Interventions that increase use of adult immunization and cancer screening services: a meta-analysis


CRD summary
This review assessed the relative effectiveness of approaches for improving adherence to adult immunisation and cancer screening guidelines. The authors concluded that the rates of screening are most likely to improve with organisational changes in staffing and clinical procedures, and that financial incentives and reminders for patients are also likely to have a positive effect. These conclusions are likely to be reliable.

Authors' objectives
The authors assessed the relative effectiveness of approaches for improving adherence to adult immunisation and cancer screening guidelines.

Searching
The Cochrane EPOC Register of trials, previous systematic reviews and the Health Care Quality Improvement Program database were searched to February 1999.

Study selection
Study designs of evaluations included in the review
Randomised controlled trials (RCTs) and controlled clinical trials (CCTs) were eligible for inclusion.

Specific interventions included in the review
Studies that evaluated an intervention to increase the use of immunisation for influenza and pneumococcal pneumonia and screening for colon, breast and cervical cancer were eligible for inclusion. Studies on the use of colon visualisation and mass mailing studies were excluded or reported elsewhere (see Other Publications of Related Interest).

Participants included in the review
Studies that targeted adult patients were eligible for inclusion.

Outcomes assessed in the review
The primary outcomes were the percentage of patients who received the service before the intervention (if available) and the percentage who received the service after the intervention.

How were decisions on the relevance of primary studies made?
Two reviewers independently selected studies for the review. Any disagreements were resolved by consensus or third party adjudication.

Assessment of study quality
Information on study design, withdrawal and drop-out rates, and agreement between unit of randomisation and unit of analysis were evaluated. Two reviewers independently assessed the quality of the studies included in the review. Any disagreements were resolved by consensus or third party adjudication.

Data extraction
Two reviewers independently extracted the data. Any disagreements were resolved by consensus or third party adjudication.
The authors identified the intervention components, i.e. reminders, provider feedback, education, financial incentives, regulatory and legislative actions, organisational change and mass media campaigns. In addition, key intervention features were determined: use of social influence, marketing and outreach, high visual appeal, collaboration and teamwork, theory based, top management support and active learning strategies. Each intervention component and key intervention feature was independently abstracted.

**Methods of synthesis**

**How were the studies combined?**

Meta-regression models were used to estimate adjusted odds ratios (ORs) for evaluating the effectiveness of different intervention components for immunisation (influenza and pneumococcal), screening mammography, cervical cytology screening and faecal occult blood testing. The independent effects of individual intervention components and the independent effects of a number of intervention features were estimated.

The results from the meta-analysis were compared with the results from individual studies that directly compared intervention components.

Publication bias was assessed graphically (funnel plots of the log risk ratios) and with adjusted rank correlation and regression asymmetry tests (Egger, Begg) for each screening device and intervention component.

**How were differences between studies investigated?**

Sensitivity analyses involved comparing the results with unadjusted random-effects pooled estimates of the ORs for subgroups of studies; adjusting the effective sample size in the clustered studies; and fitting models for RCTs only, with and without cluster adjustment.

**Results of the review**

One hundred and eight publications were included in the review: 95 RCTs and 13 CCTs evaluating one or more intervention.

**Immunisation (29 studies).**

Organisational change (adjusted OR 16.0, 95% confidence interval, CI: 11.2, 22.8), provider reminder (adjusted OR 3.80, 95% CI: 3.31, 4.37), patient financial incentive (adjusted OR 3.42, 95% CI: 2.89, 4.06), provider education (adjusted OR 2.52, 95% CI: 2.24, 2.82) and patient education (adjusted OR 1.29, 95% CI: 1.14, 1.45) significantly improved the use of immunisation screening services compared with usual care or the control group. Provider financial incentive (adjusted OR 1.26, 95% CI: 0.83, 1.90) and feedback (adjusted OR 1.23, 95% CI: 0.96, 1.58) did not significantly improve the use of immunisation screening services.

**Mammography (33 studies).**

Patient financial incentive (adjusted OR 2.74, 95% CI: 1.78, 4.24), organisational change (adjusted OR 2.47, 95% CI: 1.97, 3.10), patient reminder (adjusted OR 2.31, 95% CI: 1.97, 2.70), provider education (adjusted OR 1.99, 95% CI: 1.58, 2.51), feedback (adjusted OR 1.76, 95% CI: 1.44, 2.15), provider reminder (adjusted OR 1.63, 95% CI: 1.39, 1.92) and patient education (adjusted OR 1.31, 95% CI: 1.12, 1.52) significantly improved the use of mammography screening services compared with usual care or the control group.

**Cervical cytology (27 studies).**

Organisational change (adjusted OR 3.03, 95% CI: 2.56, 3.58), patient financial incentive (adjusted OR 2.82, 95% CI: 2.35, 3.38), patient reminder (adjusted OR 1.74, 95% CI: 1.58, 1.92), provider education (adjusted OR 1.72, 95% CI: 1.39, 2.13), patient education (adjusted OR 1.53, 95% CI: 1.30, 1.81) and provider reminder (adjusted OR 1.37, 95% CI: 1.25, 1.51) significantly improved the use of cervical cytology services compared with usual care or the control group. Feedback (adjusted OR 1.10, 95% CI: 0.93, 1.31) did not significantly improve the use of cervical cytology services.
Colon cancer screening (19 studies).

Organisational change (adjusted OR 17.6, 95% CI: 12.3, 25.2), provider education (adjusted OR 3.01, 95% CI: 1.98, 4.56), patient reminder (adjusted OR 2.75, 95% CI: 1.90, 3.97), patient financial incentive (adjusted OR 1.82, 95% CI: 1.35, 2.46) and provider reminder (adjusted OR 1.46, 95% CI: 1.15, 1.85) significantly improved the use of colon cancer screening compared with usual care or the control group. Patient education (adjusted OR 1.38, 95% CI: 0.84, 2.25) and feedback (adjusted OR 1.18, 95% CI: 0.98, 1.43) did not significantly improve the use of colon cancer screening.

Interventions that were based on needs or theory, fostered collaboration or teamwork, or provided materials with high visual appeal were associated with a statistically significant increased effect in at least three preventive care services. Publication bias was evident in mammography studies and for patient education and provider reminder interventions.

**Authors' conclusions**

The use of adult immunisation and cancer screening services is most likely to increase when health care organisations support the performance of these activities through organisational changes in staffing and clinical procedures. Patient financial incentives and reminders are also likely to positively affect the use of screening services.

**CRD commentary**

The review addressed a clear review question and employed clear inclusion criteria. Attempts were made to identify both published and unpublished literature and publication bias was formally assessed. However, it was unclear whether the authors included non-English language papers, therefore it was not possible to assess language bias. The study selection, data extraction and quality assessment processes were carried out in duplicate, hence minimising the possibility of selection bias and reviewer error. The authors do not appear to have presented the findings of the quality assessment, nor have they used this information to influence their results. The studies appear to be sensibly combined in a meta-analysis according to screening service and intervention component. The results were explored in several sensitivity analyses. The authors' conclusions are likely to be reliable.

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

Practice: The authors stated that organisations should choose interventions based on theory or a local assessment of needs and barriers; that involve collaboration and teamwork; and involve organisational change, such as nurse standing orders, special prevention clinics, or other system changes designed to make the identification and delivery of this care routine. Patient reminders should be implemented if the above system changes are already in place or are not feasible. Patient or provider education and provider feedback should not be chosen as a first intervention.

Research: The authors did not state any implications for further research.

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