The determinants of screening uptake and interventions for increasing uptake: a systematic review


Authors’ objectives
To evaluate the determinants of screening and the effectiveness of interventions to increase uptake. Data on informed uptake were also sought. Review data on determinants have not been extracted for this abstract.

Searching
Twenty-three databases of published and grey literature were searched using a pre-specified search strategy. These sources included MEDLINE (from 1966 to October 1998), databases on BIDS (from 1981 to October 1998), EconLit (from 1969 to October 1998), EMBASE (from 1985 to October 1998), Cancerlit (from 1985 to October 1998), CINAHL (from 1982 to October 1998) and PsycINFO (from 1985 to October 1998). Additional references were located by handsearching (Journal of Medical Screening), by screening the references of included studies, and by contacting specialists in the subject area of the review. There were no language restrictions.

Study selection

Study designs of evaluations included in the review
The criteria for study design were randomised controlled trials (RCTs), quasi-RCTs, and controlled trials (non-randomised cohort with concurrent control).

Specific interventions included in the review
The inclusion criteria specified any form of screening programme that aimed to increase the uptake of screening (or informed uptake) whether targeted at the population, health professional or the provision of service. Screening programmes were those that aimed to identify early the presence or absence of a specific condition, disease or disability during the pre-symptomatic phase, or before clinical detection (including antenatal screening of parents). Universal, selective and opportunistic screening programmes were all included.

Studies of self-examination procedures such as BSE and testicular self-examination were excluded, as were measures of accessibility and perceptions of barriers or motivations.

Participants included in the review
The inclusion criteria specified any people eligible to participate in a screening programme as defined by the entry criteria for that programme.

Outcomes assessed in the review
The outcome selected for the review was screening uptake or non-uptake, as recorded by health service records or by self-report by the participants. The review also measured uptake versus informed uptake of screening, and the cost of the interventions. Intermediate measures of uptake (included in studies reporting primary outcome measures) were appointment booking, reported intentions to uptake screening, attitudes to screening and knowledge of screening.

Studies that only reported intermediate measures of screening uptake were excluded.

How were decisions on the relevance of primary studies made?
One reviewer screened the titles and abstracts for inclusion and a second reviewer checked a random sample (5%) of the included and excluded papers. Full papers of the studies were then independently screened for relevance by two reviewers. Any disagreements were resolved by checking with a third reviewer.

Assessment of study quality
Studies of interventions were assessed using seven items of methodological quality derived from CRD Report 4. Each
item was graded as adequate (+); unknown, unclear or partial (+/-); or inadequate (-). These items were not used to generate an overall quality score, but were instead discussed within the review. The studies were assessed independently by two reviewers. Any disagreements were resolved by checking with a third reviewer.

**Data extraction**
The data were extracted by one reviewer and checked by a second reviewer. Any disagreements were resolved by checking with a third reviewer.

The relative risk (RR) and confidence intervals (CIs) were calculated for RCTs; all other studies were reported descriptively since many of the studies randomised participants by clustering. Where the same unit of allocation and analysis was used in the study analysis (e.g. physician), then the RR and CI were both calculated. Where the unit of analysis (e.g. individuals) was different from the unit of allocation (e.g. communities), then only the RR was calculated. Where the unit of analysis was households, the design effect due to clustering was thought to be minimal and the households were counted as individuals for treatment, and the RR and CI were calculated.

**Methods of synthesis**
How were the studies combined?
Initial meta-analyses were performed for all comparisons. Significant statistical heterogeneity was found for all comparisons except one (physician reminders versus invitation letters). Only the data from RCTs of comparisons of physician reminders versus invitation letters were pooled, using a random-effects model, to produce overall RRs and 95% CIs. The remaining comparisons were reported narratively.

How were differences between studies investigated?
Tests were performed for all sets of comparisons to investigate heterogeneity.

**Results of the review**
One hundred and ninety studies met the inclusion criteria for the interventions section of the review; 130 of these were RCTs.

Interventions aimed at individuals.

Interventions found to be effective were: invitation appointments, letters (less effective for mammography) and telephone calls; telephone counselling; and the removal of financial barriers, e.g. transport and postage costs. Interventions that may be effective included educational home visits, opportunistic screening, multicomponent community interventions, simpler procedures, a combination of different components aimed at individuals, reminders for non-attenders (for mammography only), and invitation follow-up prompts. Interventions that were found to have limited effectiveness included printed and audio-visual educational materials, educational sessions, risk-factor questionnaires, and face-to-face counselling. Interventions that were shown to be ineffective included the use of rewards or incentives. There was either no good-quality evidence or insufficient evidence to evaluate the effectiveness of other interventions.

Interventions aimed at physicians and other health care workers.

Reminder interventions were found to be effective for physicians. For physician education interventions there was insufficient good-quality evidence to assess their effectiveness. Interventions that may be effective were office systems and the use of audit and feedback to increase uptake.

Interventions aimed at both physicians and individuals.

A combination of physician reminders and patient invitations was found to be effective.

When comparing interventions aimed at individuals versus those aimed at physicians, there was a small but beneficial effect for the interventions targeting individuals.
For informed uptake, only 4 of the 190 studies reported data and included only knowledge as an outcome. Only one study investigated the effect of this information and knowledge on the decision-making process. Whether informed uptake affects the actual levels of uptake has yet to be fully evaluated.

**Authors’ conclusions**

The interventions for which there is evidence of effectiveness are invitation appointments, letters (less effective for mammography), telephone calls, telephone counselling, reduction of financial barriers (such as postage costs) and chart reminders for physicians. Most educational materials have limited effectiveness, but educational home visits may increase uptake.

The authors also mention that 65% of intervention studies and 82% of determinant studies were undertaken in the USA or Canada. Both these countries differ from the UK in the recommended ages and intervals for screening, and in the organisation of screening programmes. While some of these factors may limit the generalisability of the findings to the UK setting, they still provide a useful insight into screening behaviour.

**CRD commentary**

This was a very good review. The reviewers clearly stated the objectives of the review, as well as the inclusion and exclusion criteria. The literature search was very thorough and attempts were made to find unpublished literature and contact experts in this topic of research. The reporting of the review process was good, with several reviewers involved in selecting, quality assessing and data extracting the data for the review. Where data were available, appropriate pooling was performed and heterogeneity was assessed.

The authors made several recommendations for practice and further research. The authors' conclusions appear to follow from the results of the review. However, they commented that additional evidence would have been preferred for drawing stronger conclusions on some of the reported outcomes.

**Implications of the review for practice and research**

**Practice:** The authors state that invitation letters and/or appointments are supported by good evidence that they are effective. Telephone counselling, reducing economic barriers, and the use of reminder systems in primary and secondary settings, should be considered.

**Research:** The authors state that future studies should address not only actual uptake, but also informed uptake and measures of the decision-making process involved in uptake. Future research should address barriers to uptake, why uptake is lower in ethnic groups, and any or all factors influencing uptake, whether they were found to be significant in this report or not.

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**Other publications of related interest**

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Record Status
This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.