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National Health Service breast screening programme results for 1991-2

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Abstract

Objectives—To report the results of the NHS breast screening programme for the year March 1991 to April 1992.

Design—A report of statistics was derived from Körner (K62) returns and from the radiology quality assurance programme.

Main outcome measures—Detection rates for breast cancer and small (≤ 10 mm diameter) invasive cancer, benign biopsy rates, and recall and acceptance rates.

Results—The acceptance rate for screening across the United Kingdom was 71.3%. The referral rate for further investigation was 6.2% (regional 4.3-9.0%). The breast cancer detection rate was 6.2 cancers per 1000 women screened (5.1-9.0) and the detection rate of invasive cancers ≤ 10 mm was 1.4/1000 (1.0-2.3). 72% of screening programmes reached the target 70% acceptance rate, and 95% of programmes achieved a recall rate of less than 10%. 75% of programmes had a cancer detection rate of more than 5/1000, but only 32% had a detection rate for invasive cancers ≤ 10 mm of more than 1.5/1000.

Conclusions—Overall, the results of the screening programme for the year 1991-2 can be regarded as extremely satisfactory, given the size and complexity of the operation.

Introduction

After the publication of the Forrest report in 1987¹ a structured breast screening programme for women aged 50 and over was introduced into the National

Health Service. All women aged 50-64 who are registered with general practitioners are invited to be screened by mammography every three years, and asymptomatic women aged over 64 may obtain three yearly screening on demand. By the end of March 1991, 82 separate screening programmes were in operation, and another eight began screening during the next 10 months. These 90 programmes are sufficient to cover the 4.5 million women aged 50-64 in the United Kingdom once every three years and allow for about 10% of screening examinations to be self referrals of older women. As each round of screening is planned to extend over three years, only a minority of programmes—those starting in 1988—had completed their first round of invitations by the end of March 1992. The period covered by this report is the year from 1 April 1991 to 31 March 1992, so that all but eight programmes contributed a full year's data; only three contributed less than nine months' information.

Methods

One aspect of the national quality control of the screening programme is a standardised record system which permits the service to be routinely monitored. A number of different computerised record systems (five in total) have been specifically designed for the NHS breast screening programme, and tables showing various aspects of the performance of the screening service can be produced from these. Each screening programme in England is required to produce a "Körner" statistical return on form KC62 for the Department of Health each year, and similar arrange-

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ments apply in Scotland, Wales, and Northern Ireland. Working through regional coordinators in England, and national coordinators for the three Celtic countries, the cancer screening evaluation unit in the Institute of Cancer Research collects all these statistical returns. They are then entered into the unit's computer before analysis.

Some subdivisions of the data are not possible for the present report but will be in future. These include a breakdown of women invited into those being invited for their first screen and those being invited for routine screening after three years and, for Scotland, breakdowns by age group and by type of screen.

A few programmes experienced problems and long delays in obtaining completed forms for computer entry about women who had been referred to hospital for biopsy or treatment of breast cancer, or both. This means that there were several screening episodes in these programmes for which the outcome was still unrecorded at the time the Körner statistical returns were compiled. In almost all these cases the radiologists directing the screening programme learnt of the final diagnosis from their surgical and pathology colleagues, even though the detailed computer forms had not yet been completed. Therefore in this report the statistical returns for these programmes have been supplemented with data on referrals, biopsies, and cancers, collected to assist in radiological quality control by the "radiology big 18." This is a group of radiologists with responsibility for quality assurance in each of the 14 English regions, Scotland, Wales, Northern Ireland, and the private sector, totalling 18 in all. The radiologists' supplementary data provided more complete information on outcome for women screened between 1 April 1991 and 31 March 1992, the period covered by the KC62 returns. Unfortunately the supplementary data are available only at regional level, not individual screening programme level. Data for calculating the number of screening programmes meeting specific performance targets therefore come only from the KC62 returns and may thus lead to a slight overestimate of the number of programmes with satisfactorily low referral rates and biopsy rates and to a slight underestimate of the number with a satisfactorily higher cancer detection rate.

Results

UPTAKE OF SCREENING

In 1991-2, 71.3% of the 1 443 914 women who were invited for screening accepted the invitation (table I). There was a slight fall in response with increasing age. It is thought that the 40 989 women aged over 65 who were invited were selected as eligible when they were still 64. In addition to the women screened in response to invitation, a further 30 719 referred themselves to the screening clinics (table II).

REFERRAL FOR ASSESSMENT

Because of the potential for distress in women referred for diagnostic assessment as a result of a suspicious screening mammogram, all NHS screening programmes provide a dedicated assessment clinic where such women can be speedily and compassionately

TABLE II—Referral rates from screening

Type of screen	No of women screened	No (%) referred	Regional range of referral rates (%)
England, Wales, Northern Ireland:			
First	867 440	55 330 (6.38)	4.64-9.05
Routine rescreen	70 516	2 111 (2.99)	0.89-14.21
Referred by self or GP	30 719	1 946 (6.33)	2.47-12.94
Scotland (all types)	91 028	6 667 (7.32)	
Total	1 059 703	66 054 (6.23)	4.33-9.04

TABLE III—Breast biopsies resulting from screening

Type of screen	No of women screened	No of biopsies (%) of women screened	Regional range of biopsy rates (% of women screened)
England, Wales, Northern Ireland:			
First	867 440	7904 (0.91)	0.74-1.40
Routine rescreen	70 516	334 (0.47)	0.13-4.21
Referred by self or GP	30 719	401 (1.30)	0.62-3.39
Scotland (all types)	91 028	794 (0.87)	
Total	1 059 703	9433 (0.89)	0.69-1.31

investigated by an expert team consisting of a radiologist, clinician, pathologist, and nurse. Table II shows that overall 66 054 women, 6.2% of those screened, were referred in 1991-2.

BIOPSIES

Table III relates to women for whom a histological diagnosis was obtained after surgery and thus excludes those who had only fine needle aspiration cytology. A total of 9433 (0.9%) of screened women had histological examination, in whom 6605 tumours were malignant and 2828 benign.

BREAST CANCERS

Overall, 6.3 breast cancers were detected per 1000 women screened in the first round and 3.4/1000 at the routine rescreen three years later (table IV). These included ductal carcinoma of the breast in addition to invasive breast cancer. Detection rates increased with increasing age and were higher in self selected women. A more important indication of screening performance is the rate at which small invasive cancers (10 mm or less) were detected, shown as 1.4/1000 screened in the first round (table V).

PERFORMANCE OF INDIVIDUAL SCREENING PROGRAMMES

At the start of the screening programme a number of target performance indicators for the first round of screening were suggested.² These included an acceptance rate of 70%, a referral rate of 10% or less, a biopsy rate of 3% or less with a malignant to benign ratio greater than 0.5 to 1, a cancer detection rate in the first round of at least 5/1000, and a detection rate of invasive cancers ≥ 10 mm in diameter of at least 1.5/1000.

Table VI shows that, on the basis of data from KC62 returns, 72% of programmes achieved the target uptake of 70%. Ninety five per cent had a referral rate of 10% or less and all were at or below the target biopsy rate. Seventy five per cent had a cancer detection rate of at least 5/1000, and only three programmes had a rate significantly lower than this at the 5% level, but only 32% met the target for the detection of small cancers. Table VII shows the number of programmes meeting different numbers of targets, separately for those programmes starting during 1987-9 and those starting in 1990-2. Fifty nine per cent of programmes met five or more of the six targets, and 93% met at least four. There was no overall difference between those programmes starting in 1989 or earlier and the rest.

TABLE I—Acceptance of invitations to screening (first and second rounds combined)

	No of women invited	No screened	% Response	Regional range of response rates (%)
England, Wales, Northern Ireland:				
50-54	422 635	304 002	71.93	56.84-79.40
55-59	435 593	316 338	72.62	59.02-83.66
60-64	417 830	290 584	69.55	58.07-82.89
≥ 65	40 989	27 032	65.95	46.53-97.05
Scotland (all ages)	126 867	91 028	71.75	63.93-82.82
United Kingdom (all ages)	1 443 914	1 028 984	51.26	57.88-81.51

TABLE IV—Breast cancer detection rates

Type of screen	No of women screened	Breast cancers		Regional range of cancer detection rates (per 1000 women screened)
		No	No per 1000 women screened	
England, Wales, Northern Ireland:				
First	867 440	5470	6.3	5.1-9.5
Routine rescreen	70 516	242	3.4	1.2-15.8
Referred by self or GP	30 719	315	10.3	5.6-26.2
Scotland (all types)	91 028	578	6.3	
Total	1 059 703	6605	6.2	5.1-9.0

TABLE V—Detection rates of invasive cancers ≤ 10 mm in diameter

Type of screen	No of women screened	Invasive cancers ≤ 10 mm		Regional range of detection rates (per 1000 women screened)
		No	No per 1000 women screened	
England, Wales, Northern Ireland:				
First	867 440	1223	1.4	1.0-2.4
Routine rescreen	70 516	51	0.7	0.2-5.3
Referred by self or GP	30 719	49	1.6	0.4-6.2
Scotland (all types)	91 028	145	1.6	
Total	1 059 703	1468	1.4	1.0-3.0

TABLE VI—Screening programmes meeting targets for prevalent round* (women aged 50-64)

	No (%) of screening programmes
Response rate $> 70\%$	63 (72)
Referral rate $< 10\%$	84 (95)
Biopsy rate $< 3\%$	88 (100)
Malignant:benign ratio $> 0.5:1$	77 (87)
Cancer detection ratio $\geq 5/1000$	66 (75)
Cancers ≤ 10 mm diameter $> 1.5/1000$	28 (32)

*One programme was excluded as prevalent round was nearly complete before 1 April 1991, and one programme was excluded owing to missed data on Körner return.

TABLE VII—Number (percentage) of screening programmes meeting targets

Programme start	No of targets met				
	2	3	4	5	6
1987-9 (n=47)		1 (2)	19 (40)	17 (36)	10 (21)
1990-2 (n=41)	1 (2)	4 (10)	11 (27)	22 (54)	3 (7)
Total (n=88)*	1 (1)	5 (6)	30 (34)	39 (44)	13 (15)

*One programme was excluded as prevalent round was nearly complete before 1 April 1991, and one programme was excluded owing to missed data on Körner return.

Discussion

During the year 1991-2 almost one and a half million women were invited for screening. This shows that the overall screening programme is now running at sufficient capacity to invite all eligible women once every three years. There is still, however, a problem in the accuracy of the family health services authorities' lists of names and addresses in many areas, particularly in London. Some of those named may no longer be resident at the listed address ("ghosts" whose presence in the denominator leads to underestimation of uptake) and, more worryingly, some women may be resident but not registered with a local general practitioner and hence will never be invited. These problems are being addressed by family health services authorities and by computerisation of the NHS central register, public education to register with general practitioners, and the new general practitioner contract.

That the data from the standard returns need to be augmented is clearly unsatisfactory. It is hoped that this can be avoided in future years by improvements in computer software and by more complete and timely data entry.

The target performance indicators were based largely on the experience of two screening clinics in Edinburgh and Guildford that took part in the United Kingdom trial of early detection of breast cancer.³ There was some early scepticism as to whether the results obtained in these research centres could be translated into such widespread practice as now exists in the NHS breast screening programme, and it is gratifying to observe that these targets are almost all being met and in some cases exceeded. An overall acceptance of 71% is surprisingly high for British women in this age group, although the wide variation in acceptance across the country suggests that many districts need to improve their performance. A recent review of research findings in this area highlights the importance of high uptake and summarises present knowledge.⁴ Women's views on the screening programme are being studied in various research protocols.

In future years a breakdown of acceptance of invitations for the first screen and for subsequent routine three yearly screens will indicate whether the experience of screening is acceptable to women. Only if high participation can be maintained will the programme succeed. The relatively low referral rates and rates of benign biopsy specimens are encouraging, since the anxiety caused by false positive results of screening is often cited as the most serious side effect of screening. A further reduction in recall rates can be anticipated in future rounds of screening as a reflection of the availability of previous films with which to compare current examinations. In those centres already established on their second round of screening, recall rates of the order of 3% are currently being recorded. Interestingly, comparison of recall rates and cancer detection rates around the various regions in Britain shows no relation between recall rate and cancer detection rate. A higher recall rate might be expected to yield a higher detection rate, but this does not seem to be the case in practice. Similarly, there is no relation between the recall rate and the detection rate for small cancers. It is also desirable to minimise the number of unnecessary biopsies, and an overall biopsy rate of 0.89% with a positive predictive value for cancer of 70% means that across the United Kingdom approximately three out of four biopsies result in a diagnosis of cancer. In some of the Swedish screening programmes the positive predictive value can be as high as 86%,⁵ but in many centres in the United States the figure is 10% or below. At this stage in the British programme the positive predictive value of 70% for surgical biopsy can be regarded as a very satisfactory figure.

No region or country is failing to meet the target breast cancer detection rate of 5/1000—73% of pro-

Public health implications

- Implementation of a national breast screening programme was recommended in 1987, and 90 separate screening programmes were in operation by 1992
- These programmes cover 4.5 million British women aged 50-64 every three years
- 71.3% of women accepted screening during the year March 1991 to April 1992, and 6.2% were referred for further investigation; 6.2 cancers were detected per 1000 women screened
- 72% of screening programmes reached the target 70% acceptance rate and 95% achieved a recall rate of less than 10%
- Given the size and complexity of the system, these results are extremely satisfactory

grammes are meeting this target. The number failing to do so is little more than expected from chance variation, and many regions now exceed it, which has led to adoption of a new "achievable" standard of 6/1000. However, only six of the 17 regions and countries and 32% of individual programmes reached the target of at least 1.5 small breast cancers (diameter ≤ 10 mm) per 1000 screened. This criterion is used both as an indicator of the quality of mammography and as an indicator of the long term change in prognosis which, it is hoped, will be achieved by screening. More experience is needed to assess whether the detection rate of 3.4 breast cancers per 1000 at the three yearly repeat screen is sufficient to keep down the rate of interval cancers to 25% or less of expected three yearly incidence.⁶ All programmes are now setting up mechanisms for the routine reporting of interval cancers and cancers in non-responding eligible women from regional cancer registries and in some cases pathology laboratories. These will enable longer term predictions of whether the national screening programme is on course to meet its Health of the Nation target of a 25% reduction of breast cancer mortality in eligible women by the year 2000.⁷

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Prostitution and risk of HIV: female prostitutes in London

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Abstract

Objective—To measure the prevalence of HIV and to describe established risk factors in female prostitutes.

Design—A cross sectional survey.

Setting—A genitourinary medicine clinic, streets, and magistrates' courts in London.

Subjects—280 female prostitutes recruited between April 1989 and August 1991.

Main outcome measures—Infection with HIV-1, reported risk behaviours, and prevalence of sexually transmitted infections.

Results—228 of the women had HIV tests, and two (0.9% (95% confidence interval 0% to 2.1%)) were infected with HIV-1. Reported use of condoms was high for commercial clients and low for non-paying partners: 98% (251/255) of women used condoms with all clients and 12% (25/207) with non-paying partners for vaginal intercourse. Twenty two women were current or past injecting drug users. Of the 193 women examined for sexually transmitted infections, 27 had an acute infection (gonorrhoea, chlamydia, trichomonas, or primary genital herpes) at the time of interview. Infection was associated with younger age and increasing numbers of non-paying sexual partners, but not with duration of prostitution, numbers of clients, or reports of condom failures. When age and numbers of non-paying partners were analysed by logistic regression they remained significantly associated with sexually transmitted infections.

Conclusions—A large and diverse sample of prostitutes had a low prevalence of infection with HIV and high levels of use of condoms in commercial sex. There was a significant risk of other sexually transmitted infections associated with prostitutes' non-commercial sexual relationships, in which unprotected sex is common. Interventions to reduce the risk of sexually transmitted infections in prosti-

tutes should address both commercial and non-commercial sexual partnerships.

Introduction

It is unclear whether prostitute women in Europe are at risk of heterosexually acquired HIV independently of use of injected drugs. The risk of HIV infection has been highest in those who have a history of use of injected drugs which is associated with a history of street prostitution.¹⁻³

A prevalence of infection with HIV-1 of 1.6% was reported in 188 female prostitutes studied during 1986-8 in a London genitourinary medicine clinic.⁴ The work reported here was designed to show whether this low prevalence was related to the stage of the epidemic, sampling bias, or effective risk avoidance through the use of condoms.

Subjects and methods

A representative sample of prostitutes is difficult to define, but we had previously described the major sectors of prostitution in London⁵ and we developed methods of recruitment to ensure that our sample included women working in all these sectors. Between April 1989 and August 1991 prostitutes were recruited by referral from health workers in the genitourinary medicine clinic at St Mary's Hospital, referral from friends and colleagues of prostitutes, fieldwork (visiting streets, magistrates' courts, flats, agencies, and saunas), and telephone. We aimed for a sample size of at least 200 women to detect a prevalence as low as 2% with a 95% confidence interval that did not include zero.

A questionnaire asking for information on medical, social, and prostitution history was administered by trained interviewers. All participants were offered a HIV test, although acceptance was not a condition for

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