Cost-effectiveness of a tailored intervention to increase screening in HMO women overdue for Pap test and mammography services

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
An outreach intervention to increase Pap test and mammography in women aged 52 to 69 years, who are overdue for both of these services, was examined. As part of usual care, the health management organisation (HMO) in which the study was conducted attempts to contact all women in the target population about Pap tests and mammogram services. The outreach intervention had two components, a tailored letter and a tailored telephone call, which used brief motivational interviewing techniques. The calls averaged approximately 15 minutes.

Type of intervention
Screening.

Economic study type
Cost-effectiveness analysis.

Study population
The study population comprised women in need of both a Pap test and mammography.

Setting
The setting was primary care and the community. The economic analysis was undertaken in the HMO (Kaiser Permanente Northwest) in which the technologies were tested. Kaiser Permanente Northwest is a not-for-profit group model serving more than 450,000 people in Oregon and Southwest Washington.

Dates to which data relate
Both the effectiveness and cost data were collected in 1998 and 1999. The prices used were from the year 2000.

Source of effectiveness data
The effectiveness data were 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
A total of 4,394 eligible women were identified from electronic medical records. Of these, 2,268 were sent a survey and received a follow-up telephone call. Those who responded were allocated to four arms of the trial, including the two not reported in this paper. Only a proportion of each arm started the trial due to financial constraints. This left 127 women in the usual care only group and 127 in the usual care plus outreach group.
More detailed information on the primary report of the clinical trial (e.g. power calculations) can be found elsewhere (Valanis et al., see Other Publications of Related Interest).

**Study design**
This was a randomised controlled trial with 14 months of follow-up, which was conducted in the Kaiser Permanente Northwest Center for Health Research, Portland, Oregon. The outcome assessment was conducted using electronic data systems. More detail on the primary report of the clinical trial can be found elsewhere (Valanis et al., see Other Publications of Related Interest).

**Analysis of effectiveness**
The primary outcomes were the number and percentage of women who received both a Pap test and mammogram services within 14 months from the beginning of the trial. The analysis was conducted on an intention to treat basis. The comparability of the groups at baseline was not reported in the present study. The primary report of the clinical trial has been published (Valanis et al., see Other Publications of Related Interest).

**Effectiveness results**
Over the course of the intervention, of the 127 women randomised to usual care plus outreach, 50 (39%) received both a Pap test and mammography screening services. Of the 127 women in the usual care-only control group, 24 (19%) received both a Pap test and mammography screening services within the study period. The differences between the two groups were statistically significant, ($p=0.006$). The authors used the 95% confidence interval (CI) around intervention effectiveness to estimate low, medium and high levels of intervention effectiveness. The 95% CI was estimated from multivariate analyses and reported in another publication (Valanis et al., see Other Publications of Related Interest). The effectiveness reported in the base-case analysis corresponded to the medium level of effectiveness.

**Clinical conclusions**
Adding an outreach intervention to usual care significantly improved Pap smears and mammography adherence in this high-risk group of women who were overdue for screening.

**Measure of benefits used in the economic analysis**
The measure of benefits used in the economic analysis was the number of women who underwent both screening methods. This was derived directly from the effectiveness results.

**Direct costs**
The direct costs of the health service were evaluated. These included all administration costs of identifying the target population, obtaining information on barriers to screening and sending outreach letters. As the usual care costs were the same for both groups of women, these were not included in the study. Research-related costs (e.g. those to randomise the participants) were excluded, as were longer-term costs (e.g. follow-up treatment associated with abnormal results detected during screening) due to the short-term study horizon. The cost information was collected using three methods. Information was obtained from study and HMO accounting records. Study staff estimated the time required to complete specific tasks of the intervention, and estimated the use of capital equipment, space and the supplies needed. Historical accounting information from the HMO was used to estimate the overhead costs.

Discounting was not carried out, which was appropriate given the short-term horizon of the study. The authors categorised all intervention costs into fixed and variable costs. Resource use was evaluated during 1998 to 1999. The price year was 2000.

**Statistical analysis of costs**
The costs were treated deterministically (i.e. only point estimates were reported).

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

**Currency**
US dollars ($).

**Sensitivity analysis**
The authors conducted sensitivity analyses around two key parameters. These were the target population size (to evaluate more realistic sizes) and the level of effectiveness (derived using the 95% CI from the trial).

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

**Cost results**
The incremental cost of usual care plus outreach compared with usual care alone was $21,288.

The per-participant unit cost of the intervention was $167.62 for each women randomised to the outreach intervention.

**Synthesis of costs and benefits**
The incremental cost-effectiveness, or the incremental cost per additional women screened, of the base-case analysis was $818. From this figure, $321 represented the fixed cost and $497 the variable cost.

The results of the sensitivity analysis indicated that the incremental cost per additional woman screened with both tests would range from $90 (low clinical effectiveness, population size 2,500) to $19 (high clinical effectiveness, population size 7,500).

The large reduction in incremental cost per additional woman screened was primarily due to the fixed costs being spread across a much larger population of women. The cost per participant was $9.80 for the target population of 2,500, $8 for a population of 5,000, and $7.60 for a population of 7,500.

**Authors’ conclusions**
When using this outreach intervention, health plans with large populations are likely to increase Pap test and mammography services in this hard-to-reach population for a relatively low cost.

**CRD COMMENTARY - Selection of comparators**
The choice of the comparator was usual care, in which a substantial number of women do not receive the preventive tests evaluated. The authors explicitly justified their choice by stating that, although some studies have used no screening as the comparator, usual care is a more relevant comparator in settings with a high coverage rate. You should judge if it is relevant in your own setting.

**Validity of estimate of measure of effectiveness**
The basis of the analysis was a randomised controlled trial, which was adequate for the study question. Due to the restricted budget, only a small number of women from the study population were finally included. The authors did not describe whether their characteristics were similar to the final sample. The comparability of the study groups was also
not mentioned, although the readers were referred to the original report of the clinical trial (Valanis et al., see Other Publications of Related Interest). Appropriate statistical analyses (i.e. intention to treat) were performed. In addition, adequate ranges (i.e. 95% CI upper and lower bound) were used in the sensitivity analysis to test plausible effectiveness ranges.

Validity of estimate of measure of benefit
The estimation of benefit was measured in natural units (women who received both tests within the study period) and was obtained from the trial results. This choice of benefit measure may limit the comparability with cost-effectiveness studies in other health fields.

Validity of estimate of costs
The study had a very detailed and explicit costing section, following methods recommended by the US Panel on Cost-Effectiveness (although not taking the societal perspective they recommend). All the relevant categories and items from the adopted HMO perspective were included. The authors stated that they may have overestimated some of the costs. For example, although they assumed that the HMO have to incur all the cost of identifying the target population eligible for this intervention, this is currently done in some large health plans and, therefore, the identification process would not have to be developed from scratch. The study had a short-term time horizon and excluded possible differences in costs that might be incurred following the intervention (e.g. additional diagnostic testing or cancer treatment services). The costs and the quantities were not reported separately. The price year was reported.

Other issues
The authors made adequate and relevant comparisons with similar studies, explicitly stating similarities and differences in the results and methodology. They also discussed the generalisability of the study to other settings. The authors stated some limitations. For example, not considering a broader (i.e. societal) perspective, not considering a longer time horizon and possible cost-differences following the intervention. A further limitation was not being able to show whether an outreach letter with population-specific barriers would be as effective as the letter with person-specific barriers.

Implications of the study
Overdue women, who had not responded to regular prompts, could be motivated to obtain both Pap test and mammography screening services with a tailored outreach intervention. This study helps to inform decision-makers as they consider whether to adopt this effective intervention strategy to motivate these women. Larger health plans can probably increase Pap test and mammography services in this population for a relatively low cost by using this outreach intervention. Future research should explore whether a similar outreach intervention, using population-specific barriers, would have the same effectiveness. This approach, if effective, would be likely to significantly reduce the cost of the intervention to health plans.

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