Evaluation of The Netherlands breast cancer screening programme

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The Netherlands breast cancer screening programme for women aged 50–75 years was gradually implemented during 1989–1997. Short-term indicators for this mammography screening are 80% attendance (800,000 examinations yearly), and for the subsequent screening examinations 7.4 referrals for clinical assessment per 1000 women screened, 4.7 biopsies and 3.6 breast cancers detected. Breast cancer mortality in The Netherlands has been decreasing since 1997 after having been stable for decades. The challenge now is to disentangle the relative contributions of mammographic screening, earlier clinical diagnosis, less aggressive tumours, treatment advances and risk factors towards this decline.

Key words: breast cancer service screening, evaluation

The Dutch experience with population-based breast screening programmes dates back 25 years, when the first pilot programmes in the cities of Utrecht and Nijmegen were launched in 1975. The favourable results of these non-randomised pilot programmes and detailed outcomes of the Swedish randomised controlled trials, combined with an extensive cost-effectiveness analysis, led to the decision to implement a nationwide breast cancer screening programme in 1989. The baseline epidemiological characteristics in The Netherlands are 7500 new patients each year in the age group ≥50 years, and 3000 breast cancer deaths, which comprises 5% of the overall female mortality. The Dutch screening programme offers biennial mammography for all women aged 50–75 years (50–69 years until 1998). The National Evaluation Team for Breast Cancer Screening (NETB) monitors the programme annually, collecting regional data on screening outcomes. Regional cancer registries provide data on interval cancers and on breast cancers in unscreened women by linkage of cancer registry data to data on screened women [1]. The gradual implementation of the national screening network took more than 10 years to complete [2]. In Table 1 the early outcomes aggregated for the period 1990–1999 are presented for women screened initially, and for subsequently screened women [2]. For the subsequent screening category, i.e. a previous screening examination <2.5 years before, the results are 7.4 referrals for clinical assessment per 1000 women screened, 4.7 biopsies and 3.6 breast cancers detected. The stage distribution of detected cancers is favourable with 78% either in situ or T1 tumours of at most 20 mm, and 23% axillary lymph node positivity. Currently, the attendance rate is ~80%, and 800,000 women are examined annually.

For the subsequent examinations in the years 1990–1999 the screening statistics are displayed in Figure 1. The referral rates are on average 7.4 per 1000 women screened; there was a decline in the mid-1990s, and an increase since then. This is accompanied by rising detection rates. According to the NETB [5], the data on lymph node positivity are not broken down to all age groups, leaving trends restricted to 1991–1997.

Over a restricted observation period, up to 1996, the interval cancer rates over a 2-year follow-up period could be taken into account as estimates on the sensitivity of screening mammography. The sensitivity rates range from 60% in the early years to 70% now, with a false-positive rate of six, declining to three per 1000 now. Kerlikowske et al., in a study in Northern California, reported during a follow-up period of 13 months a sensitivity rate of 80% at a false-positive rate of 18 per 1000 [3]. All these interim results indicate a probable reduction in breast cancer mortality. To obtain a preliminary prediction of this reduction, the prognoses in all screen-detected cases are broken down as shown in Table 1, and can be applied to the 2000 women, aged 50–69 years, with a screen-detected breast cancer in 1999 [4].

Fifty per cent would have been cured; they would also have survived without a screening programme. A further 16% will die from breast cancer despite early detection, as it was not detected early enough. Another 5% would have died from other causes before clinical manifestation; that is overdiagnosis and/or death in the lead time period [6]. Finally, the remaining 28% will benefit: they will not die from breast cancer as a positive result of screening. In The Netherlands, these 28% will comprise 700 (detected through subsequent and initial screening) breast cancer cases

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additional information will still be needed regarding possible con-
may identify additional bottlenecks in the procedure.
linkage is currently underway for one screening region, which
sent to use data on their screening history is not available. A pilot
does not allow this linkage for unscreened women since their con-
istics Netherlands. At present, the strict Dutch privacy legislation
regional cancer registries and the cause of death registry at Statis-
vidual data, directly linking a woman
effect of screening on mortality is on the basis of longitudinal indi-
gramme [8]. The only way to achieve a reliable assessment of the
part of the evaluation of the Dutch breast cancer screening pro-
members and treatment to perform analyses at a more detailed
founders and treatment to perform analyses at a more detailed level. Collecting this information periodically from a sample of the target population will enable us to perform a well-designed case-referent study at a reasonable cost. A large-scale pilot case-
referent analysis of the Nijmegen screening programme has shown that such a study should pay careful attention to the definition of the exposure to screening in relation to the relevant time window for screening. These analyses should be carried out according to the actual age at which women were screened. Furthermore, histopathological and mammographical parameters, as well as clinical management issues, are of equipoise pivotal importance as determinants of breast cancer mortality reduction.

Acknowledgements


References


Table 1. Early aggregate mammographic screening outcomes

<table>
<thead>
<tr>
<th>1990–1999</th>
<th>Initial screening</th>
<th>Subsequent screening</th>
</tr>
</thead>
<tbody>
<tr>
<td>Screened</td>
<td>1.73 million</td>
<td>2.64 million</td>
</tr>
<tr>
<td>Referral</td>
<td>13.8 per 1000</td>
<td>7.4 per 1000</td>
</tr>
<tr>
<td>Biopsy</td>
<td>9.7 per 1000</td>
<td>4.7 per 1000</td>
</tr>
<tr>
<td>Breast cancer</td>
<td>6.5 per 1000</td>
<td>3.6 per 1000</td>
</tr>
<tr>
<td>In situ/T1 (%)</td>
<td>76</td>
<td>78</td>
</tr>
<tr>
<td>Node-positive (%)</td>
<td>28</td>
<td>23</td>
</tr>
<tr>
<td>Metastases (%)</td>
<td>&lt;1</td>
<td>&lt;1</td>
</tr>
</tbody>
</table>

Figure 1. Trends in screening outcomes for subsequent examinations, women aged 50–69 years.