

Executive summary

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

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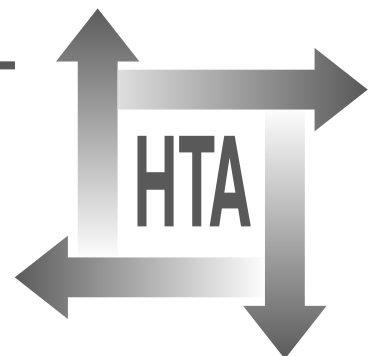
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Executive summary

Background

Screening has been defined as “the systematic application of a test or inquiry, to identify individuals at sufficient risk of a specific disorder to warrant further investigation or direct preventive action, among persons who have not sought medical attention on account of symptoms of that disorder”. Screening can be carried out with the aim of primary prevention (e.g. screening for risk factors such as hypertension), secondary prevention (e.g. cancer screening) or tertiary prevention (e.g. screening for sensorineural deafness).

The original brief of this systematic review was to evaluate the determinants of screening and interventions to increase uptake. There have been many debates in recent years, however, about the desirability of attaining high rates of uptake of screening *per se* without allowing participants to make an informed choice. Therefore, although the primary outcome of interest was actual uptake, data on informed uptake were also collected where available for all included intervention studies.

This review includes all screening programmes, regardless of whether they are of ‘proven’ effectiveness or are available or relevant in the UK setting. The reasons for taking such a broad approach are as follows:

- Some screening tests and programmes are very new or not routine in the UK, and are still being evaluated. Including all screening tests in the review means that policies for new programmes can be implemented without further reviews being undertaken.
- There is not always agreement as to which programmes are of proven benefit and which are not. Also, as new evidence emerges, programmes may be found to be more or less effective than previously thought.

Objectives

To carry out a systematic review to examine factors associated with the uptake of screening programmes and to assess the effectiveness of methods used to increase uptake.

In particular, the following questions were addressed:

- What factors (i.e. determinants) were associated with uptake of screening for different diseases?
- What interventions were shown to increase uptake of screening programmes (or informed uptake) within populations?

Methods

Data sources

Twenty-three databases of both published and grey literature were searched using strategies designed specifically for each database. Additional references were located through searching the bibliographies of related papers and contacting specialists in the subject area of the review. All published and unpublished studies were assessed for inclusion and there were no language restrictions.

Study selection

Studies of any screening programmes, where the outcome was screening uptake were assessed for inclusion. Randomised controlled trials (RCTs), quasi-RCTs, cohort studies and case-control studies (only when there was a prospective time barrier between collecting information about the determinants being assessed and the uptake of screening) were included in the determinants part of the review. In addition, only studies using some form of multivariate analysis were included. RCTs, quasi-RCTs and controlled trials were included in the interventions part of the review.

Data extraction

One reviewer screened the titles and abstracts of 46,000 studies and a second reviewer checked a random sample (5%) of included and excluded papers. Studies were independently pre-screened for relevance (using the full paper copy) by two reviewers. Data were then extracted from relevant studies by one reviewer and checked by a second reviewer. Any disagreements at any stage were resolved through discussion with a third reviewer.

Information was also recorded for each study relating to five items of methodological quality for

the determinants part of the review, and seven items for the interventions part of the review. These quality criteria were not used to obtain an overall quality score, but are reported descriptively in the text.

Data synthesis

Data reporting the relationship between each determinant and screening uptake were extracted where possible and reported in a narrative. For intervention studies, relative risks and 95% confidence intervals (CI) were calculated for all appropriate RCTs (if enough data were available) using a random-effects model. A test for heterogeneity was performed for all sets of comparisons and there was significant statistical heterogeneity for all but one of the comparisons. The results for the rest of the comparisons were reported in a narrative with diagrams displaying the relative risks (95% CI) for each RCT.

Results

Determinants

Sixty-five studies met all the inclusion criteria for the determinants section of the review. For mammography, women were more likely to attend if they had attended for a previous mammogram, had the intention to attend, had health insurance or received a recommendation to attend by their general practitioner. For Papanicolaou (Pap) smear, women were more likely to attend if they had health insurance. Age was also a determinant, although it was unclear whether older or younger women were more likely to attend. Being older than 65 years, previous participation in screening and being able to carry out the activities of daily living were found to be determinants associated with participation in faecal occult blood test (FOBT) screening. Determinants found to predict attendance at prostate cancer screening included having a higher level of education and being African-American, as opposed to Caucasian. It was not possible to ascertain which factors were important for other specific screening tests (e.g. cystic fibrosis, tuberculosis, well-child and HIV screening) due to a lack of evidence.

Determinants found to be associated with uptake across the five main screening tests (i.e. Pap smear, mammogram, HIV antibody test, FOBT and prostate screening) included attendance for a previous screening test and age.

Interventions

One-hundred and ninety studies met all the inclusion criteria for the interventions section of the

review, of which 130 (68%) were RCTs. Interventions aimed at individuals which seemed to be effective at increasing uptake included: invitation appointments, letters (less effective for mammography) and telephone calls; telephone counselling; and 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; 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.

Reminder interventions were found to be effective for physicians. Further interventions that may be effective included office systems or the use of audit and feedback to increase uptake. For physician education interventions there was insufficient good-quality evidence to assess their effectiveness. Of those 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 with those for physicians, there was a small but beneficial effect for the interventions targeting individuals.

When assessing informed uptake, only four of the 190 intervention studies (all for antenatal screening) reported giving information on the risks and benefits of screening, and included knowledge as an outcome. Only one study evaluated the effect of this information and knowledge on the decision-making process. Whether informed uptake affects actual levels of uptake, therefore, has yet to be fully evaluated.

Discussion and conclusions

Sixty-five per cent 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 findings to the UK setting,

they still provide a useful insight into screening behaviour.

Implications for practice

The authors identified a number of implications for practice arising from this review, and it is important to consider the findings in two ways: in relation to actual uptake and in relation to informed uptake. Any attempts to increase the uptake of screening should be pursued alongside initiatives to increase informed uptake.

- Individuals who previously participated in screening were more likely to be screened subsequently. Efforts could be focused on identifying and encouraging attendance among those who have never previously participated in screening.
- Current practice in the UK national screening programmes using invitation letters and/or appointments is supported by good evidence. Invitation telephone calls could also be considered, although the cost-effectiveness of this approach remains uncertain in the UK. All of these approaches could be considered for other screening tests.
- Telephone counselling where barriers to screening are discussed could be considered.
- Reducing economic barriers (e.g. offering free postage or transportation costs) can increase uptake and may be appropriate for specific groups.
- Healthcare professionals can be prompted either to perform or to recommend screening

tests by using reminder systems such as tagged notes. Such reminder systems could be considered in secondary as well as primary care.

Recommendations for future research

- All future studies should measure informed uptake as well as actual uptake and might include a measure of the decision-making process.
- A systematic review of informed uptake is needed. The review should include studies which have measured informed uptake, and/or knowledge, understanding and the decision-making process.
- Further research is needed to investigate how barriers to uptake can be minimised in ethnic groups, where uptake is known to be low.
- Further research is needed to determine whether there are other important factors influencing the uptake of screening that have not been investigated.
- Future studies need to report the outcome of all factors investigated as possible influences on screening uptake, not just those shown to be significant.

Publication

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NHS R&D HTA Programme

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The Standing Group on Health Technology advises on national priorities for health technology assessment. Six advisory panels assist the Standing Group in identifying and prioritising projects. These priorities are then considered by the HTA Commissioning Board supported by the National Coordinating Centre for HTA (NCCHTA).

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The views expressed in this publication are those of the authors and not necessarily those of the Standing Group, the Commissioning Board, the Panel members or the Department of Health. The editors wish to emphasise that funding and publication of this research by the NHS should not be taken as implicit support for the recommendations for policy contained herein. In particular, policy options in the area of screening will be considered by the National Screening Committee. This Committee, chaired by the Chief Medical Officer, will take into account the views expressed here, further available evidence and other relevant considerations.

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