

CORE

Public Health Functions for BC

Evidence Review:
Communicable Disease
(Health Promotion)

Population and Public Health
BC Ministry of Healthy Living and Sport

This paper is a review of the scientific evidence for this core program. Core program evidence reviews may draw from a number of sources, including scientific studies circulated in the academic literature, and observational or anecdotal reports recorded in community-based publications. By bringing together multiple forms of evidence, these reviews aim to provide a proven context through which public health workers can focus their local and provincial objectives. This document should be seen as a guide to understanding the scientific and community-based research, rather than as a formula for achieving success. The evidence presented for a core program will inform the health authorities in developing their priorities, but these priorities will be tailored by local context.

This Evidence Review should be read in conjunction with the accompanying Model Core Program Paper.

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Evidence Review accepted by:

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EXECUTIVE SUMMARY

This evidence paper focuses on the application of health promotion to the prevention and control of communicable diseases, excluding immunization and harm reduction interventions, which are the subjects of additional evidence papers. It takes its lead from two meetings, one held by Interior Health in November 2005 and a second by Vancouver Health Authority in February 2006, which focused on population health and health promotion, including specific sessions on their relevance to communicable diseases. Both meetings demonstrated the gap between the rich discourse located in academic literature on health promotion and population health and its application on the ground. More so, these meetings confirmed that health promotion strategies have not been a priority focus of communicable disease prevention initiatives. This was reconfirmed through a search of the literature and discussions with a key informant that has been intimately involved with international reviews of the evidence base for health promotion (I. Rootman, personal communication).

This paper devotes significant attention to “unpacking” the concepts embedded in health promotion and developing an outcome model for health promotion approaches to communicable disease prevention. Using this framework, the paper then explores the challenges in developing an evidence base for health promotion interventions before turning to examine two critical areas as illustrative examples: hand hygiene and sexual health. The paper concludes by recommending a best practices approach for the health authorities to enhance and evaluate communicable disease health promotion initiatives in their jurisdictions.

Material for this paper was located using a number of strategies described in more detail below (see ‘Search Strategy’). In the first instance, a traditional search was carried out of MEDLINE using search terms that included all the communicable diseases and health promotion. This served to confirm the scarcity of literature in this area. This was followed by the development of an outcome model for health promotion approaches to communicable disease prevention. In the second step, MEDLINE and other databases were searched using extended health promotion concepts. Databases were included more qualitative sources not usually included in evidence-based searches. The third strategy involved searching the grey literature using various search engines and exploring grey literature databases, and key informant interviews. All these attempts confirmed the lack of material in this area and supported the approach taken in this paper.

1.0 OVERVIEW/SETTING THE CONTEXT

In 2005, the British Columbia Ministry of Health released a policy framework to support the delivery of effective public health services. The *Framework for Core Functions in Public Health* identifies communicable disease as one of the 21 core programs that a health authority provides in a renewed and comprehensive public health system.

The process for developing performance improvement plans for each core program involves completion of an evidence review used to inform the development of a model core program paper. These resources are then utilized by the health authority in their performance improvement planning processes.

This evidence review was developed to identify the current state of the evidence-based on the research literature and accepted standards that have proven to be effective, especially at the health authority level. In addition, the evidence review identifies best practices and benchmarks where this information is available.

1.1 An Introduction to This Paper

This evidence paper focuses on the application of health promotion to the prevention and control of communicable diseases, excluding immunization and harm reduction interventions, which are the subjects of additional evidence papers. It takes its lead from two meetings, one held by Interior Health in November 2005 and a second by Vancouver Health Authority in February 2006, which focused on population health and health promotion, including specific sessions on their relevance to communicable diseases. Both meetings demonstrated the gap between the rich discourse located in academic literature on health promotion and population health and its application on the ground. More so, these meetings confirmed that health promotion strategies have not been a priority focus of communicable disease prevention initiatives. This was reconfirmed through a search of the literature and discussions with a key informant that has been intimately involved with international reviews of the evidence base for health promotion (I. Rootman, personal communication).

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¹ The reader is referred to two other communicable disease evidence reviews that include health promotion issues: harm reduction and immunization.

2.0 COMMUNICABLE DISEASES AND THE CORE FUNCTIONS FRAMEWORK

2.1 Core Programs

Communicable diseases are located in the disease, injury and disability prevention core programs, which are intended to prevent specific health problems that make, or might make, a significant contribution to the burden of disease. Priorities that are highlighted include vaccine-preventable diseases; prevention of sexually transmitted and blood-borne communicable diseases, including HIV/AIDS, chlamydia, gonorrhea, syphilis, and viral hepatitis B and C; prevention and control of tuberculosis, especially the multiple resistant strains; prevention and control of travel-related, imported and exotic diseases, including rare but potentially serious conditions such as Lassa fever or Ebola virus; and new/emergent diseases.

Notwithstanding, the other three core program areas are also relevant for communicable disease prevention and control. In the health improvement core programs, examples of priority areas are reproductive health, which includes reducing sexually transmitted diseases and cervical cancer; and healthy development, which includes optimum immunization. In the environmental health core programs, continuing to assure and improve the safety and sustainability of our food, water, air and soil is of paramount importance for the prevention of a wide range of communicable diseases. The health emergency management core programs include responses to potential acts of bio-terrorism, which could involve highly infectious agents.

2.2 Public Health Strategies

The core functions framework assumes that public health core programs use four complementary strategies that are particularly identified with the public health approach. These four strategies of health promotion, health protection, preventive interventions, and health assessment and disease surveillance overlap with each other and rest on the capacity of the public health system. Each of these modalities is critical to the control and prevention of communicable diseases.

Health protection strategies important to communicable diseases include those relevant to safe food, drinking water and recreational water, and adequate community sanitation. Preventive intervention strategies, which impact on communicable diseases, include primary prevention initiatives such as immunization and vector control, and early secondary prevention strategies such as post-exposure prophylaxis, screening and treatment of communicable diseases and contact tracing and management. Health assessment and disease surveillance strategies important for communicable disease prevention and control include detecting disease clusters and outbreaks through community-based, hospital-based, and clinical epidemiology, and laboratory surveillance networks. Finally, health promotion strategies important for communicable disease prevention and control, which are the focus of this evidence paper, include a set of strategies that enable people to increase control over and improve their health. This is discussed in more detail in the next section.

3.0 HEALTH PROMOTION AND THE CORE FUNCTIONS FRAMEWORK

Health promotion strategies are considered to be equally valid for the prevention and control of communicable diseases,¹ despite the focus of this approach on non-communicable diseases, especially in the developed world. The Bangkok Charter, developed in August 2005, explicitly mentioned communicable diseases in its revised definition of health promotion.² This renewed interest is also evident in Canada and can be ascribed to the growing concern about the threats posed by a number of communicable disease trends,³ such as the persistence of AIDS and hepatitis C, the advent of new and emergent diseases, and the continuing development of anti-microbial resistance. These concerns have served to emphasize the important contribution of health promotion strategies to the prevention and control of these diseases.⁴

Before turning to review the evidence for effectiveness of health promotion strategies in tackling communicable diseases, let us briefly locate health promotion within the core functions framework and review its parameters and the continuing evolution of its philosophical constructs. The need for this is dictated by the largely conceptual basis of the Ottawa Charterⁱⁱ and similar health promotion frameworks, and the fact that in relation to their conceptual and strategic development, “health promotion and public health are customers of social, behavioral and other sciences.”⁵ This leads naturally into a consideration of a model to guide the assessment of the evidence of health promotion strategies in tackling communicable diseases.

The critical elements of health promotion, established in the Ottawa Charter in 1986, have been firmly embraced by the Ministry of Healthy Living and Sport’s core functions framework and include the overall definition of enabling people to increase control over and improve their health, as well as the strategies to achieve this. While this definition stops short of including a more recent emphasis of health promotion on addressing the determinants of population health, this is implied elsewhere in the document *A Framework for Core Functions in Public Health*, where it is noted that province-wide prevention initiatives need to extend beyond the realm of public health core programs to involve partners in the rest of the health care system and in the wider society thereby contributing to a broader “population health promotion movement.”⁶ The Bangkok Health Promotion Charter² embodies this more firmly by adding this emphasis to the overall definition.ⁱⁱⁱ In addition, recent presentations in BC have reinforced the population health promotion concept as one that is concerned with understanding and addressing the broad upstream social, cultural, environmental and economic conditions that determine population health by means of health promotion strategies.⁷ Population health promotion thus builds on the complementarity of health promotion and population health.

The implication of this broader definition of population health promotion emerges when one reviews the key strategic concept of empowerment that guides the Ottawa Charter. The understated definition of health promotion, in the most conservative sense, tends to devolve empowerment processes to ones that focus on improved health literacy and self-efficacy

ⁱⁱ http://www.who.int/hpr/NPH/docs/ottawa_charter_hp.pdf .

ⁱⁱⁱ “Health promotion is the process of enabling people to increase control over their health and its determinants, and thereby improve their health. It is a core function of public health and contributes to the work of tackling communicable and noncommunicable diseases and other threats to health.” (taken from Bangkok Charter, 2005).

achieved through health education and health communication strategies. Population health promotion, in the most liberal sense, would extend the empowerment process to focus on processes of social interaction of individuals and groups that result in the development of social networks and alliances and greater community participation and competence in order to engage in social action to bring about substantial changes of living and working conditions responsible for inequalities in health. This is fundamentally a distinction between individual and community empowerment. Individual empowerment refers primarily to the individual's ability to make decisions and have control over his/her personal life. Community empowerment involves individuals acting collectively to gain greater influence and control over the determinants of health and the quality of life in their community, and is an important goal in community action for health.⁸ It occurs when people interact in ways of mutual respect, tolerance and social support. It is a social-action process that promotes participation of people, organizations and communities towards the goals of increased individual and community control, political efficacy, improved quality of community life and social justice.⁹

Health authorities in Canada are recognizing that community empowerment is a critical focus for health promotion interventions and are developing approaches to this focus. A good example of this is the framework articulated by the Winnipeg Regional Health Authority^{iv} and adopted by Vancouver Coastal Health.¹⁰ This framework includes the following facets:

- **Local area development** – The provision of, and access to, resources targeted to facilitate grassroots work and action.
- **Intersectoral networking** – Providing resources for intersectoral network development and building of alliances.
- **Organizational capacity building** – This third facet supports the previous two. Here the focus is on promoting changes within the health authority to conduct community development through enhanced knowledge, skills, commitments and resources. Successful capacity building results in enhanced support for community group organizations and action on health determinants through dedicated community development and health promotion staff and grants programs.

The role of community developer is not the only one that the health system can embrace in population health promotion. Equally important roles include¹¹

- **Educator/watchdog** – Increasing public discourse around determining social and environmental conditions and monitoring those conditions for effects on health status.
- **Resource broker** – Making internal resources more readily available to groups working on health determinants whether or not this is undertaken in the name of health to reduce preventable inequalities between groups.
- **Partnership developer** – Engaging in intersectoral joint programming and policy development with those with a stake in health determinants. Here the health system is a partner, as distinct from providing resources to communities for intersectoral network development and alliance building.

^{iv} http://www.wrha.mb.ca/howcare/commdev/files/CommDev_Framework2004.pdf

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- ***Advocate/catalyst*** – Developing and advocating statements on policy options that influence health determinants, especially to more senior government levels in non-health sectors. Organizational capacity building within health authorities, as described, is a subset of this role.

These additional roles for the health system in population health promotion call for engagement with sectors outside the system as well as parts of the health care system itself. Two primary audiences in this regard are other sectors of government and the mass media. Priority government sectors include education, social services, local government, environment, housing, justice and finance.

This refocusing of health promotion as a population health concept runs the danger of creating a dichotomy between individual and community empowerment but this need not be the case. Individual empowerment will be determined by community empowerment and the latter's ability to create the conditions for individuals to increase control over their health and its determinants. Thus the role of the health system in population health promotion is to focus on both the need to reshape this environment for this purpose as well as to embark on programs that empower individuals through the development of personal skills measured by health literacy and impacted upon by health education and health communication actions.

The next section discusses the development of an outcome model for health promotion, as a way to provide a firmer basis for an assessment of the effectiveness of health promotion strategies for communicable disease prevention and control.

4.0 AN OUTCOME MODEL FOR HEALTH PROMOTION AND COMMUNICABLE DISEASES

Any outcome model for health promotion should be firmly embedded in an approach to planning for purposes of implementation and evaluation. Unfortunately, few, if any, of the models for planning and evaluating health promotion address these communicable disease health promotion initiatives under the guidance of the goals, values, principles and strategies contained in frameworks such as the Ottawa Charter. This does not detract from useful issues that these models present for the planning process, such as the popular PRECEDE/PROCEED model.^v The model presented in this document attempts to overcome these shortcomings as well as help guide the assessment of the evidence base for the prevention and control of communicable diseases. See Table 1 for a representation of this outcome model.

This model is drawn from two complementary sources that specifically discuss health promotion,^{12,13} and is also informed by concepts from the Results-Based Logic Model of the Treasury Board of Canada¹⁴ and the Results-Based Logic Model for Primary Health Care developed by the Centre for Health Services and Policy Research at the University of British Columbia.¹⁵ The model presented in this document should also be helpful for actual health promotion program planning but is not specifically designed as a tool for this purpose. The reader is referred to a workbook approach that uses health promotion values, theory and research to provide a logical six-step approach for planning health promotion programs.¹⁶

^v <http://www.indstate.edu/hlthsfty/planning>.

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Table 1: An Outcome Model for Health Promotion and Communicable Diseases

OUTCOMES	Health Outcomes				Social Outcomes			
	Reduced morbidity, disability and preventable mortality from communicable diseases				Improved quality of life, functional independence, and equity from the prevention and control of communicable diseases			
	FINAL HEALTH AND SOCIAL OUTCOMES							
	Healthy Lifestyles		Effective Health Services				Healthy Environments	
	<ul style="list-style-type: none"> Adequate hygiene and hand washing practices Healthy eating Minimal sexual risk exposure (including abuse of alcohol and drugs that increase risk of STIs) 		<ul style="list-style-type: none"> Optimum vaccination coverage Appropriate/adequate provision of antibiotics Safe blood supply Adequate emergency management of outbreaks of communicable diseases Adequate provision of engineering controls and PPE in health care settings 				<ul style="list-style-type: none"> Adequate sewage treatment Adequate water treatment Adequate food protection Vector control Control of animal reservoirs 	
	INTERMEDIATE HEALTH AND SOCIAL OUTCOMES							
	Health Literacy		Social Action		Social Influence		Healthy Public Policy and Practice	
	<ul style="list-style-type: none"> Improved Awareness Knowledge Personal skills Attitudes Motivation Behavioural intention Self efficacy with respect to the prevention and control of communicable diseases		Enhanced <ul style="list-style-type: none"> Organizational and community capacity Participation Partnerships to prevent and control communicable diseases and impact on their determinants		Enhanced ability to influence social norms and public opinion with respect to the prevention and control of communicable diseases		<ul style="list-style-type: none"> Clear policy statements Appropriate legislation and regulation Adequate resource allocation Healthy organizational practices for the prevention and control of communicable diseases including addressing their determinants 	
	HEALTH PROMOTION OUTCOMES							
	ACTIONS	Health Education	Health Communication	Organizational Development	Community Development	Promotion of Public Debate	Advocacy	Policy Development
HEALTH PROMOTION ACTIONS								
Develop personal skills		Strengthen community action		Create supportive environments		Reorient health services		Build healthy public policy
STRATEGIES	HEALTH PROMOTION STRATEGIES							
	Empowerment Factors: <ul style="list-style-type: none"> Participatory planning and evaluation Real and felt needs of target population Cultural sensitivity 			Planning Factors: <ul style="list-style-type: none"> Theories of change Program models with short/long-term outcomes Multiple interventions 			Resource Factors: <ul style="list-style-type: none"> Accessibility issues Sustainability challenges 	
	HEALTH PROMOTION IMPLEMENTATION SUCCESS FACTORS							
VALUES	<ul style="list-style-type: none"> Treat health as a holistic concept Pursue social justice based on the human right to health Aim for equitable access to conditions and resources for health Work towards empowerment for greater control over decisions and actions affecting health Include working with members of communities who face systemic barriers to good health Maintain respect for diversity of viewpoints, cultures and perspectives on health and wellness 							
	HEALTH PROMOTION VALUES							

4.1 Values

The health promotion outcome model presented in this document rests on important values or moral principles. Health promotion is not value neutral. It is defined by a distinct set of values that guide the ways in which health promoters work with individuals, groups and communities to address health issues. These include health as a holistic concept, social justice, equity, empowerment, inclusion and respect. Labonte argues that the human right to health is a core value and remains the most palpable and empowering language for health promotion,¹¹ while Shookner has provided a tool to examine population health programs for the inclusion of critical values.¹⁷

4.2 Health Promotion Implementation Success Factors

Reviews of health promotion initiatives invariably point to a number of issues that are felt to increase the likelihood of achieving successful outcomes, whether they are short-, medium- or long-term. These include the following:

- **Empowerment Factors:**
 - ***Participatory planning and evaluation:*** The aim here is to encourage participatory approaches that provide meaningful opportunities for involvement by all those with a direct interest in communicable disease health promotion initiatives.^{18,19}
 - ***Real and felt needs of the target population:*** This refers to approaches that attempt to reach consensus about the needs perceived by targeted populations and those defined by external health promotion agents. Participatory approaches that encourage dialogue are more likely to reach consensus on these needs and lay the basis for appropriate action.
 - ***Cultural sensitivity:*** Cultural sensitivity can be defined by surface and deep structure dimensions. Surface structure dimensions involve matching intervention materials and messages to observable, superficial characteristics of a target population. This may involve using people, places, language, music, food, locations, and clothing familiar to, and preferred by, the target audience. Surface structure refers to how well interventions fit within a specific culture. Deep structure involves incorporating the cultural, social, historical, environmental and psychological forces that influence the target health behaviour in the proposed target population. Whereas surface structure generally increases the receptivity or acceptance of messages, deep structure conveys salience.²⁰
- **Planning Factors:**
 - ***Theories of change:*** This refers to the causal processes through which change comes about as a result of a program's strategies and action. It relates to how practitioners believe individual, inter-group, and social or systemic change happens and how, specifically, their actions will produce positive results.²¹ It makes explicit what the expected outcomes are and what needs to be done to achieve them.²² Formulating program theory that takes into account the social determinants of health and the mobilization of diverse actors for social change, as well as the development of evaluation theory that fosters a reflexive understanding of the integrative public health programs engaged in social change, have been identified as two critical challenges for public health and health promotion in particular.²³
 - ***Program models with short- and long-term outcomes:*** These are informed by theories of change and refer to a strategy and a set of tools to create programs. Project management resources support these initiatives. Program models also provide logic and analytic frameworks for program monitoring and evaluation.²⁴
 - ***Multiple interventions:*** It has been argued that linked, multi-level interventions should be the norm rather than the exception in order to achieve impact.²⁵ This approach includes targeting multiple layers of the socio-ecological system including individuals, social networks, organizations, communities, policy networks and political institutions.²⁶

- **Resource Factors:**
 - **Accessibility issues:** Challenges in accessing health and other services are often faced by socially excluded groups who may be experiencing a number of factors that in themselves have a negative impact on gaining access to these services. These may include low income, disability and age, coupled with poor transport provision or services sited in inaccessible locations.²⁷ Health promotion strategies need to reorient services to reach socially excluded groups.
 - **Sustainability challenges:** The aim of health promotion is to produce intervention effects that may be sustained over time as opposed to focusing only on the means by which these are/may be produced. Health promotion programs are more likely to produce sustainable effects if they address appropriate levels of individual, organizational, community and institutional social organization in seeking to achieve health promotion outcomes. Respective examples of intervention strategies at these four levels include information, education and training to promote individual change; activities to change organizational policies and practices that produce changes in individual risk behaviour and access to resources; social action and social planning initiatives to produce change in organizations and redistribute resources that affect health; and social advocacy to change legislative, budgetary and institutional settings that affect community, organizational and individual levels of social organization.²⁸

4.3 Health Promotion Strategies

The outcome model presented in this document stops short of describing the inputs (fiscal, material and human resources), activities and outputs of the initiatives that are likely to lead to the outcomes described later in this document. These concepts, while critical for planning purposes, are unnecessary to consider in a model designed to assess evidence for effectiveness. The focus here is on strategies and actions that are best employed to achieve these outcomes in order to provide selection criteria for initiatives to assess for effectiveness.

The health promotion strategies included here are taken directly from the Ottawa Charter and the core functions framework and include developing personal skills, strengthening community action, creating supportive environments, reorienting health services and building healthy public policy with respect to the prevention and control of communicable diseases. The implementation of these strategies is through health promotion actions.

4.4 Health Promotion Actions

These include health education and communication, organizational and community development, promotion of public debate, advocacy, policy development, and partnership development through inter-sectoral collaboration to prevent and control communicable diseases. These actions lead to health promotion outcomes.

4.5 Health Promotion Outcomes

The following are the direct outcomes of health promotion strategies and actions:

- **Health Literacy:**²⁹ This health promotion outcome derives, in the main, from health education and health communication actions. It is usually measured by improved awareness, knowledge, attitudes, motivation, personal skills, behavioural intention and self-efficacy with respect to the prevention and control of communicable diseases. Self-efficacy emphasizes that health literacy is more than simply the ability to read. Health literacy requires a complex group of reading, listening, analytical and decision-making skills and the ability to apply these skills to health situations and their determinants. Thus it has been described as cognitive and social skills, which determine the motivation and ability of individuals to gain access to, understand, and use information in ways that promote and maintain good health.³⁰ Nutbeam adds emphasis to this idea by noting that by improving people's access to health information and their capacity to use it effectively, health literacy is crucial to individual empowerment.³¹ The Centre for Literacy in Quebec adds that literacy is a complex set of abilities to understand and use the dominant symbol systems of a culture for personal and community development.³² This concept positions literacy as an important outcome for community empowerment. This understanding of health literacy suggests that health promoters aiming for improvements in this outcome need to measure health literacy at an individual and community level and to recognize that collective health literacy is a fundamental requirement for social action.
- **Social Action:** This outcome is the result of community empowerment efforts, including organizational and community development, to enhance the actions and control of social groups over the determinants of health, and is measured by increased organizational and community capacity, participation, and partnerships to prevent and control communicable diseases and impact on their determinants.
- **Social Influence:** This advocacy outcome reflects an enhanced ability to influence social norms and public opinion with respect to the prevention and control of communicable diseases.
- **Healthy Public Policy and Practice:** These outcomes result from efforts to overcome structural barriers to the prevention and control of communicable diseases and are measured by clear policy statements, appropriate legislation and regulation, adequate resource allocation, and healthy organizational practices towards these ends.

4.6 Intermediate Health and Social Outcomes

The health promotion outcomes described in the previous section lead to intermediate health and social outcomes, also referred to as the determinants of final health and social outcomes. With respect to communicable diseases, they include the following.

- Healthy lifestyles
 - Adequate hygiene and handwashing practices
 - Healthy eating
 - Minimal sexual risk exposure (including abuse of alcohol and drugs that increase risk of sexually transmitted infections)

- Effective Health Services
 - Optimum vaccination coverage
 - Appropriate/adequate provision of antibiotics
 - Safe blood supply
 - Adequate emergency management of outbreaks of communicable diseases
 - Adequate provision of engineering controls and personal protective equipment in health care settings
- Healthy Environments
 - Adequate sewage treatment
 - Adequate water treatment
 - Adequate food protection
 - Vector control
 - Control of animal reservoirs

4.7 Final Health and Social Outcomes

These are the ultimate goals of health promotion initiatives to prevent and control communicable diseases. In this model, these outcomes are expressed as health outcomes (reduced morbidity, disability and preventable mortality from communicable diseases) and social outcomes (improved quality of life, functional independence, equity from the prevention and control of communicable diseases). Perhaps the most important challenge to demonstrating the effectiveness of health promotion strategies is recognizing that ultimate or final outcomes are often long-term or indirect. Short funding cycles for many interventions, even those with multiple initiatives, increase the challenge to demonstrate success.²⁶

5.0 FROM THEORY TO PRACTICE: DO BUGS NEED DRUGS?

This outcome model demonstrates that health promotion is a holistic concept and process consisting of a range of strategies and actions required for its effectiveness. It also underscores the complexities and the long-term nature of the process. In this section, an attempt is made to redirect the discussion towards a practical consideration of this approach and to “bring it to life” as an integrated concept and process that is feasible and that the health care sector should continue to champion. This is done through a brief exploration of an example of a communicable disease health promotion initiative currently underway in this province that is tackling handwashing. The program is presented as a narrative with the aim of allowing the initiative to tell its own story and to demonstrate its intrinsic health promotion content and its alignment with the outcome model described in the previous sections. Data for the narrative has been drawn from an interview with the founder of the program as well as from the program website.^{vi}

Do Bugs Need Drugs?[®] is a community education project to empower children, families and health care professionals to address the problem of antibiotic resistance through preventive hygiene methods and better use of these important drugs.

This program views antibiotic resistance as a factor impeding the achievement of improved final health and social outcomes with respect to communicable disease prevention and control and supports the conclusions of international public health agencies that this is a public health threat. Although antibiotic resistance is a natural phenomenon resulting from antimicrobial gene action, two important intermediate health and social outcomes contribute to the problem. These are sub-optimal hand washing practices that contribute to increased infections, and antibiotic overuse in humans, agriculture and the environment. The Do Bugs Need Drugs?[®] program aligns with the Integrated Action Plan for Canadians on Controlling Antimicrobial Resistance, developed in 1997 by the Canadian Committee on Antibiotic Resistance and adopted by the Public Health Agency of Canada.³³

Do Bugs Need Drugs?[®] was developed and piloted in Alberta in 1998-99, through a partnership between Capital Health, the Clinical Practice Guidelines program of the Alberta Medical Association, the Alberta Lung Association and the University of Alberta.^{vii} The Alberta program includes participation of members from all of the target populations in its steering group, and consists of multiple interventions aimed at the general public, parents, elementary school children, elementary teachers, physicians, pharmacists, occupational health professionals, day care centres and assisted living sites.

Do Bugs Need Drugs?[®] tackles the determinants of antibiotic resistance “at its roots” through three fundamental health messages, with the emphasis on the preventative aspect of handwashing. This is captured in the message, “Handwashing is the best way to stop the spread of infections.” A further message recognizes public demand issues for antibiotics based in part

^{vi} <http://www.dobugsneeddrugs.org/>.

^{vii} The program was launched in British Columbia on January 12, 2006. The Ministry of Health’s Pharmacare Division committed to three years of funding (\$1.4 million) for implementing the program throughout the province. BC Centre for Disease Control will coordinate the roll-out of the program in all the health authorities over the next year.

on poor understanding that “Not all bugs are created equal” and that antibiotics are not effective against viral infections. A final message attempts to deal with provider over-supply by emphasizing that “Antibiotic resistance is a problem.” While the programme has not stated this explicitly, these interlinking messages support a logic and analytic model for tackling antibiotic resistance that target both health care professionals and the general public.

Do Bugs Need Drugs?[®] is concerned with preserving antibiotic effectiveness for extended use in future generations. This speaks directly to the community empowerment focus of the program where direct attempts are made to build the capacity and confidence of community-based groupings to actively take up key issues. These include parent groupings to promote reduced demands for antibiotics; expectations for physicians to adopt good handwashing practices; questioning antibiotic usage by physicians and day care centres; and scrutinizing schools for adequate soap provision. This public campaign aspect of the program is also designed to challenge the pharmaceutical company pressure on physicians to prescribe these drugs as well as the conservative day care centre policies for their usage. The program has also worked with other community groupings such as school boards, various health professional associations, public health communicable disease groups, and restaurants.

The program targets young children who are formulating hygiene behaviours and exploits an educational diffusion approach used extensively in developing countries, where health messages are imparted to children in educational settings with the aim that they take these messages home to their parents and guardians. The program has also developed materials for teachers to reinforce the messages about handwashing and the wise use of antibiotics. Notably, the Do Bugs Need Drugs?[®] program found that education for grade two children resulted in improved understanding of handwashing and antibiotic resistance among their parents. The theme of students as teachers is extended through an innovative and cost-effective inter-sectoral partnership between health-related faculties and education, where tertiary students from the faculties of medicine, pharmacy, nursing, dentistry, dental hygiene, physical therapy, occupational therapy and medical laboratory science teach the elementary school program as part of an interdisciplinary health care course. A further example of inter-sectoral partnership has been the bringing together of pharmacists and physicians to discuss antibiotic resistance and strategies to mitigate it.

The program has a sophisticated health communication strategy that utilizes multiple outlets including television commercials, paid air-time and public service announcements, the Internet, pamphlets, and parent guides disseminated through local magazines and public health clinics. All materials reinforce the three key messages and are pitched at a grade eight level to ensure maximum readership. Information sheets and parent guides are sensitive to cultural issues and have been developed in English, simplified and traditional Chinese, French, Persian, Punjabi, Spanish, and Vietnamese through expert translation services, and have been very widely disseminated. The website has individual pages devoted to all the target groupings highlighted above and includes innovative content such as videos, poems, articles and links. The Kids page contains games to play online, colouring sheets to download and activity pages such as word finds and crosswords. The site is well-used and experiences approximately 5,000 visits per day.

Health care professionals are targeted in various ways. These include:

- Mail-outs to physicians, pharmacists, dentists, infection control practitioners, nurse practitioners, public health units and health care students in medicine, pharmacy and dentistry.
- The provision of an anti-microbial pocket reference (also in pdf format) that is comprehensive, and evidence-based, with local recommendations for the appropriate use of antibiotics and the optimal treatment and prevention of infectious diseases.
- Powerpoint adult education tutorials.
- Ongoing web-based tips and links.

Two high-risk facilities have received priority attention and programs. These are day care centres and assisted living sites. Educational materials developed for the day care centres include a reference binder for staff, age-appropriate activities, posters/handwashing signs, and an instructional video.

Do Bugs Need Drugs?[®] has been well-evaluated with active oversight from the participatory steering group and has demonstrated promising results. It has focused on sustainability through the development of train-the-trainer programs and has succeeded in raising committed funding. The program has been considered to have high external validity and is currently being implemented in other Canadian jurisdictions and being assessed for implementation in Italy, England and Israel.

This presentation of the Do Bugs Need Drugs?[®] program does not constitute an evaluation of this initiative, but it is clear that this continues to be an impressive health promotion undertaking. This is despite the fact that it has not been subjected to a randomized controlled trial, with the exception of limited aspects of the program. Should the program be allowed to continue and be expanded based on its achievements to date? Clearly this has been answered in part by the committed three year funding for the program from the Ministry of Health. However, it also seems apparent that the potential of the program to deliver sustained reduction in antibiotic over use and optimum handwashing practices throughout the province is questionable without needed policy developments, including government control on antibiotic usage for humans, agriculture and the environment, as well as handwashing policies and mandated education concerning antibiotic resistance and its prevention in schools. This serves to emphasize the need for achievements in all health promotion outcomes to achieve success: increased health literacy, social action, social influence and healthy public policy. While the outcome of healthy public policy remains the most in need of attention, it is doubtful whether these policies would enjoy the needed compliance without the complementary achievements of this health promotion intervention.

This paper turns next to discuss approaches to grading evidence for health promotion interventions before continuing on to assess additional sources of information on hand hygiene initiatives.

6.0 GRADING EVIDENCE FOR HEALTH PROMOTION

6.1 Introduction

Evidence-based is usually taken to mean that the behavioural, social and structural interventions that are relevant to the program goal(s) and objective(s), have been tested using a methodologically rigorous design, and have been shown to be effective in research settings. Common requirements include that they are evaluated using behavioural or health outcomes; are compared to a control/comparison group(s) (or pre-post data without a comparison group(s) if a policy study); have no apparent bias when assigning persons to interventions or control groups or adjusting for any apparent assignment bias; and, produce significantly greater positive results when compared to control/comparison group(s), while not producing negative results.³⁴

6.1.1 Where does that leave health promotion?

This paper has reinforced the concept of health promotion as an enabling process, targeted at populations and not diseases and directed at the determinants of health. It has also supported the view of health promotion as a style of working and a relational practice that involves transformative processes, collaborative effort, consciousness raising and respect for the dynamic inter-relationships between people and their environments.³⁵ These views of health promotion present challenges to grading evidence as described earlier and stem directly from the challenges in accessing evaluations of health promotion. These challenges include three groups of factors:¹³

- ***The ability to undertake health promotion evaluations:*** Here the inherent difficulty concerns evaluating long-term, complex, multi-level, multi-strategy interventions over which one has little control, and the consequent lack of funding for these evaluations.
- ***The criteria for assessing effectiveness:*** There continues to be debate about the appropriate methodologies, variables, measures and criteria for evaluating health promotion initiatives and the growing challenge to the so-called gold standard of randomized controlled trials for evaluating effectiveness.
- ***The ability to know about and learn from evaluations that are undertaken:*** This has to do with the limited outlets for publishing evaluations that are undertaken and the difficulty of identifying evaluations in the “grey”, non-peer-reviewed literature.

These challenges have resulted in numerous suggestions for alternative approaches to evaluating health promotion interventions beyond those traditionally used to support evidence-based medicine and to get health promotion evidence into practice.³⁶ These approaches are prompted by the view that the application of traditional evidence grading approaches often conclude that little evidence is available to guide decisions regarding interventions in public health, especially those that address socio-behavioural health issues and that are affected by an array of individual, social and environmental factors.³⁷ With respect to health promotion, these additional approaches to grading evidence tend to adopt a best practice approach in which health promotion is viewed as those sets of processes and activities that are consistent with health promotion/public health values, goals and ethics, theories and beliefs, evidence, and understanding of the environment, and that are most likely to achieve health promotion/public health goals in a given situation.³⁸ Some have even questioned the use of the term “best” practices and have argued, instead, for “better” practices, defined as “plausible, appropriate, evidence-based and well executed actions

and processes that will contribute to significant reductions in the current and future burden of disease.”³⁹

Before reviewing these additional approaches and arriving at one that can be taken forward to assess the evidence for the effectiveness of health promotion approaches for the prevention and control of communicable diseases, it is necessary to understand the shortcomings of the traditional approach in more detail.

6.2 The Suitability of Randomized Controlled Trials for Health Promotion Evaluation

An obvious rebuttal to the previously described challenges in demonstrating health promotion effectiveness has been to call into question the hegemony of study design alone as a marker of evidence quality for public health intervention evaluation.⁴⁰ It has been strongly argued that, given the requirements in health promotion for action research designs and qualitative methods, a hierarchy of evidence with randomized controlled trials at the top is inappropriate.⁴¹ Green captures this inappropriateness when he notes that

the relative predictability of the human organism’s response to medical or surgical interventions compared with the relative unpredictability of social and psychological factors that might modify the responses to health promotion or public health interventions make the evidence-based best practices exercise qualitatively different.⁴²

The problems of randomized controlled trials have been summarized as follows:⁴³

- Random allocation is difficult to achieve in practice.
- There are ethical issues in withholding educational interventions.
- It is virtually impossible to avoid contamination of a control or comparison area in a health promotion intervention.
- It is ideologically unsound for health promotion to treat people as objects, as health promotion research requires individual and community participation.

The relevance of randomized controlled trials for the evaluation of health promotion programs is further questioned when one considers Type 1, 2 and 3 errors. These trials are predominantly designed to avoid Type 1 errors by means of random allocation to treatment and no-treatment conditions. As mentioned earlier, this is difficult to realize in practice for health promotion interventions. In addition, this study design cannot guarantee to deal with Type 2 errors, the failure to show the existence of a genuine program response, even with the use of power calculations to estimate adequate sample size. Finally, randomized controlled trials are not well-suited to overcome Type 3 errors, which refer to situations in which a grossly inadequate programme, through poor design, has correctly been judged to be ineffective. Unfortunately, health promotion programs often fail because they do not manage to deliver all the multiple level components required for effectiveness. For example, a handwashing program in day care centres may require a synergistic approach involving both policy change and education before it might be expected to show results. Ignorance of what constitutes an efficient program may result in the

whole health promotion enterprise being rejected as weak and ineffective. On the other hand, it is frequently impossible to mount programmes that meet all the requirements of maximal efficiency. This dilemma has been referred to as the efficacy paradox and underlies the need for other considerations of effectiveness for health promotion interventions.⁴³

A further consequence of the dominance of randomized controlled trials for evaluating effectiveness is to minimize the importance of external validity, or the degree to which findings can be generalized to other settings or populations. There is no doubt that the probability approach, and specifically the randomized controlled trial, is best suited for achieving the three objectives of a sound study design: to minimize selection and information bias, to control confounding and to attempt to rule out chance, thereby rendering a study internally valid. This is usually regarded as sufficient grounds for external validity or generalizability. However, this consequence of internal validity is based on the assumption of a universal biological response. While this may be appropriate for evaluations of interventions with short causal pathways, such as individual-level studies of vaccines in which the administration of the vaccine leads directly to a defined biological response, this is unlikely to be appropriate in evaluating interventions involving long, complex causal pathways or large-scale evaluations where these pathways can be affected by numerous characteristics of the population, health system, or environment.⁴⁴ This is often referred to as effect modification, when the intervention-outcome association varies according to the presence of external characteristics.

6.3 Beyond Randomized Controlled Trials for Health Promotion Evaluation

The recognized challenges facing systematic reviews of public health interventions and health promotion in particular have stimulated the development of new criteria for grading evidence and making recommendations for these interventions. Two noteworthy sources released in 2005 came from the Cochrane Collaboration⁴⁵ and the Health Development Agency (HDA), National Health Service, in the United Kingdom.⁴⁶ Recommendations call for the expansion of the traditional evaluations of evidence to incorporate the assessment of theory, integrity of interventions, context and sustainability of the interventions and outcomes. Supplementing data from quantitative studies with the results of qualitative research was noted as key to the successful replication and ultimate effectiveness of interventions. These conclusions complement a number of recent publications offering similar and more nuanced suggestions for enhancements to traditional evidence-grading approaches.

Before describing the HDA approach, which has been endorsed by the Ministry of Healthy Living and Sport for the preparation of this and other evidence papers, it is worth quoting Green, where he emphasizes that an alternative to traditional approaches to developing evidence is to view health promotion as a process rather than as packaged interventions.

What needs to be clarified is that health promotion research can promise to produce a generalizable process for planning, not a generalizable plan. The products of health promotion research that will have generalizability are ways of engaging the community, ways of assessing the needs and circumstances of the community or population, ways of assessing resources, ways of planning

programs and ways of matching needs, resources and circumstances with appropriate interventions. It is the science of diagnosis—building a better understanding of what practitioners and policy makers need to look for and find in communities, in populations and organizations—that should be developed and applied as the first level of best practice for health promotion and population health programs.⁴²

6.4 The Health Development Agency Approach to Grading Evidence for Public Health Intervention

The HDA approach suggests a pyramid of evidence building blocks upon which grades of recommendations may be based (see Appendix 2). Built up from a comprehensive review of the literature, complemented by consultations with individuals and organizations with expertise in public health and/or grading methodology, this approach presents a pragmatic framework that allows for the grade of recommendation to be promoted where the research design to demonstrate efficacy is weakened by design or methods, but where there is consistent evidence from corroborative studies to suggest that the intervention is relevant, feasible and could be implemented for the population in question. The HDA approach also includes overall evidence for cost-effectiveness.

6.4.1 Evidence of Efficacy

The HDA approach retains an evidence hierarchy to assess the efficacy of an intervention in which high quality meta-analyses, and systematic reviews of randomized controlled trials or randomized controlled trials with a very low risk of bias are at one extreme of the spectrum. However, this approach differs from traditional frameworks in that the most appropriate or highest level of evidence is not necessarily the randomized controlled trial. It also goes beyond non-analytical studies such as case reports and case series to include expert opinion and formal consensus.

Attempts to make this latter approach more rigorous are emerging with suggestions of applying systematic review methods to studies of people’s views.⁴⁷ Tones goes further and suggests that “judicial review” replace randomized controlled trials as the new gold standard for health promotion activities.⁴³ He acknowledges that this is an alternative evaluation paradigm but attempts to demystify it by suggesting that it simply builds on a triangulation approach in which multiple sources of evidence are brought together for vigilant decision-making. He promotes this judicial approach by reminding us of the importance of taking action where this is clearly needed and suggests that in the absence of evidence at the higher ends of the hierarchy decisions for action should be taken on the basis of a mix of evidence that a jury would find compelling.

6.4.2 Evidence of Corroboration

A key distinction of the HDA approach is the recommendation that evidence for efficacy be combined with an overall assessment of the strength of evidence of corroboration for the intervention in question. This refers to evidence that confirms or strengthens conclusions and recommendations based on efficacy. This recommendation is critical where the research design to demonstrate efficacy is weakened by design or methods.

Evidence for corroboration addresses the issues of direct applicability to a target population and extrapolated evidence, and in so doing draws on sources of evidence above and beyond that found in studies of efficacy. While questions of efficacy ask if the intervention worked in the context of the study or research from which the evidence was drawn, evidence for corroboration pursues questions of effectiveness more deeply in that it asks if the intervention will work in practice in other settings and/or for other populations. In the HDA approach, evidence for corroboration is concerned with whether the intervention will work for this population and, if it will work, whether it matters that it will work, or whether it will have relevant outcomes for this population. The former is referred to in the pyramid mentioned earlier as evidence to support implementation and the latter, evidence of salience. Questions of implementation consider issues of feasibility, plausibility, acceptability, transferability and sustainability.

In presenting the recommendation for the inclusion of evidence of corroboration, the authors of the HDA approach were not able to obtain consensus from their strategic informants on a hierarchy of evidence, which was recognized to be mainly forthcoming from observational studies and qualitative evidence. The suggestion provided is that the evidence be graded in the following way:

- **Strong:** Consistent findings in two or more studies with very low risk of confounding, bias or chance carried out within the country of interest and applicable to the target population with evidence of salience and implementation
- **Moderate:** One study with the features listed in the previous category or two or more studies with very low risk of confounding, bias or chance not carried out in the country of interest but applicable to the target population, with evidence of salience and implementation
- **Limited:** Only one study with low, as opposed to very low, risk of confounding, bias or chance carried out within the country of interest, or two or more studies with inconsistent findings but on balance providing evidence of benefit, or studies of low risk not carried out in the country of interest but applicable to the target population
- **No Evidence:** No study of acceptable quality or inconsistent studies with unclear benefit or no relevant research available.

6.5 Applying an Evidence Approach to Health Promotion

The discussion in the previous section has emphasized the challenges of assembling evidence for health promotion interventions both in terms of internal and external validity and has inferred that this is exacerbated if one accepts health promotion as a holistic process consisting of a range of strategies in which the effectiveness of the approach rests fundamentally on their synergism. The discussion has also stressed that the evidence base for health promotion has as much to do with how the process has been applied as it has to do with the outcomes.

The HDA approach, while offering the scope of including corroborative evidence, does not provide a means for dissecting the repertoire of health promotion strategies or assessing the quality of their application. Thus the reader will not be surprised that the peer-reviewed literature

contains little evidence for a holistic approach to health promotion. This situation is even more extreme for communicable disease prevention and control outside the domain of immunization, which is being considered in a separate evidence paper. Efforts to locate peer-reviewed literature that focus on communicable disease prevention and control through holistic health promotion strategies were met with little success beyond HIV/AIDS.

This has led this evidence review to suggest a framework to assess health promotion interventions based on the outcome model described earlier. It is inspired by a pioneering initiative in Alberta in 1999⁴⁸ as well as a more recent approach for the evaluation of health promotion in primary health care.⁴⁹ The former approach was born out of a need at the local level to assess the overall effectiveness of health promotion in one Canadian province, while the latter is an attempt to contribute to the efforts of primary health care renewal in BC. The approach suggested poses six questions:

1. How well the program applied the principles of health promotion. Did the program:
 - Treat health as a holistic concept?
 - Pursue social justice based on the human right to health?
 - Aim for equitable access to conditions and resources for health?
 - Work towards empowerment for greater control over decisions and actions affecting health?
 - Include working with members of communities who face systematic barriers to good health?
 - Maintain respect for diversity of viewpoints, cultures and perspectives on health and wellness?
2. The extent to which the program addressed empowerment factors. Did the program:
 - Include participatory planning and evaluation?
 - Address real and felt needs of the target population?
 - Include cultural sensitivity approaches?
3. How well the program was planned and to what extent it addressed resource factors. Did the program:
 - Draw on theories of change in its planning?
 - Develop program models with short/long-term outcomes?
 - Develop multiple interventions to address the various needs of the project?
4. The range of health promotion strategies and actions that were employed. Which of the following health promotion strategies were included in the program:
 - Development of personal skills?
 - Strengthening of community action?
 - Creation of supportive environments?
 - Reorienting of health services?
 - Building healthy public policy?

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Which of the following health promotion actions did the program employ:

- Health education?
 - Health communication?
 - Organizational development?
 - Community development?
 - Promotion of public debate?
 - Advocacy?
 - Partnership development?
 - Policy development?
5. The impact that the program had on achieving health promotion outcomes for individuals and/or communities. Did the program:
- Improve health literacy through one or more of the following: increased awareness, knowledge personal skills, attitudes, motivation, behavioural intention, self-efficacy?
 - Enhance social action through one or more of the following: organizational and community capacity building, participation and partnerships?
 - Advance social influence through an enhanced ability to influence social norms and public opinion?
6. The impact that the program had on addressing healthy public policy and practice. Did the program increase healthy public policy and practice through one or more of the following: clear public policy, appropriate legislation and regulation, adequate resource allocation, and healthy organizational practice?

The recommendation is that this battery of questions forms the basis of examining any individual or integral set of health promotion interventions and can be used as a tool to examine local initiatives currently underway for purposes of quality improvement.

This paper turns next to examine two critical areas for communicable disease prevention: hand hygiene and sexual health.

7.0 METHODOLOGY

Literature for this paper was located using a number of strategies. These included the following:

A preliminary search was carried out using the health database MEDLINE. This search addressed three topics from the research question: communicable diseases, health promotion and health behaviour. The BC Centre for Disease Control's (2002) *List of Reportable Communicable Diseases in BC* (November 2003) was used to define communicable diseases.⁵⁰ Many of these diseases have medical subject headings (MeSH) in MEDLINE; for those that did not have a MeSH heading, keywords were used to search those terms. For health promotion, several MeSH terms were used, in particular health promotion, health education, patient and sex education. The behaviour topic included MeSH and keyword search terms that addressed several concepts of health behaviour, patient acceptance of health care, patient participation and compliance, and attitudes to health. The search results were limited to the following publication types in English: reviews as well as evidence-based medicine (EBM) reviews, controlled clinical trials, evaluation studies, guidelines, meta analysis and consensus development conferences. In addition, Cochrane reviews were searched for communicable disease and health promotion content.

This first strategy served to confirm the scarcity of literature in this area beyond immunization and sexually transmitted diseases. This was followed by the development of an outcome model for health promotion approaches to communicable disease prevention.

MEDLINE was then re-examined, using the three search groups noted earlier (communicable diseases, health promotion, health behaviour), but extended to include health promotion concepts contained in the outcome model and supplemented with terms from several health promotion resources.^{8,51} These concepts included but were not limited to: community, population health, public health, partnerships, networks, community participation, cultural values, decision making, community organizations, community health planning, social support, network groups, preventive health care, capacity building, health care coalitions, health planning councils, holistic health, community institutional relations, and social problems (limited to prevention and control). This search was limited to English reviews and EBM reviews from 1998 to the present (see Appendix 3 for details of this search strategy. Details of additional searchers are available on request).

This second approach was then applied to other health and social science databases with adaptations of the MeSH terms to comply with the equivalent subject headings available in these sources and the use of keywords when subject headings were nonexistent. The databases examined included EMBASE, CINAHL, ERIC and PSYCHINFO.

Finally, a search of the grey literature was completed using the Internet search engine Google to access various health promotion portals and for general website searches. Health promotion portals were ascertained by examining pertinent resources.^{41,45,52}

8.0 HANDWASHING PROMOTION INTERVENTIONS

Hands are the primary mode of transmission of many infectious diseases, and handwashing is acknowledged as the most effective means of preventing the spread of many of these diseases.⁵³ Hence, it is given prominence in this paper.

Most workers in this field trace the first clear evidence of a clinical benefit from hand hygiene to Semmelweis, who worked in the Great Hospital in Vienna in the 1840s. He discovered the importance of hand hygiene for safe obstetric care using an experimental study design.⁵⁴ As one author stated, “hand hygiene is the practice of evidence-based medicine...if hand hygiene were a new drug it would be used by all.”⁵⁵ Selected health promotion strategies have been applied to increase this prevention practice in a number of settings, including the health care sector, child day care centres, elementary schools and the domestic environment.

8.1 The Health Care Sector

Reductions in hospital-acquired infections are a priority in health care in many countries. Yet despite the evidence for the effectiveness of hand hygiene in reducing these infections, compliance by health care workers in general and physicians in particular is relatively poor and has prompted various attempts to address this issue.⁵⁶ Many of these initiatives employ selected health promotion strategies to overcome lack of motivation of health care workers to prevent these infections.

One systematic review of 22 studies that looked at evidence for the effectiveness of interventions to improve hand hygiene practices noted the following:⁵⁷

- **Educational Interventions:** These included training sessions, newsletters, classes and videos but appeared to have a very short-term influence on handwashing behaviour, especially if they were one-off interventions. For example, in two of the studies the effect was sustained for a week, after which it declined to baseline levels.
- **Reminders:** These included posters, coloured signs, labels with messages, patients reminding staff; the reminders were shown to have a modest effect. Results from two of the studies showed that this effect could be sustained for at least one month. The effect ranged from an increase of 34 percent in soap use to an increase of 46 percent in observed handwashing frequency.
- **Performance Feedback:** This included personal and non-personalized feedback, oral and written feedback. This was shown to be effective but needs to be repeated regularly for sustained effects. Achievements ranged from one month (four studies) to six months (one study), and realized increases from 30 to 50 percent in observed handwashing frequency.
- **Multifaceted Interventions:** These were applied in 11 of the studies reviewed and combined education with written material, reminders and continued feedback of performance. Most of these programs had a pronounced and sustained effect on both hand hygiene practices and hospital-acquired infections, with one study showing that this effect could be maintained for a number of years. A Swiss study that appeared after this review reinforced the effectiveness of multifaceted interventions. This study demonstrated a sustained increase in hand hygiene compliance, a reduction in nosocomial

infection rates and a reduction in MRSA transmission rates. Notably, this study included the development of posters by the staff from the wards using simple messages with amusing graphic illustrations.⁵⁸

The conclusions from this review noted that only three of the 22 studies were randomized controlled trials, and that cluster randomized controlled trials were likely to be the most appropriate study design for work in the future. However, these data are consistent with other findings on the effectiveness of different interventions at improving various practices in health care. One example of this that looked at evidence from 44 systematic reviews of behaviour change confirmed that multifaceted interventions were generally more effective than single interventions.⁵⁹

From a health promotion perspective, initiatives to improve hand hygiene practices should attempt to empower health care workers and patients to engage these prevention measures. This requires identifying the determinants of poor compliance and the barriers to implement these practices. Time constraints have been identified by the Evidence Based Practice in Infection Control (EPIC) systematic review of hand hygiene as one of the main barriers to regular handwashing.⁶⁰ This masks a range of confounding factors that impact compliance, including case-mix, length of stay, bed occupancy, staffing levels, intensity of workload, antibiotic use, regional or seasonal changes, and changes in infection control practice. An additional set of perceived barriers to adherence with hand hygiene practices that point to the need for a health promotion system approach to improve compliance, include lack of active participation in hand-hygiene promotion at the institutional level (compounded by lack of individual and group engagement), lack of institutional priority for hand hygiene, and lack of an institutional safety climate.⁶¹

These many factors emphasize that comprehensive health promotion approaches are needed to achieve lasting changes in hand hygiene routines. These include participatory planning, and the targeting of different problems and barriers to change with strategies at different levels (professional, team, patient and organization),⁶² and an emphasis on addressing lack of motivation.^{61,63} An additional challenge that has been recognized is finding possible solutions to overcome religious and cultural barriers for the use of alcohol-based rubs.⁶⁴ Perhaps the most neglected aspect of hand hygiene programs in health care settings has been patient involvement in infection prevention and hand hygiene. This has been recognized and is a priority topic of a World Health Organization Task Group considering enhanced implementation strategies for hand hygiene.⁶⁴

8.2 Child Day Care Centres

Day care centres have been implicated as settings for the spread of communicable diseases, especially diarrhea, among young, susceptible children. Children in day care centres have been shown to be at greater risk of acquiring infections than children cared for in the family home environment.⁶⁵

A randomized field trial conducted in 52 day care centres in Quebec, Canada, between September 1, 1996, and November 30, 1997, set out to assess the effectiveness of a hygiene

program in reducing the incidence of respiratory and diarrhoeal diseases in toddlers attending day care centres.⁶⁶ The educators recorded absences for any reason and the daily occurrence of colds and/or diarrhoea in toddlers on calendars. The number of fecal coliforms on children's hands and on educators' hands was measured during three unannounced visits. Results showed that the incidence rate of diarrhoea was considerably reduced by the effect of monitoring (IRR = 0.73, 95% CI = 0.54,0.97), and the intervention reduced the incidence rate of upper respiratory tract infections (IRR = 0.80, 95% CI = 0.68,0.93). Monitoring alone also had an important effect in reducing the level of bacterial contamination on children's and educators' hands. These results indicate that both an intervention program and monitoring alone play a role in reducing infections in children attending day care centres.

Two systematic reviews that looked at the effectiveness of day centre infection control interventions and included mention of health promotion approaches were located.

- The first, published in 1999, was only able to locate 13 relevant studies from a systematic search of 10 databases.⁶⁷ Of these, only three were considered to contain sufficient quality to provide evidence and only one had health promotion relevance. This was a randomized controlled trial, published as a doctoral dissertation, in which day care centre staff received a slide tape presentation and two handwashing reinforcement sessions presented at three weekly intervals.⁶⁸ This study demonstrated evidence for the effectiveness of educational sessions in increasing infection prevention knowledge and behaviour among the staff after a three-week follow-up period. This limits conclusions about long-term impact. The study also did not assess the incidence of infections in staff and children. It is worth noting that a further randomized control study reported in this review showed that an intervention of intensive policy for excluding and treating all symptomatic and asymptomatic *Giardia*-infected children was not more effective than other, less rigorous policies,⁶⁹ implying the need for holistic health promotion approaches that go beyond healthy public policy.
- The second systematic review focused on studies linking handwashing to diarrhoeal diseases.⁷⁰ The 17 studies with observational and intervention designs that were retained for the review included two day care centre initiatives in developed countries. The remaining studies were from developing countries and for the most part were not based in day care centres.
 - The first, an intervention trial that studied four day care centres in suburban Atlanta, Georgia, randomly allocated two centres as experimental ones and two as controls.⁷¹ These were systematically chosen by the investigators from a national chain of centres that were apparently comparable. The initiative, described as a “rigorously supervised intervention”, involved active supervision of children by staff to ensure they did not place their hands in their mouths while using the toilet and that they washed their hands when they entered the centre, used the toilet, were diapered, or prepared to eat. This intervention was able to demonstrate a relative risk for diarrhea of 1.92 (1.32-2.81) when compared to control sites. The study, as with the *Giardia* study noted earlier, focused on policy issues and, more specifically, the quality control of these policies. While the results of the study support the effectiveness of this approach on diarrhoeal outcome, it does not focus

- on health promotion strategies to enhance compliance with hand hygiene or comment on the impact of this supervision on compliance.
- The second study, from an Australian urban day care centre, was an intervention trial that involved the training of child care staff about transmission of infection and handwashing and focused on both staff and child behaviour.⁷² The training included lessons and demonstrations to staff. Multivariate analyses demonstrated that diarrhoeal episodes were significantly reduced in intervention centre children by 50 percent and upper respiratory tract infections by 12 percent, but that the impact of the intervention on diarrhoeal episodes was confined to children over 24 months of age and that the impact on respiratory tract infections was confined to children below 24 months. For those centres in which children's compliance with handwashing was high, diarrhoeal episodes were reduced by 66 percent.

A further day care centre longitudinal study, conducted in two comparable Indiana sites, situated 5 miles apart, over a 21-week period, was able to demonstrate a 32 percent reduction in the experimental as compared to the control centre.⁷³ Throughout the study the test group was exposed to a variety of handwashing and germ activities and policies for children and teachers. This included innovative ideas such as encouraging everyone to “give their cough the elbow.” Staff, parents, volunteers and children demonstrated this simple technique of lifting one's arm and sneezing or coughing into it rather than sneezing or coughing into one's hands. Handwashing posters were displayed near handwashing sinks as reminders of when and how to wash hands. Children in the test group received a developmentally appropriate three-day unit plan on handwashing at three-week intervals starting at week three of the study. The audiotapes, hands-on activities, stories and poems from an established program were incorporated into the curriculum. The tapes contained jingles set to music encouraging the children to sing along as they washed their hands. A story about “Soapy and Sudsy” was read to the children with puppets made of a bar of soap and of a liquid soap container like the characters in the story. The teachers devoted 15 to 20 minutes per day to the unit topics. Teachers in the test group received training on infectious diseases and practiced proper handwashing procedures.

8.3 Elementary Schools

A study in a school of 5- to 12-year-olds in the United States of a mandatory, scheduled handwashing program in selected classrooms was associated with a significant fall in absences due to all acute communicable illness (relative risk = .75) in the 37 school days examined.⁷⁴ There were less days of absence due to gastrointestinal symptoms (relative risk = .43). The difference in absence due to respiratory symptoms was not statistically significant. The intervention group, approximately half of the school children, washed their hands a minimum of four scheduled times a day. The control group continued handwashing practices as usual. As discussed earlier, this approach serves to support the effectiveness of handwashing but lacks health promotion content.

A study with health promotion relevance that focused on elementary schools was located.⁷⁵ This intervention trial non-randomly assigned five of six public elementary schools in Washington, DC to four handwashing interventions and retained one school as a control. Two schools received a peer education program, one school an introduction of hand wipes with an

instructional poster, and one school a combination of the educational program and hand wipes. In the comparison school that received no intervention, handwashing was observed. Results demonstrated a significant increase in handwashing frequency as measured three weeks after the program in each of the intervention schools compared to the control, in which there was no change. However, this increase was reversed in the education-only school when measured at six weeks. In the combination school there was a further increase at six weeks as compared to three weeks.

The presence of the observers seemed to impact on the control group, as the frequency increased during the latter three weeks. This study suggests that a one-time peer education program that is reinforced by easy-to-use and readily accessible handwashing materials has the potential for a positive impact on hand hygiene practices of elementary school children. The authors recommend that these interventions consider the cultural diversity of communities both in terms of teaching approaches and with regard to the meanings of hygiene practices across cultures. This study attempted to do this through the peer education approach, which included innovative training content for the fourth-graders, who acted as peers for the first-graders, such as a video presentation of a clown doing a handwashing demonstration, storyboards, overheads, posters and training on how to use various teaching techniques for first-graders. In their session with the first-graders, the peer educators included an interactive song emphasizing the steps of handwashing and issued stickers to denote participation in the program.

8.4 Domestic Environment

As would be expected, published reports are lacking on experimental evidence for handwashing interventions directed at the domestic environment in the developed world. Given the ubiquitous usage of safe water supplies and antibacterial and/or plain soap in these settings, it is not surprising that investigators have turned to the developing world for these domestic studies, where the need is greatest and where control populations that do not have access to these supplies exist.

A recent example is the report of a cluster, randomized controlled trial carried out in high-risk communities in Pakistan, which demonstrated the effectiveness of a handwashing promotion intervention in reducing the incidence of diarrhoea and acute respiratory infections and which was also effective in preventing impetigo.⁷⁶ This study supports a previous meta-analysis that handwashing promotion interventions within communities could prevent one million child deaths per year,⁷⁷ mostly in the developing world. The Pakistan intervention (Karachi Soap Health Study) contained a number of health promotion approaches designed to improve health literacy, including neighbourhood meetings, and regular household visits where health care workers spoke the first language of the household and encouraged questions and discussion about handwashing.

Despite the relatively low risk of infectious disease transmission in the domestic environment in the developed world, there is a need to enhance hand hygiene practices across all environments, including this setting. For example, children would be confused by a different emphasis being placed on practices in day care centres or school settings and the home environment. While school-based programs do have the vicarious effect of children taking home the messages of the

program and even educating their parents, it is important to supplement this with initiatives that target the general public. The Do Bugs Need Drugs?[®] program, described earlier, recognized this need and has correctly included this general public target through mass media approaches and interventions designed to reach clinic attendees and parents through the school environment. Promising results include statistically increased awareness among grade two parents exposed to the program compared to an age-matched cohort; website visits of approximately 5,000 hits per day, including from the general public and parents; and statistically increased awareness of hand hygiene for the prevention of infectious diseases and reduced expectation for antibiotics from parents who were exposed to the program.

9.0 HEALTH PROMOTION AND SEXUAL HEALTH

The area of sexual health provides a rich canvass for a discussion of the effectiveness of health promotion and communicable disease prevention and control.

The concept of sexual health is usually traced back to a 1975 WHO conference⁷⁸ and has continued to be developed.⁷⁹ However, it has been argued that there is no international consensus on the definition of sexual health and its implementation in public health policies. It has been suggested that conceptions of sexual health remain embedded in national and political contexts and that, depending on the context, sexual health may be conceived as an ideal state of well-being or as the reduction of negative consequences of sexual activity.⁸⁰ These two conceptions of sexual health define the challenges for health promotion interventions aimed at improving sexual health status. A focus on the latter reduces interventions to those aimed at lowering the risk of unintended pregnancies or acquiring sexually transmitted infections (STIs), through information, education and counselling activities. An example of this focus is the information, motivation, behaviour (IMB) approach.⁸¹ A focus on the former does not limit interventions to diseases of the genital organs or the treatment thereof, or to procreation and its control by individuals, but instead emphasizes the positive aspects of sexuality, including its relationship to love and the development of the personality.⁸⁰ This focus has been reinforced by the updated WHO definition of sexual health (2002):

Sexual health is a state of physical, emotional, mental and social well-being in relation to sexuality; it is not merely the absence of disease, dysfunction or infirmity. Sexual health requires a positive and respectful approach to sexuality and sexual relationships, as well as the possibility of having pleasurable and safe sexual experiences, free of coercion, discrimination and violence. For sexual health to be attained and maintained, the sexual rights of all persons must be respected, protected and fulfilled.⁸²

9.1 Sexual Health and the Reduction of Risk for Sexually Transmitted Infections

Despite the limitations inherent in the concept of sexual health as the reduction of negative consequences of sexual activity, there have been numerous demonstrations of effective interventions aimed at reducing the risk unintended pregnancies or acquiring STIs.^{83,84} In addition, many of these interventions have employed various health promotion strategies. A review of behaviourally effective and cost-effective interventions aimed at the prevention of STIs in various populations, including adolescents, street youth, STI clinic patients, women, heterosexually active men, men who have sex with men, and communities, arrived at some common characteristics for these successful interventions.⁸⁵ These characteristics include the use of theoretical models; incorporation of behavioural skills training; emphasis on promoting condom usage; helping clients create a personal sexual health plan; use of community, culturally appropriate strategies; use of peer educators and community opinion leaders; and appropriate intervention duration. Many of these characteristics are important health promotion actions and approaches. Their inclusion in successful interventions support the conclusion reached in 1993

that “health promotion is an effective model to address a comprehensive, coordinated, ethical response to HIV/AIDS prevention in Canada.”⁸⁶

9.2 Sexual Health as a State of Well-Being

While the evidence for the effectiveness of the many intervention types cited above is impressive and offers a lot of scope for the planning and implementation of STI prevention programs in BC, these studies do not, in the main, tackle sexual health as a holistic concept. It is argued that this is because most of these interventions have failed to employ a comprehensive health promotion approach. The lack of a more holistic approach may deny the achievement of long-term risk reduction outcomes and the synergistic effect that this may have beyond reducing STI risk. A holistic approach to sexual health should also result in reduced unintended pregnancies, the development and enhancement of generic social skills, such as decision-making, communication and negotiation, and greater equality between the sexes.

A closer look at adolescent sex education highlights these issues. Although there is little controversy about the need for school-based curricula to address teenage STI and unintended pregnancies, there is no consensus regarding appropriate objectives for, and content of, such education.⁸⁷ The proposal that adolescents need to be educated about romantic, sexual relationships, handling sexual encounters, and competent condom and contraceptive use, remains controversial.⁸⁸ This is despite the fact that social skills training does not differentiate sexual health promotion from other aspects of health promotion with young people and the methods available to promote such skills are much the same across behaviour targets.⁸⁸ Sexual health promotion programs employ discussion groups, planning exercises, scenario rehearsal, video modeling and role play,^{89,90,91} all of which have been proven to be effective for the development of social skills required to prevent health-risk behaviours such as substance abuse.

In addition to the controversy about the nature of sexual health programs at schools, there is the need for specialist teaching skills. Facilitating the development of social skills for safer sexual practice is more challenging than skill development work in most other areas of health promotion. Health promotion in classrooms, especially sexual health promotion, depends upon the establishment of a safe classroom environment. All of this makes sexual health promotion in schools a specialized aspect of health promotion. Policy and cultural constraints on the provision of more holistic sexual health programs in schools, coupled with the need for specialized health promotion skills, suggests the need for an enabling legislative environment and the mobilization of communities and parents to appreciate the need for these programs and to advocate for them.

A deeper concern about the limitation of sexual health programs surfaces when one looks at culture. Cultural sensitivity is an important empowerment factor in the health promotion outcome model. It has been argued that this should be a required consideration for sexual health programs, with the recommendation that cultural sensitivity be an issue for both the structure and content of interventions. One strategy for ensuring cultural sensitivity is the recommendation for using holistic health nurses to reach Aboriginal youth with STI prevention programs through an empowerment approach.⁹² The author of this strategy, in quoting Busnell⁹³ and Freire,⁹⁴ emphasizes that this approach is one that does not “dismiss community intelligence” or assume that learners are only “capable of acquiring knowledge, not producing it.”

An in-depth review of culturally grounded STI prevention attempted to locate interventions that had explicitly sought to address cultural concepts. A total of 17 published reports were found that firmly acknowledged the impact that cultural values may have on individual and community-level behaviour change. The authors concluded that there are two primary strategies that HIV preventionists have used to integrate the concept of culture into intervention research: attending to intervention presentation and attending to intervention content. The former involves strategies to design aspects of how the intervention will be presented in order to appeal to a particular cultural group. This approach focuses on the visible and audible characteristics of the presentation of the STI prevention program. The latter embeds cultural concepts into the design of the intervention activities and messages.⁹⁵ The authors argued that addressing cultural issues by merely matching facilitators or by using words and phrases indigenous to the targeted group may increase “buy-in” to the program but does not address the cultural context in which risk behaviours occur and in which protective factors develop. The authors concluded that to achieve a more culturally meaningful approach to intervention design, a cultural theory needs to be developed. They identified in the literature two culturally bound factors that have been felt to be influential in STI prevention initiatives: societal preferences for heterosexual relationships over homosexual ones and beliefs about gender roles that privilege men over women.

10.0 CONCLUSIONS AND RECOMMENDATIONS

This paper has sought to review the conceptual underpinnings of health promotion in order to build an outcome model and a set of complementary questions to assist with the conceptualization, planning and assessment of communicable disease prevention initiatives. This model and the related questions provide the framework for developing indicators (performance measures) and standards or benchmarks (performance targets). It is recommended that this outcome model and set of questions be shared with the health authorities and once finalized, be formalized into a tool to strengthen communicable disease health promotion efforts.

It is further recommended that the health authorities apply this tool, once finalized, to an assessment of current community-based projects that include communicable disease content, in order to identify health promotion approaches being utilized and in need of incorporation into the projects. The tool could also be adapted to review non-communicable disease initiatives. It is suggested that this tool could act as both a mobilization instrument as well as an evaluation tool. It is strongly recommended that the application of the tool be done in a participatory manner. Sources of data from the projects can be derived from annual reports, individual interviews and focus group discussions. One idea is that the results of these community-based evaluations could be fed into networking meetings of different projects in order to promote sharing of ideas and partnerships.

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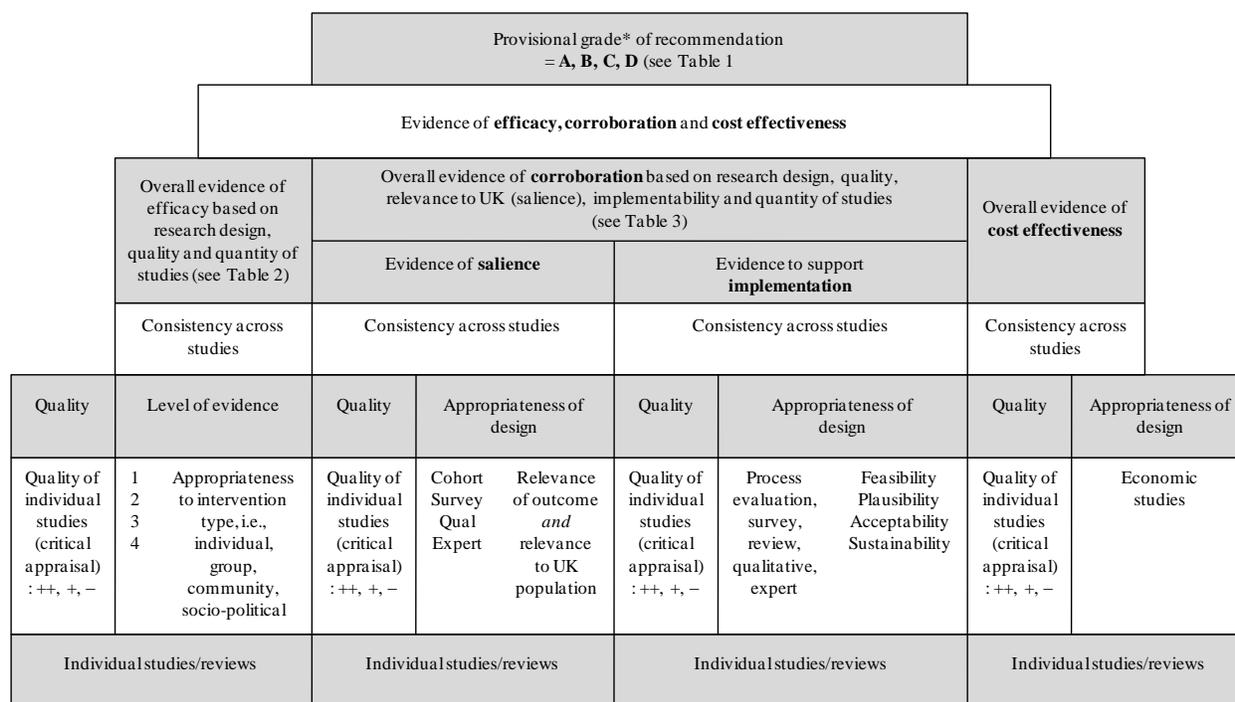
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APPENDIX 1: PYRAMID OF EVIDENCE BUILDING BLOCKS

Reproduced from: *Grading Evidence and Recommendations for Public Health Interventions: Developing and Piloting a Framework*, by A. Weightman, S. Ellis, A. Cullum, L. Sander, & R. Turley (2005, London: Health Development Agency).



*The final grade would take into account magnitude/effect size(s) (+ve or -ve)
 Key to quality: ++, very low risk; +, low risk; -, high risk of confounding, bias or chance.

APPENDIX 2: INITIAL MEDLINE SEARCH STRATEGY

- 1 Anthrax/ (2141)
- 2 exp HIV Infections/ (149892)
- 3 Botulism/ (1868)
- 4 exp Brucellosis/ (6123)
- 5 Cholera/ (5098)
- 6 Toxoplasmosis, Congenital/ (1763)
- 7 Rubella Syndrome, Congenital/ (411)
- 8 RUBELLA/cn [Congenital] (1070)
- 9 exp Cytomegalovirus Infections/cn [Congenital] (955)
- 10 exp Herpes Simplex/cn [Congenital] (236)
- 11 chickenpox/ or exp herpes zoster/ (10281)
- 12 Chickenpox/cn [Congenital] (200)
- 13 exp Hepatitis B/cn [Congenital] (109)
- 14 exp Listeria Infections/cn [Congenital] (94)
- 15 exp Cryptococcosis/ (4826)
- 16 Cryptosporidiosis/ (2935)
- 17 coccidiosis/ or cyclosporiasis/ (4612)
- 18 exp Keratitis/ (12405)
- 19 (DLK or lamellar).mp. [mp=title, original title, abstract, name of substance word, subject heading word] (7985)
- 20 18 and 19 (255)
- 21 Diphtheria/ (2782)
- 22 exp Encephalitis/ (25505)
- 23 food poisoning/ or botulism/ or ciguatera poisoning/ or favism/ or mushroom poisoning/ or salmonella food poisoning/ or staphylococcal food poisoning/ (10102)
- 24 exp Gastroenteritis/ (96181)
- 25 exp Chlamydia Infections/ (11726)
- 26 Giardiasis/ (3183)
- 27 streptococcus pyogenes/ (8589)
- 28 shock, septic/ or cellulitis/ or exp pneumonia/ or myositis/ (71441)
- 29 27 and 28 (711)
- 30 erysipelas/ or fasciitis, necrotizing/ or exp rheumatic fever/ (13715)
- 31 29 or 30 (14316)
- 32 exp Haemophilus Infections/ (7790)
- 33 Hantavirus Pulmonary Syndrome/ (299)
- 34 exp Hemorrhagic Fevers, Viral/ (7196)
- 35 Hemolytic-Uremic Syndrome/ (3221)
- 36 exp Hepatitis, Viral, Human/ (68605)
- 37 exp Leprosy/ (13889)
- 38 exp Lyme Disease/ (6320)
- 39 exp Measles/ (9772)
- 40 exp Meningitis/ (31921)
- 41 exp Meningococcal Infections/ (6948)
- 42 Mumps/ (2612)
- 43 neonatal group b streptococcal infections.mp. (35)
- 44 exp Streptococcal Infections/ (44905)
- 45 neonatal.mp. (102599)
- 46 exp infant newborn/ (361257)
- 47 45 or 46 (407658)
- 48 group b.mp. [mp=title, original title, abstract, name of substance word, subject heading word] (30494)
- 49 44 and 47 and 48 (1612)

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- 50 Whooping Cough/ (3714)
- 51 paralytic shellfish poisoning.mp. (187)
- 52 (shellfish adj10 poison\$.mp. [mp=title, original title, abstract, name of substance word, subject heading word] (528)
- 53 Shellfish/ (1900)
- 54 toxins/ or exp marine toxins/ (22872)
- 55 53 and 54 (391)
- 56 51 or 52 or 55 (692)
- 57 Plague/ (2568)
- 58 exp Poliomyelitis/ (6965)
- 59 Rabies/ (5404)
- 60 Reye Syndrome/ (1653)
- 61 exp Rubella/ (6201)
- 62 Severe Acute Respiratory Syndrome/ (2644)
- 63 Smallpox/ (3535)
- 64 invasive streptococcus pneumoniae infection.mp. (10)
- 65 invasive.mp. [mp=title, original title, abstract, name of substance word, subject heading word] (96982)
- 66 exp Pneumococcal Infections/ (10820)
- 67 65 and 66 (863)
- 68 64 or 67 (863)
- 69 exp Syphilis/ (11663)
- 70 Tetanus/ (5065)
- 71 transfusion transmitted infections.mp. (79)
- 72 transfusion transmitted infection.mp. (50)
- 73 infection\$.mp. (814616)
- 74 Blood-Borne Pathogens/ (1595)
- 75 exp communicable diseases/ (10237)
- 76 73 or 74 or 75 (822003)
- 77 Blood Transfusion/ (37087)
- 78 76 and 77 (5991)
- 79 71 or 72 (123)
- 80 78 or 79 (6036)
- 81 exp tuberculosis/ (81543)
- 82 Tularemia/ (1360)
- 83 Typhoid Fever/ (5205)
- 84 Paratyphoid Fever/ (944)
- 85 sexually transmitted diseases/ or sexually transmitted diseases, bacterial/ or chancroid/ or exp chlamydia infections/ or gonorrhea/ or granuloma inguinale/ or syphilis/ (37877)
- 86 water supply/ or water purification/ (20987)
- 87 (disease\$ or infection\$ or parasit\$.mp. [mp=title, original title, abstract, name of substance word, subject heading word] (3197892)
- 88 86 and 87 (3800)
- 89 West Nile Fever/ (1301)
- 90 Yellow Fever/ (1389)
- 91 or/1-17,20-26,31-42,49-50,56-63,68-70,80-85,88-90 (614922)
- 92 Campylobacter Infections/ (4405)
- 93 Salmonella Infections/ (7281)
- 94 Dysentery, Bacillary/ (4792)
- 95 exp yersinia infections/ (5446)
- 96 exp Virus Diseases/ (458372)
- 97 diarrhea/ (27292)
- 98 96 and 97 (3737)
- 99 exp Amebiasis/ (7254)
- 100 cerebrospinal fluid infections.mp. (4)

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- 101 (cerebrospinal fluid adj5 infection\$.mp. [mp=title, original title, abstract, name of substance word, subject heading word] (692)
- 102 exp Central Nervous System Infections/ (82561)
- 103 or/100-102 (82983)
- 104 chlamydia infections/ or conjunctivitis, inclusion/ or lymphogranuloma venereum/ or trachoma/ or chlamydochila infections/ or ornithosis/ (13782)
- 105 Herpes Genitalis/ (2950)
- 106 orthomyxoviridae infections/ or influenza, avian/ or influenza/ (30699)
- 107 legionellosis/ or legionnaires' disease/ (3660)
- 108 leptospirosis/ or weil disease/ (4022)
- 109 listeria infections/ or meningitis, listeria/ (4795)
- 110 exp Malaria/ (29550)
- 111 Q Fever/ (2087)
- 112 rickettsiaceae infections/ or pneumonia, rickettsial/ or rickettsia infections/ or boutonneuse fever/ or rocky mountain spotted fever/ or typhus, endemic flea-borne/ or typhus, epidemic louse-borne/ or scrub typhus/ (4526)
- 113 or/92-95,98-99,103-112 (203661)
- 114 exp Communicable Diseases/ (10237)
- 115 91 or 113 or 114 (730520)
- 116 health promotion/ or healthy people programs/ (26291)
- 117 health education/ or health fairs/ or patient education/ or sex education/ (85405)
- 118 or/116-117 (107388)
- 119 "patient acceptance of health care"/ or patient compliance/ or patient participation/ or patient satisfaction/ or treatment refusal/ (84697)
- 120 health behavior/ or patient compliance/ or self-examination/ or treatment refusal/ (48234)
- 121 attitude to health/ or health knowledge, attitudes, practice/ (70644)
- 122 (health seek\$ adj10 behavior?r\$.ti,ab. (391)
- 123 or/119-122 (157303)
- 124 communit\$.mp. [mp=title, original title, abstract, name of substance word, subject heading word] (189887)
- 125 exp Health Promotion/ (26291)
- 126 Public Health/ (31471)
- 127 (population adj5 health).mp. [mp=title, original title, abstract, name of substance word, subject heading word] (10125)
- 128 or/124-127 (245872)
- 129 (cultur\$ adj3 value\$.mp. [mp=title, original title, abstract, name of substance word, subject heading word] (1803)
- 130 Health Services Accessibility/ (23951)
- 131 (health adj5 determinant\$.mp. [mp=title, original title, abstract, name of substance word, subject heading word] (1750)
- 132 partnership\$.mp. [mp=title, original title, abstract, name of substance word, subject heading word] (8916)
- 133 social network\$.mp. [mp=title, original title, abstract, name of substance word, subject heading word] (2400)
- 134 participation.mp. [mp=title, original title, abstract, name of substance word, subject heading word] (63457)
- 135 community networks/ (2212)
- 136 capacity building.mp. [mp=title, original title, abstract, name of substance word, subject heading word] (342)
- 137 or/129-136 (101699)
- 138 health promotion.mp. adj20 (evaluation studies/ or program evaluation/) [mp=title, original title, abstract, name of substance word, subject heading word] (0)
- 139 (Health promotion adj20 (preventive or preventative or prevention)).mp. [mp=title, original title, abstract, name of substance word, subject heading word] (2977)
- 140 (health promotion adj3 program\$.mp. [mp=title, original title, abstract, name of substance word, subject heading word] (1476)
- 141 (health promotion adj3 service\$.mp. [mp=title, original title, abstract, name of substance word, subject heading word] (204)
- 142 health promotion intervention\$.mp. [mp=title, original title, abstract, name of substance word, subject heading word] (273)

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- 143 health promotion network\$.mp. [mp=title, original title, abstract, name of substance word, subject heading word] (4)
- 144 (health promotion adj3 communication).mp. [mp=title, original title, abstract, name of substance word, subject heading word] (22)
- 145 (Health promotion adj3 (collaboration or collaborative)).mp. [mp=title, original title, abstract, name of substance word, subject heading word] (31)
- 146 consumer organizations/ or health planning organizations/ or health care coalitions/ or health planning councils/ (3894)
- 147 Preventive Health Services/ (7327)
- 148 Social Problems/pc [Prevention & Control] (141)
- 149 Holistic Health/ (4580)
- 150 preventive health service\$.ti,ab. (269)
- 151 preventive health care.ti,ab. (729)
- 152 (communit\$ adj5 (mobili#ation or action or development)).mp. [mp=title, original title, abstract, name of substance word, subject heading word] (2978)
- 153 Community Health Planning/ (2828)
- 154 secondary prevention.mp. (5679)
- 155 primary prevention/ (8043)
- 156 or/138-155 (37860)
- 157 115 and 156 (2906)
- 158 115 and 128 (22151)
- 159 115 and 128 and 137 (1474)
- 160 limit 159 to humans (1424)
- 161 limit 160 to "review articles" (187)
- 162 limit 160 to "ebm reviews" (6)
- 163 161 or 162 (192)
- 164 limit 163 to yr="1998 - 2006" (128)
- 165 limit 164 to english language (120)
- 166 115 and 128 and 156 (907)
- 167 limit 166 to humans (887)
- 168 limit 167 to "review articles" (174)
- 169 limit 167 to "ebm reviews" (6)
- 170 168 or 169 (178)
- 171 limit 170 to yr="1998 - 2006" (122)
- 172 limit 171 to english language (115)
- 173 165 or 172 (214)