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HEALTH LITERACY INTERVENTIONS

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OVERVIEW OF HEALTH LITERACY INTERVENTIONS

Health literacy refers to a person's capacity to find, understand and use basic health information and services needed to make appropriate health decisions. A guide to health literacy produced by the US Department of Health and Human Services suggests the following broad strategies to address health literacy barriers in the health system:¹

1. Improving usability of health services
 - Improve usability of health forms and instructions
 - Improve accessibility of the physical environment (universal symbols and clear signage, promote easy flow through health care facilities, train staff to create and maintain a respectful and shame-free environment)
 - Establish a patient navigator program
2. Build knowledge to improve health decision-making
3. Improve access to accurate and appropriate health information
 - Create mechanisms for sharing and distributing plain language materials among health professionals
 - Work with the media by increasing media's awareness of health literacy and making scientific and medical information easier to understand
 - Develop new methods for information dissemination (e.g., personal electronic devices and talking kiosks) message channels should fit with communication objectives

There is some evidence of these types of health literacy interventions in practice, but few have been rigorously evaluated. In 2004, Pignone and colleagues carried out a systematic review of health literacy interventions that targeted individuals in the health system.² They reviewed interventions designed to improve health outcomes for people with low literacy skills.

In general, interventions used one or more of the following approaches: developing plain language brochure, using videotape, computerized tool, or oral presentation for education purposes. Because too few studies examined each type of intervention, it was difficult to make any conclusions about what might be the most effective.

Most studies examined the effect of interventions on health knowledge or behaviours. No research examined how interventions affect the general health status of people with low literacy or whether they affect health care costs or health disparities based on race, ethnicity, culture, or age.

The studies reviewed found mixed results because of the small number of studies on each type of intervention. Furthermore, the approach of the study meant that interventions that did not measure literacy directly were not included. With respect to chronic disease prevention and management, this eliminates a huge number of interventions and promising practices that aim to overcome barriers experienced by high risk groups, many of whom likely experience literacy barriers.

The review was also limited because it did not include population health or health promotion interventions, of particular interest with respect to chronic disease prevention. Nutbeam talks about the need for public health to emphasize personal forms of communication and community-based educational outreach.³ He suggests that the educational content needs to better equip people to overcome structural barriers to health.

The role of public health in helping people understand how to improve their quality of life has also been raised. Rima Rudd, a leading researcher in health literacy summarizes the importance of looking beyond health care to support healthy living and prevent health problems:⁴

For example, adults who have accessed care and successfully developed the needed skills to follow the complicated regimen to manage asthma may still face difficulties with asthma triggers beyond their control. Living in a multi-family dwelling with exposure to cigarette smoke, dust, mould, mildew or roaches, living in a neighbourhood with heavy traffic or idling buses; and working with a variety of chemicals all have asthma-related consequences. Becoming aware of new findings, gathering information, participating in tenants associations and involvement in community action groups require skills related to research, discussion, analysis, decision-making and action. Thus, as we explore this area and define needed skills, we must be sure to move beyond the realm of medical care and include action taken at home, at work, in the community and in the policy arena.

A limited number of studies have examined the impact of low health literacy on primary prevention efforts targeting common risk factors for chronic disease such as unhealthy weights/eating, physical inactivity and high blood pressure. Most studies have been in the area of cancer screening interventions. Another area of research has examined chronic disease management efforts in primary care settings, especially for diabetes.

The next three sections of this report summarizes the research on health literacy interventions and describes some promising practices in Canada, including some which do not specifically measure literacy or health literacy, but address health literacy barriers.

INTERVENTIONS TO IMPROVE THE HEALTH LITERACY SKILLS OF INDIVIDUALS

Gazmararian provides a useful way to consider how health education, health communications and health literacy interventions are related:

Public health disseminates its messages as grounded in the theories and principles of health education (e.g., what the message says) or health communication (e.g., how the message is delivered), rather than considering the health literacy of the intended audience (e.g., whether the message is accessed and understood).⁵

Gazmararian also points out that: "the practice of shaping public health messages to make them more accessible to those with low health literacy, while essential, may ultimately address only the 'side effects' of low health literacy without addressing the underlying problem. The IOM report on health literacy outlines the research and best practice findings in education, health services and sociocultural factors, all of which influence health literacy. An ethical approach to remediating low health literacy would be to train, educate, and empower people, giving them the skills and abilities they need for functional health literacy."

Health Communication Tools and Information for Consumers

Providing health communication tools is one approach to improving health literacy skills of individuals. There are examples of broad-based web campaigns and community-based tool development. Some tools focus on the health care setting, aimed at improving the quality of the patient's interaction when going to the doctor, clinic or hospital. Others focus on providing accessible health information or tools to promote healthy living and self-care.

The Ask Me 3 campaign in the United States is a Website helping consumers prepare for a productive encounter with a health care provider.⁶ The Website provides three important questions that serve as a guide for the consumer when they visit the doctor, clinic or hospital. The Website also links to resources for plain language health information and suggests ways the consumer can prepare for the encounter.

Similar tools have been prepared in Canada, such as the "Going to the Doctor" resource prepared by Yukon Learn and the "It's Your Health" resource prepared through the Nova Scotia Heart Health Partnership.^{7,8} Plain language health information on a variety of health topics has been developed, including those that relate to chronic disease prevention. However, this information has not been disseminated broadly in literacy or health networks to reach consumers with limited literacy or to support health providers and literacy practitioners. In Alberta, workshops have been held with adults with limited literacy to develop skills, such as improving understanding of medication instructions.⁹

Other Websites have been developed to provide plain language health information to low literacy consumers, health providers and literacy practitioners. The California Health Literacy¹⁰ Website and the LINCS Health and Literacy Special collection¹¹ include plain language health resources.

This review did not identify information about the effectiveness of these interventions to improve health literacy or other health outcomes, although adult learners have identified these types of resources as helpful through consultations.

With respect to public health messages, lessons can be learned from the approach taken by the US Office on Smoking and Health. A structured approach was developed for creating and testing material at a level that could be understood by low literacy and aging audiences, but was still appropriate for the general public.¹² The methodology included visual design standards, reading measurements, and assessment of draft material, cultural appropriateness and message clarity. Reviews included ESL specialists, minorities, youth and older smokers and non-smokers.

The publication received national and international awards and has been put forward as offering valuable lessons-learned that are useful to a broad public health audience on issues of low literacy populations and the impact on health message assimilation. After publication participatory research interviews after 3 months and 1 year assessed effectiveness in communication key ideas and influencing perspectives on health consequences.

There have been tools developed which aim to improve nutrition and healthy eating practices of the Canadian population. The Thought for Food Project of Human Resources and Skills Development Canada found that individuals and groups that most needed information about food and nutrition have limited access to this health information.¹³

Health Canada revised the Canada Food and Physical Activity Guide and re-designed nutrition labels on food products to make them easier to use for consumers.¹⁴ A partnership

of Health Canada, NGOs, consumer and food producers developed a nutrition education strategy, *Healthy Eating is in Store for You*, to support healthy eating through education about food labelling.¹⁵

Partnerships have been important factors in resource development. The nutrition labelling project involved literacy experts in the development process and testing with adult learners. Through a partnership with the Canadian Diabetes Association and Dietitians of Canada, a tool kit was developed to assist with disseminating the products, including adapted resources for use with Inuit populations in the North and First Nations communities.

This tool kit included the development of picture-based nutrition fact sheets that incorporate traditional “country” foods and cooking practices. These tools are being used by community health representatives, and other community-based health workers in conjunction with healthy living and nutrition programs such as pre-natal nutrition and community kitchens. Similar picture-based resources have been developed for tobacco prevention messages.

Non-governmental organizations promoting healthy living and risk reduction have used other strategies. These include interactive, web-based tools that allow consumers to self-assess disease risk factors or analyze lifestyle choices (e.g., virtual shopping cart) and telephone information services (e.g., Dial-a-Dietitian) that provide an alternative to print-based information.¹⁶ Easy-to-recognize labelling of food products or menu items (e.g., Health Check¹⁷ label) are examples of other tools in place to help consumers make healthy food choices.

No specific information was found with respect to the effectiveness of these tools in reaching groups with low health literacy.

The BC HealthGuide program represents a major population-based health intervention to improve self-care through providing better access to health information and resources.¹⁸ The program includes a plain language guide to health information about health promotion, prevention and management of common health problems, a nurse info-line and web-based information about health and available resources.

Evaluation of the BC HealthGuide Program indicates that program awareness and satisfaction are high. The written information may improve patient confidence and ability to engage providers in health discussions. The nurse info-line can help patients describe their health condition during a physician visit.

However, there is lower use of all program components by youth, seniors, people living on low income and non-English speakers. High rates of low health literacy are common in the latter three sub-groups.

The evaluation suggests that low use groups, such as seniors, may find program components helpful to complement integrated approaches, such as through disease management or wellness support programs. This is consistent with other findings, which suggests that face-to-face interaction is an important element in supporting self-care, especially for groups with health literacy barriers. Callers from low income households were somewhat less satisfied with the nurse-line service which may relate to ability to understand and use health information.

There has been additional research into the effectiveness of the program in reaching members of the Farsi-speaking population.¹⁹ A successful intervention using video²⁰ and translated materials and community outreach increased utilization; however, a number of

barriers to access to health services were identified. This project provides insight into strategies to increase access to sub-groups that may experience health literacy barriers.

Further study is needed to understand the reasons the BC HealthGuide is underused by these sub-groups, and to assess its potential as an effective intervention to improve self-care for individuals with health literacy barriers.

It is difficult to draw conclusions from the available information about the effectiveness of these approaches with respect to improving health literacy. These examples represent promising practices that require further study, although their ability to reach sub-groups with health literacy barriers is unclear. Opportunities for piloting tools with adults with limited literacy and conducting participatory evaluation will be valuable in building knowledge about effectiveness.

Improving Health Literacy Skills through Adult Education

Health literacy has been integrated into the adult basic education curriculum in some US states, and is currently being incorporated into curriculum in Nova Scotia.^{21,22,23} The current trend is to move away from a focus on health content towards the literacy skills needed for health-related action.²⁴

These skills are critical for adults to prevent and manage chronic disease, listen to recommendations, and make health-related decisions. This approach moves away from a focus on the medical care setting and a focus on disease to a more public health focus with attention to maintaining health at home and in the community.

Rima Rudd, a leading health literacy expert, notes that “by focusing health literacy programs on enhancing skills and capacities that are relevant for multiple domains of adult learners lives, adult educators may be able to meet the challenges.” The goal is to identify and improve transferable functional literacy skills, which are critical to maintaining health and accessing care.

This skills-based approach to health literacy focuses on the reading, writing, math, and communication skills that adults need to carry out the wide range of skills needed to manage their health. The health content is limited, although it can be expanded by having, for example, a medical partner or resource person come into the classroom. With this approach, the literacy instructor focuses on the literacy, language, and math skills that students need to carry out health-related tasks.

Literacy practitioners have a long history of incorporating health into their teaching. To strengthen current practice, a learning model is currently being piloted and evaluated in the US through the use of Health Literacy Study Circles. Adult education instructors work with students in the classroom using facilitator guides published by the National Center for the Study of Adult Learning and Literacy (NCSALL).²⁵ These guides are designed to provide teachers with structured opportunities to explore health care access and navigation, chronic disease management, disease prevention and screening with adults with lower literacy levels.

Health Providers Partnering with Adult Education, Literacy and ESL

Community partnerships between health and literacy sectors have been identified as important strategies to improve low health literacy, especially for adults with low education and immigrants enrolled in ESL courses. The learning environment has been identified as an important setting for disease prevention, health promotion and empowerment.

The thousands of adult education classrooms throughout the country offer an impressive platform for reaching adults with significant health problems and poor access to health services. It would be hard to imagine a better scenario for health promotion and disease prevention: adults routinely make time in their schedule to come together in small groups once or twice a week over the course of many months, if not years, in a supportive, community-based environment. Health care providers should be beating down the doors of adult education programs to gain access to these programs.²⁶

There are a number of ways the adult education system can assist health care providers:

- building trust and access to adult learners and their families
- providing better insight into how adults learn and into how to communicate effectively with individuals from other cultures
- teaching strategies for rapidly assessing whether patients have understood, and can make appropriate use of written and oral communications
- suggesting how to break down complicated tasks and ambitious learning objectives into smaller, more realistic learning goals and then how to help adults recognize and build upon their incremental progress.

Some important principles of adult education and learning are included in patient-centred systems for chronic disease management, such as: authentic assessment, individualized goal-setting, skills-based curricula, participatory learning strategies, availability of progressively more advanced instruction, linkages to important non-literacy resources.

World Education in the US recently evaluated its Health Education and Adult Literacy: Breast and Cervical Cancer (HEAL:BCC) project. This is a health literacy initiative that disseminates information about breast and cervical cancer early detection and screening through adult basic education (ABE) and English for speakers of other languages (EOSL) programs. Results from the evaluation show that introducing health content into adult education programs improves screening knowledge, attitudes and behaviours.²⁷

The curriculum developed through the program aims to meet health information needs and literacy goals of ABE learners. It includes activities to improve reading, writing, and oral presentation skills. In addition to curriculum materials and training, the curriculum provides technical assistance and support, linkages to local breast and cervical cancer screening programs and a final project event.

The Manitoba Cervical Cancer Screening Program provides a Canadian example of promising practices that draws from established health promotion principles and guidelines for working effectively with people with low health literacy.²⁸ To increase cervical cancer screening in women living in Winnipeg Inner City the Manitoba Cervical Cancer Screening Program (MCCSP) partnered in creative ways. MCCSP partnered with seven Inner City Clinics to provide a one day, drop-in Pap Clinic.

The clinics agreed to open their doors to under-serviced women residing in the inner city and to provide Pap test and follow-up treatment or referral according to the Pap test results

for every woman who attended that day. Of the women screened at this one day clinic, 75% had not had a Pap test for over 3 years. Intervention strategies included:

- involving stakeholders in developing plain language content and design for a promotional poster (inner city health care and non health care agencies, inner city women of various ages and ethnic backgrounds and a low literacy consultant)
- using photographs of women living or working in the inner city in the final graphic design
- promoting the screening day through forging creative partnerships with English as Second Language classes (ESL) and literacy programs
- using a plain language article about pap tests and the poster as a teaching tool in the classroom setting
- distributing the poster and the article through the local school board to all elementary students' homes in the area, food banks, public health nurses, occupational health nurses in the area and by church groups
- displaying the poster in local businesses, missions, women's shelters etc and using it in a bus shelter ad campaign in the inner city.

Other multi-cultural outreach efforts are underway to address barriers related to culture, access, transportation and language. These efforts include working with community advisory committees, training facilitators from within cultural communities to carry out outreach, coordinating group trips for Pap tests and breast cancer screening, and translating needed resources.

Other promising practices that integrate literacy and health promotion have the goal of empowering participants to take better control of their health. In the US, a participatory, peer-education model of health promotion for adults with literacy barriers has been evaluated and found effective at increasing health knowledge and health literacy skills.²⁹ This program trains student leaders to identify health topics and provide health information to other students at a learning centre for immigrants. Participatory learning methods such as role play and story-telling are used, and health providers are involved as external resources to the learner groups.

In Canada, a 36-week project was initiated by the Heart Health Partnership to examine the link between literacy levels and health promotion.³⁰ Seven learning networks in the western region of Nova Scotia participated in the full phases of the Heart Health Nova Scotia program to build organizational capacity for health promotion and chronic disease prevention; more specifically, it was intended to enable people to increase control over their health and the conditions that determine their health.

Four case studies were conducted of adult learners whose low literacy skills presented many challenges to them, particularly in the area of health promotion. Following the project, each learner felt that they had learned a great deal about the health issue they had researched. Results indicate that learning networks can promote and encourage the use of health promotion projects as a means of improving literacy skills and increasing good health among learners.

Another community-based, participatory project worked with low income women with low literacy to improve health-related outcomes.³¹ This participatory education program combined literacy development with health promotion. After two 12-week sessions, the women made a continuing attempt to change their lifestyles, especially in terms of diet and exercise. They increased their ability to seek out health information, access health services and critically weigh health advice from all sources of information. The study concluded that

the social network and the support provided by the intervention were key factors in encouraging women with low literacy to make health-related changes in their lifestyle.³²

Working with Families

Programs in the fields of literacy and public health are working with low income families with young children. These parents represent a sub-group with higher rates of low literacy. Comprehensive program strategies take health literacy barriers into account and aim to provide skills and practical support to improve access to services, nutrition and other health-promoting practices.

There is evidence that integrated promotion and prevention services for families at-risk can improve health outcomes. For example, the program *Naître égaux - grandir en santé* includes a perinatal program and an early childhood education program for women living in poverty, either under 20 years of age, with low education or who are immigrants. The program includes home visits by public health nurses and guiding women towards resources.

The program was successful at reaching the targeted groups of women, in improving nutrition during pregnancy, reducing stress, and improving access to other supports. The program was not successful in reducing the rate of low birth weight, smoking, drug or alcohol consumption. This intervention strategy appears to have good potential to reach women with low health literacy, to improve access to available health-enhancing supports and to improve nutrition.³³

Such integrated early intervention programs provide useful channels to reduce risk factors for chronic disease by addressing the determinants of health. For example, the Aboriginal Head Start program is designed to prepare young First Nations children for their school years, by meeting their emotional, social, health, nutritional and psychological needs. These initiatives encourage projects that address: culture and language, education, health promotion, nutrition, social support and parental involvement.

Within the literacy field, family literacy programs are in place across Canada.³⁴ These family-centred programs help parents understand their child's development, including learning, play and nutrition. They may also use trained peer support workers from within cultural communities and aim to address the impact of poverty on parents and young children. Partners in family literacy programs include public health pre-natal nutrition, literacy and community programs.

Health literacy has not been specifically measured in program evaluations; however, built into these comprehensive programs are strategies to improve the capacity of parents to find, understand and use health information to take charge of their own and their family's health. As such, they are examples of promising approaches to improve health literacy where barriers exist.

INTERVENTIONS TO BUILD KNOWLEDGE AND SKILLS OF HEALTH PROVIDERS

This section focuses on interventions that specifically address chronic disease prevention and management, including models of primary health care delivery, program development and organizational and public policy.

Building the health literacy skills of individuals is one approach to close the gap between individual capacity and the demands of the health system. Professionals in public health and health care do not have the skills or mechanisms to improve the literacy skills of their community population or of their patients. They can, however, work to improve their own communication skills, the procedures followed for communicating with and interacting with people, and the forms and materials they write.

While patients with poor functional health literacy have difficulties reading and understanding written medical instructions, there has been limited research into the problems experienced with other modes of communication, such as face-to-face encounters with primary care physicians. A recent study of patients with Type 2 diabetes assessed their experiences of communication with their physician.³⁵ Patients with inadequate health literacy were more likely to report worse communication in terms of general clarity, explanation of condition, and explanation of processes of care.

Poor functional health literacy appears to be a marker for oral communication problems. This highlights the need for strategies to improve communication for this group of patients. These strategies would aim to promote better interaction and to examine how physicians can help patients understand and safely ask questions to get the information needed. This group typically includes members of ethnocultural groups, the elderly, and those of lower socioeconomic status. These strategies may help reduce health inequities for people living with chronic disease.

There has been research that demonstrates low awareness among health professionals of the presence of low health literacy in their client populations. Only 25% of residents raised low health literacy as a possible reason for hospital readmission when reviewing a case study that included clues to this barrier.³⁶ Only 16% suggested using a strategy recommended for low-literate adults as part of patient education. Another study found that pharmacies infrequently attempt to identify and assist clients with limited literacy skills.³⁷

A common method used to ensure patient understanding is a method for checking patient recall and understanding. In a public hospital in the US, only 20% of primary care physicians assessed recall and comprehension of new concepts among diabetic patients with low health literacy.³⁸ Patients with better blood sugar control had higher health literacy and had physicians who assessed recall and understanding. The study illustrates that physicians in this practice setting made minimal use of best practice communication techniques in their patient education. It also supports the concept that effective communication skills can improve health outcomes.

One study found that physicians who were alerted to limited health literacy of their patient with Type 2 diabetes were more likely to use helpful strategies for communication and patient education.³⁹ Strategies used by physicians included:

- involving patients family members or friends
- referring to a diabetes educator
- referring to a nutritionist
- using pictures or diagrams
- reviewing understanding of medications.

Physicians were responsive to receiving notification of their patients' health literacy barriers; however, they did not openly acknowledge communication barriers. This inhibits mutual problem-solving with patients, is unlikely to improve outcomes, and may partially explain negative patient outcomes. As a result, the need for specific training and/or system-wide support for physicians and patients was identified as necessary to improving diabetes outcomes.

A recent review of the role of health literacy in patient-physician communication also clearly indicates the need to educate medical students and physicians to improve communication.⁴⁰ The authors suggest that research is needed on the effects of poor health literacy on patients' ability to communicate their history and physicians' ability to solicit information. In addition, research is needed to identify the most effective techniques to educate patients.

The Institute of Medicine expert committee on health literacy considered improving provider communication skills to be an important component of system change to address health literacy. The IOM panel recommended developing best practice guidelines, including that providers have adequate time for educating patients, and ensuring that providers have adequate personal communication and patient education skills.⁴¹

In Canada, little information is available about the knowledge and skills of health professionals to address health literacy barriers or interventions in place to address the issue. An environmental scan was conducted with a senior staff member in all nine of Nova Scotia's District Health Authorities. The purpose of the scan was to better understand the level of awareness of the connection between literacy and health and the programs and policies currently in place in Nova Scotia. Based on the results of the scan, it was recommended to develop education and training strategies to increase the awareness level of health care executives and health care professionals regarding the link between literacy and health.⁴²

In the US, a comprehensive training program for health professionals has been developed based on a universal approach to improving patient-provider communication. Health Literacy: Help Your Patients Understand was developed through the American Medical Association Foundation.⁴³ This approach to training physicians and other health professionals is currently being applied and evaluated in pilot sites across the United States.

To date, most efforts in Canada have targeted increasing awareness of health professionals of the links between literacy and health and the possible implications for policy, practice and program development. Guides to developing plain language material and using clear communication have been developed and plain language services are available to assist with resource development.⁴⁴

Based on the results of this review, there are no continuing education programs in place to build knowledge and skills of health professional groups in addressing health literacy barriers. However, there have been limited examples of workshops developed to specifically build skills and provide practical techniques that can be employed in practice settings to address literacy barriers. Communication techniques are taught as part of clinical skills courses as part of required health professional curriculum. However, there is no consistent curriculum across institutions or across disciplines. To our knowledge, strategies specifically addressing low literacy are not included, although some programs address language and cultural barriers to communication in clinical skills.

The Centre for Literacy of Quebec has worked with the Faculty of Nursing at McGill University to provide some classroom instruction in health literacy to undergraduate nursing

students. There are efforts underway in Nova Scotia to develop workshops for providers and adults with literacy barriers to promote mutual learning.⁴⁵ Providers will receive direct feedback from adult learners with respect to their communication style and presentation of health and treatment information. Adult learners will gain skills with respect to navigating the health system, preparing for health care encounters, and taking care of their health.

There is general agreement in the literature about guidelines for developing plain language materials and clear communication techniques that are centred on the patient's life context.⁴⁶ This approach encourages asking questions, using common vocabulary and concrete examples, and checking for understanding using the teach-back method. These are simple techniques that can be easily integrated into a standard patient encounter.

To summarize, in Canada, there are limited examples of interventions to improve patient-provider communication to specifically address health literacy barriers. There is a basic need to raise awareness among health professionals of the barriers that low health literacy presents. While there are promising practices developing, there is no system-wide approach to addressing the capacity of health professionals to address health literacy barriers. A review of current approaches to communication in clinical skills training would provide more insight into the gaps in training. Recognizing that many Canadians with chronic disease are among population groups with high rates of low health literacy, this type of training may contribute to improving outcomes for disease management and self-care.

Identifying Clients/Patients with Literacy Barriers

As part of the skill-building required for health professionals, the need for improved methods for recognizing literacy problems in primary care settings has been identified.^{47,48,49,50} The rationale for identifying patients with literacy barriers is to flag the need to adapt communication and to take a patient-centred approach that considers learning styles. Adapting to the needs of the patient has the potential to improve knowledge and skills necessary for self-care in chronic disease prevention and management.

Although research studies use standard instruments to measure health literacy, it is generally accepted that these tools are not suitable for use in clinical practice to identify patients with literacy barriers. There has been some work recently in developing a simple literacy assessment tool for use in primary care practice.

Weiss and colleagues have developed the Newest Vital Sign (NVS) as a quick screening test for primary care practice.⁵¹ The NVS is intended to alert physicians to patients who may need more attention to help physicians focus on patient-provider communication using recommended techniques. The NVS is based on a series of questions to test the patients understanding of a nutrition label. The nutrition label format was chosen because it is a familiar item and because nutrition is an important part of chronic disease management.

Chew et al. developed three screening questions to assist physicians in identifying patients with inadequate or marginal health literacy: "How often do you have someone help you read hospital materials?," "How confident are you filling out medical forms by yourself," "How often do you have problems learning about your medical condition because of difficulty understanding written health information?"⁵² The questions were effective in identifying patients with inadequate literacy, but weaker identifying those with marginal literacy.

Shea et al. have tested shortening the Rapid Assessment of Adult Literacy in Medicine tool to make it more useful for use in family medicine practice.⁵³ They noted that the tool may have language and cultural biases, based on lower scores of African Americans. A short,

reliable, non-stigmatizing tool has been developed for measuring literacy in adults with diabetes (the Literacy Assessment for Diabetes instrument).⁵⁴

A simple checklist was developed through the Health Literacy in Rural Nova Scotia Research Project to help identify patients with literacy barriers in health settings.⁵⁵ The checklist has been provided to health professionals in the Guysborough-Antigonish Health District in conjunction with workshops held to raise awareness about literacy and health and is posted on the Nova Scotia Health Department's Primary Health Care Website for broader dissemination.

Although providers have identified the need for simple tools to help identify patients with literacy barriers, the value of screening patients for low literacy in the first place has been questioned.⁵⁶ A universal approach aimed at improving clear communication and teaching skills would help all patients, and not just those with low literacy. This approach would also promote a shame-free environment that would not stigmatize patients with low literacy.

Also calling into question the approach to screening are the results of studies examining the perspectives of adults with literacy barriers. Study participants indicated that screening for low literacy should be done by sensitive and aware health care workers.⁵⁷ They also expressed discomfort and anxiety in screening simulations. This suggests that any efforts to widely disseminate a screening tool or other aid to identifying patients with low health literacy should be accompanied by appropriate awareness and training of health professionals, including knowledge, skills and tools to address literacy barriers, if identified.

More research is required to better understand the value of identifying patients with health literacy barriers and the effectiveness of various tools to support this in clinical practice settings. However, current knowledge suggests that both a combined "universal precautions" approach and a respectful, informed approach to identifying those with health literacy barriers may best support chronic disease prevention and management efforts.

INTERVENTIONS TO IMPROVE CHRONIC DISEASE PREVENTION AND MANAGEMENT FOR PEOPLE WITH LIMITED HEALTH LITERACY

There are many other factors, both within the health system and outside the health system that impact on both individual and provider efforts in chronic disease prevention and management. These factors include the type of models used in primary health care and public health program development, the policies within health care organizations, and healthy public policies that address the determinants of health.

There is a wealth of research on intervention strategies to prevent chronic disease, to improve management efforts, and to reduce health inequities. However, there is limited information regarding how current practice and policy development addresses low health literacy as a barrier to health and a potential intervention point for improving chronic disease prevention and management.

The majority of the research on health literacy in chronic disease management focuses on diabetes. Most studies addressing secondary prevention efforts are in the area of cancer screening. A limited number of studies have examined the impact of low health literacy on primary prevention efforts targeting common risk factors for chronic disease such as unhealthy weights/eating, physical inactivity and high blood pressure. These three areas are discussed in the following section.

The Example of Chronic Disease Management in Primary Care

Integrated approaches to chronic disease management and the models of care that support them are among the health system factors that impact on health outcomes. They also represent intervention points to address health literacy barriers. The chronic disease management field has already adopted a number of the key principles of health literacy. Health care providers are no longer focused on “educating” patients, but are helping them develop self-efficacy skills and supporting them in the self-management process.

Widely accepted models for chronic disease prevention and management call for proactive, planned, patient-oriented care over the long-term.^{58,59,60,61,62, 63} The Chronic Care Model identifies different intervention points in the health system that can lead to high-quality chronic disease care: the community, the health system, self-management support, delivery system design, decision support and clinical information systems.⁶⁴

This approach has been shown to be effective in improving outcomes for patients with diabetes and heart failure.⁶⁵ In BC, this model has been expanded to include disease prevention and health promotion.⁶⁶ Schillinger has used this model to consider the relationship between health literacy and diabetes outcomes.⁶⁷

Experience gained from the area of diabetes management provides insight into effective models of chronic disease management that address health literacy barriers. Research indicates that low literacy is an important barrier for patients with diabetes. Low literacy is common among patients with diabetes and is associated with poor knowledge about diabetes and difficulties learning the advanced self-care skills needed to improve glycemic (blood sugar) control.^{68,69,70,71,72,73,74} There is still limited understanding of the relationship between low literacy and poor control of blood sugar levels.^{75,76,77}

Rothman studied the impact of limited health literacy on the effectiveness of a comprehensive disease management program for patients with diabetes.^{78,79,80} The study

was a randomized, controlled design. It analyzed how literacy affects control of blood sugar level and blood pressure for patients in a general internal medicine practice in the US.

All communication to patients was individualized and presented in a way to improve understanding for patients with low literacy. Intervention patients received intensive disease management from a multidisciplinary team. Control patients received an initial education session to explain how to self-manage their diabetes and continued with usual care. The education and supports provided to the intervention group are listed in Table 1.

Table 1 - Components of Comprehensive Diabetes Management Program

1. Usual care from their primary care physician
2. Intensive diabetes management from (1) clinical pharmacists trained in outpatient disease management and certified as diabetes educators; (2) a diabetes care coordinator
3. One-to-one educational sessions including counselling and medication management
4. Application of clinical practice guidelines ("treatment algorithms") to help manage glucose and cardiovascular risks by adjusting medication
5. Concrete, tailored care plans to address patient barriers such as transportation, communication and health insurance.
6. Regular telephone contact every 2 to 4 weeks, or more frequently, if required
7. Verbal education with concrete, simplified explanations of critical behaviours and goals, "teach-back" and picture-based materials
8. Main topics revisited throughout the follow-up period, including treatment goals, symptom identification, prevention of long-term complications and self-care.

Rothman et al., JAMA 2004; 292 (14): 1712.¹⁶⁴

Participants in the control group and the intervention group had similar characteristics, including low socioeconomic status and poor control of blood sugar level. More than one third of participants in each group had low literacy (less than Grade 6 level), as measured by the Rapid Estimate of Adult Literacy in Medicine. Participants with low literacy were more likely to be older, be African American, report lower income and educational attainment, and have less diabetes-specific knowledge.

This intensive intervention successfully improved control of blood sugar level. Participants with low literacy that received this intensive education and support program had greater improvement in control of blood sugar level and were more likely to obtain their goal for HbA_{1c} at 12 months. The statistical analysis showed clearly that literacy level has an effect on reaching goal levels of HbA_{1c}.

The study concluded that literacy may be an important factor for predicting who will benefit from an intervention for diabetes management. They found that the comprehensive diabetes management program benefited patients with low literacy to a greater degree than it did patients with higher literacy. They suggest that frequent one-to-one contact and attention to the needs of patients with low literacy may have helped the patients overcome barriers and fully participate in their diabetes management. A diabetes management program that addresses literacy may increase access and help reduce health disparities.

Key elements of self-management support and multidisciplinary team approach are being adopted through primary health care transition projects across Canada. The complement of health professionals varies, including physicians, nurses, nurse practitioners, dietitians,

pharmacists, health educators, social workers and health promoters. However, it is unclear if these models include other elements of the Rothman model which specifically address literacy barriers.

Although the results of the Rothman clinical trial are encouraging with respect to overcoming health literacy barriers, there is more information needed to understand which components of the program were the most beneficial. The simple explanation of “more time and attention” is not sufficient to explain the differences observed. There was no difference in frequency of visits/treatment actions, time spent with patients or number of medications added between those with high or low literacy levels in the intervention group.

There is other evidence that intensive diabetes education may improve health outcomes for patients with prolonged self-management difficulties.⁸¹ In addition to the factors examined by Rothman, patient empowerment may be a factor that contributes to improvements in health-related quality of life. Empowerment has been examined in terms of a patient’s perceived control and coping strategies to self-manage their diabetes.

There is some evidence that determinants of empowerment should be considered in diabetes education and other chronic conditions. This is based on the fact that improvements in knowledge alone do not result in long-term self-management changes.

Although not specifically targeting diabetes management, another project identified empowerment as an important component in health literacy interventions. The Health Enhancement of the Rural Elderly (HERE) project in Kentucky was designed to improve the health literacy of rural elderly living in two counties identified as rural and poor.⁸² Educational modules were developed, tested and refined to address areas identified in a needs assessment: medications, medical terminology, basic anatomy and physiology, orientation to medical forms, and communication skills.

The study found that before the intervention, participants tended to take a fairly passive role in their health care and most were embarrassed to ask health-related questions and intimidated by the health-care system. Many reported being confused by medical terminology, health insurance forms and prescription instructions. Six months after the intervention, participants had experienced positive changes on several health-related practices. The authors suggest that improving health literacy has the potential to empower rural elderly to become more active participants in their health care, with the potential to improve health outcomes.

An empowerment approach to diabetes management has emerged from community health centres (CHCs). CHCs have been effective in serving vulnerable populations who are likely to have high rates of low literacy. They have developed programs to improve chronic disease prevention and management for the populations they serve and operate using a patient-centred model and multidisciplinary team approach.

In Ontario, community health centres (CHC) have linked a network of local sites and partners including CHCs, community resource centres and local hospitals to provide community-based education programs for patients newly diagnosed with Type 2 diabetes.⁸³ Participants in the education program significantly improved their knowledge of who to call for help, how to treat a low blood glucose reaction and other important self-management techniques. The learning and practice provided by this model puts patients in a better position to get appropriate treatment quickly, improving outcomes and reducing health care costs.

Some ethnocultural communities in Canada have higher prevalence of risk factors for and incidence of Type 2 diabetes. Furthermore, language and culture can present significant health literacy barriers that affect chronic disease prevention and management. In response, community partnerships have evolved through various models to meet the needs of high-risk ethnocultural groups.

For example, the Calgary Health Region developed a culturally sensitive, community-driven diabetes screening and awareness program held in conjunction with religious gatherings in temples and mosques.⁸⁴ Trained community volunteers and nurses performed the screenings in Punjabi, Gujarati, Hindi and English languages.

A similar and more comprehensive approach originated through a Community Health Centre program model in London, Ontario. The program actively engaged the Latin American community in screening, disease management and prevention efforts.⁸⁵ The model included screening sessions in a community setting, and on-site interactive diabetes prevention education designed and delivered in partnership with community members in Spanish.

Where diabetes or pre-diabetes was detected, individual goal-setting was conducted, including problem-solving for barriers and linking with resources to address other determinants (income, food security, employment, social supports, stress). There were improvements in management of blood glucose level and reduction in risk factors for diabetes complications. The program evolved to include a prevention program targeting children and their families, promoting physical activity and healthy eating. It included systemic advocacy to facilitate access to recreation programs and affordable, healthy foods. Significant increases in fitness and decreases in body mass index have been documented.

This model was disseminated across Canada and adapted for other ethnocultural communities.⁸⁶ The community development process outlined in the primary prevention model is a promising practice that may be applied not only to ethnocultural groups, but to other vulnerable populations, particularly populations with low socioeconomic status and/or high rates of low health literacy. For example, it is currently being successfully adapted for use with mental health consumers.

While health literacy is not measured in this intervention, it targets the basic elements of health literacy, by aiming to help people find, understand and use health information and services to take care of their health, and has important implications for chronic disease prevention and management.

To summarize, some models for integrated chronic disease management share common principles for improving health literacy by helping individuals to develop self-efficacy skills and supporting them in the self-management process. Intervention approaches appear to require a comprehensive patient-centred approach, collaborative goal-setting and problem-solving, clear communication techniques and plain language materials, patient education strategies that include demonstrations and practice, regular contact to reinforce learning, provide reminders and answer questions, and practical supports to overcome other barriers. Models that aim to empower individuals to take charge of their health, that target vulnerable populations and that provide supports for other determinants (e.g., access to income, food, employment, counselling) may serve low literacy populations with language, culture or socioeconomic barriers.

Secondary Prevention – The Example of Cancer Screening

Possessing health-related knowledge and skills is necessary but not sufficient for engaging in healthy behaviours. Many factors beyond knowledge affect behaviours, including stage of change, attitudes and motivation. These factors have been examined in terms of both primary and secondary prevention. Most of the related health literacy research is in the area of cancer screening.

A review was conducted in 2002 of health literacy and cancer communication.⁸⁷ The authors note that effective cancer communication is a clinical and public health priority in order to enhance prevention, early detection and treatment of cancer. Health literacy is an often overlooked problem in all areas of cancer communication.⁸⁸ Low literacy has also been shown to impact a person's ability to access written cancer screening materials, to benefit from instruction during the clinical encounter and to access preventive screening.

An individual's health literacy may predict higher cancer risk or lower rates of participation in cancer screening programs.⁸⁹ Women with low health literacy have been found to be less likely to have had a mammogram or Pap smear.⁹⁰ The role of low health literacy may be an especially important factor because low literacy correlates with both low socioeconomic status and older age. There is evidence that adults in these groups are less likely to be screened for cancer, are more likely to present with late-stage cancer and are more likely to die as a result of cancer.⁹¹

In Canada, "hard-to-reach" groups for breast and cervical cancer screening have been identified. These groups are difficult to reach with health promotion messages targeting the general population. Groups more likely to never have had a mammogram or Pap test include immigrant women, elderly women, women of low socioeconomic status and Aboriginal women.^{92,93,94,95} Members of visible minorities were less likely than white people to have had a prostate screening test, mammogram or Pap test based on analysis of the 2001 Canadian Community Health Survey.⁹⁶ These groups have all been found to have higher rates of low health literacy.⁹⁷

Individuals with limited health literacy obtain less information from cancer control messages, materials and conversations.³ A number of factors have been identified that may explain this relationship.

The language used in written and verbal information is one factor. A study of inadequate health literacy in colorectal cancer screening found that patients with low health literacy struggled to understand information with new vocabulary and concepts, such as the term "screening," anatomical terms such as "colon" and diagnostic terms such as "tumour," "lesion" and "cure."⁹⁸ Older women who participated in focus groups about cancer screening materials did not understand such words as "cervix," "hysterectomy," or "menopause."⁹⁹ Patients and providers have difficulty finding lay terms to describe screening tests and treatment.

In addition to vocabulary, individuals with low health literacy may have difficulty understanding the concept of screening and its benefits. Low health literacy has been linked to late-stage presentation of prostate cancer.¹⁰⁰ It has also been linked to negative attitudes about screening, including fear of embarrassment, harm or pain and a perception that not much can be done about cancer^{101,102,103,104} and with misconceptions about cancer treatment.¹⁰⁵

Research on health literacy interventions and cancer prevention has focused on understanding knowledge, attitudes and behaviours towards cancer and cancer screening, and on readability of information sources, and on accessibility of screening programs. There are key findings that suggest access to vulnerable groups may be improved by improving health literacy.

Source of information is one factor that may explain knowledge and attitudes to cancer prevention and treatment. Low income women with low literacy indicated being interested in more information about mammography and breast cancer control.¹⁰⁶ However, they indicated that they would tend not to ask nurses or physicians about these topics. Instead, they relied heavily on the advice of family and friends and on television messages. Television messages seemed to raise awareness, but did not seem successful in changing attitudes or screening behaviours.

Low health literacy presents a barrier to accessing cancer prevention information. The majority of printed cancer information is written at readability levels of high school or higher and may be difficult to understand for people searching for medical information.^{107,108} A recent study assessed the readability level of popular Websites on breast, colon, and prostate cancers.¹⁰⁹ This study concluded that readability of cancer information on the Internet is at a college level. The authors note that individuals with basic literacy skills must be considered when posting cancer information on the Internet. Otherwise this information will remain inaccessible to a segment of the population who is at risk for cancer.

Even though some plain language cancer materials have been developed that target vulnerable groups, there is still much need for improvement¹¹⁰ and more research is needed to understand Internet use among low literacy groups.¹¹¹ A Canadian study found that cancer prevention information is not written at a level appropriate to the literacy abilities of older adults, lacks proper age-related information in seniors print media sources and has little mobilizing information to help seniors take charge of their health.¹¹²

A number of studies compared easy-to-read and/or illustrated screening material with standard screening information. An illustrated brochure on cervical cancer screening was found to be better understood by patients with low literacy than a bulleted text version.¹¹³ Another study compared a videotape, an easy-to-read brochure and standard information on colorectal cancer screening.¹¹⁴ Both videotape and easy-to-read brochure improved knowledge of patients, both for low and high literacy patients.

Another study of breast cancer screening use found that a recommendation from a physician, a culturally-appropriate, easy-to-read brochure and a “soap-opera” style video increased mammography use by 30% in a group of women with low literacy and low income.¹¹⁵ However, there was no difference between giving a patient an easy-to-read brochure and a recommendation alone. This suggests that written information alone will not lead to higher screening rates.

Culture and socioeconomic barriers have been identified as important factors in developing screening and community outreach programs. These are also two important factors which impact health literacy. A number of interventions address these barriers. Although they do not specifically measure impacts on health literacy, they can provide some insight into effective interventions for these sub-groups.

Culture and literacy have been identified as important in screening programs for at-risk groups.¹¹⁶ A review was conducted in 2004 examining trends in use of breast cancer screening among medically underserved women.¹¹⁷ The review included a description of

the barriers to mammography and reported on effective interventions to increase the use of screening. Disparities exist among racial/ethnic minorities and low income women.

For racial/ethnic minorities, particularly new immigrants, underutilization of preventive health care services has been documented related to cultural barriers and health systems obstacles. Literacy has been identified as a barrier to breast cancer screening distinct from language proficiency that affects all racial/ethnic and age groups among low income women.¹¹⁸

For underserved populations, tailored messages in an interactive format have been found to be more effective at increasing breast cancer screening rates, which would include those with low health literacy. These interactive formats include individualized letters, in-person contact, or telephone counselling.

Individual-targeted strategies that improve access have been shown to be most effective in increasing breast cancer screening.^{119,120} Interventions address practical barriers by helping with scheduling appointments, providing transportation, offering screening in community settings that are non-threatening, and providing patient navigators. These strategies are consistent with intervention strategies for low literacy populations to improve health care access.

The effectiveness of phone counselling through community health centres in New York City was assessed to increase screening rates for low income women.¹²¹ The calls assessed patient barriers to screening, provided any needed education and assisted with access to services. Study participants who received phone calls from patient care managers had significantly higher rates of breast, cervical and colorectal cancer screening.

Another study compared a one-on-one counselling intervention, a small group educational intervention and a financial incentive to increase rates of colorectal cancer screening in an African American population.¹²² One-on-one counselling was found to have a 70% increase in assessed knowledge, attitudes and behaviours, including the highest screening rate one month following the intervention, double the rate of the group education participants.

A Vietnamese community in Santa Clara California addressed cervical cancer screening among Vietnamese women. They recruited a woman physician, changed the hours of the clinic to be more accessible, recruited community-based organizations and got 50 lay or community health workers to do outreach and recruitment. They compared a media-only intervention with the other that included the lay health worker/community health worker intervention. With the media intervention, there was a 6% increase in knowledge of HPV causing cervical cancer. With the community health workers helping people navigate the system, there was a 38% increase in knowledge. There was an increase in Pap smear of 4% in media intervention and 15% in the other group.

To summarize, the evidence clearly suggests that low health literacy may be a major factor contributing to presentation with advanced stage cancer and is linked to related factors of low socioeconomic status, low education and ethnicity. More research is required to thoroughly understand how these factors interact to predict cancer screening knowledge, attitudes and behaviours.

Interventions that acknowledge and address the issue of health literacy provide an important opportunity to achieve cancer control objectives. Promising practices include tailoring messages in an interactive format, such as through phone and in-person counselling and partnering with community members to develop messages and deliver

information and programs. Practical barriers need to be addressed through helping with scheduling appointments, providing transportation, offering screening in community settings that are non-threatening, and providing patient navigators.

PRIMARY PREVENTION –THE EXAMPLE OF ADDRESSING COMMON RISK FACTORS FOR CHRONIC DISEASE

The barriers faced by sub-groups with low health literacy have already been discussed in general terms. Findings of major studies on preventing heart disease and diabetes suggest that programs should focus on higher risk subgroups to reduce inequities in health, as well as on common risk factors such as unhealthy weights/eating, physical inactivity and blood pressure control.^{123,124}

There are a limited number of studies that specifically address primary prevention of chronic diseases in relation to health literacy. Future research is needed to mine the wealth of chronic disease prevention research for the intervention strategies that address improving access to health information and services, and to reducing health inequities. Many of these intervention strategies, particularly those targeting vulnerable groups, address health literacy barriers.

A focus group component of a Canadian cardiovascular risk reduction project, the Community Outreach in Heart Health and Risk Reduction Trial was designed to explore issues that facilitate or hinder individual efforts to change their health behaviours.¹²⁵ All focus group members had difficulty interpreting their personal risk for heart disease. This was a “sneaky disease” in its earliest stages. The findings suggest that lay understanding of the body and health differ from those of health professionals and educators. Lay understanding differs according to socioeconomic status and gender.

Another study analyzed changes in knowledge of cardiovascular risk factors and risk-reduction strategies by socioeconomic status, as measured by level of education.¹²⁶ The study found that individuals with less than Grade 12 level education experienced only slight improvement in their knowledge of cardiovascular risk factors and knowledge of risk-reduction strategies. However, interest in risk modification was high for all education groups throughout the study period. The disparity in knowledge suggests the need to reform existing cardiovascular risk-reduction education campaigns. Although these studies did not measure literacy level, groups with low education tend to have high rates of low literacy and the results may have implications for risk reduction campaign design and development.

Researchers have found that community-based prevention programs can promote a positive shift in health status in high-risk populations.¹²⁷ Interventions have been based on accepted principles of health promotion that address individual and systemic barriers.¹²⁸

For example, the Pawtucket heart health project included a marketing strategy to promote intervention programs and education programs.¹²⁹ Materials were designed for people with low literacy levels. Interventions on weight control, reducing blood cholesterol levels and smoking cessation were part of the design and there was extensive community participation in the project. The most notable effects were seen in individuals with lower levels of education. It was found that certain subgroups, specifically those of low socioeconomic status, appeared to benefit from the interventions.

A review of the major heart health studies shows that it is easier to change the risk of individuals that participate in a program than to achieve a community-wide reduction in risk.¹³⁰ The major studies all include three components to support health:

- mass media
- program-specific prevention initiatives that provide education and/or skill building in multiple settings such as schools, worksites, grocery store and restaurant and health care settings
- environmental support through policy development and site program development.

The impact of low health literacy on the success of all three intervention components are important to consider, particularly with respect to reducing health inequities. Health inequities in rates of heart disease and diabetes have been documented for different population groups, including Aboriginal peoples, immigrants and some ethnocultural groups, seniors, and people with low socioeconomic status. Higher risk sub-groups tend to have high rates of low health literacy.

A study in inner-city Montreal aimed to increase the awareness of healthy eating and weight ranges while downplaying diet and weight loss in adults of low education and socioeconomic status.¹³¹ A series of 18 pamphlets were designed to be highly accessible to persons of low literacy with few sources of social or clinical support. The pamphlets were adapted based on feedback from focus groups with residents from the neighbourhood, and then sent out by mail to an intervention group. This inexpensive, low-intensity intervention was effective in supporting change processes among volunteers who wanted to learn about weight control, to improve eating habits, and to improve health.

A community-based randomized trial in the US assessed the impact of a low-intensity, self-help dietary intervention aimed at dietary fat and fibre behaviour.¹³² The study took place in a rural, low-education/low literacy, partly minority population over a five-year period. The intervention provided tailored dietary feedback, followed by brief telephone counselling and evidence-based nutrition education booklets. This study is of particular interest because it incorporated principles of effective health promotion as well as principles of practice to address low literacy.

A community advisory board (CAB) was recruited to make sure that the researchers knew their audience and gave them what they wanted and needed. The information material was evidence-based, but the CAB helped to tailor the content and format of intervention materials, including the dietary fat and fibre feedback information. The development of the materials was guided by a professional literacy consultant, and skills became the central focus, through production of “self-help” books.

The intervention group demonstrated significant improvements in dietary fat and fibre behaviours and intentions to change fat and fibre. The authors conclude that this approach provides an effective model for achieving public health-level dietary health behaviour changes among a rural minority and low-literacy/low education population. However, some limitations in the study method may have excluded those with low income, low literacy, who were obese or who had diabetes. Participants may also have self-reported inaccurately to please the researchers.

As noted, health communication tools have been developed to increase knowledge of healthy living through better nutrition and physical inactivity, as well as information to support self-care and access to resources. Strategies have included developing culturally appropriate plain language health information and product labelling,^{133,134} alternatives to print information such as audio¹³⁵ and interactive web-based information, delivering

interactive educational activities where people live, work and play, and telephone access to informed professionals.

The Stanford Nutrition Action Program (SNAP) designed a curriculum to address the unique issues faced by low-literate, low-income populations as they attempt to modify their diet to lower risk of chronic disease.^{136,137} Initial focus groups and pilot tests were conducted to assess nutrition knowledge, interests, and dietary habits of a multiethnic, low-literate population. These investigations revealed that a nutrition education curriculum tailored to a population with low literacy skills would need to address the taste, cost, and convenience of low-fat foods, and teach participants how to incorporate low-fat foods and cooking methods into their family's diet with minimal disruption. These findings, combined with published data on food intake and preferences, were used to design the SNAP curriculum.

The SNAP classroom curriculum operationalized principles of adult education, constructs from social learning theory, and followed established national guidelines on how to develop appropriate print materials for low-literate adults. Each of its six lessons included role modeling, goal setting, problem-solving, group activities, and skills building tasks; many included SNAP videotapes, food demonstrations, and posters that enhanced group discussions. Print materials were written at or below the 5th grade reading level. The SNAP curriculum combined interactive teaching techniques and behaviour change methods to successfully teach and stimulate the interest of low-literate, low-income population to overcome barriers to reducing fat.

There are also efforts underway to facilitate the role of primary care physicians in promoting healthy eating and nutrition, as part of primary health care renewal. Some research indicates this is a possible route to supporting patients with low literacy to change their dietary habits.¹³⁸

There is evidence that dietary interventions need to consider factors beyond individual behaviour to address low health literacy.¹³⁹ Through community-based organizations in Canada, efforts have been made to address other determinants of health that impact on healthy living, including poverty, isolation and social exclusion. A huge array of community-based interventions have been implemented to address food security in both urban and rural/isolated communities. Interventions such as community kitchens and community gardens with practical, hands-on demonstrations, and cheap, affordable food products have been used to provide information about healthy eating and to build skills and personal capacity.

Broad-based and targeted social marketing campaigns are underway across the country, most targeting school-age children and seniors.¹⁴⁰ There appears to be some promise in approaches that use cultural media as a route for messaging, using tailored, culturally-appropriate messages.¹⁴¹ Alternatives to print or web-based information, such as television and radio, are important channels for adults with literacy barriers, as well as peer-delivered information.¹⁴² As noted, there are comprehensive programs for diabetes prevention and management that address barriers to healthy eating and physical inactivity, including cultural barriers that impact on access to recreation, employment and other social supports.

Research is currently underway to develop better tools for measuring health literacy, targeting school-age children, seniors and people living on low income.¹⁴³ It is hoped that new information will help guide interventions to address health literacy barriers in these groups through school and community. Systemic advocacy efforts are underway to address poverty, as the acknowledged primary determinant of health, and significant factor in the primary prevention of chronic disease.^{144,145} increase social assistance rates and minimum

wage and to move towards more progressive taxation system. Intersectoral collaboration in research, policy and practice is being supported through the National Collaborating Centre on the Determinants of Health, the Canadian Council on Learning, the National Literacy and Health Research Program and the Canadian Public Health Association's National Literacy and Health Program.^{146, 147, 148}

To summarize, the findings of major studies on preventing heart disease and diabetes suggest that programs should focus on higher risk subgroups to reduce inequities in health, as well as on common risk factors such as unhealthy weights/eating, physical inactivity and blood pressure control.^{149, 150} There are a limited number of studies that specifically address primary prevention in relation to health literacy. However, there is some evidence that community-based approaches that address the barriers that low literacy presents can have positive results. There is little information about social marketing through mass media that addresses health literacy barriers. Population health interventions that address the determinants of health, especially poverty, food security and social exclusion are important considerations. Future research is needed to mine the wealth of chronic disease prevention research for the intervention strategies that address improving access to health information and services, and to reducing health inequities. Many of these intervention strategies, particularly those targeting vulnerable groups, address health literacy barriers.

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