Improving uptake of cervical cancer screening in women with prolonged history of non-attendance for screening: a randomized trial of enhanced invitation methods

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Record Status
This is a critical abstract of an economic evaluation that meets the criteria for inclusion on NHS EED. Each abstract contains a brief summary of the methods, the results and conclusions followed by a detailed critical assessment on the reliability of the study and the conclusions drawn.

Health technology
Three methods of enhanced invitation to improve uptake of cervical cancer were examined. These were a telephone call, screening commissioner letter and a celebrity letter. The telephone call was made from an experienced research nurse using a prepared script, with a maximum of three attempts (on consecutive days) to make contact. The letter was sent from the Health Authority District Cervical Screening Commissioner (a public health doctor) on behalf of the National Cervical Screening Programme. The celebrity letter was sent from Claire Rayner, Chair of the Patients' Association and a well-known journalist and broadcaster.

Type of intervention
Screening.

Economic study type
Cost-effectiveness analysis.

Study population
The study population comprised women aged 39 to 64 years who were considered eligible for screening but who did not have a screening history for the previous 15 years.

Setting
The setting was primary care. The economic study was carried out in the UK.

Dates to which data relate
The effectiveness and resource use data were gathered in June 2001. The price year was 2001.

Source of effectiveness data
The effectiveness evidence was derived from a single study.

Link between effectiveness and cost data
The costing was carried out prospectively on the same sample of patients as that used in the effectiveness analysis.

Study sample
Power calculations were performed in the preliminary phase of the study. These suggested that a sample of 1,140 participants would be required to detect a clinically worthwhile difference in screening uptake between the groups of at least 10% and after considering exclusions by general practitioners (GPs), with 80% power and 95% precision. The participants were identified from records held by the Devon Patient and Practitioners Services Agency (PPSA)
database. Of the 8,186 patients initially assessed for eligibility, the final study sample included 1,140 women (285 patients allocated to each of the four groups). The mean age of the women was 53.6 (+/- 7.4) years in the telephone call group, 53.5 (+/- 7.1) years in the screening commissioner letter group, 53.9 (+/- 6.8) years in the celebrity letter group, and 53.4 (+/-7.3) years in the control group.

**Study design**
This was a prospective, multi-centre, randomised clinical trial. The participating sample was drawn randomly from the sampling frame and allocation to the three intervention groups was carried out at random, independently of the research team and without knowledge of the identity of women in the sample. The control group was selected at random from the original sampling frame at the analysis stage. The length of follow-up was 3 months. Around a fifth (n=193) of the participants in the intervention groups were excluded by GPs during the study period. The reasons for exclusion were hysterectomy, death, physical or learning disability, and other. Blinding was clearly not performed.

**Analysis of effectiveness**
The authors stated that the analysis of the clinical study was conducted on an intention to treat basis. The primary outcome measure was attendance for cervical screening within 3 months of the intervention. The study groups were comparable at baseline in terms of their sociodemographic factors.

**Effectiveness results**
In the telephone intervention group, 109 (49%) of the 222 attempted calls were successfully completed. In 25 (11.3%) unsuccessful calls no phone number was available, in 56 (25.2%) the number was unlisted and in one case the woman was out of the area, and in 31 (13.9%) there was no reply after three calls or the woman had moved address.

Six (3.2%) letters from the screening commissioner and seven (3.2%) letters from the celebrity were returned by the Post Office.

The attendance rate was:

1.4% (95% confidence interval, CI: 0.38 to 3.6) in the telephone call group,

4.6% (95% CI: 2.5 to 7.7) in the screening commissioner letter group,

1.8% (95% CI: 0.57 to 4.0) in the celebrity letter group, and

1.8% (95% CI: 0.57 to 4.0) in the control group.

Differences between the groups did not reach statistical significance.

**Clinical conclusions**
The effectiveness analysis showed that the three interventions were equally effective in terms of the uptake rate.

**Measure of benefits used in the economic analysis**
The summary benefit measure used in the economic analysis was attendance for cervical screening. This was derived directly from the effectiveness analysis.

**Direct costs**
The analysis of the costs was undertaken from the perspective of the NHS. It included the costs of staff time, telephone calls and letters (paper, photocopying and postage). The costs in the control group were assumed to have been zero. The unit costs were presented separately from the quantities of resources used for all items. Resource use was estimated from the actual patterns of care derived from the sample of women included in the clinical trial. The source of the costs
was not explicitly stated. Discounting was not relevant as the costs were incurred during a short timeframe. The price year was 2001.

**Statistical analysis of costs**
The costs were treated deterministically.

**Indirect Costs**
The indirect costs were not considered.

**Currency**
UK pounds sterling (€).

**Sensitivity analysis**
Sensitivity analyses were not carried out.

**Estimated benefits used in the economic analysis**
See the 'Effectiveness Results' section.

**Cost results**
The average cost per woman was 2.01 in the telephone call group and 0.65 in both of the letter groups (i.e. commissioner and celebrity).

**Synthesis of costs and benefits**
Average and incremental cost-effectiveness ratios were calculated to combine the costs and benefits of the alternative strategies.

The average cost per attendee was 145.12 in the telephone call group, 14.29 in the letter from commissioner group, and 37.14 in the letter from celebrity group.

The incremental analysis revealed that the telephone call was more costly and less effective than the commissioner letter and the control. The celebrity letter cost the same but was less effective than the commissioner letter. The incremental cost per attendee with the commissioner letter in comparison with the control was 23.21.

**Authors' conclusions**
The telephone call from a nurse and the letter from a celebrity to encourage attendance for cervical screening were neither effective nor cost-effective in women with a prolonged history of non-participation in the screening programme. Compared with no intervention, the use of a letter from the local cervical screening programme commissioner led to a small, non significant increase in uptake at a reasonable additional cost.

**CRD COMMENTARY - Selection of comparators**
The rationale for the selection of the comparator (i.e. taking no action) was appropriate since it might represent the standard care in several setting. The three invitation methods were appropriately chosen to reflect possible approaches to enhancing participation in screening programmes. You should decide whether they are valid comparators in your own setting.
Validity of estimate of measure of effectiveness
The clinical outcome used in the analysis was obtained from a randomised clinical trial. This was appropriate for the study question and reduced the impact of selection bias. The length of follow-up was appropriate and the possibility of administrative delays in the PPSA database was taken into consideration. The approach used to select the sample of participating women was described and details of sample selection were provided. For example, the number of patients excluded from the initial study sample by their GPs was reported. The study groups were well balanced at baseline, and the fact that the analysis was based on intention to treat should improve the validity of the analysis. Power calculations provided an explicit justification for the sample size. However, the authors stated that the actual power of the study was around 50%. These issues should be considered when assessing the validity of the study.

Validity of estimate of measure of benefit
The summary benefit measure was specific to the disease considered in the study. It is not comparable with the benefits of other health care interventions.

Validity of estimate of costs
The analysis of the costs was consistent with the perspective (i.e. NHS) adopted in the study. A breakdown of the cost items was given, as was extensive information on resource consumption and unit costs. This enhances the possibility of replicating the analysis in other settings. The sources of the costs were not reported, but it is likely that they reflected typical NHS sources. Statistical analyses of the costs were not carried out and the cost estimates were specific to the study setting. In effect, the impact of using different costs was not investigated in the sensitivity analysis. The price year was reported, which will facilitate reflation exercises in other time periods.

Other issues
The authors did not compare their findings with those from other studies. They also did not address the issue of the generalisability of the study results to other settings. Sensitivity analyses were not carried out, thus caution is required when extrapolating the results of the analysis to other contexts. The study referred to women with prolonged history of non-attendance for cervical cancer screening, and this was reflected in the authors' conclusions.

Implications of the study
The authors stated "the low cost and ease of implementation of this intervention support further research into its use in routine practice".

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