

Pattern of participation in a cohort aged 50–60 years at first invitation to the service-screening programme with mammography in Stockholm county, Sweden

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Abstract

Background. Mammography screening can only be effective if a high proportion of the invited women attend. The aim of the present study was to search for patterns of participation in women who were invited to five consecutive rounds in a large screening programme.

Method. Stockholm service-screening programme started 1989 and invites women between 50 and 69 years of age to mammography with 2 years interval. 64,852 women were eligible for an invitation to all five rounds during a 10-year period and were included in the study.

Results. More than 50% attended at all five rounds, and more than 70% at least four rounds. Only 8.5% were permanent non-participants. Women who attended at the first invitation round were more likely to attend also at subsequent rounds.

Conclusions. It is possible to reach a high participation also in a large urban screening programme, but it seems that the invitation and examination at first round are most important in order to get a high compliance. Women who come at first round are more likely to come back for routine screening at a majority of subsequent rounds.

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Introduction

After publication of the results of the Two-county study in the *Lancet* in 1985 (Tabar et al., 1985), the National Board of Health and Welfare (NBHW) issued recommendations for the County Councils to initiate mammography screening programmes for women 40–74 years (National Board of Health and Welfare, 1986). The recommendations stated that women below 55 years should be invited every 18th month and women 55 years and older every second year. The Malmö Mammography Screening trial (MMST), published in *BMJ* 1988 (Andersson et al., 1988), did not achieve the same pronounced breast cancer mortality reduction as in the Two-

county study, especially not in younger women, which resulted in altered recommendations from the NBHW that, in case of lack of resources, the counties should focus on the age group 50–69 years. Therefore, the Stockholm county mammography screening programme, launched in July 1989, comprises women 50–69 years who are invited to screening every second year (National Board of Health and Welfare, 1986, 1998). The situation with national recommendations for screening with decisions taken at a county level but with national coverage is similar to that in Canada (De Grasse et al., 1999; Maxwell et al., 1997; Snider et al., 1996). From 2005, age group 40–49 will be included in the Stockholm mammography screening programme.

A prerequisite for the success of the programme in terms of reaching a breast cancer mortality reduction is a high coverage and regular attendance which is only possible with

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a high level of population's acceptance (Lagerlund et al., 2001; Alcaraz et al., 2002; Bakker et al., 1998; Banks et al., 1998; Barr et al., 2001b; Bonfill et al., 2001).

Today, national service-screening programme with mammography is ongoing in Finland, Iceland, Luxembourg, The Netherlands, Norway, Sweden, and UK. Other European countries, e.g., Ireland, Italy, and France, are in a building up phase of national screening. Studies of acceptance of repeated regular invitation to mammography screening have been presented from several countries, e.g., The Netherlands (Drossaert et al., 2002; Otten et al., 1996; Scaf-Klomp et al., 1995), from UK (Banks et al., 1998; O'Byrne et al., 2000; Steadman et al., 1999; Woodman and Threlfall, 2001), from Italy, Finland, Spain (Alcaraz et al., 2002; Bonfill et al., 2001; Bonelli et al., 1996; Giorgi et al., 2000; Aro et al., 2001; Lostao et al., 2001), and from the regional screening programme in Copenhagen (Vejborg et al., 2002). Studies from US (Henderson and Schenck, 2001; Michaelson et al., 2002) illustrate the pattern of utilisation in a programme not based on individual invitation to screening.

There are numerous studies of factors related to attendance to screening, but there is a lack of knowledge of the attendance pattern in mammography screening, and to our knowledge, none has been able to follow a cohort for a longer time period to study the long-term participation pattern. Are the women encouraged or discouraged to attend at next screening round after having experienced the screening examination procedure at their first visit? Do consecutive visits increase the likelihood of attending screening at subsequent rounds?

The aim of this study is to analyse the participation pattern during the first five rounds in the service-screening programme with mammography in the Stockholm county, Sweden.

Methods

The screening programme in Stockholm county is population-based, covering the entire female population aged 50 to 69 who are invited at a 2-year interval. A two-view mammography is the routine examination at first round, and, at subsequent rounds, one view mammography is taken if not very dense breasts. All mammograms are read by two independent radiologists at each unit. At start, no fee was charged, but from 1993 to 2003, the fee was 50 SEK (5.4 €), and at present (2005), the fee is 140 SEK (15 €).

Mammography screening in Stockholm county has a centralised organisation with one coordinating centre. The county is divided into five health care areas of almost equal population size, and each area has a fixed screening unit totally devoted to screening, which is connected to a hospital at which further assessment is performed. The hospitals are Danderyd, Karolinska, Huddinge, S:t Göran, and Södersjukhuset. The first unit started in April 1989, three units started in August 1989, and the last one started in

March 1990 (Lidbrink et al., 1994). During the study period 1989 to 1999, no changes in the programme organisation were made. In 1994, one unit moved to new facilities in another hospital without altering the catchment area.

Stockholm county has approximately 1.5 million inhabitants, and the target group of women included in the screening programme was also the basis for the studied cohort. Age group 50–69 has been defined as the women who during a calendar year will turn 50 up to 69 years of age. To be able to follow the women for five complete rounds, the analyses were limited to women aged 49 to 60 years and resident in Stockholm county and who were invited to the first screening round between 1st of July 1989 and 30th of June 1991. Women aged 61 and older were all turning 70 during the study period of 10 years and excluded from the screening programme and could therefore not be invited more than 4 times. The study cohort was followed for five rounds, that is, until 30th of June 1999. The target population for the Stockholm screening programme in 1989 covering the age group 50–69 years was 144,186 women. Out of these, 80,176 were 50–60 years at first invitation and thus would be eligible to be invited to five consecutive screening rounds during the period of the present study 1989–1999 (Fig. 1). Women who registered themselves as “active non-participants” (did not accept to be re-invited to coming rounds) during the 10 years follow-up period, women who died or moved out from the county (catchment area), or had a screen-detected cancer or an interval cancer detected during any round were excluded from the analyses as they were not invited for 5 rounds (Fig. 2).

The booking system had online connection with the daily updated regional population register, and record linkage between Swedish population-based registers is possible due to a unique personal identification number. At the screening unit, information was recorded on participation, and whether the examination was normal or abnormal. The information was transferred to the follow-up database once a week at the regional oncologic coordination centre in Stockholm. All results, i.e., measures on attendance or not, and findings at the complete radiological assessment, the clinical examination, the cytological examination, the type of surgery, and

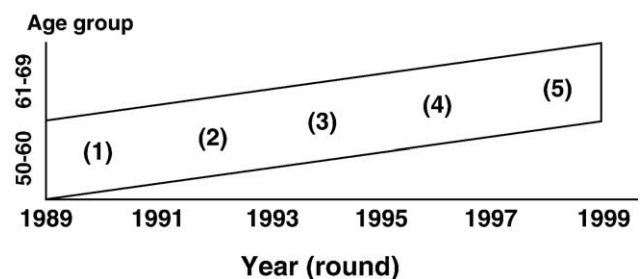


Fig. 1. Lexis diagram illustrating why the study was limited to the fixed cohort of women between 50 and 60 years of age during the five screening rounds. Women older than 60 could never be invited more than 4 times due to their leaving the programme when turning the age of 70. Number of screening round within brackets.

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