Evidence summary Title:
Interventions that increase use of adult immunization and cancer screening services: Evidence and implications for public health

Review Quality Rating: 5 (moderate)

Review on which this evidence summary is based:

Review author contact information:
Paul G. Shekelle, MD, PhD, RAND, 1700 Main Street, PO Box 2138, Santa Monica, CA 90407-2138; shekelle@rand.org.

This is an evidence summary written to condense the work of the authors of this systematic review, referenced above. The intent of this summary is to provide an overview of the findings and implications of the full review. For more information on individual studies included in the review, please see the review itself.

Review content summary
This meta-analysis of 81 controlled studies (70 of which were randomized controlled trials) aimed to determine the effectiveness of practices that increase the use of adult immunization and cancer screening services. Participants studied were: patients, providers, organizations, and communities. To be included, studies were: identify inclusion criteria. Interventions described in this review included: reminders, provider feedback, education, financial incentives, regulatory intervention, organizational change, and media campaigns. Outcomes measured include: immunizations, mammography, cervical cytology, and colon cancer screening. Authors report that organizational change (based on knowledge of client and provider needs, barriers and theories) implemented in a collaborative team environment was the most effective strategy to increase the use of adult immunization and cancer screening services. In addition the use of patient reminders and patient financial incentives can be an effective supplement to organizational changes..

Comments on this review’s methodology
This is a methodologically strong systematic review. A focused clinical question was clearly identified. Appropriate inclusion criteria were used to guide the search. A comprehensive search was not employed using only health databases and unpubliche studies, while there is no mention of whether other databases, handsearching, key informants, or reference lists were searched. The search was not limited by language. Primary studies were not adequately assessed for methodological quality. The methods were not described in sufficient detail so as to allow replication although two reviewers were involved in quality appraisal. Any discrepancies in appraisal results were rectified by discussion or by another reviewer. The results of this review were transparent. Results were clearly presented in narrative form so as to allow for comparisons across studies. Heterogeneity was not assessed. Appropriate analytical methods (fixed effects, random effects) were not employed to enable the synthesis of study results.

Why this issue is of interest to public health
Immunization is one of the most cost-effective public health interventions available. The mandate of the Public Health Agency of Canada’s Immunization and Respiratory Infections Division is to prevent, reduce or eliminate vaccine-preventable and infectious respiratory diseases; reduce the negative impact of emerging and re-emerging respiratory infections; and maintain public and professional confidence in immunization programs in Canada. Such disease control requires the maintenance of very high levels of immunization because infectious agents still circulate in communities, albeit in reduced numbers. In Canada, as a result of immunization programs, vaccine-preventable diseases now cause less than 5% of all deaths.

The Canadian Cancer Society reports that cancer is the leading cause of premature death in Canada resulting in 989,800 potential years of life lost in 2002, making cancer prevention a high national priority. The Canadian Cancer Society suggests that fewer Canadians would die from cancer if screening programs were enhanced and expanded. For a screening test to have a population-based impact there must be adequate uptake (i.e., participation) in the target population. However, despite evidence to support population-based screening for cervical, breast, and colorectal cancers, related screening rates remain suboptimal, especially for colorectal cancer. Further, some screening tests can help prevent cancer (e.g., breast, cervical, and colorectal cancers) as they detect pre-cancerous conditions, which can then be treated or removed.

Evidence and implications
Evidence points are in order of the strength of evidence
## What’s the evidence?

### 1. Organizational change (20 studies)

1.1. Organizational change interventions were consistently associated with increased use of the clinical and preventive services. Compared to participants in comparison groups, participants receiving organizational change interventions were:

1.1.1. 16 times more likely to receive immunizations (influenza and pneumonia). The true effect ranged from 11.2 to 22.8 times more likely.

1.1.2. 2.47 times more likely to have mammography. The true effect ranged from 1.97–3.10 times more likely.

1.1.3. 3.03 times more likely to have Pap smears. The true effect ranged from 2.56 to 3.58 times more likely

1.1.4. 17.6 times more likely to have colon cancer screening. The true effect ranged from 12.3 to 25.2 times more likely.

1.2. Organizational change interventions included:

1.2.1. the establishment of a separate clinic devoted to screening and prevention activities (3 studies)

1.2.2. use of a planned care visit for prevention (2 studies)

1.2.3. use of techniques similar to continuous quality improvement (one study)

1.2.4. designation of specific prevention responsibilities to non-physician staff (14 studies)

### 2. Patient financial incentives

2.1. Compared to participants in comparison groups, participants receiving patient financial incentives were

2.1.1. 3.42 times more likely to receive immunizations. The true effect ranged from 2.89 to 4.06 times more likely.

2.1.2. 2.74 times more likely to have mammography. The true effect ranged from 1.78 to 4.24 times more likely

2.1.3. 2.82 times more likely to have Pap smears. The true effect ranged from 2.35 to 3.38 times more likely.

2.1.4. 1.82 times more likely to have colon cancer screening. The true effect ranged from 1.35 to 2.46 times more likely.

2.2. Patient financial incentives included reducing or eliminating co-payments

### 3. Personalized patient reminders

3.1. Compared to participants in comparison groups, participants receiving personalized patient reminders were

3.1.1. 2.52 times more likely to receive immunizations. The true effect ranged from 2.24 to 2.82 times more likely.

3.1.2. 2.31 times more likely to have mammography. The true effect ranged from 1.97 to 2.70 times more likely

3.1.3. 1.74 times more likely to have Pap smears. The true effect ranged from 1.58 to 1.92 times more likely.

3.1.4. 2.75 times more likely to have colon cancer screening. The true effect ranged from 1.90 to 3.97 times more likely.

### 4. Patient education

4.1. Compared to participants in comparison groups, participants receiving education were

4.1.1. 1.29 times more likely to receive immunizations. The true effect ranged from 1.14 to 1.45 times more likely

4.1.2. 1.31 times more likely to use mammography services. The true effect ranged from 1.12 to 1.52 times more likely

4.1.3. 1.53 times more likely to have Pap smears. The true effect ranged from 1.30 to 1.81 times more likely

4.1.4. no more likely to have colon cancer screening

### 5. Provider reminder

5.1. Compared to participants in comparison groups, participants whose providers received reminders were

5.1.1. 3.80 times more likely to receive immunizations. The

## Implications for practice and policy:

### 1. Organizational change

1.1. Programs aimed at increasing the use of immunizations and cancer screening services should be developed to include interventions that involve organizational change, such as nurse standing orders, special prevention clinics, or other system changes designed to make the identification and delivery of this care routine.

1.1.1. While organizational change may require additional resources (financial, human, time), programs that involve such interventions are likely to be effective.

### 2. Patient financial incentives

2.1. Programs aimed at increasing the use of immunizations and cancer screening services should provide these services with no cost or reduced costs to patients

### 3. Personalized patient reminders

3.1. Programs aimed at increasing the use of immunizations and cancer screening services should include personal reminders to patients

3.1.1. The development of a computer-based system to support this intervention may require additional resources initially and some human and financial resources (data entry, system maintenance and update) to support this system long term

### 4. Patient education

4.1. Programs aimed at increasing the use of immunizations and cancer screening services should not involve patient education as a sole intervention.

### 5. Provider reminder

5.1. 1.46 times more likely to have colon cancer screening. The true effect ranged from 1.15 to 1.85 times more likely
| 5.1.2. | The true effect ranged from 3.31 to 4.37 times more likely 1.63 times more likely to use mammography services. The true effect ranged from 1.39 to 1.92 times more likely |
| 5.1.3. | The true effect ranged from 1.37 to 1.92 times more likely to have Pap smears. The true effect ranged from 1.25 to 1.51 times more likely |
| 5.1.4. | The true effect ranged from 1.46 to 1.85 times more likely to have colon cancer screening. The true effect ranged from 1.15 to 1.85 times more likely |

### 6. Provider education

6.1. Compared to participants in comparison groups, participants whose providers received education were:

| 6.1.1. | 3.21 times more likely to receive immunizations. The true effect ranged from 2.24 to 4.61 times more likely |
| 6.1.2. | 1.99 times more likely to use mammography services. The true effect ranged from 1.58 to 2.51 times more likely |
| 6.1.3. | 1.72 times more likely to have Pap smears. The true effect ranged from 1.39 to 2.13 times more likely |
| 6.1.4. | 3.01 times more likely to have colon cancer screening. The true effect ranged from 1.98 to 4.56 times more likely |

### 7. Provider financial incentive

7.1. Compared to participants in comparison groups, participants whose provider received financial incentives were:

| 7.1.1. | No more likely to receive immunizations |
| 7.1.2. | 1.76 times more likely to use mammography services. The true effect ranged from 1.44 to 2.15 times more likely |
| 7.1.3. | No more likely to have Pap smears |
| 7.1.4. | No more likely to have colon cancer screening |

### 8. Feedback

8.1. Compared to participants in comparison groups, participants receiving feedback were:

| 8.1.1. | No more likely to have immunizations |
| 8.1.2. | 1.76 times more likely to use mammography services. The true effect ranged from 1.44 to 2.15 times more likely |
| 8.1.3. | No more likely to have Pap smears |
| 8.1.4. | No more likely to have colon cancer screening |

### 9. Key intervention features (7 studies)

9.1. Compared to participants in comparison groups, participants receiving interventions that involve collaboration among providers and were delivered through teams were:

| 9.1.1. | 17.9 times more likely to receive immunizations. The true effect ranged from 10.4–30.9 times more likely |
| 9.1.2. | 1.22 times more likely to use mammography services. The true effect ranged from 0.87–1.71 times more likely |
| 9.1.3. | 5.55 times more likely to have Pap smears. The true effect ranged from 4.54–6.80 times more likely |
| 9.1.4. | 9.21 times more likely to have colon cancer screening. The true effect ranged from 5.46–15.5 times more likely |

9.2. Compared to participants in comparison groups, participants receiving interventions based on theory or a local assessment of needs and barriers were:

| 9.2.1. | 1.62 times more likely to receive immunizations. The true effect ranged from 1.52–1.71 times more likely |
| 9.2.2. | 1.94 times more likely to use mammography services. The true effect ranged from 1.76–2.14 times more likely |
| 9.2.3. | 1.44 times more likely to have Pap smears. The true effect ranged from 1.30–1.59 times more likely |
| 9.2.4. | 2.16 times more likely to have colon cancer screening. The true effect ranged from 1.85–2.53 times more likely |

9.3. Compared to participants in comparison groups, participants receiving interventions with high visual appeal and clarity were:

| 9.3.1. | 3.25 times more likely to receive immunizations. The |
true effect ranged from 2.09–5.06 times more likely
9.3.2. 1.19 times more likely to use mammography services.
The true effect ranged from 0.89–1.59 times more likely
9.3.3. 1.99 times more likely to have Pap smears. The true
effect ranged from 1.69–2.34 times more likely
9.3.4. 1.95 times more likely to have colon cancer screening.
The true effect ranged from 1.24–3.05 times more likely
9.4. Compared to participants in comparison groups, participants
receiving interventions with use of social influence
9.4.1. no more likely to receive immunizations, use
mammography services, or have Pap smears
9.5. Compared to participants in comparison groups, participants
receiving interventions with learning strategies are
9.5.1. no more likely to receive immunizations or use
mammography services
9.5.2. 2.30 times more likely to have Pap smears. The true
effect ranged from 1.89–2.81 times more likely
9.5.3. 5.25 times more likely to have colon cancer screening.
The true effect ranged from 2.96–9.29 times more likely
9.6. Compared to participants in comparison groups, participants
receiving interventions with marketing and outreach are no
more likely to use mammography services.

10. Cost Benefit or Cost-effectiveness Information
10.1. Future research should assess cost benefit or cost-
effectiveness of the interventions

General Implications
- The results of this meta-analysis provide strong evidence that the following strategies are most effective in promoting
immunization and screening behaviours:
  - the implementation of organizational change that makes the delivery of these services part of routine care
  - patient reminders
  - patient financial incentives
- The following strategies are not effective, particularly when used alone:
  - education
  - provider feedback
- Alternatively, when these less effective strategies are combined with the most effective strategies such as organizational
change, use of financial incentives and personal reminders, they can lead to significant increases in the utilization of
prevention and screening services.

Legend: CI – Confidence Interval; OR – Odds Ratio; RR – Relative Risk
**For definitions please see the healthevidence.org glossary http://www.healthevidence.org/glossary.aspx

References used to outline issue

Other quality reviews on this topic


Related links
- Cancer Control PLANET [http://cancercontrolplanet.cancer.gov](http://cancercontrolplanet.cancer.gov)

Suggested citation

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