Community-Based Strategies to Promote Cervical Cancer Screening

Chronic Diseases and Injuries
Chronic Disease Prevention

March 2000
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Margaret Black, R.N., PhD\textsuperscript{1,2}
Janet Yamada, RN, MSc\textsuperscript{2}
Ruth Bakker, RN, BScN\textsuperscript{3}
Ginny Brunton, RN, MSc (candidate)\textsuperscript{2}
Maureen Cava, BScN, MSc\textsuperscript{4}
Yolanda Camiletti, MScN\textsuperscript{5}
Patricia Colton, MA\textsuperscript{2}
Maureen Harmer, R.N., BScN, MSc\textsuperscript{2}
Dr. Val Mann, PhD\textsuperscript{6}
Isabelle Michel, BScN, MA\textsuperscript{7}
Sandra Micucci, BA, MSc\textsuperscript{2}
Mary Ann O’Brien, PT, MSc\textsuperscript{2}
Darlyne Rath, BScN, MSc(T)\textsuperscript{8}
Katrine Varcoe, R.N., BScN, BA\textsuperscript{3}

1. McMaster University, School of Nursing
2. Region of Hamilton-Wentworth, Social and Public Health Services Division
3. Regional Niagara Public Health Department
4. Cancer Care Ontario
5. Middlesex-London Health Unit
6. Kingston, Frontenac, and Lennox & Addington Health Unit
7. Sudbury & District Health Unit
8. University of Toronto, School of Nursing
To determine the effectiveness of interventions included in the Mandatory Health Programs and Services Guidelines (MHPSG), the following systematic reviews were completed and funded by the Public Health Research, Education and Development (PHRED) Program of the Public Health Branch, Ontario Ministry of Health.

1998 - 1999
- Health Hazard Investigation
  - Emergency Response to Acute Environmental Hazards
  - Strategies to Enhance Public Awareness of Environmental Risks
- Chronic Diseases and Injuries
  - Chronic Disease Prevention
    - Community interventions to Enhance Fruit and Vegetable Consumption
    - Use of Coalitions in Heart Health, Tobacco Use Reduction and Injury Prevention
    - Community-Based Heart Health Programs
    - School-Based Adolescent Risk Behaviour Prevention Programs
- Family Health
  - Sexual Health
    - Adolescent Pregnancy Prevention Strategies
  - Child Health
    - Professionally Led Parenting Groups
    - Peer/Paraprofessional 1:1 Interventions in Improving Maternal/Child Health
    - Public Health Nurse Home Visiting
    - Curriculum Suicide Prevention Programs for Adolescents
- Infectious Diseases
  - Day Care Centre Infection Control Interventions
  - Adolescent STD Prevention Strategies

1999 – 2000
- Chronic Diseases and Injuries
  - Chronic Disease Prevention
    - Postpartum Smoking Relapse Prevention Strategies
    - Cervical Cancer Screening Interventions
  - Injury Prevention
    - Anticipatory Care Interventions with Community Dwelling Elderly
- Family Health
  - Sexual Health
    - Youth to Youth Peer Health Promotion
  - Child Health
    - Healthy Feeding in Infants Under One Year of Age
    - Injury Prevention in Children & Adolescents
- Infectious Diseases
  - Needle Exchange Programs
  - Online Computer Support Groups for Adults
# TABLE OF CONTENTS

**ACKNOWLEDGEMENTS** .......................................................................................................................... i  
**PREFACE** ........................................................................................................................................... ii  
**SUMMARY STATEMENT FOR PRACTITIONERS** ............................................................................... 1  
**POLICY IMPLICATIONS** ..................................................................................................................... 5  
**ABSTRACT** .......................................................................................................................................... 7  
**BACKGROUND** ................................................................................................................................. 9  
  - Introduction ........................................................................................................................................ 9  
  - Review and Advisory Committee ..................................................................................................... 11  
  - Review Question ............................................................................................................................... 11  
**METHODS** .......................................................................................................................................... 11  
  - Criteria for Study Selection ............................................................................................................. 11  
  - Search Strategy ................................................................................................................................ 11  
  - Review Procedures ............................................................................................................................ 12  
**RESULTS** ........................................................................................................................................... 13  
  - Identification of Relevant Studies .................................................................................................... 13  
  - Validity Assessment of Studies ........................................................................................................ 13  
  - Description of Included “Strong” or “Moderate” Studies .................................................................. 14  
  - Effectiveness of Interventions for Strong and Moderate Studies .................................................... 15  
**DISCUSSION** ..................................................................................................................................... 16  
**CONCLUSIONS** ................................................................................................................................. 17  
  - Implications for Practice ................................................................................................................... 18  
  - Implications for Research .................................................................................................................. 18  
  - Key Messages .................................................................................................................................... 18  
**TABLES** ............................................................................................................................................ 20  
  - Table 1: Summary of Included Studies Rated Moderate or Strong .................................................. 22  
  - Table 2: Component Ratings of All Studies Assessed for Methodological Quality ....................... 42  
  - Table 3: Interventions by Study and Type of Strategies Used ............................................................ 46  
**REFERENCES** ..................................................................................................................................... 48  
**APPENDICES** .................................................................................................................................... 52  
  - Appendix 1: Review Committee Members ....................................................................................... 54  
  - Appendix 2: Key Words Used in Computer Search ......................................................................... 56  
  - Appendix 3: Databases/Indexes Searched for French-Language Literature ...................................... 58  
  - Appendix 4: Selection Criteria for Study Inclusion/Exclusion ......................................................... 63  
  - Appendix 5: Effective Public Health Practice Project Relevance Tool ............................................. 65  
  - Appendix 6: Quality Assessment Tool for Quantitative Studies ....................................................... 67  
  - Appendix 7: Core Data Extraction Form ............................................................................................ 72
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The Public Health Branch of the Ontario Ministry of Health released new Mandatory Health Programs and Services Guidelines (MHPSG) in December 1997. Although the MHPSG provide guidelines for a wide range of public health practices in Ontario, the strength of evidence for many of the guidelines has not been summarized in a systematic way.

In 1998/1999, the Public Health Branch provided funding for the Effective Public Health Practice Project (EPHPP). The mandate of the project was to complete 15 summaries based upon systematic reviews of the effectiveness of specific requirements of the MHPSG. In 1999/2000 the EPHPP is completing eight more summaries. Each review is linked to one of the three general standards or three program standards. The reviews summarize the best available research evidence for public health practice in these areas. Research evidence is one piece of information needed to inform decision making in public health. Other factors, such as the local environment, local priorities, and available resources are also important.

The reviews were completed by review groups composed of members of the Ontario Public Health Research, Education and Development (PHRED) Program Health Units as well as representatives from other health units around the province. The PHRED Provincial Steering Committee has overseen the project.

Potential review topics were initially identified through a survey of public health practitioners and managers across Ontario. Each review group followed a systematic approach that included comprehensive search strategies and quality assessment of each primary research study selected for inclusion in the review.

One of the primary objectives in completing this work was to ensure that it is relevant to public health practitioners in the field. We contacted all Medical Officers of Health and asked for volunteer experts. The response was tremendous and more than 100 practitioners and managers from over 90% of health units across Ontario agreed to take on the role of peer reviewers for the draft reports.

This project already has had many benefits. Public Health professionals have developed skills in completing systematic reviews and have increased awareness of the importance and feasibility of evidence-based practice. Through this project, we have established new links with the Cochrane Collaboration. We hope that several reviews will be registered with the various Cochrane Review Groups, making them accessible to the international public health community. Finally, the process of completing this project has contributed to the development of a strong province-wide network of public health professionals.
Effective Public Health Practice Project

Summary Statement for Practitioners/Managers

March 2000

Effectiveness of Community-Based Strategies to Increase Cervical Cancer Screening

Public Health Mandate
Under the Mandatory Health Programs and Services Guidelines' Standard, Early Detection of Cancer, one objective is to reduce the mortality from cervical cancer by 50 per cent by the year 2005. The requirement states that boards of health shall work with community groups, women, and health professionals to coordinate services, to identify gaps and barriers to screening, and to develop and implement strategies to increase cervical cancer screening, particularly among women, facing significant barriers.

Background
Cancer of the uterine cervix is the eighth most frequently diagnosed cancer among Ontario women of all ages, and ranks eleventh in terms of cancer causes of death. However, its incidence among younger women aged 20 to 34, and 35 to 49, ranks third and second, respectively. Since 1971, the incidence and mortality of cervical cancer in Ontario has decreased by about 46 per cent. This rate of decline has slowed since the early 1980s, most likely reflecting a plateau in screening activity. Ontario and Canada have some of the lowest rates of cervical cancer in the world. Cervical cancer has a relatively good prognosis if diagnosed early, with a five-year relative survival rate of 74 per cent. In 1998, 580 Ontario women were diagnosed with cervical cancer and 150 women died of the disease.

Issue
Currently in Canada, opportunistic methods are being used to recruit women and while relatively successful, some women are being overscreened while others are not being screened at all. According
to the 1996/97 National Population Health Study (NPHS), about one in six Canadian women aged 18 or older have never had a Pap test. Never having been screened is the major factor leading to the development of invasive disease. Effective strategies are needed to increase cervical cancer screening.

Finding the Answers
A systematic review of both published and unpublished studies was completed to determine the effectiveness of strategies to increase cervical cancer screening among women.

What’s the Evidence?

- Forty-two studies evaluating strategies to increase cervical screening rates aimed at women in the community were found.

- One study was rated as methodologically "strong", 18 were rated as "moderate", and 23 were rated as "weak". None of the studies found was Canadian.

- Among the strong/moderate studies, half were aimed at disadvantaged women (low-income, poorly educated). Nine studies involved minorities and two targeted new immigrants.

- The most frequently used intervention was mass media campaigns (N=9) alone or combined with clinics, followed by individual education with/without clinics or letters. Seven studies used peer educators as interventionists.

- Sixteen of the 19 strong/moderate studies evaluated strategies that had positive impacts on the following outcomes: increasing Pap smear rates, increasing knowledge, the ratios of in situ to invasive cancer rates, the intentions to obtain Pap smears, reducing perceived barriers, and mortality rates.

- Those that combined a strategy such as mass media campaigns with health care provider education seemed to be most successful, suggesting that strategies aimed at both women and providers are necessary.

Implications for Practice and Research

- Consider the combined use of mass media campaigns with provider education/cooperation and personal reminder letters to women within the target population.
• Public health staff could explore the use of lay health educators when working with minority groups or new immigrants, ensuring support and on-going training for the educator and an evaluation of efficacy.

• Adequate resources/funding must be provided for public health units to implement strategies.

• Use of provincial centralized cytology data base would permit investigators to have complete and accurate baseline measures of screening rates.

• Methodologically rigorous and theoretically based evaluation research should be conducted in Ontario to assess behaviour change using validated reports of pap smear rates.

• Multi-site studies with the same design or those that include qualitative measures to assess reasons for not responding to the strategy would be helpful.

More Sources of Information

Black, M., Yamada, J., Bakker, R., Brunton, G., Cava, M., Camiletty, Y., Colton, P., Harmer, M., Mann, V., Michel, I., Micucci, S., O’Brien, M.A., Rath, D., & Varcoe, K. (2000). Effectiveness of Strategies To Increase Cervical Cancer Screening: A Systematic Review Of The Literature 1989 – 1999. Prepared by the Effective Public Health Practice Project for the Public Health Branch, Ontario Ministry of Health and Long Term Care.

Contact Information

Margaret Black RN, PhD
Public Health Consultant
Region of Hamilton-Wentworth
Social and Public Health Services Division
Community Support and Research Branch
PHRED Program
Hamilton, Ontario
Phone: (905) 525-9140 ext. 22726
Fax: (905) 628-5617
Email: blackm@mcmaster.ca
Effective Public Health Practice Project
Highlights for Policy Development

March 2000

Effectiveness of Community-Based Strategies to Increase Cervical Cancer Screening

Issue
Currently in Canada, opportunistic methods are being used to recruit women for cervical screening. While relatively successful, some women are being overscreened while others have not been screened at all. According to the 1996/97 National Population Health Study (NPHS), about one in six Canadian women aged 18 or older have never had a Pap test. Never having been screened is the major factor leading to the development of invasive disease. Effective strategies are needed to increase cervical cancer screening in women.

Background
Cancer of the uterine cervix is the eighth most frequently diagnosed cancer among Ontario women of all ages, and ranks eleventh in cancer mortality. However, its incidence ranks third and second respectively, among younger women aged 20 to 34, and 35 to 49. Since 1971, the incidence and mortality of cervical cancer in Ontario has decreased by about 46 per cent. This rate of decline has slowed since the early 1980s, most likely reflecting a plateau in screening activity. Ontario and Canada as a whole have some of the lowest rates of cervical cancer in the world. Cervical cancer has a relatively good prognosis, with a five-year relative survival rate of 74 percent. In 1998, 580 Ontario women were diagnosed with cervical cancer and 150 women died.

Public Health Mandate
Under the Mandatory Health Programs and Services Guidelines’ Standard, Early Detection of Cancer, one objective is to reduce the mortality from cervical cancer by 50 per cent by the year 2005. The requirement states that boards of health shall work with community groups, women, and health professionals to co-ordinate services, to identify gaps and barriers to screening, and to develop and implement strategies to increase cervical cancer screening, particularly among women facing significant barriers.

What’s the Evidence?
- Some intervention strategies have been effective in increasing Pap smear rates, knowledge, intentions to obtain Pap smears, ratio of in situ to invasive cancer rates, and reducing perceived barriers and mortality.
Those that combined a strategy such as mass media campaigns with health care provider education seemed to be most successful, suggesting that strategies aimed at both women and providers are necessary.

Seven of the studies used peer educators/volunteers as interventionists. Involving members of the intended audience in planning and delivery of the educational message can be beneficial.

Implications

• Consider the combination of mass media campaigns with health care provider education and/or provider co-operation with personal reminder letters.

• Explore and evaluate the use of lay health educators when working with minority groups or new immigrants, ensuring their on-going training and support.

• Provide adequate resources/funding for public health units to implement strategies.

• Utilize the provincial centralized cytology data base to permit investigators to have complete and accurate baseline measures of screening rates.

• Conduct methodologically rigorous and theory based evaluation research in Ontario, in order to assess effectiveness of strategies on behaviour change using validated reports of Pap smear rates.

Contact Information

Margaret Black RN., PhD.
Public Health Consultant
Region of Hamilton-Wentworth
Social and Public Health Services Division
Community Support and Research Branch
PHRED Program
Hamilton, Ontario
Phone: (905) 525-9140 ext. 22726
Fax: (905) 628-5617
Email: blackm@mcmaster.ca
ABSTRACT

Objectives
The purpose of this systematic review was to assess the effectiveness of community-based cervical cancer screening interventions intended to enhance the uptake of cervical cancer screening, consistent with public health practice in Canada.

Methods
A variety of sources were searched for articles. Ten electronic databases were searched. French-language Web sites, seven key public health journals and French-language DOCUMENSA were hand searched, for any potentially relevant studies. Key informants in Cancer Care Ontario and Ontario public health units were contacted for any published or unpublished studies evaluating cervical cancer screening interventions. Two independent reviewers screened lists of potentially relevant articles resulting from these searches for retrieval and possible inclusion in the review. Hard copies of all retrieved articles were rated using pretested tools for relevance, quality assessment, and data extraction by two trained independent reviewers, who reached agreement on ratings by discussion.

Results
A total of 428 English articles were selected for retrieval. Of the retrieved articles, 96 were found to be relevant. A search of the French-language literature elicited 36 articles for retrieval, none of which passed relevance testing. Because of the large number of relevant articles that were identified, two reviewers grouped the articles into four categories of interventions. The largest group with greatest relevance to public health was composed of the studies with interventions aimed at women in the community. Only these 50 studies were assessed for quality and included in this review. Fifteen papers representing multiple publications of seven studies were found, some of which reflected different phases of a single study. This left an overall total of 42 studies to be rated for quality. The overall quality ratings resulted in one strong study (2.3 per cent), 18 moderate studies (42.9 per cent), and 23 weak studies (54.8 per cent). Only the strong and moderate studies were used to evaluate the effectiveness of cervical cancer screening strategies.

A number of strategies, including reminder letters from physicians and those that were delivered by peer educators, were found to improve Pap smear rates. Mass media campaigns combined with education directed toward providers/women over varying time periods and intensity were successful at increasing Pap smear rates. Limited evidence was found for improved knowledge or intention, although Pap smear rates in these studies did improve. The effectiveness of campaign recall was dependent on the complexity of the assessment used. One study assessing barriers found a statistically significant drop in perceived barriers. One study assessing mortality using mass media campaigns, education, and clinics, reported improvements in mortality over ten years. Similarly, a community campaign and free clinics led to a higher ratio of in situ to invasive cancer rates, an indication of success. This ratio dropped off when the program ended and returned to pre-program levels, supporting the contention that such programs need to be in place continuously to maintain the gains made in improved early detection.
Conclusions
The evidence suggests that a successful program would be theory based, would combine a mass media campaign with direct tailored information/education to women and/or health care providers, would measure Pap smear rates, self-reported knowledge, and barriers, and would be sensitive to system and cultural factors. The combined use of mass media campaigns and provider education/cooperation with personal reminder letters to women within the target population should be considered. Public health staff could explore the use of lay health educators when working with minority groups or new immigrants, ensuring support and on-going training for the educator, and an evaluation of program efficacy. Adequate resources must be provided for public health units to implement strategies. The provincial centralized database will permit investigators to have complete and accurate baseline measures of screening rates. Methodologically rigorous and theoretically based evaluation research should be conducted in Ontario to assess behaviour change using validated reports of Pap smear rates. Multi-site studies, or those that include qualitative measures to assess reasons for not responding to the strategy, would be helpful.
BACKGROUND

Introduction
Cancer of the uterine cervix is the eighth most frequently diagnosed cancer among Ontario women of all ages, and ranks eleventh in all cancer causes of death. However, its incidence ranks third and second among younger women aged 20 to 34, and 35 to 49, respectively. Lifetime likelihood of acquiring this type of cancer is 1 in 122 women. Since 1971, the incidence and mortality rates of cervical cancer in Ontario have decreased by about 46 per cent, but this rate of decline has slowed since the early 1980s, most likely reflecting a plateau in screening activity (Health Canada, 1998; Marrett, Chiarelli, Nishri, & Theis, 1999). Still, Ontario and Canada have some of the lowest rates of cervical cancer in the world (Stuart & Parboosingh, 1996) and cervical cancer has a relatively good prognosis, with a five-year relative survival rate of 74 per cent (Lee & Parsons, 1998). In 1998, 580 Ontario women were diagnosed with cervical cancer and 150 women died from cancer of the cervix (Marrett et al., 1999).

Major risk factors identified for cervical cancer are infection with human papilloma virus (HPV), early age at first intercourse and first pregnancy, increased number of children, greater number of sexual partners, cigarette smoking, and low socio-economic status. Other risk factors include oral contraceptive use and nutritional deficiencies (Health Canada, 1998; Marrett et al., 1999)

Much of the decrease in the incidence and mortality of cervical cancer has been attributed to the use of the Papanicolaou test (Pap test/smear). This test is the most effective means to prevent invasive squamous cell carcinoma, which accounts for 80 per cent of all types of cervical cancer (Marrett et al., 1999). Variations in the effectiveness of the Pap test are associated with the degree of physician encouragement, improper smear technique, false negative test results reported by cytotechnologists, inadequate follow up, lack of integrated information systems, lack of nationally agreed upon quality management guidelines, and failure to consider alternative care providers and incentives (Stuart & Parboosingh, 1996).

Cervical cancer is an ideal disease for mass screening because it has a prolonged pre-invasive phase during which detection and treatment can pre-empt the development of cancer. Although randomized clinical trials have not been conducted to support the efficacy of the Pap test, mounting evidence has shown that Pap smears can decrease the incidence and mortality from cervical cancer by as much as 60 to 90 per cent (Brown, 1996). Never having been screened is the major factor leading to the development of invasive disease (Stuart and Parboosingh, 1996).

In Ontario, 88 per cent of women aged 18 and over reported ever having had a Pap test. The rates of screening varied directly with age and education, with the lowest proportion of women reporting ever having had a test in the 70 years and over group (Public Health Research, 2000). According to the 1996/97 National Population Health Study (NPHS), about one in six Canadian women aged 18 or older have never had a Pap test (Statistics Canada, 1998).
As well as increasing age and lower educational level, there are other characteristics associated with being underscreened. These include poverty, being from rural areas, being an immigrant or an Aboriginal woman, or speaking neither official language. (Goel, 1994; Stuart & Parboosingh, 1996; Marrett et al., 1999). For example, a study of First Nations people in Ontario from 1966 to 1996 found that cervical cancer occurs 1.75 times more frequently in Aboriginal women compared to Ontario women as a whole (Joint OCTRF/CCO-Aboriginal Committee on Cancer Care, 1997). Women born in Asia were nine times more likely than Canadian-born women to have never been screened (Lee, Parsons & Gentleman, 1998). Another way to categorize unscreened women has been identified: those known within the health care system and those not known to the health care system. Both unscreened groups include older women, immigrants, those less educated or of low-income, women living in a small residential center/rural, single women, and women having no sex partners in the previous year (Lee et al., 1998).

Stuart and Parboosingh (1996) reviewed the history of attempts to establish comprehensive screening programs in Canada. The earliest program was founded in 1949 in British Columbia. Subsequent national reports recommended comprehensive programs in 1973, 1982, and 1989, with little progress seen. British Columbia and Nova Scotia (the latter’s program established in 1991) have the most developed programs, while Ontario has been working to improve the current system since 1993. In 1997, the Public Health Branch of the Ontario Ministry of Health released Mandatory Health Program and Services Guidelines (MSG). These guidelines contain the standard, Early Detection of Cancer that requires boards of health to reduce the mortality of cervical cancer by 50 per cent by the year 2005. The requirement states that “boards of health shall work with community groups, women, and health professionals to coordinate services, identify gaps and barriers to screening, and develop and implement strategies to increase recruitment for cervical cancer screening, particularly those in hard-to-reach groups” (Ontario Ministry of Health, 1997, p. 19). The Ontario Cervical Screening Collaborative Group, consisting of community representatives, key agencies, professional organizations, and the Ministry of Health, has the objective of meeting the MSG goal. Currently, opportunistic methods are being used to recruit women and while relatively successful, some women are being over screened while others are not being screened at all (Miller, et al., 1991; Krauser, 1998).

Barriers to obtaining smears identified in U.S. studies fall into at least four categories: 1) lack of knowledge by the woman or the provider; 2) economic barriers; 3) a group’s culture or belief system (e.g., fatalism, misconceptions); and 4) logistical barriers (e.g., lack of transportation, child care). (Brown, 1996) Important barriers for poorer, immigrant, or Aboriginal women may arise from competing health and survival issues and limited access to culturally sensitive care (Marrett et al., 1999).

The standard for early detection of cervical cancer is very broad, given that it involves many types of public health interventions; consequently, a broad systematic review was envisioned. However, a subsequent decision to limit this review to interventions directed toward women in the community was made given the large amount of literature identified. This review, then, examined the effectiveness of community-based cervical cancer screening interventions that were designed to enhance the uptake of cervical cancer screening and that are consistent with public health practice in Canada.
Review and Advisory Committee

The overall direction for this review was determined by members of the Review and Advisory Committee, consisting of public health or cancer care practitioners with expertise in promotion of early detection activities and women’s health, and experts in conducting systematic reviews. Appendix 1 lists the members of this committee. The tasks included defining the question which would be of use to the public health field; determining the key search terms; identifying key informants, relevant databases, key journals, and unpublished studies/reports; reviewing the draft documentation; and developing appropriate recommendations for research and practice. In addition to these tasks, a subgroup of this committee reviewed the retrieved articles for relevance, and conducted quality assessment and data extraction.

Review Question

The review question was: “What is the effectiveness of strategies to increase women’s participation in cervical cancer screening?”

METHODS

Criteria for Study Selection

Although the focus of the Mandatory Health Programs and Services Guideline for Early Detection of Cervical Cancer is on hard-to-reach groups, the review included women of all ages (adolescent, adult, middle-aged, and aged), and a broad range of socio-demographic variables, in order to examine the different subgroups that emerged. The interventions included those applicable to public health practice in Canada, (i.e., consistent with Ontario’s MHPSG), that could be implemented, facilitated, or promoted by staff in public health units in Canada. The interventions were aimed at increasing the uptake of cervical screening and could be any individual, group, or population strategies directed towards women or health professionals. The study design had to be prospective and include a control group (one group pre/post designs were acceptable). Measures focused on screening knowledge, attitudes, or behaviours, satisfaction, cervical cancer incidence/prevalence. The studies could have been published in English or French. Studies that measured only process or health professional knowledge, attitudes, or behaviour (other than screening rates) were not eligible (see Appendix 3 for a list of selection criteria).

Search Strategy

Published Studies

A broad search strategy was developed with two librarians from the Public Health Research Education and Development (PHRED) Program. Key words found in titles of relevant articles were used, as well as a variety of MeSH terms (see Appendix 2). The following computerized databases were searched from 1989 to September, 1999: Medline, Current Contents, CINAHL, HealthSTAR, EMBASE, PsycINFO, Sociological Abstracts, and the Cochrane Library. Seven core journals were hand searched back five years (1994-99) to ensure studies had not been missed by other methods. These were the American Journal of Public Health, American Journal of Health Promotion, American
Journal of Epidemiology, Canadian Journal of Public Health, Health Promotion International, Health Education and Behavior, and Journal of Epidemiology and Community Health. Two other journals, American Journal of Preventive Medicine, and Cancer Epidemiology Biomarkers and Prevention were also hand searched. Persons in agencies such as Cancer Care Ontario were contacted to ensure other relevant published studies were identified.

Unpublished Studies

Unpublished studies in English were retrieved through contacts the advisory committee had with key staff at Cancer Care Ontario and public health departments; a search of theses in the Dissertation Abstracts database; a search of the Public Health Effectiveness Database in the Hamilton-Wentworth Regional Social and Public Health Services’ PHRED program; and through other key informants.

Unpublished studies in French were retrieved through a search of French-language Web sites (see Appendix 2) and a manual search of DOCUMENSA (1990-1999).

Review Procedures

Screening Process

The retrieved abstracts or titles were transferred into Reference Manager (or separate text files for Dissertation Abstracts and the Cochrane Library) and screened independently by two reviewers. Their independent selections were pooled and retrieved as potentially relevant articles. Four pairs of reviewers independently rated the retrieved articles for relevance using a tool developed by the team (see Appendix 4). These eight persons trained together by teleconference using one common article, then the group leader reviewed five articles with each of the other seven. Once this initial training was completed, the four pairs commenced the review process. Each of the pairs reviewed the articles independently, then in consultation agreed on the relevance rating. The pair also identified potentially relevant studies from the reference sections of reviewed articles. The identified references were subsequently reviewed for relevance by project team members. French articles were screened by two French-speaking persons who were trained in the same method.

Quality Assessment

A generic quality assessment tool was used to rate the retrieved articles (see Appendix 5). This tool, previously designed by the Effective Public Health Practice Project (EPHPP) team, was used because of its established ability to produce consistent assessment of methodological quality (validity assessment). Due to the number of community-based studies involving surveys, some adaptations were made to the form and its accompanying dictionary to aid in interpretation. Two raters independently assessed the quality of each study using the form. When each rater was finished, the individual ratings were compared and consensus was reached on each item. In cases of disagreement after discussion, a third person was asked to assess the study. All the relevant studies were assessed by one of the investigators to provide consistency in interpretation.
A data extraction tool also previously designed by the EPHPP team was individualized for this review, particularly in areas such as sample characteristics, intervention descriptors, intervention providers, setting, and target group (see Appendix 6). Two reviewers independently extracted the data, and any discrepancies were discussed between the two extractors. Primary outcome measures were identified and clinical/statistical significance was noted when possible.

RESULTS

Identification of Relevant Studies
The search for published and unpublished studies identified a large number of potentially relevant articles. After the initial screening of the abstracts, a total of 428 English articles were selected for retrieval. Of the retrieved articles, 96 were found to be relevant. Hand searching did not identify any new relevant articles, but did locate seven articles that had already been identified as relevant in the search of electronic databases. No French-language articles were identified in the electronic databases. In the French-language grey literature, 36 articles were selected for retrieval, but none was relevant.

A framework for displaying the data was established to include:
- type of design,
- who funded and who led the project (local or national in scope),
- whether the intervention was based on a theory,
- whether it was a combination intervention aimed also at breast screening,
- what population the intervention was aimed at,
- who/what gave the intervention; and whether they were trained, and
- the nature and intensity of the intervention.

Because of the large number of relevant articles that were identified, two reviewers grouped the articles into four categories: 1) interventions aimed at women in the community (n=50); 2) interventions aimed at women attending primary care providersclinics (n=33); 3) interventions aimed at health care providers and women (n=7); and 4) interventions aimed at health care providers only (n=6). The largest group with greatest relevance to public health was composed of the studies with interventions aimed at women in the community; thus, only these 50 studies were assessed for quality and included in this review. The remaining articles may be the subject of a future review.

After all of the studies in the first group (n=50) were rated for relevance, multiple publications of a single study were identified. Fifteen papers representing multiple publications of seven studies were found, some of which reflected different phases of a single study. This left an overall total of 42 studies to be rated for quality.

Validity Assessment of Studies
Table 2 summarizes the results of the quality ratings for the 42 studies. The overall quality ratings resulted in one strong study (2.3 per cent); 18 moderate studies (42.9 per cent); and 23 weak studies (54.8 per cent). Six of the 18 studies rated as moderate...
involved multiple publications of the same study. There were two randomized controlled trials (RCT), ten controlled clinical trials (CCT), 11 cohort analytic (two group pre and post), 13 cohort (one group pre and post) and six interrupted time series (multiple observations over time, with a specific point when the intervention is noted). Both RCTs were rated globally as weak, because they both failed to control for confounders, and/or had invalid or unreliable tools, had problems with selection or with dropouts. Although some of the other studies were described as RCTs, they were rated as CCTs if they failed to describe the randomization method, or failed to conceal randomization.

Of those studies rated moderate or strong, there were six CCTs, six cohort analytic, four cohort, and three interrupted time series designs. The main design problem with the cohort analytic studies that used community samples was finding a comparable city or region. Statistical adjustment for baseline differences was done in some studies. Cohort and interrupted time series studies suffered from not having a comparison group, instead using the pre-test measure to assess change.

**Description of Included "Strong" or "Moderate" Studies**

The 19 studies rated as of moderate or strong quality are described as follows and are displayed in Table 1. The studies were published between 1989 and 1999 (although some started data collection in the eighties). The studies were located in United States (9), Australia (7), United Kingdom (2), and Taiwan (1). No Canadian studies were located. Seven studies were directed at all women living in cities/regions/counties or tribes, while the others were aimed at groups within communities. Sample sizes tended to range between 200 to 400 per group, although the population studies involved much larger numbers. Participants in ten of the studies were disadvantaged (low-income, poorly educated); however, in eight of the other studies, the samples were poorly described. Half the studies were aimed at women within a broad age range (e.g., 18 to 70 years), although within these studies, analyses of subgroups were performed. Nine studies involved minorities, and two studies targeted immigrant groups (Vietnamese and Cambodian). The interventionists included research staff, lay peer educators, and health professionals.

Table 3 displays the interventions by study and type of strategy used. Five of the studies focused on interventions directed at both breast and cervical cancer screening, while the rest focused only on cervical cancer screening interventions. The most frequently used interventions were mass media campaigns (11 studies), alone (8) or combined with clinics (3), and individual education (5 studies) with clinics (1) or without clinics (4). Three of these four studies also included print material. Reminder letters were used alone (3 studies), or combined with a clinic (1). Three sets of strategies were combined or were compared with each other. The intensity or duration of the intervention was not always clear, but ranged from a day (for a letter), three weeks, one month, or up to 2 months annually for 3 years. Outcomes measured were Pap smear rates (17), knowledge (8), recall of campaign (6), intention to be screened (2), acceptability of strategy (1), barriers (1), cervical and uterine cancer mortality (1) and ratio of in situ cancer rates to invasive cancer rates (1).

Five of the 19 studies reported a theoretical basis for the intervention. The most popular was the Social Cognitive Model, alone or combined with the Communication Behaviour Change Model, social marketing, the PRECEDE, or the Health Belief Model.
Effectiveness of Interventions for Strong and Moderate Studies

Pap Smear Rates
Of the 19 studies rated as moderate or strong, 17 of these (16 moderate, one strong) measured Pap smear rates. All but five reported statistically significant improvements in rates. Of those five, two reported nonsignificant findings and three were unclear, although they appeared to have achieved clinically important results. The study rated strong (Bowman, Sanson-Fisher, Boyle, Pope, & Redman, 1995) compared women in three groups: those who received reminder letters, those who were invited to a special clinic, and those who received a personalized letter from the family physician. There was also a no-intervention control group. The physician letter group had a statistically significantly higher rate than the other three, although the net difference was at best 12 per cent. The pre-test may have minimized the differences found among groups.

Several studies had clinically and statistically important improvements in rates, that ranged from an increase of 61 per cent for an education video given to Cambodian women (Kelly, et al., 1996), 52 to 110 per cent for TV advertisement combined with FP education (Byles, Sanson-Fisher, Redman, Dickinson, & Halpin, 1994), 52 per cent for an intense mass media campaign combined with FP education (Shelley, Irwig, Simpson, & Macaskill, 1991), 50 per cent for intense individual education, plus media, plus FP education, plus clinics (Hirst, Mitchell, & Medley, 1990), and 21 per cent for an intense outreach/inreach program over four years (Tatum, Wilson, Dignan, Paskett, & Velez, 1997). A number of these studies delivered intensive methods, some a single brief but focussed method, while others were delivered over a longer period of time, with multiple methods. Seven of the studies utilized lay educators as interventionists, and of these, five produced positive effects (Dignan, et al., 1995; Dignan, et al. 1996; Kelly et al., 1996; Tatum, 1997; Bird, et al., 1998; Dignan, et al., 1998; Paskett, et al., 1999).

The two that did not achieve improvements in Pap smear rates (Suarez, Nichols & Brady, 1993; Suarez, Nichols, Pulley, Brady, & McAlister, 1993; Suarez, et al., 1997) identified limitations such as understaffing, low power to detect differences, and not addressing system barriers.

Knowledge
Only the study (by Shelley et al.) and the two studies by Dignan, et al., (1995;1998), showed significant improvements in knowledge. Despite no gains in knowledge, other studies reported improvements in Pap smear rates.

Campaign recall
Those studies that involved mass media campaigns (Suarez Nichols & Brady, et al., 1993; Suarez et al., 1993; Tatum et al., 1997; Byles, et al., 1995; Bird et al., 1998; Byles et al., 1994; Shelley et al., 1991; Paskett et al., 1999) reported the rates of those surveyed who recognized or recalled the campaign as ranging from 27 per cent to 78 per cent. However, the method of measuring this varied from a general question posed to asking about specific aspects of the campaign.

Barriers
The one study assessing barriers, found a statistically significant drop in perceived barriers by the women in the intervention group compared to the comparison (Tatum et al., 1997; Paskett et al., 1999).
Intention
In two studies (Dignan et al. 1998, Mills, Simpson, Shelley, & Turnbull, 1994), it was found that when controlling for the pretest, that there was no difference in intention to obtain a Pap smear as a result of the intervention, although there was a statistically significant improvement in Pap smear rate.

Mortality
The single study that assessed mortality (Chou & Chen, 1989), used mass media campaigns, education, and clinics, and reported improvements in mortality over ten years. The authors attributed this to early detection as seen by an increased identification of early cases. They did not report Pap smear rates and thus, one has to infer that the improvements are due to an increase in screening.

Ratio of in situ to invasive cancer rates
In a study by Holland Foster and Louria (1993), a community campaign and free clinics led to a higher ratio of in situ to invasive cancer rates, an indication of success. This ratio dropped off when the program ended and returned to preprogram levels, supporting the authors’ contention that such programs need to be in place continuously to maintain the gains made in improved early detection. The study does not report Pap smear rates, and one again has to infer that the improvements found in cancer rates are due to an increase in early detection activities.

DISCUSSION

Based on the findings of this review, there are some promising approaches to increasing the uptake of cervical cancer screening among women in the community. Some combination of strategies, including mass media campaigns and/or tailored education/information to women and/or health care providers appears to have positive results.

Only the studies rated as strong and moderate were used to evaluate the effectiveness of cervical cancer screening interventions. Among the 19 studies rated moderate or strong, there were a number of methodological strengths and weaknesses. Sampling in a number of studies reflected the need to reach underserved populations and thus were aimed at minorities, older women, or immigrants. However, a number of studies failed to describe the sample characteristics beyond gender, thus their similarity to other underserved populations is questionable. Study design was problematic; some controlled clinical trials lacked equivalence at baseline for the outcome measure although they used statistical adjustment for these differences. Cohort analytic studies led to difficulties finding comparable comparison groups; cohort studies lacked a comparison group.

Operationalization of the interventions was supported with theory in only seven studies, and thus the remainder lack adequate conceptualization. The outcomes that used self-reported data were a potential source of bias. Those that provided an external validation of receipt of Pap smear through laboratory reports were stronger than those using only self-report. Measures of knowledge and attitudes did not provide reliability or validity assessment.
Controlling for the effect of the pre-test through designs such as the Solomon Four Group (Dignan et al., 1996) led the researchers to contend that pretesting can interact with some interventions and can influence the strength of the outcome, but the reasons for this effect need further study. One alternate design would be a posttest only design with randomization. Those studies that compared multiple strategies with no intervention are problematic in that one cannot disentangle the relative contribution of each strategy to the outcome. Others tried to overcome this by comparing different combinations of strategies. Those that combined a strategy such as mass media campaigns with family practitioner education seemed to be most successful, especially at reaching previously unscreened women, suggesting that strategies aimed at both women and health care providers are necessary.

A number of authors proposed that a change in behaviour (increase in Pap smear rates) can occur without a concomitant increase in knowledge or attitude (Suarez, Nichols & Brady et al., 1993; Suarez et al., 1993; Suarez et al., 1997; Shelley et al., 1991). Others suggested that the probability of behaviour change increased as the focus of attention shifted from the group toward the individual (Dignan et al., 1996). Shelley contended that a mass media campaign’s effectiveness lay in its “cue to action,” raising awareness and knowledge, whereas individual education more directly affected behaviour. A number of studies used lay educators as interventionists and found this approach promising (e.g., Bird et al., 1998) although Suarez et al. (1997) reported their study failed to provide enough supervision and training, necessary prerequisites for delivering such an intervention.

Intervention integrity was affected by secular trends, and by contamination of the comparison group with other strategies, notably mass campaigns. Length of follow up tended to be short for many studies. The long-term effect of mass campaigns would be important to assess, but few followed up for any length of time. Only one study with nonsignificant results provided a power analysis to determine if its sample size was sufficient.

CONCLUSIONS

Over the time period reviewed, studies assessing cervical cancer screening effectiveness have become more rigorous, with many attempting to account for the challenges of conducting research in the community. There has also been tremendous variety in the nature and scope of interventions assessed. Studies that mounted resource-intensive strategies that demonstrated strong improvements present difficulties for regions with only limited resources to carry them out. On the other hand, short, modest interventions such as media and provider education (Shelley et al., 1991) or the provision of a personal reminder letter (Byles et al., 1995) suggest positive trends, although design issues limit their usefulness. Thurston and Scott (1996) note that studies that accounted for system barriers such as provider knowledge, availability/accessibility of clinics, or cultural/language issues, seem promising. Thus, the evidence suggests that a successful program would be theory based, would combine a mass media campaign with direct, tailored information/education to women and/or health care providers, would measure Pap smear rates, self-reported knowledge, and barriers, and would be sensitive to system and cultural factors.
Implications for Practice

The combined use of mass media campaigns and provider education/cooperation with personal reminder letters to women within the target population should be considered.

Public health staff could explore the use of lay health educators when working with minority groups or new immigrants, ensuring support and ongoing training for the educator, and an evaluation of program efficacy. Adequate resources must be provided for public health units to implement strategies.

Implications for Research

The provincial centralized database will permit investigators to have complete and accurate baseline measures of screening rates. Methodologically rigorous and theoretically based evaluation research should be conducted in Ontario to assess behaviour change, using validated reports of Pap smear rates.

Multi-site studies (e.g., replicating the design with two different groups as in the Dignan projects) or those that include qualitative measures to assess reasons for not responding to the strategy would be helpful.

Key Messages

The combination of mass media campaigns with health care provider education and/or provider cooperation with personal reminder letters should be considered.

Explore and evaluate the use of lay health educators when working with minority groups or new immigrants, ensuring their ongoing training and support.

Provide adequate resources/funding for public health units to implement strategies.

Utilize the provincial centralized cytology database to permit investigators to have complete and accurate baseline measures of screening rates.

Conduct methodologically rigorous and theoretically based evaluation research in Ontario, in order to assess effectiveness of strategies on behaviour change using validated reports of Pap smear rates.
TABLES

Table 1: Summary of Included Studies Rated Moderate of Strong
Table 2: Component Ratings of All Studies Assessed for Methodological Quality
Table 3: Interventions by Study and Type of Strategies Used
Table 1: Summary of Included Studies Rated Moderate or Strong

| Study          | Design/ Quality | Participants | Intervention | Outcomes | Results/Comments |
|---------------|----------------|--------------|--------------|----------|-----------------|
| Suarez et al. (1997) | Cohort analytic over 3 years | Target audience: Adult women in a Texas community (El Paso – intervention) compared to another community (Houston) | Interventionists: Peer volunteers; Public health staff | Pap smear rates | Intervention not intensive enough, too diffuse across community (too few role model stories, too few volunteers) |
|               | Overall quality rating: MODERATE | Random sample surveys in the two communities (El Paso n= 450; Houston n=473) of Mexican-American women 40 years and older. Pre and post intervention surveys used independent samples. Education: ~85% less than 12 years schooling Ethnicity: >60% born in Mexico Low English use & >58% at poverty level | Training: by public health staff | Cancer screening knowledge | Despite community collaboration, there were barriers to use of media |
|               | Led by: Local Public Health department and service provider consortium |             | • Years 1-3: role model stories on T.V., radio and newspaper (English & Spanish) | Follow up: At end of third year of the intervention | Needed more intensive training and monitoring of staff and volunteers |
|               | Funded by: NCI |             | • Years 2-3: PSAs on radio & TV | Pap smear: Intervention women reported 5.9% absolute increase in use, similar to comparison increase of 6.6%. After adjusting for baseline demographic differences, changes were identical OR=1.00 (95% CI=0.68, 1.47) | Comparison community contaminated by national campaign |
|               | Theoretical framework: Social cognitive model |             | • TV interviews | Knowledge: Comparison community had greater increase in knowledge of Pap smear guidelines than women in intervention community (19.4% versus 4.0% change, p<.05) | |
|               | Foci: Breast and cervical cancer screening |             | • Bilingual newsletters distributed and discussed by volunteers in neighbourhoods, clinics and churches | | |
| Study | Design/Quality | Participants | Intervention | Outcomes | Results/Comments |
|-------|----------------|--------------|--------------|----------|-----------------|
| Shelley et al. (1991) | Cohort Analytic Overall Quality rating: MODERATE | Target audience: Women aged 18 – 70 years, especially those >50 years in New South Wales, Australia, compared to expected levels and to women in three control states | Intervention: Media • Short intensive health education media campaign including one 30 second TV & radio commercials, & ads in two women magazines over 3 week period • Educational package mailed to all general practitioners (posters/pamphlet) | • Recall of campaign • Knowledge & attitudes to Pap smears and screening • Pap smear rates Follow up: 4 months’ measure of rates immediately post campaign Recall after one month Recall: 40% of women recalled media campaign, TV had biggest recall, inversely related to age Knowledge & attitudes: some statistically significant improvements Pap smear rates: 30% increase in NSW overall Pap smears during 4 months post campaign and 52% increase (p<.05) in women 50-69 years old who were most lapsed (not screened in over previous 2 years) | Prior to campaign levels of knowledge and favourable attitudes generally high • Authors argue mass media acts as “cue to action” • Difficult to assess relative contribution of media and provider education • Unable to assess long term impact • Control states likely contaminated by national TV coverage |
| Study               | Design/Quality | Participants | Intervention | Outcomes                                                                 | Results/Comments                                                                 |
|---------------------|----------------|--------------|--------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------|
| Suarez et al. (1993a) | Cohort over 2 ½ years  
Overall quality rating: MODERATE | Led by: Local public health department  
Theoretical framework: Social cognitive theory  
Foci: Breast and cervical cancer screening | Target audience: Mexican-American women in Corpus Christi and African-American women in Galveston, Texas, both 40-70 years of age  
Random sample surveys in the two communities (Corpus Christi: n=107; Galveston: n=82). Pre and post intervention surveys used independent samples  
Mexican-American women were less educated, more were married, and more were homemakers than the African-American women  
Mean age ~55 years | Interventionists: Peer role models: Lay community volunteers (n=769); Provider (RN, MD etc) volunteers Training: by public health staff and consultant  
• Role model stories tailored to population on 3 TV and 5 radio stations & newspapers over 3 months  
• Newsletters delivered by volunteers to neighbours, friends and patients | • Level of program awareness  
• Knowledge of screening & attitude toward cancer  
• Pap smear rate over 2 years  
Follow up: Two years post intervention  
Level of awareness: 27%-40% recalled  
Knowledge and attitude: did not improve significantly  
Pap smear rate: No statistically significant increase but small improvements were noted in favour of the intervention | • Lack of comparison community  
• Baseline rate relatively high (65-70%) thus, power to detect differences limited by sample size  
• Did not address system barriers  
• Appeal of strategy is its use of local resources to reach out |
| Study                      | Design/Quality | Participants                                                                 | Intervention                                                                 | Outcomes                                                                 | Results/Comments                                                                 |
|---------------------------|----------------|-------------------------------------------------------------------------------|------------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------|
| Mitchell et al. (1997)    | Cohort over 3 years Overall quality rating: MODERATE Led by: Local State Cancer Council Funded by: Not specified Theoretical framework: Not specified Focus: Cervical cancer screening | Target audience: Adult women in the state of Victoria, Australia of non-English-speaking background (NESB) compared to English speaking women 29 state postcodes selected as High NESB had 49% women who were non-English speaking (approx 89,000) compared to 39 postcodes selected as Low NESB with 7% non-English-speaking women Primarily low income and comparable across postcodes; other sample variables, including ages of women not specified | Interventionists: Bilingual (12 languages) community workers Training: Specifically briefed “Pap Test Victoria” • Year one: live interviews on ethnic radio • Year two: 15 live radio interviews, 210 paid announcements and 36 prizes, articles & ads in 11 ethnic newspapers • Year three: 12 live radio interviews, 216 paid announcements and 39 prizes Each year, intervention lasted 1.5 – 2 months | Pap smear rates over 3 months pre and post intervention with 3 month washout period Follow up: 3 months after end of each intervention Pap smear: Across the 3 intervention periods, the media publicity appeared to generate an additional 6.7% (95%CI 4.4-9.2%) increase in screening of women in high NESB, compared to changes in screening of women in low NESB areas. Had larger improvements during more intense coverage | Cannot differentiate relative effect among strategies used, although ethnic print media appeared to have little effect Modest cost for promising effect from use of ethnic media, especially radio Confounded with secular trends influenced by another campaign during same period |

Table 1: Included Studies
| Study | Design/Quality | Participants | Intervention | Outcomes | Results/Comments |
|-------|---------------|--------------|--------------|----------|-----------------|
| Hirst et al. (1990) | Cohort over 1 month | Overall quality rating: MODERATE | Led and funded by: State Anti-Cancer Council with help from 3 regional coordinating bodies | Theoretical framework: not specified | Focus: Cervical cancer screening |
| | Target audience: Women 40 years and older in the State of Victoria, Australia who had not received Pap test in previous two years | Primarily living in rural Victoria, women from less than 20 years to those over 59 years | Other sample characteristics not specified | Interventionists: Community health workers; Gynecologist educator and clinic providers | Training not specified |
| | “Pap Test Month” August 1988 | | | Pap smear rates (mean daily rate) two months pre intervention, the month during, and 3 months immediately after. Based on regional lab reports | |
| | 46 educational sessions to women’s groups and 2 groups of hospital staff; 8 public meetings, ethnic women’s day, TV and radio promotions; posters and brochures to general community and 37 workplaces and pay slip messages in two large companies | All 165 family physicians invited to resource meeting or received tape, guide; posters and brochures for their patients | 18 specialized free screening clinics | Pap smear rates: During campaign was an overall 50% increase in rates; rate doubled among women over 60 years; 50% increase among women 40-59 who had previously been unscreened by registry. Screening clinics accounted for ½ of the increase in tests during the campaign; and seemed to attract women with no screening history. After the campaign, rates declined to just below pre-campaign rates | |
| | Follow up: 3 months post intervention | | | | |
| | Family physician attendance (27%) at meetings was low; not seen as useful method for promoting screening | | | | |
| | Not clear from article whether differences statistically significant | | | | |
| | Authors attempted to rule out sources of co-intervention | | | | |
| | Sustainability as issue: clinics were not permanent | | | | |
| | Authors argue strategies need to be accessible and acceptable | | | | |
| Study               | Design/ Quality | Participants                                                                 | Intervention                                                                                           | Outcomes                                                                 | Results/Comments                                                                                     |
|---------------------|-----------------|------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|
| Byles et al. (1994) | Cohort analytic  | Target audience: Women 18-70 years in New South Wales, Australia (approx 14,000). Nine matched postal regions stratified by setting (rural locality, country town, major rural) - randomly assigned to receive one of three intervention programmes. Compared to three matched regions | Interventionists: Media and project staff                                                                    | • Recall of campaign                                                                                                                                 |
|                     | Overall quality rating: MODERATE | Post-intervention community survey of 1001 women randomly sampled                |                                                                                                         | • Pap smear rates within last 3 years compared actual to expected and to rates in 3 control regions. Based on regional lab reports | • Self-report of media coverage likely overestimated rates |
|                     | Funded and Led by: Australian Dept of Community Services and Health and NSW State Cancer Council | Other sample characteristics: Not specified                                                                 | • Group 1: 30 second TV advertisement aimed at 50+ years shown 12 times over three days                  | Recall of campaign: 52% of women in intervention groups recalled seeing & differed significantly from control | • Media coverage seemed to have varied across settings, confounding effect |
|                     | Theoretical framework: Social Cognitive Model |                                                                                     | • Group 2: TV advertisement and letter of invitation to all 18-70 years to be screened and enrolled in reminder service | Pap smears: TV significantly increased rates (13%, p<.00001) in rural centre compared to control, though only small increases in previously unscreened | • Brief TV media campaign not likely to have an effect on screening |
|                     | Focus: Cervical cancer screening |                                                                                     | • Group 3: TV advertisement and family physician based recruitment over 6 month period. (All family physicians invited to meet twice, given education and identified strategies) | TV plus letters increased rates in rural (52%, p=.03) and rural centres (43%, p<.00001). Especially for older women and previously unscreened. (59% increase in one regions) | • Difficult to assess effect of education on actual performance by family physician |
|                     |                  |                                                                                     |                                                                                                         | TV Plus family physician - all 3 regions showed increases, two for the 6 months. Best for previously unscreened (up to 112% increase) | • Unable to match regions on baseline screening rates (not available) |

**Strengths:**
- Pap smear rates based on lab reports, not self report
- Stratifying by type of community
| Study                | Design/Quality | Participants | Intervention | Outcomes | Results/Comments |
|---------------------|----------------|--------------|--------------|----------|-----------------|
| Byles et al. (1995) | CCT with multiple measures | Target audience: Adult women 18-70 years, approximately 1000 in each of 3 regions in Australia (total eligible 3640 women) | Intervention: written material • Personally addressed letter with information, advice and invitation to enrol in reminder service • Same letter PLUS 5 targeted prompt cards to overcome common barriers | Recall and read letter • Acceptability of letter • Attendance for Pap smear (lab reports) | Follow up: 3 months post intervention Recall and read: Ranged from 69-78% of women in the two sites Acceptability: >95% of women agreed with method Attendance for Pap smear: Letter only resulted in 42.4% increase in women attending ($Z=3.47$, $p<0.0001$). Letter plus prompts resulted in 39.6% increase ($Z=3.2$, $p<0.0001$). Changes in both regions were significantly different from the control group No significant differences between interventions | Strengths: Matched regions on age, sex, ethnicity; randomly assigned to intervention and control, multiple measures over time Geographically separated control from interventions to minimize contamination Not able to match on baseline screening rates (not available) Most women read letters but few reported use of targeted prompts – may be too complex |
| Study                        | Design/Quality | Participants                                                                 | Intervention                                                                 | Outcomes                                                                 | Results/Comments                                                                                           |
|-----------------------------|----------------|------------------------------------------------------------------------------|------------------------------------------------------------------------------|--------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|
| Bowman et al. (1995)        | CCT            | Target audience: Women 18-70 years who have not been screened in previous last 3 years in NSW, Australia | Intervention: mailings                                                       | •Self-reported Pap smears obtained by telephone survey                   | •Need to look at ways to overcome older women's resistance                                                |
|                             |                | Community survey of 7000 women identified target population (n=913)            | •Group 1: Pamphlet with information, advice and invitation to reminder service| •Validated rate by insurance records                                      | •Family physician/male provider did not act as deterrent to screening                                      |
|                             |                | Randomly allocated 878 women into either one of three intervention groups     | •Group 2: Letter of invitation to free women's health clinic with female nurse practitioner | Follow up: 6 months post intervention                                     | •Poor response to women's clinic may be due to barriers or was not targeted enough                       |
|                             |                | (n=219; 220; 220) or one control group (n=219)                               | •Group 3: Personalized letter from regular family physician advising screening (109/130 family physicians participated) | Group 3 had 36.9% Pap smear rate on self-report (p=0.012), significantly greater than other groups, including control (25%, 22.6%, 24.5%). | •Pamphlet may be more useful among subgroups (those who lack knowledge)                                    |
|                             |                | Representative sample: Mean age: 48 years, 45% were between 55-70 years; 62% had 3-6 years high school; 66% married, 74% were in low occupational level; 48% premenopausal | Control group: •No intervention                                                | Self-reported rates confirmed by insurance records                                                        | •Possible testing effect of baseline survey among control group may have decreased differences found       |

Table 1: Included Studies
| Study                          | Design/Quality | Participants                                                                 | Intervention                                                                 | Outcomes                                                                 | Results/Comments                                                                                                                                 |
|-------------------------------|----------------|------------------------------------------------------------------------------|------------------------------------------------------------------------------|--------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| Kelly et al. (1996)           | Cohort         | Target audience: All Cambodian women >50 years in Olmstead County, Minnesota | Interventionists: Program staff and 2 paid Cambodian peers                   | Pap smear use                                                            | Resource intensive, involving multiple partners within community and outside                                                                                                                                 |
|                               | Overall quality rating: MODERATE | Record review (n=57) indicated baseline screening rates of this group significantly lower than non-Cambodian women | Health education: Cambodian videotape about cancer and detection and barriers used in 7 meetings held in homes, churches (n=31 attended) | Pap smear rate changed from 13% of sample pre-intervention to 74% (p<0.001) post intervention | Attracted women to education after start of study who also achieved high rates of screening (82%) (not part of study results)                                                                                                                                 |
|                               | Funded by: Charitable trust, NCI and others | Generally this population had little formal education, were unemployed and had low income | Reduced institutional barriers: Group transportation to clinic, interpreter, female examiner, 6 clinic sessions in private setting |                                                                                         | Knowledge of cultural factors very important                                                                                                                                                           |
|                               | Led by: Mayo Clinic, Minnesota | Mean age: 59.6 years, range 50-79 years                                      |                                                                                         |                                                                                         | Unclear whether knowledge improvement or social interaction led to improved screening rates                                                                                                                                 |
|                               | Theoretical framework: Not specified |                                                                                         |                                                                                         |                                                                                         |                                                                                                                                                                                                 |
|                               | Focus: Breast and cervical cancer screening |                                                                                         |                                                                                         |                                                                                         |                                                                                                                                                                                                 |
| Study                  | Design/Quality | Participants                                                                 | Intervention                                                                 | Outcomes                                                                 | Results/Comments                                                                 |
|-----------------------|---------------|------------------------------------------------------------------------------|------------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------|
| Chou & Chen (1989)    | Interrupted time series, Overall quality rating: MODERATE | Target audience: All adult women 25 years and older, in Taiwan, especially those never screened<br>Two phases over 10 years (1974-1978; 1979-1984)<br>Women in largest group had junior high school education; 40% were between ages 30-39 years<br>Other sample characteristics not specified | Interventionists: Unspecified providers from the Cancer Society<br>Phase One:<br>• Education to physicians<br>• Mass media (TV, radio, ads)<br>• Brochures to women through children in schools<br>• Films/exhibits or lectures<br>• Free Pap tests at 661 rotating clinics in 21 regions<br>Phase Two:<br>• Same except offered 560 regularly scheduled clinics at low cost | • Lab reports of Pap smears in central system<br>• Cervical and uterine cancer mortality rates<br>Follow up: Women with abnormal results followed, interviewed<br>Phase One: First time screeners represented 2.4% of Taiwan adult female population (n=77,599).<br>Phase Two: First time screeners were 3.3% of total population (n=129,357)<br>Declines in overall mortality of cervical and uterine cancers seen among those 40-49 years. Over time, the number of early cases increased. | • Program had low examination rate among women >50 years.<br>• Statistical and clinically important differences not clarified, although program seems to have improved early detection |
| Study               | Design/Quality | Participants                                                                 | Intervention                                                                                                                                  | Outcomes                                                                                       | Results/Comments                                                                                   |
|---------------------|----------------|-------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|
| Tatum et al. (1997) | Cohort analytic | Target audience: African-American women, 40 years and older                   | Interventionists: Two lay outreach workers  
Project coordinator

"FoCaS Project" four phases over four years

1) developed protocol and baseline
2) inreach and outreach
3) follow up survey
4) transfer strategies to comparison community  

Inreach:  
• One to one counselling in clinics  
• Personalized letters  

Outreach:  
• Mass media  
• Community education classes  
• Religious focus  
• Information centers  
• Community wide event  
• One to one counselling in women’s homes  

Comparison community  
• No intervention  

Recall of campaign  
• Barriers  
• Beliefs & knowledge  
• Pap smear rates  

Follow up: 2 1/2 years after intervention  
Recall of campaign: 66% in intervention city reported seeing or attending at least one event (class most NB)  
Barriers: significantly more women in Winston-Salem reported no barriers at F/U compared with women in Greensboro (55% vs 29%, p<.05)  
Beliefs & knowledge: No significant difference between groups reporting positive beliefs and knowledge about cervical cancer and screening  
Pap smear: Women in Winston-Salem reported an increase in rates from 73% to 87% compared to a decrease in Greensboro from 67% to 60%; A net difference of 21% (p=.004)  
Authors argue improvement likely a conservative estimate given follow up done before 3 years elapsed  
Bigger effect on younger women and women examined in last 12 months  
Limitations:  
• Unit of randomization (city) differed from unit of analysis (person)  
• Self-report of Pap smear rate |
| Paskett et al. (1999) | Overall quality rating: MODERATE | Women recruited from 9 low income housing units in Winston-Salem, (n=125) compared to women in 18 housing units in Greensboro (n=123). Surveys pre and post intervention comprised independent cross-sectional samples. | Led by: University School of Public Health, North Carolina  
Theoretical frameworks: PRECEDE  
Health Belief Model  
Social Cognitive Model  
PEN III model (Person, Extended Family, Neighbourhood)  
Foci: Breast and cervical cancer screening | Most of the women were 65-68 years old; 95% were African-American; <20 % were married; of those under 65 years, only 15-30% were employed  
Inreach:  
• One to one counselling in clinics  
• Personalized letters  

Follow up survey  
Recall of campaign: 66% in intervention city reported seeing or attending at least one event (class most NB)  
Barriers: significantly more women in Winston-Salem reported no barriers at F/U compared with women in Greensboro (55% vs 29%, p<.05)  
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• Self-report of Pap smear rate |

Table 1: Included Studies
| Study                  | Design/Quality                                                                 | Participants                                                                 | Intervention                                                                 | Outcomes                                                                 | Results/Comments                                                                 |
|-----------------------|-------------------------------------------------------------------------------|------------------------------------------------------------------------------|------------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------|
| Michielutte et al.    | Overall quality rating: MODERATE                                               | Target audience: Approximately 25,000 African-American women aged 18 or older in Forsyth County, NC. These women were compared to women in Durham County NC. Telephone surveys of population based independent samples conducted pre (n=474;477) and post (n=433;446) intervention. Ages 18-90 years; ~44% married, ~50% some high school, mostly urban dwelling, low socioeconomic status | Interventionists: Direct education coordinator. Extensive pretesting, use of models from the target population. "Forsyth County Cervical Cancer Prevention Project" – over 5 years from November 1988 to September 1991. At outset: • Electronic media (TV 30 second PSA, radio, contests) • Print media (posters, brochures, newsletters) • Direct Education (20 minute community workshops via black churches, civic centers and community leaders) • Update information to primary care physicians. Phased in 3 months later: • Groups in homes, and to businesses • Direct mail | • Awareness of campaign • Knowledge of cervical cancer and screening • Pap smear rate. Follow up: six months post intervention. Awareness of campaign: significant increase occurred pre and posttest with radio, TV, newspapers, posters and pamphlets in Forsyth County. Knowledge: No significant differences pre-to-posttest in either group. Pap smear: The proportion in the intervention group reporting a Pap smear in the past year increased from pre to posttest, compared to the control group which showed no significant change. ($\chi^2 = 3.94, p=0.047$). Post hoc analysis comparing high and low risk groups: High risk women in intervention county had significantly higher Pap smear rate in previous 6 months than pre test and compared to control | Authors caution interpreting results of high and low risk groups analysis without further validation. |
| Dignan et al. (1990)  | Funded by: National Cancer Institute                                            | Led by: School of Medicine, Wake Forest University, North Carolina. Theoretical framework: Social Cognitive Model Social marketing theory Communication Behavior Change model (CBC) Focus: Cervical cancer screening. |                                                                                                                                          |                                                                                                                                          |                                                                                                                                          |
| Dignan et al. (1994)  |                                                                                                                                          |                                                                                                                                          |                                                                                                                                          |                                                                                                                                          |                                                                                                                                          |
| Study          | Design/Quality | Participants                                                                 | Intervention                                                                 | Outcomes                                                                                      | Results/Comments                                                                                      |
|---------------|---------------|------------------------------------------------------------------------------|------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|
| Dignan et al. (1994) | CCT Solomon 4 Group design over 30 month period Overall quality rating: MODERATE | Target audience: Native American women 18 and older of the Lumbee tribe in North Carolina | Interventionists: Trained Lay Health Educators (LHE) Native American           | • Knowledge of Pap smear • Intention to be screened • Pap smear rate in last year Follow up: six months post intervention Knowledge: When controlling for the pretest, women in both program groups were more likely to answer correctly than the control groups (OR=1.54, 95%CI=1.08,2.20) Intention: Controlling for pretest, no significant difference between groups; but a significant interaction between pretest and program Pap smear rate: In logistic regression, women in program were 50% more likely to report Pap test than in control (adjusted OR=1.5, p<.05) | Although intervention had an effect, the overall amount of the effect was small Secular trends may have increased rates in program and control groups Those at highest risk were least responsive Caution interpreting role of culture on screening, needs more work Authors took efforts to minimize contamination Use of LHE promising |
| Dignan et al. (1998) | Funded by: NCI Led by: Wake-Forest University, Winston-Salem NC and others Theoretical framework: PRECEDE Health Belief Model Social cognitive model Self-efficacy theory Minority health communication model Communication-Behavior Change model Focus: Cervical cancer screening | Randomly sampled from tribal role aiming for 250 in each of 4 groups. Randomly allocated a total of 983, of which 423 were pretested. 125 lost to follow up Age range 18-91, mean 42.4 years; over 60% up to 11 years education; over half had incomes $20,000 or less. Mixed urban and rural area. Assimilated into ethnically diverse population | Two visits (2-3 wks apart) with one to one education using a 10 minute videotape in women’s homes Brochures, magnets and periodic mailings Control groups: • No Intervention | |
| Study                  | Design/Quality | Participants                                                                 | Intervention                                                                 | Outcomes                                                                 | Results/Comments                                                                                      |
|-----------------------|----------------|------------------------------------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|
| Dignan et al. (1994)  | CCT Solomon Four Group design over 5 years | Target audience: Native American women 18 years and older of the Cherokee tribe in North Carolina | Interventionists: Trained Lay Health Educators (Native American), project cultural consultants | Knowledge of Pap smear  • Intention to be screened  • Pap smear rate in last year | Follow up: six months post intervention  Knowledge: Among those not pretested, compared to control group, there was a small increase in knowledge at post test. Logistic regression showed education program had a positive effect (OR=2.18, 95% CI=1.08-4.39)  Intention: No difference in intention between program or control groups whether pretested or not  Pap smear rate: Regardless of pretest, women in program groups were more than 2X likely to report Pap test than in control (OR=2.06, 95% CI=1.14-3.72) Younger age, annual physical and history of abnormal Pap also predicted Pap test | • No systematic effect of pretest on program, but needs further study  • Supports theory that individual attention increases learning and behaviour more than less individualized attention |
| Dignan et al. (1996)  | Overall quality rating: MODERATE | Randomly sampled from tribal role aiming for 250 in each of 4 groups. Randomly allocated a total of 996, of which 540 were pretested. 181 lost to follow up | Two program groups received:  • Focus groups and key informants helped develop materials  • Two visits (2 to 3 weeks apart) with one to one education using a 10 minute videotape in women’s homes  • Brochures, magnets & periodic mailings |  |  |

Table 1: Included Studies
| Study                  | Design/Quality                      | Participants                                                                 | Intervention                                                                 | Outcomes                                                                                         | Results/Comments                                                                                   |
|-----------------------|-------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| Robertson et al. (1989) | Interrupted time series (1986 – 1989) | Target audience: Women previously unscreened ages 50-60 years, n=1978 (although entire program aimed at 20-60 years) in two counties of Scotland. Women identified from community-wide registry. Setting a mix of rural, small towns and one large town (Perth). Other sample characteristics: Not specified | Interventionists: Family practitioners, pathologists  
- OCCURS (online cervical cytology update & recall system): Lists generated letter of invitation (plus brochure) to receive smear from family physician or clinic  
- After three months non-response, sent reminder  
- After four months non-response, sent default letter from pathologist (cc to family physician), plus brochure |  
- Weekly Pap smear rate over 36 weeks  
- Per cent of total eligible population having Pap smears rose from 58% before call system to 69% after. Including those exempt, this represents 84% of total population who were 50-60 years (n=7423)  
- Call program had slightly better effect in rural (44%) versus large town (39.7%) |  
- Success with cooperating medical practices attributed to close integration of primary care with hospital services  
- Community health index register promotes continual upgrading of information, thus lists are accurate  
- Statistical significance not specified |
| Study                      | Design/Quality                                                                 | Participants                                                                 | Intervention                                      | Outcomes                                                                 | Results/Comments                                                                 |
|----------------------------|--------------------------------------------------------------------------------|------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------|
| Holland et al. (1993)      | Interrupted time series over 3 periods of time Period I: 1970-76 Period II: 1976-80 Period III: 1981-88 | Target audience: Females ages 10-80 years, although education targeted primarily Black adult women in Newark, US City-wide program for the Black and White population who were generally poor. Period I incidence of invasive cervical cancer in Newark was 40.9 per 100,00 in Black women versus 34.4 per 100,000 population-wide. Ratio of in situ/invasive cancer (Black and White women) was 1:1 compared to 2.1-3.1 nationwide Other population characteristics: Not specified Note: “Black”, “White” terms used by authors | Interventionists: not specified, likely health department staff Health education program given during 1976-80 (Period II) • Ads on buses • Placards posted • Informational talks mainly in churches and community centers • Free clinic | • Ratio of in situ cervical cancer rates to invasive cervical cancer, by year of diagnosis, adjusted for length of time period and size of population • Lower ratios found during both periods I and III among all age and race subgroups, compared to higher ratio in Period II Periods I and III not statistically distinct from one another, but Period II was statistically distinct from the other two periods (p=.05) • Race was not associated with ratio, but age was inversely associated (p=.0001) | • The higher the ratio, the earlier the cancer was detected: a measure of screening effectiveness • National temporal trends did not appear to affect the high in situ/invasive ratio in Period II • Authors ruled out possible sources of measurement and ascertainment biases • Both Black and White women appear to have been influenced by the program • Cessation of funding for education and screening can result in resumption of unfavourable in situ/invasive cervical cancer ratio |
| Study            | Design/Quality | Participants                                                                                      | Intervention                                                                                                                                                                                                 | Outcomes                                                                                                                                                                                                 | Results/Comments                                                                                                                                                                                                                     |
|-----------------|----------------|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Bird et al. (1998) | Cohort analytic | Target audience: Vietnamese- American low income women living in San Francisco, US             | Interventionists: Paid Vietnamese lay health workers (16 leaders & 68 assistants); Vietnamese outreach staff and other team members                                                                 | • Recognition of tests<br>• Receipt (ever had) of Pap test<br>• Test Maintenance (up to date within 2 ½ years of last Pap)                                                                                                                                  | - Strength was multivariate analyses to control for group differences and other significant predictors  
- Authors argue not only statistical but clinically important differences – an average of 37-45% improvement.  
- Highly underserved population recently immigrated (e.g. 46% Pap smear rate in 1993)  
- Resource-intensive interpersonal method reaches fewer than mass media methods, but authors suggest latter effective for raising awareness, while face-to-face greater effectiveness to change screening behaviour.  
- Anecdotal evidence of diffusion of effect to others; improved access to medical care  
- Limitations: self-report of tests; length of follow up                                                                                                                                                                         |
|                 | Overall quality rating: MODERATE | Independent sample surveys conducted with women face-to-face pre (1992) and post (1996) intervention in San Francisco (SF) and Sacramento (comparison city). Pre surveys sampled 306; 339 and post surveys sampled 345;372 in SF and Sacramento respectively | 3 Phases in project: General prevention, breast and cervical screening                                                                                                                                            | For intervention group bivariate and logistic regression analyses:<br>Recognition of test: Increased by 3X from 22%-78% (p=.001) or OR 52.7 (95%CI 28.3-98.0)  
Receipt: Increased from 46%-66% (p=.001) or OR 4.5 (95%CI 2.9-7.0)  
Maintenance: Increased from 26%-45% (p=.001) or OR 2.4 (95%CI 1.6-3.6)                                                                                                                                   |                                                                                                                                                                                                                                                                                                |
|                 | Funded by: National Cancer Institute | Ages 18-50+ years, ~ 46% were 18-39 years; 26% 40-49 years; intervention sample differed significantly from comparison, having fewer ethnic Vietnamese, fewer poor, higher self-reported health, and fewer with insurance. |                                                                                                                                                                                                              | Comparison city: No statistically significant differences pre to post-intervention. Various predictors of attending sessions were identified                                                                                          |                                                                                                                                                                                                                                                                                                |
|                 | Led by: Cancer Center and University |                                                                                                                                                                           |                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                |
|                 | Theoretical framework: Not specified |                                                                                                                                                                           |                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                |
|                 | Foci: Breast and cervical cancer screening |                                                                                                                                                                           |                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                |

Table 1: Included Studies
| Study | Design/Quality | Participants | Intervention | Outcomes | Results/Comments |
|-------|----------------|--------------|--------------|----------|-----------------|
| McAvoy & Raza (1991) | CCT | Overall quality rating: MODERATE | Target audience: Asian women not previously screened, in the city of Leicester, England during 1987-88 | Interventionist: Asian research assistant, volunteer translators Trained and feedback provided<br><br>Randomly selected from registry of family physicians, stratified by age, religion, postcode and previous study participation, then randomly allocated into one of three study groups (n=263;219;131) or control (n=124)<br><br>Most were young women (<35 years); married (73%); born in India (46%) or East Africa (31%); 61% lived in UK more than 10 years; over half Hindu; many lived in extended families<br>Half were not literate in own spoken language, most could not speak much English<br><br>Control group:<br><br>• No intervention | • Cervical smear test as measured by central cytology lab<br><br>Follow up: 2 and 4 months post intervention<br><br>Visits to show leaflet and fact sheet were 2 ½ times more effective than sending by mail ($\chi^2=11.93$, df=1; 5.5%-25.1%)<br><br>Visit to show video and leaflet/fact sheet were almost 3 times more effective than mailing ($\chi^2=18.74$; df=1; 10.8-28.7%)<br><br>No differences between visited groups<br><br>No differences between women in control and mailing groups.<br>Only 10% in mailing group received Pap test<br><br>Overall, favourable review of educational materials | • A subgroup who asked to view video on their own time, had highest uptake of all who viewed video.<br><br>Video was popular among Asians, suggesting potential for distributing video other than in homes<br><br>Given low literacy levels, written materials need to be supplemented<br><br>Personal instruction was best form of education<br><br>Overall 13% dropout rate consistent with other data on practice turnover. |
| Study                  | Design/Quality | Participants                                                                 | Intervention                                      | Outcomes                                                                 | Results/Comments                                                                 |
|-----------------------|----------------|-------------------------------------------------------------------------------|---------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------|
| Del Mar et al. (1998) | CCT            | Target audience: Adult Vietnamese women aged 18-67 years in South Brisbane, Australia | Intervention: Letter                              | Pap smear rate (records from central cytology labs)                      | Authors argue intervention not strong enough to overcome barriers             |
|                       | Overall quality rating: MODERATE | 689 women with Vietnamese names identified from electoral roll, randomly assigned to intervention (n=359) or control (n=330). All women exposed to media campaign starting two months prior to randomized strategy | Region received: Media campaign (radio, local Vietnamese newspaper over two 10-week periods, flyers) plus health talks at centres, schools, colleges, and family physicians notified of campaign | Follow up: One year after letter mailed                                      | Ruled out flaws due to sampling error or low power                          |
|                       | Led by: University of Queensland | Other sample characteristics: Not specified                                      | • Letter sent to intervention group written in Vietnamese | Pap smear rate: Relative rate of appropriate screening versus control group =0.85 (95%CI 0.55-1.3) | Co-intervention (media campaign) may have confounded effect.                |
|                       | Theoretical framework: Not specified | Focus: Cervical cancer screening                                                | • Control group: No letter mailed                   | One year post letter, smear rate in intervention group 10% versus 12% in control |                                                                                   |
| Author     | Year | Global Rating | Selection Bias | Study Design | Confounders | Blinding | Data Collection | Withdrawals |
|------------|------|---------------|----------------|--------------|-------------|----------|----------------|-------------|
| Alexy      | 1998 | Weak          | Moderate       | Moderate     | Weak        | Moderate  | Weak           | N/A         |
| Ansell     | 1994 | Weak          | Moderate       | Moderate     | Weak        | Weak     | Strong         | Strong      |
| Bird       | 1998 | Moderate      | Moderate       | Strong       | Moderate    | Weak     | Moderate       | Moderate    |
| Bjorge     | 1995 | Weak          | Moderate       | Weak         | Moderate    | Weak     | N/A            |            |
| Bowman     | 1995 | Strong        | Strong         | Strong       | Moderate    | Strong   | Strong         | Moderate    |
| Brown      | 1996 | Weak          | Weak           | Moderate     | Weak        | Weak     | Strong         | Weak        |
| Byles      | 1995 | Moderate      | Moderate       | Strong       | Moderate    | Strong   | Weak           | Weak        |
| Byles      | 1994 | Moderate      | Moderate       | Strong       | Moderate    | Strong   | N/A            |            |
| Carney     | 1992 | Weak          | Weak           | Moderate     | Weak        | Weak     | Moderate       |            |
| Chou       | 1989 | Moderate      | Moderate       | Weak         | Moderate    | Strong   | N/A            |            |
| Curry      | 1994 | Weak          | Weak           | Moderate     | Weak        | Weak     | Weak           |            |
| Delmar     | 1998 | Moderate      | Moderate       | Strong       | Moderate    | Strong   | Weak           |            |
| Dietrich   | 1989 | Weak          | Weak           | Moderate     | Weak        | Weak     | Weak           |            |
| Dignan     | 1998*| Moderate      | Moderate       | Strong       | Moderate    | Weak     | Strong         |            |
| Dignan     | 1996*| Moderate      | Moderate       | Strong       | Moderate    | Weak     | Strong         |            |
| El-Hadad   | 1995 | Weak          | Moderate       | Strong       | Weak        | Weak     | Moderate       |            |
| Fernandez  | 1999 | Weak          | Moderate       | Weak         | Moderate    | Moderate | Weak           |            |
| Fernandez  | 1995 | Weak          | Moderate       | Strong       | Moderate    | Weak     | Strong         |            |
| Friedell   | 1997 | Weak          | Weak           | Moderate     | Weak        | Moderate | Weak           |            |
| Author       | Year | Global Rating | Selection Bias | Study Design | Confounders | Blinding | Data Collection | Withdrawals |
|--------------|------|---------------|----------------|--------------|-------------|----------|-----------------|-------------|
| Goldsmith    | 1996 | Weak          | Moderate       | Moderate     | Weak        | Weak     | Weak            | Strong      |
| Hirst        | 1990 | Moderate      | Moderate       | Moderate     | Weak        | Moderate | Strong          | N/A         |
| Holland      | 1993 | Moderate      | Moderate       | Moderate     | Weak        | Strong   | Strong          | N/A         |
| Jenkins      | 1999 | Weak          | Weak           | Moderate     | Strong      | Moderate | Weak            | Strong      |
| Kelly        | 1996 | Moderate      | Moderate       | Moderate     | Weak        | Moderate | Strong          | Moderate    |
| Kernohan     | 1996 | Weak          | Moderate       | Moderate     | Weak        | Moderate | Weak            | Strong      |
| Lancaster    | 1992 | Weak          | Weak           | Strong       | Weak        | Moderate | Strong          | Weak        |
| McAlister    | 1995 | Weak          | Moderate       | Moderate     | Weak        | Moderate | Weak            | Moderate    |
| McAvoy       | 1991 | Moderate      | Moderate       | Strong       | Weak        | Moderate | Strong          | Moderate    |
| Michielutte  | 1989*| Moderate      | Moderate       | Moderate     | Strong      | Moderate | Weak            | Strong      |
| Mills        | 1994 | Weak          | Weak           | Moderate     | Weak        | Moderate | Weak            | Weak        |
| Mitchell     | 1997 | Moderate      | Moderate       | Weak         | Strong      | Strong   | N/A             |             |
| Navarro      | 1998*| Weak          | Moderate       | Strong       | Strong      | Weak     | Weak            | Moderate    |
| Paskett      | 1999*| Moderate      | Moderate       | Moderate     | Strong      | Moderate | Strong          | Moderate    |
| Robertson    | 1989 | Moderate      | Strong         | Moderate     | Weak        | Strong   | Moderate        | N/A         |
| Shelley      | 1991 | Moderate      | Moderate       | Weak         | Moderate    | Strong   | Moderate        | Moderate    |
| Stillwater   | 1995 | Weak          | Weak           | Moderate     | Weak        | Moderate | Weak            | Weak        |
| Suarez       | 1997 | Moderate      | Strong         | Moderate     | Strong      | Moderate | Weak            | Moderate    |
| Suarez       | 1993*| Moderate      | Moderate       | Strong       | Moderate    | Weak     | Strong          |             |
| Sung         | 1997*| Weak          | Weak           | Strong       | Strong      | Weak     | Weak            | Weak        |
| Swaddiwudhipong | 1999*| Weak        | Moderate       | Weak         | Moderate    | Weak     | Strong          |             |

Table 2: Component Ratings
| Author | Year | Global Rating | Selection Bias | Study Design | Confounders | Blinding | Data Collection | Withdrawals |
|--------|------|---------------|----------------|--------------|-------------|----------|----------------|-------------|
| White  | 1993 | Weak          | Weak           | Strong       | Weak        | Weak     | Weak           | Weak        |
| Young  | 1990 | Weak          | Moderate       | Moderate     | Weak        | Moderate | Weak           | N/A         |

* These studies include more than one study—see included studies table.
| Study and Year | Mass Media | Clinics | Personalized Reminders | Reminders & Prompts | Letter from GP | Provider Education | Community Group Ed | Individual Education | Consumer Handouts | Incentives | Prizes | Improvements |
|---------------|------------|---------|------------------------|---------------------|---------------|-------------------|-------------------|-------------------|------------------|------------|--------|---------------|
| Suarez et al., 1997* | X |        |                        |                     |               |                   |                   |                   |                  |            |        | NO            |
| Shelley et al., 1991* | X |        |                        |                     |               |                   | X                 |                   |                  | YES        |        |               |
| Suarez et al., 1993; Suarez, Nichols & Brady, 1993 | X |        |                        |                     |               |                   | X                 |                   |                  | NO         |        |               |
| Mitchell et al., 1997 | X |        |                        |                     | X             |                   |                   |                   |                  | YES        |        |               |
| Hirst et al., 1990 | X | X       |                        |                     | X             |                   |                   |                   |                  | YES        |        |               |
| Byles et al., 1994* | X |        |                        |                     |               |                   |                   |                   | Plus X           | YES        |        |               |
| Byles et al., 1995* | X |        |                        |                     |               |                   |                   |                   | Or X             | YES        |        |               |
| Bowman et al., 1995* | X | Or X    |                        |                     |               |                   |                   |                   | Or X             | YES        |        |               |
| Kelly et al., 1996 | X |        |                        |                     |               |                   |                   |                   | X                | YES        |        |               |
| Chou et al., 1989 | X | X       |                        |                     |               |                   |                   |                   | X                | YES        |        |               |
| Tatum et al., 1997; Paskett et al., 1999* | X | X       |                        |                     |               |                   |                   |                   | X                | X          |        | YES           |
| Michielutte et al., 1989; Dignan et al., 1994; Dignan et al., 1990* | X | X       |                        |                     |               |                   |                   |                   | X                | YES        |        |               |
| Dignan et al., 1995; Dignan et al., 1998* | X |        |                        |                     |               |                   |                   |                   | X                | X          |        | YES           |
| Dignan et al., 1995; Dignan et al., 1996* | X |        |                        |                     |               |                   |                   |                   | X                | X          |        | YES           |
| Robertson et al., 1989 |        |         |                        |                     |               |                   |                   |                   |                  |            |        | YES           |
| Holland et al., 1993 |   | X       |                        |                     |               |                   |                   |                   |                  |            |        | YES           |
| Bird et al., 1998* | X |        |                        |                     |               |                   |                   |                   |                  |            |        | YES           |
| McAvoy et al., 1991* | X |        |                        |                     |               |                   |                   |                   |                  |            |        | YES           |
| Del Mar et al., 1998* | X |        |                        |                     |               |                   |                   |                   |                  |            |        | NO            |

* Intervention group compared to a “no intervention” group X – Main intervention
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APPENDICES

Appendix 1: Review Committee Members
Appendix 2: Key Words Used in Computer Search
Appendix 3: List of databases/Indexes Searched for French-Language Literature
Appendix 4: Selection Criteria for Study Inclusion/Exclusion
Appendix 5: Effective Public Health Practice Project Relevance Tool
Appendix 6: Quality Assessment Tool for Quantitative Studies
Appendix 7: Core Data Extraction Form
Appendix 1:
Review Committee Members

Relevance Assessors
Maureen Harmer
Yolanda Camiletti
Maureen Cava
Darlyne Rath
Dr. Val Mann
Ruth Bakker
Trina Varcoe
Dr. Margaret Black
Trish Colton

Quality Assessment Raters
Mary Ann O’Brien
Trish Colton
Sandra Micucci
Janet Yamada
Dr. Margaret Black

French Language Assessors
Isabelle Michel
Louise Willcock

Additional Advisory Committee and Draft Reviewers
Dr. Michael Fung Kee Fung
Dr. Otto Sanchez-Sweatman
Vicki Majpruz-Moat
Dr. Marlene Greenberg
Dr. Verna Mai
Lorna Dobi
John Garcia
Dr. John Sellors
Judy Showers
## Appendix 2: Key Words Used in Computer Search

| Effectiveness | Strategies | Increase | Participation | Screening | Cervical Cancer |
|---------------|------------|----------|---------------|-----------|----------------|
| Effectiveness | Intervention | Influence | Utilization | Screen | Cervix |
| Evaluate      | Strategies  | Increase  | Participation | Examine | Cervical |
| Impact        | Factor      | Recruit   | Uptake        | Vaginal smears | Neoplasm |
| Outcome       | Program     | Improve   | Compliance    | Pap smears | |
| Efficacy      | System      | Change    | Participation | Pap Tests | Cancer |
|               | Education   | Promote   | Adherence     | Diagnose | |
|               | Campaign    | Develop   | Rate          |           | |
|               | Alerts      |           | Practice      |           | |
|               | Hotline     |           | Attitude      |           | |
|               | Telephone   |           | Attendance    |           | |
|               | Mail        |           | Incidence     |           | |
|               | Media       |           | Prevalence    |           | |
|               |             |           | Knowledge     |           | |
|               |             |           | Satisfaction  |           | |
|               |             |           | Cooperation   |           | |
|               |             |           |               |           | |
|               |             |           |               |           | |
|               |             |           |               |           | |
Appendix 3:
French Language Literature - Search Strategy – Keywords

**Cervical Cancer:**
- Cancer du col de l’utérus
- Cancer du col utérin
- Cancer – Organe de reproduction

**Screening:**
- Dépistage
- Frottis vaginal
- Examen/Test de Papanicolaou
- Prévention (primaire/secondaire), Programme(s) de
- Examen périodique
- Lutte contre le cancer
- Détection précoce

**Participation:**
- Utilisation
- Participation
- Recours au dépistage
- Incidence
- Coopération
- Prévalence
- Attitude
- Pratique(s)
- Connaissance
- Habitudes
- Comportement

**Increase:**
- Recrutement
- Influence
- Encourager
- Promotion
- Développement
- Mobilisation
- Augmentation
- Changement
**Strategies:**
- Stratégies
- Intervention
- Facteurs
- Programme(s)
- Education
- Campagne
- Systématique
- Service d'information
- Téléphone
- Courier
- Média

**Effectiveness:**
- Efficacité
- Evaluation
- Résultats
- Activités
Appendix 3:
List of Databases/Indexes Searched in French Language Literature

MANUAL SEARCH:

DOCUMENSA: Index de la santé et des services sociaux
(1990-1999)

ELECTRONIC SEARCH: (Canada)

CREPUQ: Regroupements universitaires de recherche
www.crepuq.qc.ca

CUBIQ: Catalogue unifié des bibliothèques gouvernementales du Québec
(RIBG: Réseau informatisé des bibliothèques gouvernementales)
www.ribg.qc.ca/cubiq.htm

Fondation québécoise du cancer
www.fqc.qc.ca

Gouvernement du Québec
www.gouv.qc.ca

Institut national du cancer du Canada
www.ncic.cancer.ca

IRIS: Bibliothèque Nationale du Québec
www2.biblinat.gouv.qc.ca

Ministère de la santé et des services sociaux du Québec
www.msss.gouv.qc.ca

SANTECOM: Centre de documentation québécois en santé publique
www.santecom.qc.ca

Société de recherche sur le cancer Inc.
www.cancer-research-society.ca

Université de Montréal
www.bib.umontreal.ca

Université d’Ottawa – Réseau de bibliothèques (ORBIS)
www.uottawa.ca/library/databases/cat.html

Université Laval – ARIANE WEB
www.arianeweb.ulaval.ca/web2

Université de Moncton
www.eloize.umoncton.ca

ELECTRONIC SEARCH: (International)

Institut scientifique de la santé publique (Belgium)
www.iph.fgov.be

Total number of articles retrieved: 36 (1 n/a)
Total number of relevant articles: 0 (1 n/a)
Appendix 4: Selection Criteria for Study Inclusion/Exclusion

| Type of Study          | All types of prospective studies were eligible if they included a control group. One group pre/post design were acceptable. Only primary studies were eligible. Review articles were retrieved and examined for possible relevant studies. |
|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Participants           | Women (adolescent and older) as well as health care professionals.                                                                                                                                 |
| Interventions          | Studies that examined strategies within public health practice or those that public health could promote among others in Canada were eligible. Examples of interventions include physician reminder systems, public education, mass media campaigns, professional education, peer advocate/educator, outreach work. Interventions aimed at follow up for abnormal results of screening were not eligible. |
| Outcome measures       | Studies included changes in attitudes, knowledge and behaviour (practices) by women or health care professionals. Examples include screening appointments kept, screening rates, cancer incidence, client satisfaction, barriers, knowledge of cancer/cancer screening, attitudes toward cancer. Studies aimed at measuring only processes of care or health professional knowledge, attitudes, or behavior (other than screening rates) were not eligible. |
Appendix 5: Effective Public Health Practice Project Relevance Tool

Effectiveness of Strategies to Improve Cervical Cancer Screening

Ref. ID: _____________
Reviewer: MB RB MC MH VM DR TV YC

Relevance Criteria:

1. The study involves an intervention applicable to public health practice in Canada, consistent with Ontario’s Mandatory Health Programs and Services Guidelines. Y N

2. The intervention described could be implemented, facilitated or promoted by staff in local public health units in Canada. Y N

3. The study intervention is aimed at increasing the uptake of cervix screening and directed toward women or health professionals. Y N

4. The outcomes of interest include screening knowledge, attitudes or behaviours, satisfaction, cervical cancer prevalence/incidence. Studies that measure only process or health professional knowledge, attitudes or behaviour (other than screening rates) are not eligible. Y N

5. The study design is prospective and includes a control group (one group pre/post designs are acceptable). Y N

Reviewer Decision:

1. Include in critical appraisal (only if answer ‘yes’ to all 5 relevance criteria). Y N

2. If ‘Yes’, check reference list for studies likely to meet relevance criteria or for systematic reviews and fax to Ginny Brunton (905) 546-2856.

If Discrepancy in Inclusion Decision:

Reason for discrepancy:

Oversight Y N
Difference in interpretation of criteria Y N
Differences in interpretation of study Y N

Additional Comments:

FINAL DECISION: INCLUDE IN STUDY Y N
Appendix 6: Quality Assessment Tool for Quantitative Studies

COMPONENT RATINGS

A) SELECTION BIAS

(Q1) Are the individuals selected to participate in the study likely to be representative of the target population?
1 Very likely
2 Somewhat likely
3 Not likely
4 Can't tell

(Q2) What percentage of selected individuals agreed to participate?
1 80 - 100% agreement
2 60 – 79% agreement
3 less than 60% agreement
4 Not applicable
5 Can’t tell

| RATE THIS SECTION | STRONG | MODERATE | WEAK |
|-------------------|--------|----------|------|
| See dictionary    | 1      | 2        | 3    |

B) STUDY DESIGN

Indicate the study design
1 Randomized controlled trial
2 Controlled clinical trial
3 Cohort analytic (two group pre + post)
4 Case-control
5 Cohort (one group pre + post (before and after))
6 Interrupted time series
7 Other specify ______
8 Can't tell

Was the study described as randomized?
No
Yes

If NO, go to component C

If Yes, was the method of randomization described? (see dictionary)
No
Yes

If Yes, was the method appropriate? (see dictionary)
No
Yes

| RATE THIS SECTION | STRONG | MODERATE | WEAK |
|-------------------|--------|----------|------|
| See dictionary    | 1      | 2        | 3    |
C) CONFOUNDERS

(Q1) Were there important differences between groups prior to the intervention?
1   Yes
2   No
3   Can’t tell

The following are examples of confounders:
1   Race
2   Sex
3   Marital status / family
4   Age
5   SES (income or class)
6   Education
7   Health status
8   Pre-intervention score on outcome measure

(Q2) If yes, indicate the percentage of relevant confounders that were controlled (either in the design (e.g. stratification, matching) or analysis)?
1   80 – 100%
2   60 – 79%
3   Less than 60%
4   Can’t Tell

RATE THIS SECTION STRONG MODERATE WEAK
See dictionary 1 2 3

D) BLINDING

(Q1) Was (were) the outcome assessor(s) aware of the intervention or exposure status of participants?
1   Yes
2   No
3   Can’t tell

(Q2) Were the study participants aware of the research question?
1   Yes
2   No
3   Can’t tell

RATE THIS SECTION STRONG MODERATE WEAK
See dictionary 1 2 3

E) DATA COLLECTION METHODS

(Q1) Were data collection tools shown to be valid?
1   Yes
2   No
3   Can’t tell

(Q2) Were data collection tools shown to be reliable?
1   Yes
2   No
3   Can’t tell

RATE THIS SECTION STRONG MODERATE WEAK
See dictionary 1 2 3
F)  WITHDRAWALS AND DROP-OUTS

(Q1) Were withdrawals and drop-outs reported in terms of numbers and reasons per group?
1 Yes
2 No
3 Can’t tell

(Q2) Indicate the percentage of participants completing the study. (If the percentage differs by groups, record the lowest).
1 80 -100%
2 60 - 79%
3 less than 60%
4 Can’t tell

G)  INTERVENTION INTEGRITY

(Q1) What percentage of participants received the allocated intervention or exposure of interest?
1 80 -100%
2 60 - 79%
3 less than 60%
4 Can’t tell

(Q2) Was the consistency of the intervention measured?
1 Yes
2 No
3 Can’t tell

(Q3) Is it likely that subjects received an unintended intervention (contamination or co-intervention) that may influence the results?
1 Yes
2 No
3 Can’t tell

H)  ANALYSES

(Q1) Indicate the unit of allocation (circle one)
community organization/institution practice/office provider client

(Q2) Indicate the unit of analysis (circle one)
community organization/institution practice/office provider client

(Q3) Are the statistical methods appropriate for the study design?
1 Yes
2 No
3 Can’t tell

(Q4) Is the analysis performed by intervention allocation status (i.e. intention to treat) rather than the actual intervention received?
1 Yes
2 No
3 Can’t tell

RATE THIS SECTION  STRONG  MODERATE  WEAK
See dictionary  1  2  3
### GLOBAL RATING

#### COMPONENT RATINGS

Please transcribe the information from the gray boxes on pages 2-4 onto this page.

| Component | Rating | Strong | Moderate | Weak |
|-----------|--------|--------|----------|------|
| A SELECTION BIAS | | 1 | 2 | 3 |
| B STUDY DESIGN | | 1 | 2 | 3 |
| C CONFOUNDERS | | 1 | 2 | 3 |
| D BLINDING | | 1 | 2 | 3 |
| E DATA COLLECTION METHODS | | 1 | 2 | 3 |
| F WITHDRAWALS AND DROPOUTS | | 1 | 2 | 3 |

**GLOBAL RATING FOR THIS PAPER** (circle one):

1. **STRONG** (four STRONG ratings with no WEAK ratings)
2. **MODERATE** (less than four STRONG ratings and one WEAK rating)
3. **WEAK** (two or more WEAK ratings)

**WITH BOTH REVIEWERS DISCUSSING THE RATINGS:**

Is there a discrepancy between the two reviewers with respect to the component (A-F) ratings?

| | No | Yes |
|---|---|---|
| Oversight | | |
| Differences in interpretation of criteria | | |
| Differences in interpretation of study | | |

**FINAL DECISION OF BOTH REVIEWERS** (circle one):

1. **STRONG**
2. **MODERATE**
3. **WEAK**
Appendix 7: PHRED Effective Public Health Practice Project  
Core Data Extraction Form

Study Identification

| Item | Details |
|------|---------|
| First Author |  
| Year of publication | 19XX  |
| Language of publication | English | French | Other language (specify)  |
| Country (setting of study) | Canada | United States | United Kingdom | Other (specify) | Can’t tell |

Design

| Item | Details |
|------|---------|
| Years data collected | 19XX to 19XX | Can’t tell |
| Number of intervention groups |  |
| Number of control groups |  |
| Number of subjects screened |  |
| Number of eligible subjects |  |

Number of allocated subjects (total and by group)

| Category | Details |
|----------|---------|
| Total |  |
| Intervention #1 |  |
| Intervention #2 |  |
| Intervention #3 |  |
| Control |  |

Number of drop-outs (total and by group)

| Category | Details |
|----------|---------|
| Total |  |
| Intervention #1 |  |
| Intervention #2 |  |
| Intervention #3 |  |
| Control |  |

Source of funding for the study (check all that apply)

- Governmental organization (e.g. Ministry of Health)
- Commercial organization (e.g. Milk Marketing Board)
- Health-care provider organization
- Voluntary body (e.g. Canadian Public Health Association)
- Charitable trust (e.g. Heart and Stroke Foundation)
Appendix 7: Core Data Extraction Form

Ref ID #_________

☐ Research funding body (e.g. Medical Research Council, NHRDP)
☐ Other (specify) ______________________
☐ Can’t Tell

Sample

Sex (Check one box only) ☐ Male ☐ Female ☐ Mixed ☐ Can’t tell
Age (specify mean and range) mean_________ upper_________ lower _______ ☐ Can’t tell
Ethnicity (specify) ______________________ ☐ Can’t tell
  New immigrant ☐

Education (Check one box only)
  ☐ Completed grade school
  ☐ Completed high school
  ☐ Completed university
  ☐ Mix
  ☐ Other ______________
  ☐ Can’t tell

Residential Setting (Check one box only)
  ☐ Urban ☐ Mix
  ☐ Rural ☐ Can’t Tell

Social-economic status (specify) ______________________ ☐ Can’t Tell
(e.g. income, employment)

Intervention – Describe for each intervention as applicable:

| Intervention #1 | Intervention #2 | Intervention #3 | Control |
|-----------------|-----------------|-----------------|---------|
| Eg. Frail elders personalized program plus community development program | | | Eg. Visits by project community development program |
| | | | Eg. No intervention control |
| | | | |
**Intervention descriptors: (check all that apply)**

| Intervention #1 | Intervention #2 | Intervention #3 | Control |
|----------------|-----------------|-----------------|---------|
| MS             |                 |                 |         |
| Computer pt tracking |               |                 |         |
| Reminder cards       |                 |                 |         |
| IS             |                 |                 |         |
| Provider reminder |                 |                 |         |
| Provider/consumer education |   |                 |         |
| Use of RNs/NP/GP    |                 |                 |         |
| CBO            |                 |                 |         |
| Gp educ at community |               |                 |         |
| (e.g. workshops)   |                 |                 |         |
| One-to-one counselling |             |                 |         |
| Consumer handouts  |                 |                 |         |
| (e.g. newsletters,flyers) |         |                 |         |
| Consumer incentives |                 |                 |         |
| (e.g. transportation) |           |                 |         |
| Door-to-door recruitment |           |                 |         |
| MM             |                 |                 |         |
| Deliver by TV, radio, etc |         |                 |         |
| PC             |                 |                 |         |
| Direct Mailings: |                 |                 |         |
| with educ message|                 |                 |         |
| tailored message |                 |                 |         |
| Telephone reminders|                 |                 |         |

**Theoretical framework: (check all that apply for each intervention and control)**

| Intervention #1 | Intervention #2 | Intervention #3 | Control |
|----------------|-----------------|-----------------|---------|
| Trans theoretical |               |                 |         |
| PRECEDE         |                 |                 |         |
| Intention and action |            |                 |         |
| Health belief model |               |                 |         |
| Social cognitive theory |          |                 |         |
| Diffusion of innovation |             |                 |         |
| Social marketing theory |             |                 |         |
| Can’t tell      |                 |                 |         |
| Other (specify) |                 |                 |         |

☐ No Intervention
**Intervention provider: (state who (or what) delivered the intervention. check all that apply)**

|                      | Intervention #1 | Intervention #2 | Intervention #3 | Control |
|----------------------|-----------------|-----------------|-----------------|---------|
| Professional (state  | ☐               | ☐               | ☐               | ☐       |
| profession           |                 |                 |                 |         |
| Research worker      | ☐               | ☐               | ☐               | ☐       |
| (member of study team) |               |                 |                 |         |
| Para professional    | ☐               | ☐               | ☐               | ☐       |

**Peer:**

- Paid: ☐
- Unpaid: ☐

**Computer system:**

|                      | Intervention #1 | Intervention #2 | Intervention #3 | Control |
|----------------------|-----------------|-----------------|-----------------|---------|
|                      | ☐               | ☐               | ☐               | ☐       |

**Community groups:**

|                      | Intervention #1 | Intervention #2 | Intervention #3 | Control |
|----------------------|-----------------|-----------------|-----------------|---------|
|                      | ☐               | ☐               | ☐               | ☐       |

**Can’t tell:**

|                      | Intervention #1 | Intervention #2 | Intervention #3 | Control |
|----------------------|-----------------|-----------------|-----------------|---------|
|                      | ☐               | ☐               | ☐               | ☐       |

**Other (Specify):**

|                      | Intervention #1 | Intervention #2 | Intervention #3 | Control |
|----------------------|-----------------|-----------------|-----------------|---------|
|                      | ☐               | ☐               | ☐               | ☐       |

☐ No Intervention

**Internal training provided:**

|                      | Intervention #1 | Intervention #2 | Intervention #3 | Control |
|----------------------|-----------------|-----------------|-----------------|---------|
| Yes (Specify)         | ☐               | ☐               | ☐               | ☐       |

☐ No Intervention

**Intervention setting: (check all that apply)**

|                      | Intervention #1 | Intervention #2 | Intervention #3 | Control |
|----------------------|-----------------|-----------------|-----------------|---------|
| Community            | ☐               | ☐               | ☐               | ☐       |
| Home                 | ☐               | ☐               | ☐               | ☐       |
| Hospital             | ☐               | ☐               | ☐               | ☐       |
| School               | ☐               | ☐               | ☐               | ☐       |
| Telephone            | ☐               | ☐               | ☐               | ☐       |
| Worksite             | ☐               | ☐               | ☐               | ☐       |
| Clinic               | ☐               | ☐               | ☐               | ☐       |
| Can’t Tell           | ☐               | ☐               | ☐               | ☐       |
| Other (Specify)      | ☐               | ☐               | ☐               | ☐       |

☐ No Intervention

---

Appendix 7: Core Data Extraction Form 75
### Intervention target group: (check all that apply)

| Intervention | Intervention #1 | Intervention #2 | Intervention #3 | Control |
|--------------|-----------------|-----------------|-----------------|---------|
| Adolescent females | ❑ | ❑ | ❑ | ❑ |
| Adult females | ❑ | ❑ | ❑ | ❑ |
| Senior females | ❑ | ❑ | ❑ | ❑ |
| Other (specify) | ❑ | ❑ | ❑ | ❑ |
| Can’t tell | ❑ | ❑ | ❑ | ❑ |

☐ No Intervention

### Target group size: (check all that apply)

| Intervention | Intervention #1 | Intervention #2 | Intervention #3 | Control |
|--------------|-----------------|-----------------|-----------------|---------|
| Individual | ❑ | ❑ | ❑ | ❑ |
| Family | ❑ | ❑ | ❑ | ❑ |
| Group | ❑ | ❑ | ❑ | ❑ |
| Community | ❑ | ❑ | ❑ | ❑ |
| Can’t Tell | ❑ | ❑ | ❑ | ❑ |

☐ No Intervention

### Consumer involvement: Were consumers (i.e. members of the public) involved at any point of the design, conduct or interpretation of the study? (e.g., consumers involved in guideline development, or their views collected)

| Intervention | Intervention #1 | Intervention #2 | Intervention #3 | Control |
|--------------|-----------------|-----------------|-----------------|---------|
| Yes | ❑ | ❑ | ❑ | ❑ |
| No | ❑ | ❑ | ❑ | ❑ |
| Can’t Tell | ❑ | ❑ | ❑ | ❑ |

☐ No Intervention

### Length of each session: Specify in hours

| Intervention | Intervention #1 | Intervention #2 | Intervention #3 | Control |
|--------------|-----------------|-----------------|-----------------|---------|
| Can’t tell | ❑ | ❑ | ❑ | ❑ |

☐ No Intervention

### Intervention duration: Over what time period (Specify in months)

| Intervention | Intervention #1 | Intervention #2 | Intervention #3 | Control |
|--------------|-----------------|-----------------|-----------------|---------|
| Can’t tell | ❑ | ❑ | ❑ | ❑ |

☐ No Intervention

Intervention
**Intervention frequency:**

|                | Intervention #1 | Intervention #2 | Intervention #3 | Control |
|----------------|-----------------|-----------------|-----------------|---------|
| Delivered how many times | □               | □               | □               | □       |
| Can’t tell      |     □         |     □         | □               | □ No Intervention |

**Length of post intervention follow-up period (all data collection points):**

|                | Intervention #1 | Intervention #2 | Intervention #3 | Control |
|----------------|-----------------|-----------------|-----------------|---------|
| Specify in weeks | □               | □               | □               | □       |
| Can’t tell      | □               | □               | □               | □ No Intervention |

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Notes:
Legend for CXCA Data Extraction Tool:  
Intervention Descriptors

**MS = Management systems**  
- Computerized patient tracking  
- Reminder postcards to providers and /or consumers

**IS = Integration of preventive services at primary health care sites**  
- Provider reminder systems  
- Provider and consumer education  
- Use of nurses and nurse practitioners, general practitioners

**CO = Community-based outreach**  
- Group education delivered at community sites (i.e. workshops, churches, health fairs, public housing offices).  
- One-to-one counselling  
- Consumer handouts (newsletters, brochures, flyers with recipes)  
- Consumer incentives (child care, luncheons, transportation)  
- Door-to-door recruitment

**MM = Mass media**  
- Education delivered via television, radio, newspaper, billboards, posters

**PC = Personalized communications**  
- Direct mailings with educational messages  
- Direct mailings with individually tailored messages  
- Telephone reminders