lesions to malignant lesions surgically removed in any round of screening. This ratio may vary between initial and subsequent screening examinations.

**Background incidence rate:** the incidence rate of invasive breast cancer that would be expected in the screened population in the absence of screening.

**Breast cancer:** a pathologically-proven malignant lesion which is classified as ductal carcinoma in situ or invasive breast cancer.

**Breast cancer detection rate:** the number of pathologically-proven malignant lesions of the breast (both in situ and invasive) detected in a screening round per 1000 women screened in that round. This rate will differ for initial versus subsequent screening examinations. Cancers detected at intermediate mammography should be regarded as screen-detected cancers and thus be included in the cancer detection rate. Recurrent breast cancers, detected for the first time at mammographic screening, should also be regarded as screen-detected cancers since they will be identified and diagnosed in the same way as a primary breast cancer. Cancer metastases diagnosed in the breast as a consequence of a primary cancer outside the breast should not be included in the cancer detection rate.

**Breast cancer incidence rate:** the rate at which new cases of breast cancer occur in a population. The incidence rate: numerator is the number of newly diagnosed cases of breast cancer (both in situ and invasive) that occur in a defined time period. The denominator is the population at risk of being diagnosed with breast cancer during this defined period, sometimes expressed in person time.

**Breast cancer mortality rate:** the rate at which deaths of breast cancer occur in a population. The numerator is the number of breast cancer deaths that occur in a defined time period. The denominator is the population at risk of dying from breast cancer during this defined period, sometimes expressed in person-time.

**Breast cancer register:** a register of breast cancer cases specifically created for a screening programme, when a country or region does not have or can not access a pathology register and/or cancer register; or to provide more detailed data than in the (national or regional) cancer registry.

**Clinical examination:** inspection of the breast and palpation of the breast and regional lymph nodes.

**Core biopsy:** a percutaneous biopsy using a cutting needle to provide a core of tissue for histological assessment without the need for an operation. Vacuum-assisted biopsies are also included in this category.

**Coverage by examination:** the extent to which the screening programme covers the eligible population by examination. It can be calculated as the ratio between the number of examinations during a period equal to the screening interval and the number of women in the eligible population.

**Coverage by invitation:** the extent to which the screening programme covers the eligible population by invitation. It can be calculated as the ratio between the number of invitations during a period equal to the screening interval and the number of women in the eligible population. Self registrations should be counted in the calculation of the extension of screening, but their number should be also reported separately. Self registrations in fact cause an underestimation of coverage by invitation.

**Cytology:** a procedure where cells are aspirated from a breast lesion using a simple blood taking needle, usually under negative pressure. Cysts can also be aspirated. Cytological preparations are examined for evidence of malignancy.

**Dedicated screening facility:** a facility with specialised equipment and trained staff that is used solely for screening examinations and/or further assessment of women where a perceived abnormality was detected at the screening examination.

**Dynamic cohort:** a cohort for which membership is determined by eligibility for breast cancer screening and therefore gains and loses members. The composition of the cohort is continuously changing allowing for the addition of new members for screening and follow up, and cessation of screening for those who become older than the maximum screening age. In order for estimates of screening efficacy to be accurately derived it is essential to know the denominator of the dynamic cohort at all times.

**Eligible population:** the adjusted target population, i.e. the target population minus those women that are to be excluded according to screening policy on the basis of eligibility criteria other than age, gender and geographic location.

**Fixed cohort:** a cohort for which membership is determined by being present at some defining event. Thus, there are no entries during the study period, including the follow up period. In a screening programme this means that a specific birth cohort is selected for screening and follow up. Women entering the age category in subsequent years of the screening programme are not included in the study cohort.

**Further assessment:** additional diagnostic techniques (either non-invasive or invasive) that are performed for medical reasons in order to clarify the nature of a perceived abnormality detected at the screening examination. Further assessment can take place at the time of the screening test or on recall. It includes breast clinical examination, additional imaging and invasive investigations (cytology, core biopsy and open biopsies for diagnostic purposes).

**Further assessment Rate:** the number of women undergoing further assessment (either at screening or on recall) as a proportion of all women who had a screening examination.

**Initial screening:** first screening examination of individual women within the screening programme, regardless of the organisational screening round in which women are screened.

**Intermediate mammogram following screening:** a mammogram performed out of sequence with the screening interval (say at 6 or 12 months), as a result of the screening test. Cancers detected at intermediate mammography should be regarded as screen-detected cancers (not interval cancers). However they also represent a delayed diagnosis and should be subject to separate analysis and review. It is recommended that the screening policy does not allow the opportunity for an intermediate mammogram following screening.

**Intermediate mammogram following further assessment:** a mammogram performed out of sequence with the screening interval (say at 6 or 12 months), as a result of the screening test and further assessment. Cancers detected at intermediate mammography following further assessment

should be regarded as screen-detected cancers (not interval cancers). However they also represent a delayed diagnosis and should be subject to separate analysis and review. The term 'early recall' is frequently used to refer to an intermediate mammogram following further assessment.

**Interval cancer:** a primary breast cancer, which is diagnosed in a woman who had a screening, test, with/without further assessment, which was negative for malignancy, either:

- before the next invitation to screening, or
- within a time period equal to a screening interval for a woman who has reached the upper age limit for screening.

**Interval cancer rate:** the number of interval cancers diagnosed within a defined time period since the last negative screening examination per 10,000 women screened negative. The rate of interval cancers can also be expressed as a proportion of the background (expected) breast cancer incidence rate in the screened group.

**Neo-adjuvant therapy:** systemic treatment before primary treatment.

**Open biopsy:** surgical removal of (part of) a breast lesion. This is also referred to as excision biopsy.

**Open biopsy rate:** the number of women undergoing open biopsy as a proportion of all women who have a screening examination. This rate may differ for initial versus subsequent screening examinations.

**Opportunistic screening:** screening that takes place outside an organised or population-based screening programme. This type of screening may be the result of e.g. a recommendation made during a routine medical consultation, consultation for an unrelated condition, on the basis of a possible increased risk of developing breast cancer (family history or other known risk factor).

**Participation rate:** the number of women who have a screening test as a proportion of all women who are invited to attend for screening. Self-registrations should be excluded from both the numerator and the denominator in the calculation of participation rate.

**Primary treatment:** initial treatment offered to women with breast cancer. Most women will be offered surgical treatment. Surgery may be preceded by neoadjuvant therapy to reduce the size of the tumour. Women with large inoperable primary tumours and women with distant metastases usually receive medical systemic treatment as primary treatment.

**Population-based:** pertains to a population defined by geographical boundaries. For a screening programme to be population-based every member of the target population who is eligible to attend on the basis of predecided criteria must be known to the programme. This emphasises the need for accurate information on the population at risk, constituting the denominator of most rates.

**Positive predictive value (PPV):** the ratio of lesions that are truly positive to those test positive. It is intimately affected by the prevalence of the condition under study. Thus, with a prevalence of < 1%, as with breast cancer, one can expect a low positive predictive and a very high negative predictive value for screening mammography.

**Post-surgical treatment:** treatment in addition to primary treatment. Most women will receive some form of post-surgical treatment (adjuvant treatment), e.g. chemotherapy, radiotherapy, hormonal therapy.

**PPV of cytology:** the number of cancers detected as a proportion of the women with positive cytology (C5), i.e. suspicion of malignancy. In practice, the denominator corresponds to those women who undergo biopsy after cytology.

**PPV of recall:** the number of cancers detected as a proportion of the women who were positive as a final result of further assessment after recall (but excluding those for technical recall) and therefore had a surgical referral.

**PPV of screening test:** the number of cancers detected as a proportion of the women with a positive screening test. In practice, the denominator corresponds to women undergoing further assessment

either at the time of screening or on recall. Further assessment does not include additional mammograms for technical reasons (repeat screening tests).

**Recall:** refers to women who have to come back to the screening unit, i.e. who are physically recalled, as a consequence of the screening examination for:

- a) a repeat mammogram because of a technical inadequacy of the screening mammogram (technical recall); or
- b) clarification of a perceived abnormality detected at the screening examination, by performance of an additional procedure (recall for further assessment).

This group is different from those who may have additional investigations performed at the time of the screening examination, but who were not physically recalled for that extra procedure.

**Recall rate:** the number of women recalled for further assessment as a proportion of all women who had a screening examination.

**Recent mammogram:** a mammogram performed at a shorter time interval than the regular screening interval. Women who had a recent mammogram (either diagnostic or screening) may potentially be excluded from the target population and/or the results dependent on screening policy.

**Repeat screening test:** a screening test repeated for technical reasons, either at the time of the screening examination or on recall. The most common reasons for a repeat screening test are:

- a) processing error;
- b) inadequate positioning of the breast; or
- c) machine or operator errors.

Technical recalls will be reduced considerably, though not necessarily completely eliminated, by onsite processing taking place before a woman is dismissed.

**Screening interval:** the fixed interval between routine screens decided upon in each screening programme dependent on screening policy.

**Screening policy:** the specific policy of a screening programme which dictates the targeted age and gender group, the geographic area to target, the screening test, the screening interval (usually two or three years), etcetera.

**Screening test:** the test that is applied to all women in the programme. This may be a single or two-view mammogram (two views are recommended) with or without clinical examination. The screening test does not include additional imaging tests carried out at the time of the initial screening examination.

**Screening unit:** a facility where screening examinations take place. It does not refer to the exact number of e.g. mammography machines within the unit.

**Self-registration:** women who are not invited, but present themselves for screening and are included in the screening roster. It is the responsibility of the screening staff to decide whether self-registered women qualify to become members of the screening roster or not. It would be expected that only women who are members of the target population and thus eligible to attend would be allowed to self-refer.

**Sensitivity:** the proportion of truly diseased persons in the screened population who are identified as diseased by the screening test. The more general expression for 'sensitivity of the screening programme' refers to the ratio of breast cancers correctly identified at the screening examination to breast cancers identified and not identified at the screening examination (i.e. true positives/true positives + false negatives). It is clear that to establish the sensitivity of the screening test in a particular programme there must be a flawless system for identification and classification of all interval cancers (false negatives).

**Sources of demographic data:** demographic data for the purpose of issuing invitations to screening may come from a population register, an electoral register, other registers, population survey, or census data.

**Specificity:** the proportion of truly non-diseased persons in the screened population who are identified as non-diseased by the screening test. Here it refers to the ratio of truly negative screening examinations to

those that are truly negative and falsely positive (i.e. true negatives/true negatives + false positive). To derive an absolutely accurate estimate of specificity would require that each person dismissed as having a negative screening test is followed for ascertainment of subsequent negativity, and that those who are recalled for additional investigation following the screening test are regarded as potentially all having a malignancy. The false positives are those who have a histologically-proven benign lesion.

A note of caution is warranted here, however, in that, not infrequently, it is known beforehand, on the basis of radiological investigation, that the offending lesion is benign. The reason for surgery on a benign lesion may be surgeon or patient preference for excision. In practice ascertainment of specificity is frequently made on the basis of the results of initial mammograms.

**Subsequent screening:** all screening examinations of individual women within the screening programme following an initial screening examination, regardless of the organisational screening round in which women are screened. There are two types of subsequent screening examinations:

- subsequent screening at the regular screening interval, i.e. in accordance with the routine interval defined by the screening policy (SUBS-R);
- subsequent screening at irregular intervals, i.e. those who miss an invitation to routine screening and return in a subsequent organisational screening round (SUBS-IRR).

**Symptomatic women:** women reporting breast complaints or symptoms at the screening examination may potentially be excluded from the target population and/or results according to screening policy.

**Target population:** the group of persons for whom the intervention is planned. In screening for breast cancer, it refers to all women eligible to attend for screening on the basis of age and geographic location (dictated by screening policy). This includes special groups such as institutionalised or minority groups.

**Women invited:** all women invited in the period to which data refer, even if they have yet to receive a reminder.

**Women screened:** all women screened in the period to which data refer, even if results of mammograms are not yet available.

**World age- standardised rate:** the rate that would have occurred if the observed age-specific rates had operated in the standard world population (see below):

Standard world population used for the computation of age-standardised mortality and incidence rates\*:

| Age (years) | World  |
|-------------|--------|
| 0 - 4       | 12 000 |
| 5 - 9       | 10 000 |
| 10 - 14     | 9 000  |
| 15 - 19     | 9 000  |
| 20 - 24     | 8 000  |
| 25 - 29     | 8 000  |

|         |         |
|---------|---------|
| 30 - 34 | 6 000   |
| 35 - 39 | 6 000   |
| 40 - 44 | 6 000   |
| 45 - 49 | 6 000   |
| 50 - 54 | 5 000   |
| 55 - 59 | 4 000   |
| 60 - 64 | 4 000   |
| 65 - 69 | 3 000   |
| 70 - 74 | 2 000   |
| 75 - 79 | 1 000   |
| 80 -84  | 500     |
| 85 +    | 500     |
| TOTAL   | 100 000 |

\*Smith PG (1992) Comparison between registries: age-standardized rates. In: Parkin DM, Muir CS, Whelan SL, Gao Y-T, Ferlay J, Powell J (eds.) Cancer Incidence in Five Continents, Volume VI. IARC Scientific Publications No 120, Lyon, p 865-870

## Annex 3. Synopsis of visits to breast screening units

9.05.2011

### Pärnu Central Hospital

Dr. Tiina Juckum, Radiologist  
Ms. Piret Vahtramäe, Head Radiology Nurse  
Mr. Joosep Kepler, Medical Physicist

The waiting list in Pärnu is currently 2 days. The secretary asks about the menstrual cycle. When the secretary books an appointment, she does not see when the woman had her previous mammogram since there is no electronic database. About 20% of women screened in Pärnu are Russian speaking.

Women who have not attended screening during the invitation year may still be screened during the first quarter of the following year.

Women who are screened in Pärnu Central Hospital live within a radius of 60 km. From some small islands like Kihnu, access is still quite difficult by public transport. A mobile screening unit visits the larger islands of Hiiumaa and Saaremaa.

Mammography has been digital since 2005 using a CR (cassette) system. The machine is General Electric Instrumentarium Performa with 3 megapixel monitors and Agfa digital imaging system.

A dosimetry quality assurance system is in place. According to an international practice the measuring instruments used in radiation protection are calibrated at least once in two years. Measuring instruments used in radiation protection are not calibrated in Estonia, the nearest possibilities for that are in Latvia and in Finland. The hospital must renew the radiation practice licence every 5 years.

There is also a General Electric ultrasound machine but it is used only for the examination of symptomatic women. All additional examinations of screenees are carried out in the breast assessment unit in Tallinn (North Estonia Medical Centre).

Screening examinations are performed on Mondays, Wednesdays, Fridays and Saturdays. On the weekdays, half of the day is reserved for screening and another half for clinical cases. Saturday is entirely for screening. At the end of the working day, non-screenees have the possibility to undergo mammography for 26€. A list of screenees is sent by email to Tallinn and the screening forms (Model 2002, ) are sent by mail.

Every year about 1500 screening mammograms and about twice as many clinical mammograms are performed. Breast biopsies are not performed in Pärnu.

The 2<sup>nd</sup> reading is performed in the North Estonia Medical Centre (NEMC) in Tallinn a few days after the 1<sup>st</sup> reading. There are four radiologists doing the 2<sup>nd</sup> reading. When the radiologist in Pärnu is on holiday, both the 1<sup>st</sup> and 2<sup>nd</sup> readings are carried out in Tallinn.

If the mammogram is normal, the information letter is sent from NEMC to the screenee within 7-8 working days from the screening examination.

If additional examinations are needed, NEMC invites the woman for the additional examination(s) either by telephone or by letter. In 2010, 51 women were recalled and only one woman did not come (had moved abroad).

After a core needle biopsy, the patient is asked to call at a given time in one week for the report. In case of malignancy, the radiology department will call a breast surgeon to set the operation time. (For patients from Tallinn the time for surgery can be booked electronically.)

**Future plans:**

- Connect Pärnu Central Hospital to the radiology information system (RIS)
- Purchase a Direct Digital (DR) mammography unit and a 5 megapixel display

**Recommendations:**

- Organize case reviews in NEMC for the radiologist working in Pärnu to learn about all the cases that were referred to further examinations. This should be stipulated in the contract so that it is considered official working time.

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**10.05.2011**

**East Viru Central Hospital, Puru korpus (Puru Hospital)**

Dr. Igor Muhhin, Radiologist  
Natalia Vilde, Head Radiology Nurse

The East Viru central hospital is larger than the hospital in Pärnu (above). The Puru Hospital is one of three separate hospitals at three different locations. There are 800 beds. A new building for emergency medicine and surgery will be constructed by 2013. In addition to Estonians there are doctors from Russia, Belarus, Kyrgyzstan etc. In the mammography unit there is one radiologist and 5 radiology nurses. The nurses work alone. Mammography has been performed for five years, now for three years with a direct digital (DR) Siemens Mammomat Balance. Technical maintenance from Tallinn is available on the same day or next day, if needed.

Women within a radius of 90 km come to Puru for screening mammograms. The waiting list for mammography is currently 2 weeks. When women call for an appointment, the secretary asks only for their telephone number; no other routine questions are asked. 95% of the women have Russian as their mother tongue. Mammography is performed 8 hours per day. Screenees and symptomatic women are not separated, but screenees prefer early morning or late afternoon hours. In 2010, 2045 screening mammograms and about as many clinical mammograms were performed.

The radiologist sends the daily list of screenees by e-mail to the Tartu University clinic, where Dr. Sulev Ulp does the 2<sup>nd</sup> reading. When the radiologist in Puru hospital is on annual leave, both 1<sup>st</sup> and 2<sup>nd</sup> readings are performed in Tartu. In 2010, about 60 women were referred for additional examinations in Tartu. They receive a letter from the radiologist in Puru hospital with instructions to book an appointment in Tartu. In Tartu the women receive the ultrasound diagnosis right away and if surgery is indicated, an appointment is fixed. At the time of our visit there was no queue to breast surgery.

Second mammograms 6 months after the first one are practised very seldom, once or twice per year. If a woman with a screening invitation becomes unemployed, she loses the health insurance coverage after one month. Women without an invitation (and without health insurance coverage) can undergo mammography if they have a referral from a physician, and the cost of the examination is 26€.

**Recommendations:**

- Organise case reviews in Tartu for the radiologist working in Puru to learn about all the cases that were referred to further examinations. This should be stipulated in the contract so that it is considered official working time.
- 

**10.05.2011**

**Narva Hospital**

Dr. Pille Letjuka, Head Doctor, Neurologist  
Anna Višnjova, Head Radiology Nurse  
Galina Tišina, Radiology Nurse

Narva is the 3rd largest city in Estonia. The population is 68.000 and 95% are Russian speakers. Narva hospital has 327 beds. Mammography screening began in 2009. Before that a mobile unit was covering the area. Currently there are 4 radiologists (who all work half time due to various family reasons) and 2 ultrasound doctors but there is no radiologist in the Narva hospital to read the screening mammograms. New physicians for surgery and anaesthesiology have been recruited from Russia and Ukraine but it has been difficult to attract radiologists. Clinical mammograms are read in the Tartu university clinic and screening mammograms are read in the North Estonia Medical Centre.

The Narva hospital and the North Estonia Medical Centre are interconnected by a Radiology Information System (RIS). That allows the mammogram readers in Tallinn to see the women's answers to the eight questions on the electronic version of the Screening form (MAM-1, model 2002). Both readers and radiology nurses can enter and receive feedback through RIS.

As in the other screening units, screenees call by telephone to book an appointment. Mammography, mostly screening, is performed every day from 12:00 – 16:00. There are 6 radiology nurses. Only female nurses do screening mammography. The machine is Planmed Nuance, model 2009. In 2010, 2271 screening mammograms (according to PERH 2261) and 618 clinical mammograms were performed. Self paying (26€) women without a screening invitation must first be examined by a gynaecologist.

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**11.05.2011**

**North Estonia Medical Centre**

Dr. Maret Talk, Head of Radiology Department  
Prof. Sergei Nazarenko, Director of the North Estonia Medical Centre  
Dr. Andrus Paats, Senior Biomedical Engineer  
Dr. Priit Pauls, Radiologist, Ultrasound specialist  
Dr. Tiiu-Liis Tigane, Oncologist  
Ms. Piret Tannebaum, breast cancer screening secretary

On the way to the North Estonia Medical Centre in Mustamäe, we passed by the East Tallinn Central Hospital which has almost 600 beds and employs over 2000 staff including 327 doctors and 819 qualified nurses. The hospital's diagnostic radiology unit has just purchased a Siemens Direct Digital mammography system. After having gained experience in diagnostic and screening mammography, they may apply through the breast cancer screening foundation to be included as a screening unit in the national screening programme.

The North Estonia Medical Centre is Estonia's foremost hospital. The hospital is an employer for 3626 people, including 590 doctors, 1352 nursing staff and 862 caregivers. There are 35 radiologists, digital image archiving system with automatic long-term back-up.

In discussions about the PACS system it was again noted that sharing of pictures within the screening programme is crucial to success.

There are 2 mammography machines: a Siemens Mammomat NovationDR (2007) with a stereotactic device and a Siemens Mammomat Inspiration (2010) which is currently without a magnification breast support table although it is specifically intended for screening. There is a third mammography room with space for a third machine for the future.

For breast assessment there is the latest GE ultrasound machine and a GE 3 Tesla MRI (2010). There is no MRI biopsy coil. MRI-US fusion is not yet in use.

The new digital (DR) x-ray system is from Siemens. There is also a new 64 slices HD CT scanner from General Electric.

A relatively common diagnostic problem in Estonia (as in other countries) is that e.g. a 3mm breast (or thyroid) nodule is detected by MRI, the patient is referred to another unit for a biopsy and there the nodule cannot be found in the ultrasound examination. Specimen radiograms are taken from all guide wire specimens but not from all breast operation specimens in general.

The Radiology Information System is in place. Paper documents are not used internally but the old paper archive is still available for backup.

There are four mammography nurses. The planned schedule is 15 minutes per screening examination. Screenees prefer early morning mammography times. They receive the result of the screening examination within one week, sometimes earlier, sometimes after up to 10 days. At the time of our visit there was no queue for screening mammography.

The 2010 screening results were reviewed. The numbers differ somewhat from the ones reported by the Health Insurance Fund, because the latter include also clinical cases of screening age.

May is the breast cancer awareness month in Estonia. Downloadable materials in Estonian and Russian e.g. at <http://www.haigekassa.ee/ennetus>

[http://www.haigekassa.ee/uploads/userfiles/file/ennetus/ara\\_jaa\\_hiljaks\\_insert\\_EST\\_105x250.pdf](http://www.haigekassa.ee/uploads/userfiles/file/ennetus/ara_jaa_hiljaks_insert_EST_105x250.pdf)

[http://www.haigekassa.ee/uploads/userfiles/file/ennetus/Arajaahiljaks\\_A3\\_rus.pdf](http://www.haigekassa.ee/uploads/userfiles/file/ennetus/Arajaahiljaks_A3_rus.pdf)

[http://www.haigekassa.ee/uploads/userfiles/HAK\\_plakat\\_RUS.JPG](http://www.haigekassa.ee/uploads/userfiles/HAK_plakat_RUS.JPG)

Information materials are also in the bulletin of the North Estonia Regional Hospital etc. etc.

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**11.05.2011**

**Viimsi hospital (in Tallinn)**

Dr. Lidia Lill, radiologist

Viimsi hospital is the first private hospital in Estonia. Still in the Soviet times in 1979, it was founded as the hospital of a fishermen's collective. In 2009 the hospital has leased a Planmed Sophie screening mammography machine (CR). It is a 2003 model, without the optional magnification stand. Clinical mammography examinations started in 2009 and in January 2010 Viimsi hospital became a screening unit for the national screening programme. Dr. Lill is the only radiologist. She works 7 hours per day. There are 2 mammography nurses working every day from 9:00 till 18:20. In 2010 they performed 512 screening examinations and 102 clinical mammography examinations. Dr. Sulev Ulp in Tartu University Clinic does the second reading. The patient lists are sent by email.

Dr. Lill does breast ultrasound examinations with a GE Voluson 730 Pro machine which is otherwise OK but the probe is only 4 cm wide. If a breast biopsy is needed, the woman is referred to the North Estonia Medical Centre.

The mammograms were viewed on the 5 megapixel Barco monitors (similar to the ones in the other screening units) and they were of very high quality and had the best contrast resolution of all mammograms viewed during the mission. During the visit one of the monitors in Viimsi hospital was out of order.

In 2010, among the screened women three breast cancers were detected. Six breast cancers were detected among the symptomatic women – four women were younger than 50 years old and two were older than 62. For 2011, Viimsi hospital has a contract with the health insurance fund to screen 600 women. Dr Lill estimates she could do up to 1000 screening mammograms per year.

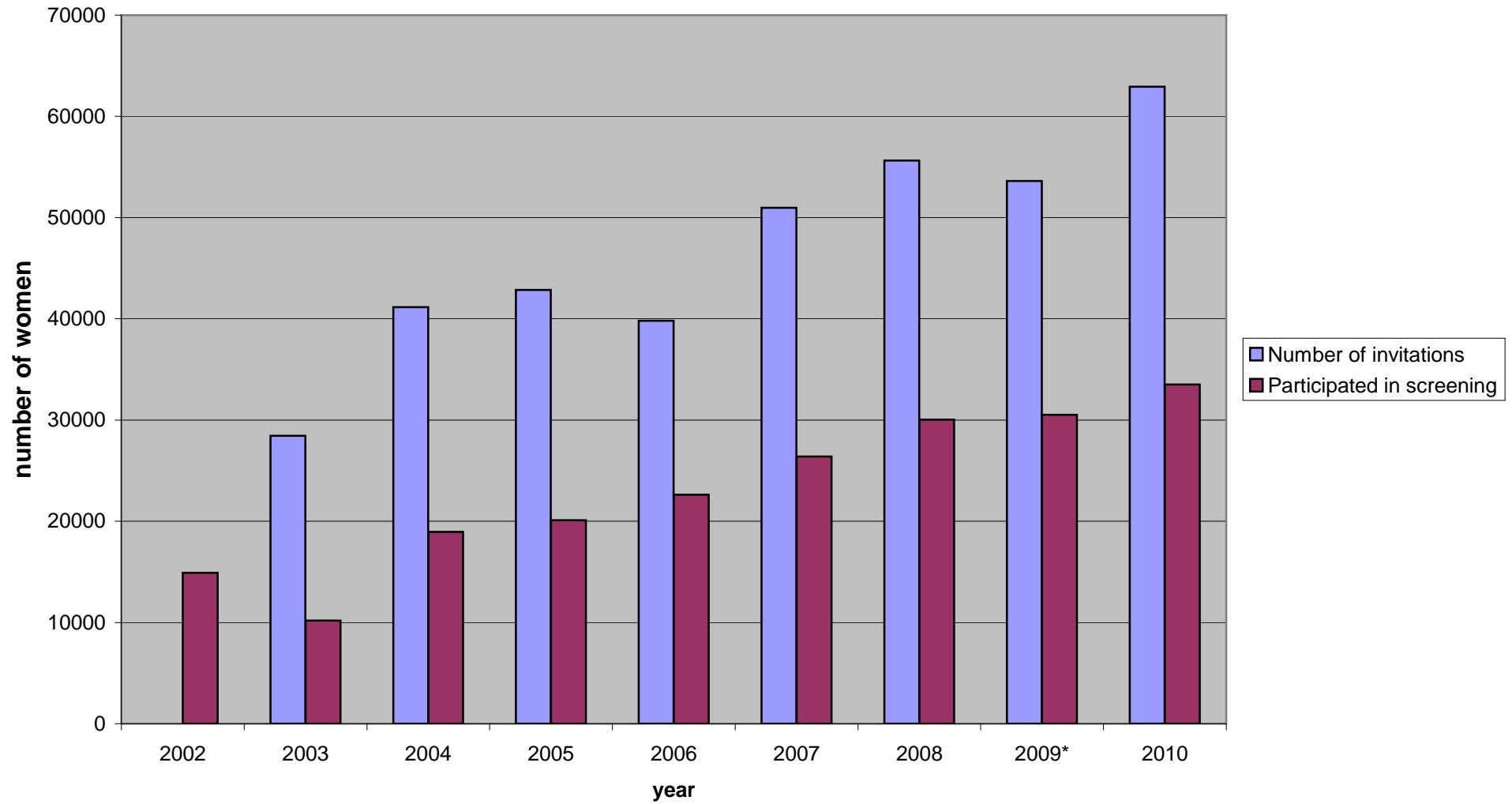
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## **Annex 4: Breast cancer screening in Estonia**

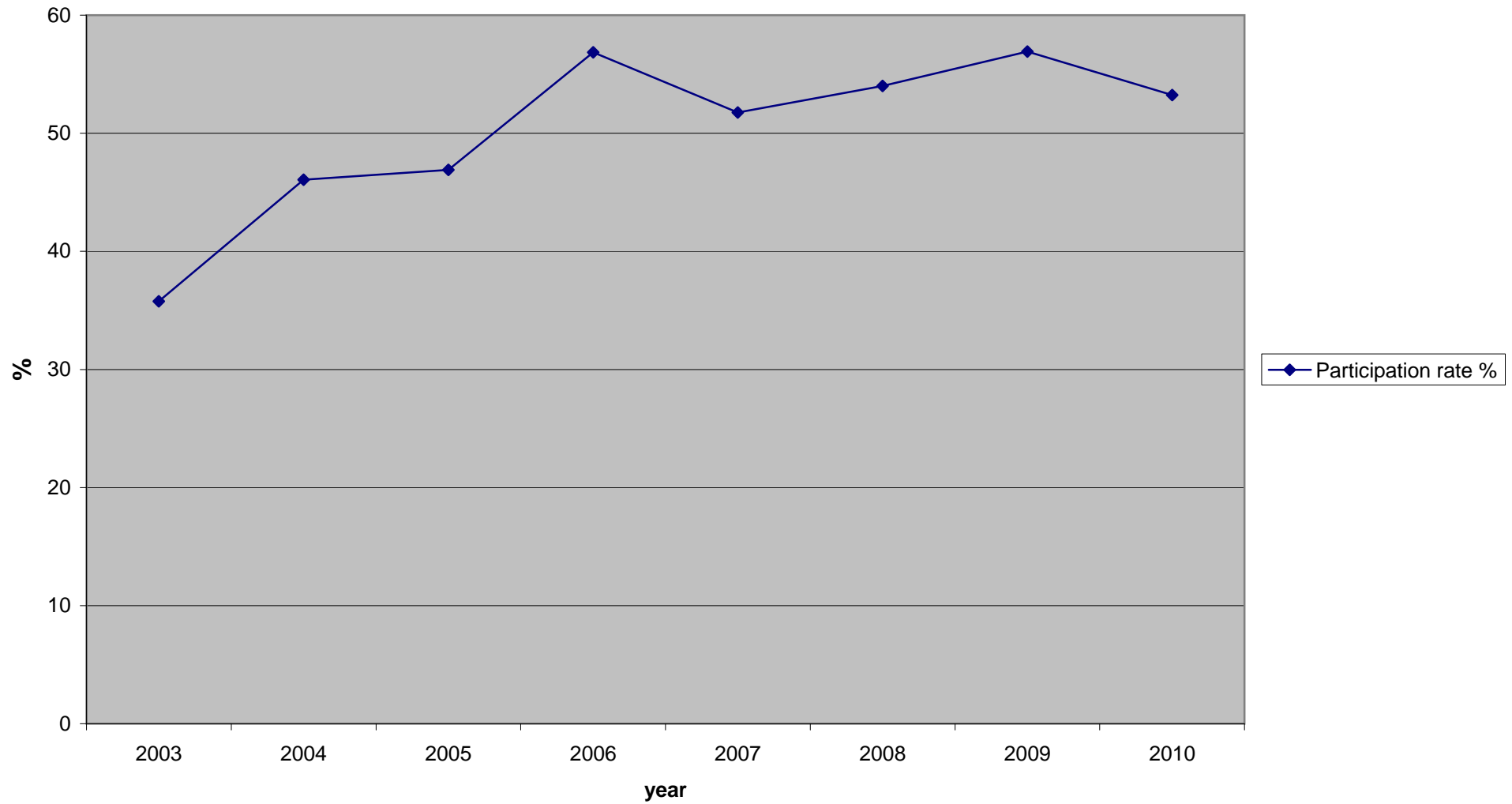
### **Graphic presentation of Results 2002 – 2010**

1. Invitations and participation
2. Participation rate in percent
3. Further assessment rate in percent
4. Number of cancers detected /1000 women screened
5. Proportion of early breast cancer (St 0-2A) from all screen detected cases
6. Proportion of invasive screen detected cancers that are up to 15 mm in size

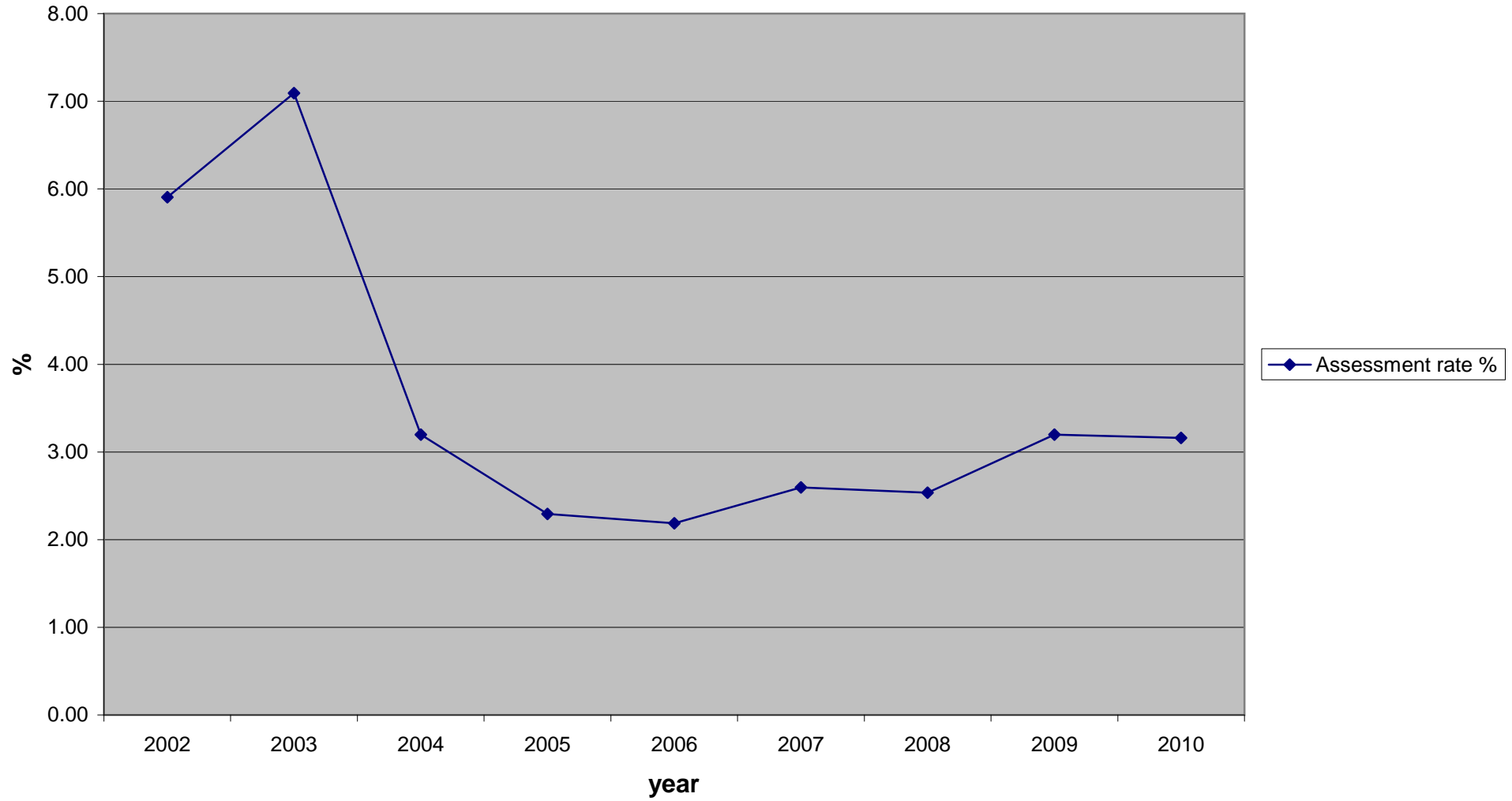
**Graph 1. Invitations and participation 2002-2010**



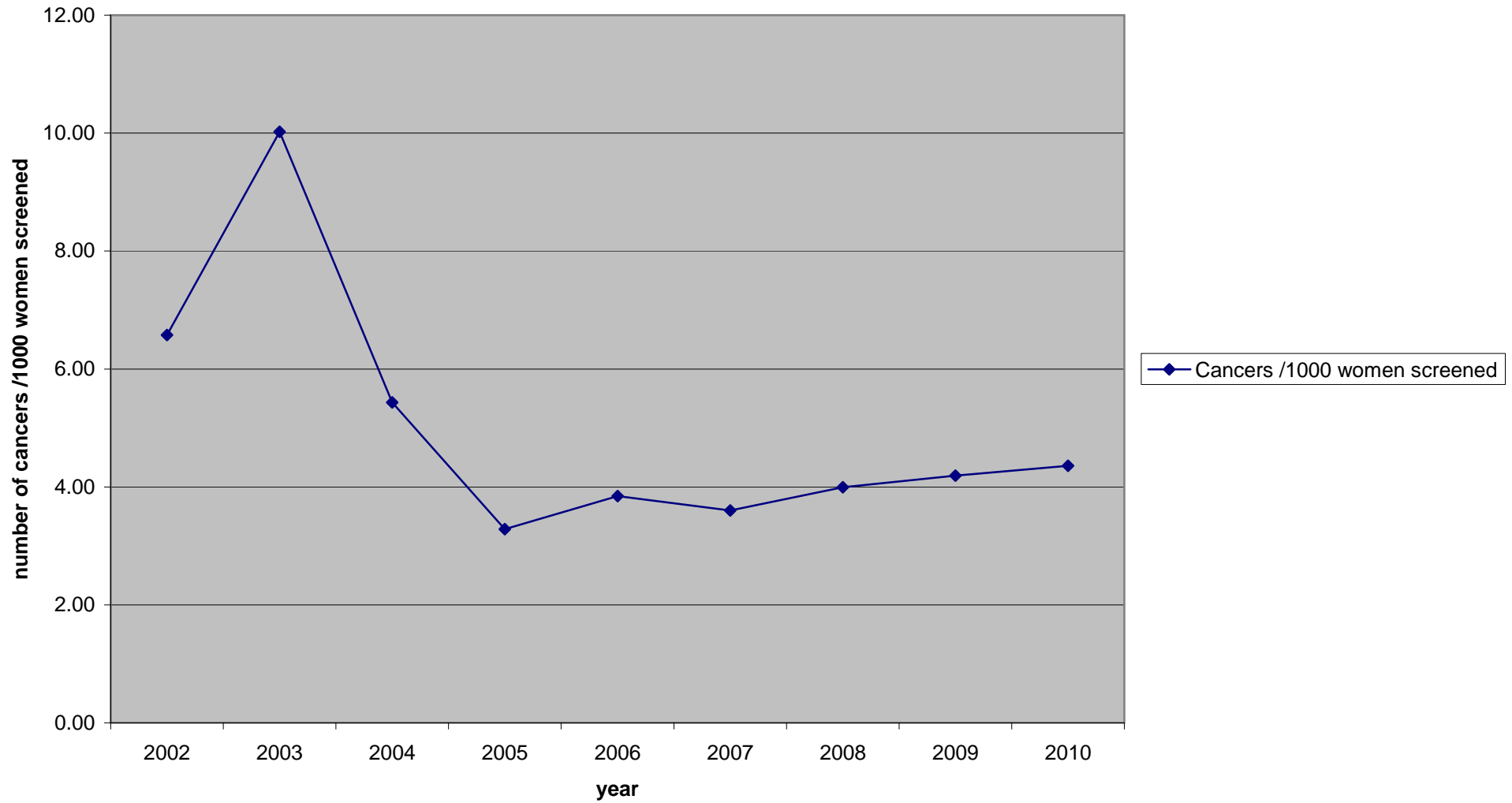
**Graph 2. Participation rate %**



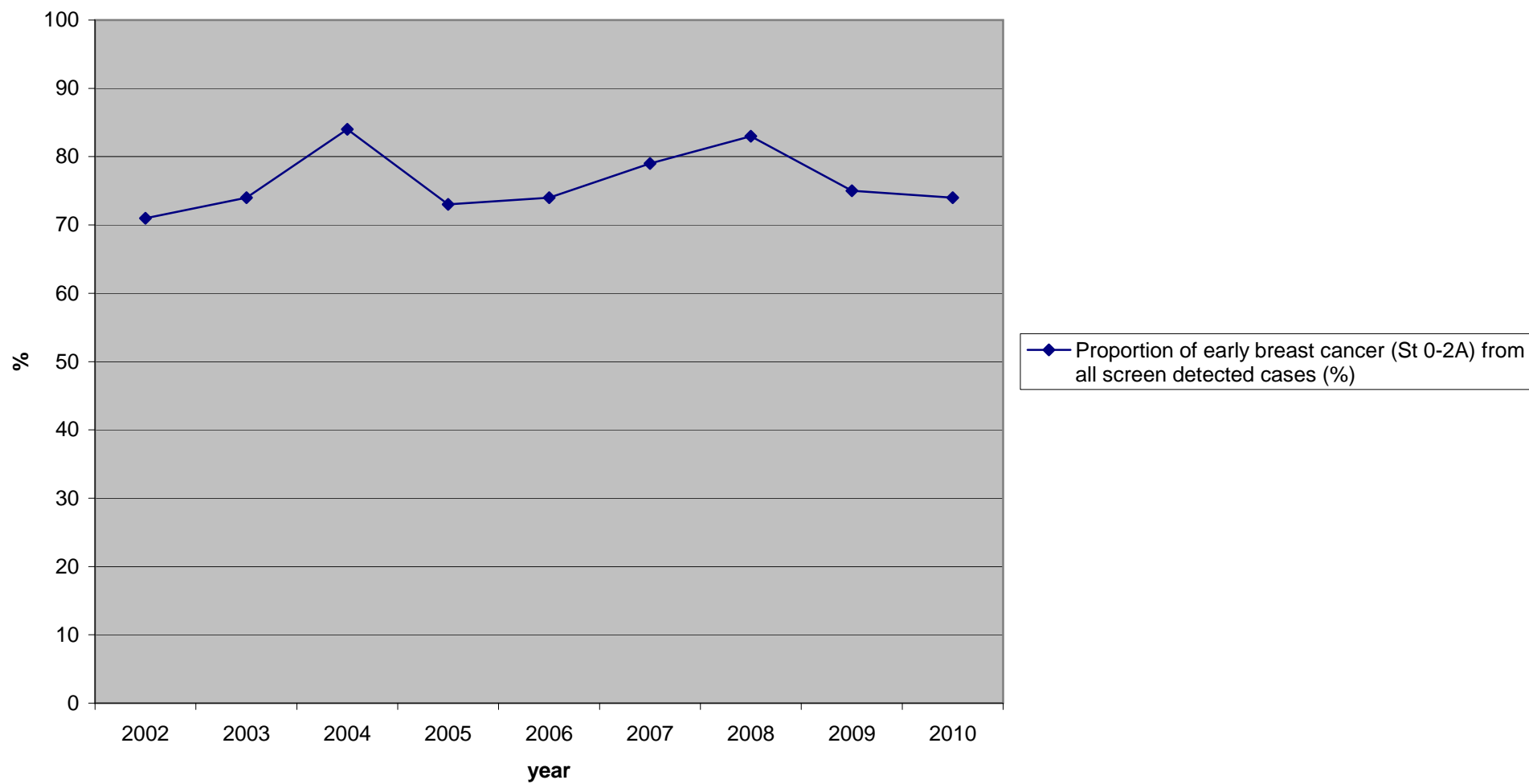
**Graph 3. Further assessment rate %**



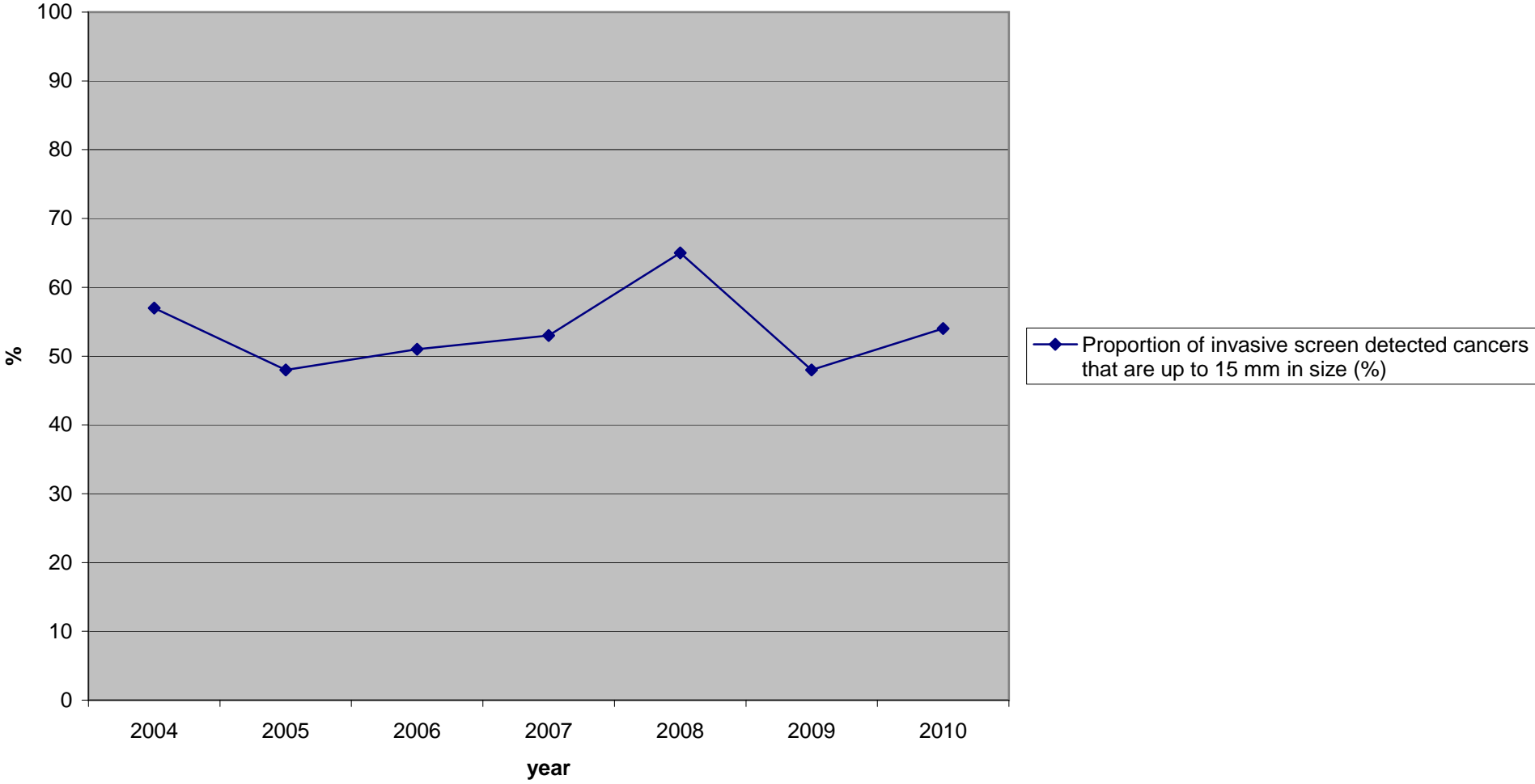
**Graph 4. Number of cancers detected /1000 women screened**



**Graph 5. Proportion of early breast cancer (St 0-2A) from all screen detected cases (%)**



**Graph 6. Proportion of invasive screen detected cancers that are up to 15 mm in size (%)**



## BREAST CANCER SCREENING IN ESTONIA

### Results 2002 - 2010

Source data for Graphs 1-6

|   | 2002  | 2003  | 2004  | 2005  | 2006  | 2007  | 2008  | 2009* | 2010  |
|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Number of invitations   |       | 28456 | 41149 | 42854 | 39815 | 50981 | 55645 | 53630 | 62923 |
| Participated in screening   | 14899 | 10179 | 18957 | 20101 | 22635 | 26389 | 30053 | 30528 | 33502 |
| Participation rate %  | n.a.  | 36    | 46    | 47    | 57    | 52    | 54    | 57    | 53    |
| Number of recalls   |       |       |       |       |       |       |       |       |       |
| Recall rate   |       |       |       |       |       |       |       |       |       |
| Participated in assessment  | 880   | 722   | 606   | 461   | 495   | 685   | 762   | 976   | 1059  |
| Assessment rate %   | 5.91  | 7.09  | 3.20  | 2.29  | 2.19  | 2.60  | 2.54  | 3.20  | 3.16  |
| Number of cancers detected  | 98    | 102   | 103   | 66    | 87    | 95    | 120   | 128   | 146   |
| Cancers /1000 women screened  | 6.58  | 10.02 | 5.43  | 3.28  | 3.84  | 3.60  | 3.99  | 4.19  | 4.36  |
| Proportion of early breast cancer (St 0-2A) from all screen detected cases (%)  | 71    | 74    | 84    | 73    | 74    | 79    | 83    | 75    | 74    |
| Proportion of invasive screen detected cancers that are up to 15 mm in size (%) | n.a.  | n.a.  | 57    | 48    | 51    | 53    | 65    | 48    | 54    |

\* In addition, 6370 rein invitations were sent in 2009, i.e. total invitations in 2009 was 60.000.

| Participation rate % | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|----------------------|------|------|------|------|------|------|------|------|
|                      | 36   | 46   | 47   | 57   | 52   | 54   | 57   | 53   |

| Assessment rate % | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|-------------------|------|------|------|------|------|------|------|------|------|
|                   | 5.91 | 7.09 | 3.20 | 2.29 | 2.19 | 2.60 | 2.54 | 3.20 | 3.16 |

| Cancers /1000 women screened | 2002 | 2003  | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|------------------------------|------|-------|------|------|------|------|------|------|------|
|                              | 6.58 | 10.02 | 5.43 | 3.28 | 3.84 | 3.60 | 3.99 | 4.19 | 4.36 |

| Proportion of early breast cancer (St 0-2A) from all screen detected cases (%) | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|--|------|------|------|------|------|------|------|------|------|
|  | 71   | 74   | 84   | 73   | 74   | 79   | 83   | 75   | 74   |

| Proportion of invasive screen detected cancers that are up to 15 mm in size (%) | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|------|------|------|------|------|------|------|
|   | 57   | 48   | 51   | 53   | 65   | 48   | 54   |