Evaluation of mammographic surveillance services in women aged 40–49 years with a moderate family history of breast cancer: a single-arm cohort study

SW Duffy,[1]* J Mackay,[2] S Thomas,[3] E Anderson,[4] THH Chen,[5] I Ellis,[6] G Evans,[7] H Fielder,[3] R Fox,[3] G Gui,[8] D Macmillan,[9] S Moss,[1] C Rogers,[3] M Sibbering,[10] M Wallis,[11] R Warren,[11] E Watson,[12] D Whynes,[6] P Allgood[1] and J Caunt[13]

[1]Centre for Cancer Prevention, Wolfson Institute of Preventive Medicine, Barts and the London School of Medicine and Dentistry, Queen Mary, University of London, London, UK
[2]Department of Biology, University College, London, UK
[3]Public Health Wales, Cardiff, Wales, UK
[4]Edinburgh Breast Unit, Western General Hospital, Edinburgh, UK
[5]Division of Biostatistics, National Taiwan University, Taipei, China
[6]Department of Histopathology, University of Nottingham, Nottingham, UK
[7]Genetic Medicine, University of Manchester, Manchester, UK
[8]Breast Unit, Royal Marsden Hospital, London, UK
[9]Breast Unit, Nottingham City Hospital, Nottingham, UK
[10]General Surgery, Royal Derby Hospital, Derby, UK
[11]Department of Radiology, Addenbrooke's Hospital, Cambridge, UK
[12]Department of Clinical Health Care, Oxford Brookes University, Oxford, UK
[13]Breast Test Wales, Cardiff, Wales, UK

*Corresponding author

Executive summary

Evaluation of mammographic surveillance services

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Executive summary

Background

For the last two decades, there has been a perceived need to evaluate the benefit of mammographic surveillance for young women at moderate risk of breast cancer due to family history.

Objectives

We planned to evaluate the policy of annual mammography in women aged 40–49 years with a significant family history of breast or ovarian cancer. The major questions were 'What is the likely effect of the surveillance on future mortality from breast cancer?' and 'At what cost is this effect on mortality achieved?'. The study is referred to as FH01.

Methods

In FH01, we recruited 6710 women between the ages of 40 and 50 years with an estimated personal risk of at least 3%. Women were recruited in 74 surveillance centres from England, Wales, Scotland and Northern Ireland. The women were offered annual mammography for at least 5 years. The age group 40–44 years was targeted so that they would still be aged < 50 years after 5 years of surveillance. This was a single-arm cohort study with recruitment taking place between January 2003 and February 2007. The primary study end point was the predicted risk of death from breast cancer as estimated from the size, lymph node status and grade of the tumours diagnosed. The 10-year deaths were estimated using the Nottingham Prognostic Index. The predicted mortality was compared with that of the control group from the UK Breast Screening Age Trial (Age Trial), adjusting for the different underlying incidence in the two populations. In addition, we compared the predicted mortality with a Dutch series of tumours from a similar risk group with ours, and carried out an internal estimation of the predicted mortality over 20 years using Markov process models.

Results

As of December 2010, there were 165 breast cancers diagnosed in 37,025 person-years of observation and 30,556 mammographic screening episodes. Recall rates for assessment were 8% at prevalence screens and 6% at incidence screens. Cancer detection rates were 5 per 1000 at prevalence screens and 4 per 1000 at incidence screens. Of these, 122 (74%) were diagnosed at screening, 39 (24%) were interval cancers and 4 (2%) were diagnosed in non-attenders (symptomatic diagnosis after failure to attend for the most recent screen offered). The cancers included 44 (26%) cases of ductal carcinoma in situ. Cancers in FH01 were significantly smaller ($p = 0.004$), less likely to be node positive ($p = 0.003$) and of a more favourable histological grade ($p = 0.002$) than the Age Trial control patients. There were 24 predicted deaths in 37,025 person-years in FH01, with an estimated incidence of 6.3 per 1000 per year. The corresponding figures for the Age Trial control group were 204 predicted deaths in 622,127 person-years and an incidence of 2.4 per 1000 per year. This gave an estimated 40% reduction in breast cancer mortality [relative risk = 0.60; 95% confidence interval (CI) 0.37 to 0.98; $p = 0.04$]. This was achieved with recall rates, preoperative diagnosis rates and radiation doses, which would be acceptable in the National Health Service Breast Screening Programme. The Markov model results indicated a 31–34% reduction in

future breast cancer mortality over 20 years, and 320–357 life-years saved (256–286 years after quality adjustment). Depending on assumptions, estimated costs ranged from £4435 (95% CI £3426 to £6234) to £5450 (95% CI £4154 to £7878) per quality-adjusted life-year saved.

Conclusions

Annual mammographic surveillance in women aged 40–49 years with an increased familial risk of breast cancer is likely to bring about a substantial reduction in mortality from breast cancer and to be cost-effective. There is a need to further standardise familial risk assessment, to research the impact of digital mammography and to clarify the role of breast density in this population.

Trial registration

This study is registered as National Research Register N0484114809.

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Editorial contact: nihredit@southampton.ac.uk

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