

**MEASURING COORDINATION AND INTEGRATION IN CHRONIC DISEASE
CARE: TAILORING EVALUATION TOOLS FOR NORTH SHORE CHRONIC
DISEASE SERVICES**

by

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Abstract

Measuring coordination and integration within and between programs in chronic care is an evaluation strategy underutilized in health care. North Shore Chronic Disease Services (NSCDS) is an example of a coordinated approach to chronic disease care in British Columbia. In 2009, NSCDS planned a comprehensive evaluation strategy, including a tool to measure coordination and integration between and within acute, chronic and community programs. This paper extrapolates from this section of evaluation work and proposes a tailored, quantitative evaluation tool to measure the actual degree of coordination and integration of NSCDS to other community programs. The process of tailoring this tool is presented and the implications for population and public health practice in relation to chronic disease management and program evaluation are also discussed.

Keywords: Program Evaluation; Evaluation Research; Chronic Disease; Coordination and Integration

Executive Summary

Chronic disease is a major contributor to death and disability worldwide. Risk and preventive factors associated with the development of chronic diseases span over the entire spectrum factors which determine health, from social, environmental, behavioral and genetic risk factors to the structure and delivery of health care itself. Systematic, coordinated chronic disease management and prevention strategies are necessary to address morbidity, mortality, economic and social realities associated with the burden of chronic disease. Evaluation of these programs and strategies is an integral tool for public health professionals; not only to give legitimacy to their efforts but also as a process to inculcate public health professionals with the knowledge of a more efficient and effective chronic care system. North Shore Chronic Disease Services (NSCDS) provides an example of a coordinated approach, which aims to reduce the prevalence of chronic disease and promote population health within Vancouver Coastal Health (VCH). In 2009, the author of this paper drafted a program logic model, evaluation framework and guideline¹ (see Appendix 1) for NSCDS as a practicum project while attending the Masters of Public Health Program at Simon Fraser University. This paper extrapolates from a section of this evaluation work and proposes a tailored, quantitative evaluation tool to measure the actual degree of coordination and integration of NSCDS with other programs in VCH and the community. The implications for population and public health practice in relation to chronic disease management and program evaluation are also discussed.

¹ As concepts from this paper are drawn from the Program Logic Model and Evaluation Framework in Appendix 1, it is highly recommended by the author to review both the model and framework, paying special attention to the *Coordination and Integration of Care* outcome under the broad outcome category of *Community and Health Care System*.

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Glossary and List of Abbreviations

CCM: Chronic Care Model
CDM: Chronic Disease Management
CDSMP: Chronic Disease Self-Management Programs
CVD: Cardiovascular Disease
DBP: Diastolic Blood Pressure
ECCM: Expanded Chronic Care Model
HSDA: Health Service Delivery Area
HTN: Hypertension
LHC: Local Health Care
NSCDS: North Shore Chronic Disease Services
SBP: Systolic Blood Pressure
VCH: Vancouver Coastal Health

Background

The Burden of Chronic Disease

Chronic diseases are non-communicable diseases and can be defined as prolonged illnesses that do not resolve spontaneously and are rarely completely cured (US Centre for Disease Control and Prevention, 2009). Defining and contextualizing chronic disease is in itself, an inherently complex process. For the purposes of this paper, the term ‘chronic disease’ will encompass additional terms including chronic condition(s) and chronic illness(es). The categorization of chronic disease can be organized by body system and include cardiovascular², chronic respiratory³ and musculoskeletal disease⁴. The umbrella term chronic disease also encompasses diabetes, mental illness and all forms of cancer.⁵

Chronic disease contributes significantly to morbidity and mortality and is an immense social and economic burden worldwide. Cardiovascular disease is the most pervasive chronic disease worldwide and is the number one cause of death. Low-income and middle-income countries are disproportionately affected by cardiovascular disease; accounting for approximately 80% of deaths (WHO, 2009). In Canada, chronic diseases are the number one cause of mortality and account for approximately 89% of all deaths.

² Hypertension, chronic heart failure, peripheral vascular disease, coronary heart diseases (atherosclerosis and arteriosclerosis), cerebrovascular disease (stroke), rheumatic heart disease and congenital heart disease (WHO, 2010)

³ Asthma, Chronic Obstructive Pulmonary Disease (COPD), respiratory allergies, occupational lung disease and pulmonary hypertension (WHO, 2010)

⁴ Rheumatoid arthritis, osteoarthritis, osteoarthritis and other musculoskeletal conditions (musculoskeletal injuries, gout).

⁵ There is some controversy on whether cancer should have its own category. Usually this is because the health delivery systems for cancer care are different from other chronic diseases. The Ministry of Health of British Columbia considers cancer a chronic condition and groups it with other chronic conditions in the Core Public Health Functions of British Columbia (Ministry of Health, 2005).

Cardiovascular disease is the most significant contributor to chronic disease mortality, accounting for over 34% of deaths, followed closely by cancer, which accounts for 29% of deaths (WHO, 2005). In the next 10 years the prevalence of chronic disease is expected to increase by as much as 15%, with notable increases in the prevalence of diabetes (WHO, 2005).

In addition to mortality, chronic diseases also account for large direct⁶ and indirect⁷ health care costs. In Canada, neuropsychiatric diseases are the largest contributor to the economic burden of chronic disease amounting to just over \$34 billion per year (\$1056 per capita). CVD accounts for the second largest contribution with over \$20 billion per year (\$640 per capita) (Patra, Popova, Bondy, Flint and Giesbrecht, 2007). It is not only the chronic diseases themselves that are an economic burden to the Canadian health care system. The risk factors associated with the development of chronic disease are also responsible for a large portion of health care costs: physical inactivity (\$9.14 billion direct costs, \$23 billion indirect), tobacco (\$4.7 billion direct, \$13 billion indirect), alcohol (\$2.7 billion direct, \$4.6 billion indirect) and obesity (\$2.1 billion direct) (Patra et al., 2007). A recent study⁸ of the costs of obesity in Canada estimates that the total direct cost overweight and obesity is \$6 billion dollars, with 66% of this cost attributable to obesity alone (or \$3.96 billion) (Anis, Zhang, Bandback, Guh, Amarsi et al., 2010). Trends indicate that the incidence and direct

⁶ For the purposes of this paper direct costs include all costs attributable to illness: hospital care, physician care, specialist treatment, prescription drugs, other (other health care professionals, public health, capital, health research and other costs) (Patra et al., 2007)

⁷ Indirect health care costs include economic loss due to illness, premature death or disability (cost of years of life lost due to premature mortality, the value of days lost due to short and long term disability) (Patra et al., 2007).

⁸ The direct cost for obesity (\$2.1 billion) cannot be compared to this study as the previous estimate of obesity in Canada used a BMI of 27 or greater in 1997, and based on self-reported data. The study by Anis et al., 2010 uses a BMI of greater than 30 and used directly measured BMI.

costs related to risk factors for chronic disease are increasing, with risk factors becoming increasingly more prevalent among young Canadians and those of lower socio-economic status (Lee, Chui, Manuel, Tu, Xuesong et al., 2009). The vast majority of these health disparities experienced by groups of lower socio-economic status, race or ethnicity are largely avoidable. In Canada, the odds of reporting Type II Diabetes Mellitus for Aboriginal peoples (OR: 3.007) or South Asian (OR: 3.202) is over three times higher than respondents who identify as white⁹ (Veenstra, 2009).

*A Profile of Chronic Disease on the North Shore*¹⁰

Within the health authority of Vancouver Coastal Health (VCH) in British Columbia, the Health Service Delivery Area (HSDA) of the North Shore is comprised of both West and North Vancouver. In 2006, the population of the North Vancouver and West Vancouver combined was 124, 693 (82,562 and 42,131, respectively) (Statistics Canada, 2006). As in other communities in British Columbia, and Canada, the population on the North Shore is aging. Age is an important non-modifiable risk factor for developing chronic disease. Individuals 75 years of age or older are three times more likely to have concomitant chronic conditions than individuals between the ages of 50-64 (Sarte, 2008). The North Shore has a slightly older population than the rest of metro Vancouver, with 15.9% of the residents aged 65 years or older and 8.6% of the population 75 years old or greater (Sarte, 2008).

⁹ Data from an analysis of the Canadian Community Health Survey. It should be noted that the data collected on Aboriginal peoples in Canada only accounts for those respondents living off-reserve. It is well documented that the health of on-reserve Aboriginal peoples is worse than those living off-reserve (Curtis, 2007).

¹⁰ All statistics included in this paper are derived from a document titled “Chronic Disease Management Inventory of the North Shore” prepared for NSCDS by Ann Frances Isobel Sarte in 2008. This document is not available for public use but can be requested by contacting Sandra Edelman or Juan Solorzano at NSCDS.

In 2006, an estimated 35% of adults on the North Shore had one or more chronic conditions, with the most common chronic conditions being: hypertension (15.7%), depression (8.7%), asthma (7.2%) and osteoarthritis (6.7%) (Sarte, 2008). Overall, the age-standardized prevalence rates for all chronic conditions in the Coastal HSDA¹¹ are slightly lower compared with the rest of British Columbia. However, in line with their provincial counterparts, the Coastal HSDA prevalence rates for chronic conditions show a steady increase in incidence and prevalence across all chronic conditions (Sarte, 2008).

The Evolution of Chronic Disease Services:

A Historical Context

In the mid-90s, both health care providers and academics began to question the organization and delivery of care for patients with chronic conditions in North America. Issues identified surrounding the organization and delivery of chronic care included: lack of adherence to standards of care and best practice guidelines, inconsistencies in interventions to aid in self-management supports and limitations related to the large focus on the delivery of acute care in the current health care system (Wagner, Austin and Von Korff, 1996). In 1996, Wagner et al., identified the need for an integrated, patient care-centered focus in chronic care in the United States. Shortly after this paper was published, Bodenheimer, Wagner and Grumbach (1999) introduced the Chronic Care Model (CCM) as a response to the shortcomings of the current chronic care system (see Appendix 2). The CCM proposes an integrated and collaborative model that aims to fundamentally reorganize care for patients with chronic conditions. The CCM theorizes that chronic care occurs in a ‘trigalactic

¹¹ Age-standardized prevalence, incidence or mortality rates are not available for the North Shore. This paper will utilize age-standardized rates for the Coastal HSDA (North Shore/Coast Garibaldi) in comparison to the rest of British Columbia.

universe' consisting of the community, health care system and the provider organization and is based on six essential elements: *self management supports, community resources, delivery system design, decision support, clinical information systems and health care organization*. The goal of the CCM model is an “informed activated patient interacting with a prepared proactive practice team resulting in high-quality satisfying encounters and improved outcomes” (Bodenheimer et al., 1999, p. 1777).

Although partisans of the CCM maintain that the model includes a population-based approach (Glasgow, Orleans and Wagner, 2001), critics question the model's actual capacity for health promotion and chronic disease prevention at a population level (Barr, Robinson, Marin-Link, Underhill, Dots et al., 2003). Proponents of the CCM's capacity for health promotion argue that prevention, promotion and management of chronic conditions share more similarities than differences as both involve some degree of screening and/or counseling, changing a variety of complex behaviours/risk factors and linking patients and caregivers to community resources. Glasgow et al., (2001) recognize that CCM has the capacity for health promotion and disease prevention only *if* the organizational climate is primed for change *and* the role of the community in policy and environmental change is brought to the forefront.

In the Canadian health care system, the CCM does not seem to be responsive enough to foster chronic disease prevention and health promotion. Glasgow et al., (2001) acknowledge that in order to address health promotion and disease prevention the 'Community Resources and Policy' component of the CCM requires expansion, and that “policy and environmental change efforts may need to play a more prominent role” (p.603). In 2003, Barr and colleagues introduced the Expanded Chronic Care Model (ECCM) (see

Appendix 3), to address the concerns regarding the CCM's ability to integrate population health promotion into the prevention and management of chronic disease. Barr et al., (2003) argue that the language of the CCM "does not resonate with population health promotion practitioners" (p.74) and lacks the overall message of prevention in chronic care. The ECCM addresses the weaker points of the CCM for prevention efforts outlined above through the addition of strategies for prevention and promotion efforts. The ECCM incorporates the principles of health promotion from the Ottawa Charter (WHO, 1986): building healthy public policy, creating supportive environments, strengthening community action, developing personal skills and re-orienting health services. The ECCM retains the advantages of a single model for both disease prevention and management of chronic care (Glasgow et al., 2001) while incorporating population health promotion and the social determinants of health. The provincial governments of British Columbia and Alberta have since adopted this model as the foundation for prevention, early detection and management of chronic conditions (Ministry of Health, 2007; Delon and MacKinnon, 2009). The Calgary Chronic Disease Management Program is an example of a program strategy that employs the ECCM for both program planning and evaluation. The Calgary CDM program demonstrated improved clinical outcomes,¹² increased access to services as well as decreased costs¹³ from baseline to 12-month follow-up (Briggs, 2009).

¹² For example: a significant increase of diabetic patients HgA1C control (from 40-56%) from baseline to a one year follow up; a significant increase in patients controlling their triglycerides (from 34% to 47%) (Delon and MacKinnon, 2009).

¹³ For example: A significant decrease in patients with COPD related hospitalization (from 320 to 260 per 1,000 patients); a significant decrease in hospital admissions across all patients (380 to 224 per 1,000 patients); and a significant decrease in emergency department visits across all patients (755 to 495 per 1,000 patients (Delon and MacKinnon, 2009).

While the ECCM has informed planning of chronic disease services in Canada, no research has been done to evaluate the coordination and integration of the system. This knowledge gap in evaluation research and program evaluation seems counterintuitive for chronic care programming based on the principles of the Ottawa Charter (WHO, 1986) and the ECCM. A coordinated and integrated health care system is an important component of the ECCM. Below is a list of examples of how integration and coordination affect the implementation of the ECCM. Each example offers evaluation opportunities for better understanding the importance of a well-integrated and coordinated system.

1. *Re-orienting health services and delivery system design:* The responsibility and accountability for health promotion is not solely dependent on the health care system, but instead is shared among individuals, communities, for-profit and not-for-profit organizations and all levels of government. The health care system must be a leader in advocating for health to move beyond the provision of secondary and tertiary services to support individuals, families and communities in achieving, sustaining and promoting health. Building and sustaining diverse partnerships in health requires the coordination and integration of all stakeholders.
2. *Building healthy public policy:* A diverse range of policy approaches is necessary to achieve population health: taxation, legislation, organizational change and fiscal measures, etc. It is the coordination and prioritization of these actions that can lead to better health for all.
3. *Developing personal and self-management skills:* This involves both coping with illness and promoting individual, family and community health and wellness.

- Coordinated and integrated approaches to behavioural modification and educational messaging among programs and services within communities could have positive impacts on health outcomes and save programming dollars.
4. *Creating supportive environments:* include strategies that improve and change living conditions, both in our physical and social environment. The goal of these supportive environments is to make healthy choices easier for everyone. Coordinated efforts of all stakeholders (health care, all levels of government, industry) to monitor and evaluate the health impact of industry technology, the built environment, energy production etc. that are necessary to ensure positive impacts on population health
 5. *Strengthening community action:* Community action (empowering communities to enhance health and wellbeing) is fundamentally strengthened through advocacy and mobilization efforts, ideally using resources and materials that already exist in the community. It is the coordination, and to some extent the integration or pooling, of these resources, along with health care and other professional knowledge and resources that make it possible for communities to become more resilient and empowered.
 6. *Enhancing decision supports:* Coordination and integration between general practitioners, specialists, community programs and supports and health promotion practitioners are key for maintaining and building professional and community relationships that support and enhance chronic disease prevention and management.
 7. *Building information systems:* A key feature of the ECCM is the building and expansion of a broad base of chronic disease management and prevention information

systems. These information systems go beyond the healthcare system to include data on social determinants of health such as education, housing and income. Ideally a large variety of users (health care, all levels of government and community groups) would both contribute to and access these information systems. For example, a clinical information system could have the capacity to go beyond sharing relevant clinical information between providers (i.e. Electronic Medical Records) to assisting with identifying patient subgroups that may require proactive chronic disease care. The CCM only outlines three basic roles of clinical information systems: reminder system, feedback/evaluation tool for physicians and registries for planning/population-based care. The ECCM greatly expands this concept, as the CCM regards information systems as having functionality for strictly clinical and information purposes. This core functionality of information systems in the ECCM remains intact, however information systems are viewed as a platform to support change, promote health and prevent disease.

As shown, coordination and integration play a key role in the implementation of the Expanded Chronic Care System. Scholars and evaluators should consider these elements when designing evaluations of healthcare programs and services as an integrated and coordinated chronic care system can potentially have a variety of positive outcomes that influence:

- Population health: evaluation results of targeted interventions can help to identify key populations and direct resources appropriately as well as influence evidence-based care and health care management.

- Quality of care: through the implementation of interdisciplinary approaches to chronic disease management.
- Reduction of costs: through pooling resources, avoiding duplications in programs and services and more efficient use of resources (right care by the right provider).
- Provision of seamless care: in a coordinated and integrated chronic care system providers would be aware of programs and services and could tailor referrals to the needs of the individual. Seamless transitions between levels of care and providers might also reduce the number of patients that ‘fall through the cracks’ of the current chronic care system.

However these potential positive impacts are not without their challenges including privacy issues, cost of implementation, turf wars and organizational autonomy and influencing transformational change.

Present Day Chronic Care on the North Shore

North Shore Chronic Disease Services (NSCDS) provides comprehensive and integrated services to clients and their families who reside on the North Shore. The majority of the direct patient services for NSCDS are housed in Lion’s Gate Hospital and West Vancouver Community Health Clinic¹⁴. However NSCDS also provides a variety of planning and support services as well as opportunities for staff learning and development (see NSCDS Program Map in Appendix 4). NSCDS follows the strategic direction of VCH, which is to, “support healthy lives in healthy communities with our *partnerships* through care, education

¹⁴ In November 2009 (after the completion of the NSCDS evaluation planning had been completed) all CDS (with the exception of Cardiac and Respiratory) were relocated to the West Vancouver Community Centre.

and research” (VCH, n.d.). The values of NSCDS include accessibility, improving care delivery and improving health (individual, families and communities) through a variety of strategies linked to specific program activities and initiative (see NSCDS Program Map in Appendix 4).

NSCDS is an example of a coordinated and integrated approach to chronic disease prevention and management, as it employs chronic disease self-management principles¹⁵ within the delivery context of the ECCM. When the province of British Columbia inducted the ECCM as the blueprint for the delivery of chronic care in 2007, NSCDS began to strategically plan its chronic care management and prevention based programs to follow suit. Today, NSCDS employs a variety of strategies that link program activities (which can be more clearly understood by viewing the NSCDS Program Logic Model and Evaluation Framework in Appendix 1) to measurable outcomes. Some of these innovative activities that improve coordination and integration between the health care system and the community on the North Shore include: Physician Engagement Tours, Program and Services Directory, Chronic Disease Nurse Navigator, Interdisciplinary Group Visits Program, Integrated Referral Form, CDM Networking Sessions and the Frequent Admission Research Project. Some of these activities have received preliminary positive feedback from a variety of stakeholders including GPs, staff and clients. However, upon review of NSCDS, program managers determined that a structured, comprehensive evaluation plan to further quantify outcomes in order to disseminate evaluation results to a variety of stakeholders was necessary.

¹⁵ Lorig and Holman (2003) conceptualize self-management as a series of self-management tasks (medication, role and emotional management) linked to skills (problem solving, decision making, resource utilization, forming a patient/health care provider partnership).

The Development of NSCDS Logic Model and Evaluation Framework

In 2009, NSCDS began the planning stages of a comprehensive evaluation of their disease management services and prevention strategies. In planning the evaluation for NSCDS, a comprehensive outcome measurement framework, including a logic model and an accompanying evaluation guideline were created to streamline and direct managers and staff through the evaluation process (see Appendix 1). The evaluation framework chosen was a modified version of the Outcome Measurement Framework, used by the SMART Fund of VCH (n.d.). Modification and tailoring of this framework for NSCDS was achieved by altering program outcomes from short, intermediate and long-term to patient and caregiver, health care professionals and community and health care system. In this way, NSCDS could include multiple outcomes that were more meaningful to its stakeholders than the traditional long, intermediate and short-term outcomes. In total, the program logic model and evaluation framework include 12 outcomes, 4 in each outcome category (patient and caregiver, health care provider and community and health care system). The evaluation framework links each outcome to evaluation questions, indicators, collection methods, data sources, and timelines. This paper will focus on the outcome of interest, coordination and integration, which falls under the outcome of community and health care system, and reads as follows:

Chronic disease services on the North Shore are well coordinated and linked into a network of care.

As outlined in the evaluation framework (Appendix 1) the outcome above is linked to the following evaluation questions:

1. How well are NSCDS connected to other programs in VCH and the community?

2. How well is patient information shared between chronic disease services?

Which are then linked to measurable indicators as follows:

1. Ratio scale of integration (0=full segregation, 100=full integration) regarding:
 - a. Patient Referrals
 - b. Information sharing
 - c. Networks of care
 - d. Network Managers
 - e. Pooled Resources

These evaluation questions and indicators are directly linked to the evaluation collection methods chosen, which for this outcome is a modified version of the Scale of Functional Clinical Integration (Appendix 5) (Ahgren and Axleson, 2005). Each outcome was then assigned a data source (where the data would come from), who was responsible for collecting the data and how often the data would be collected.

The majority of the collection methods included in the evaluation framework were highly reliable tools and surveys used extensively in evaluating chronic disease programs and services (Patient Assessment of Chronic Illness Care (2004), Self-Efficacy for Managing Chronic Disease-6 Item Scale, Assessment of Chronic Illness Care Version 3.5). In addition to these tools, interviews with NSCDS staff and managers, existing NSCDS patient surveys, database searches and operational reviews are also listed as collection methods.

Purpose

The purpose of this paper is to develop and discuss a tailored and quantitative evaluation tool to measure coordination and integration for NSCDS. The proposed Scale of Functional Clinical and Community Integration for NSCDS is presented within the process of planning a comprehensive evaluation strategy for NSCDS. This tool is intended to measure coordination and integration between and within NSCDS, other VCH programs and community partners involved in the delivery and planning of chronic disease programs on the North Shore.

Methods

During the planning stages of the Evaluation Framework and Guideline for NSCDS, the first step identified was to create an Evaluation Planning Tool (see Appendix 6). Upon scanning relevant literature on evaluating planning tools and frameworks, there was no single framework that encompassed the ideal combination of steps and processes for NSCDS. Instead, NSCDS created an entirely new evaluation planning tool, using a combination of three evaluation planning tools and frameworks, one published by the CDC and two PHAC evaluation tool kits (one for public health programming and one for health surveillance) (CDC, 1998; PHAC, 1997; PHAC, 2004). From each of the three frameworks and tool kits, NSCDS incorporated the following aspects:

- The CDC *Framework for Program Evaluation in Public Health* (1999) focused heavily on incorporating stakeholders in the early planning stages. This was used for the early identification and engagement of stakeholders as well as outlining stakeholder's expectations of the evaluation process and outcomes.

- From the *PHAC Program Evaluation Tool Kit* (1997) a list of comprehensive evaluation steps linked to key deliverables. The foundational focus of having a program logic model to guide our evaluation efforts was also included.
- From the *PHAC Framework and Tools for Evaluating Health Surveillance System* early planning for dissemination of results was linked to a key deliverable (a formalized Dissemination Plan).

The next steps of the evaluation process for NSCDS can be viewed in Appendix 6. This paper will focus on the steps listed under the methods section, *creating a data collection plan*. With the program logic model complete and evaluation questions solidified, the next step was to determine what data collection methods would be employed for each outcome. For feasibility and timeline constraints, it was decided to focus on using existing data collection tools, which are mainly surveys. The goal was to find existing data collection tools with demonstrated reliability and validity. To find existing data collection tools, experts in chronic disease care and chronic disease management were consulted including: Patrick McGowan, Associate Professor at the University of Victoria and expert in Self-Management Supports and Evaluation and Lisa Dwyer Evaluation Services Manager Fraser Health Authority. These experts were helpful in linking outcomes for patient and health care provider outcomes, but were not familiar with any tools that would measure coordination and integration for NSCDS.

In addition to contacting experts in the field, a search of online academic databases (Google Scholar, PubMed, CINAHL) was conducted using the keywords ‘coordination’, ‘integration’ and ‘program evaluation’. Through these online databases searches, the article *Evaluating*

Integration Care: A Model For Measurement (Aghren and Axelsson, 2005), which proposed a scale, titled “The Scale of Functional Clinical Integration” (Appendix 5) was chosen as a model to further tailor for NSCDS. This scale was chosen for NSCDS for a variety of reasons. First, when searching academic databases, only two existing instruments that measured some degree of integration and coordination were found, the Scale of Functional Clinical Integration (Aghren and Axelsson, 2005) and the Human Service Integration Model and Measure (Browne et al., 2004) (Appendix 7). The Aghren and Axelsson (2005) scale had a number of features which made it the superior choice for NSCDS: a ratio scale of measurement (versus an ordinal measure), the requirement of a group consensus to rank integration between and within programs and services (opposed to only gathering program coordinators’ rankings) as well as the creation of an integration and coordination optimal rank for each program, service or initiative. These components of the Scale of Functional Clinical Integration will be expanded upon in the *Results* section.

After the Aghren and Axelsson (2005) scale was chosen to measure the degree of coordination and integration on the North Shore, a comparison of the Canadian and Swedish health care systems was undertaken to demonstrate the appropriateness of translating this scale for use on the North Shore. Knowledge of how the Swedish health care system functions also aided in the understanding of the application of the scale as well as the definition of the terms coordination and integration as used by Aghren and Axlesson (2005). The basic structure of the Swedish health care system (financing, political ideologies, financing, taxation) was reviewed along with the concepts of ‘coordination’ and ‘integration’ used by Aghren and Axelsson (2005). These steps were crucial in understanding what the scale proposed by Aghren and Axelsson was actually measuring, so that these concepts could

be defined for NSCDS programming efforts. Part of the process of tailoring the Scale of Functional Clinical Integration required that specific aspects and components of the scale were defined for NSCDS. The process of tailoring the scale involved engaging stakeholders at NSCDS (managers, physicians, nurses and program staff) to further define measures of the scale (full segregation to full integration) as well as specific components of the scale. With this completed, definitions and instructions on how to complete all aspects of NSCDS evaluations were compiled into a document titled *North Shore Chronic Disease Services Evaluation Guideline* (Appendix 8). This document, paired with the NSCDS Program Logic Model and Evaluation Framework (Appendix 1), provides a comprehensive guide to both process and outcome indicators for chronic disease services on the North Shore.

Comparing Health Care Systems

In many ways, Sweden and Canada have comparable health care systems. Both have three levels of governance. In Canada these are federal, provincial and municipal. In Sweden they are central, county councils and municipalities. Both health care systems are a single payer, universal health care system. However to fully elucidate the concepts of ‘integration’ and ‘coordination’ from the Ahgren and Axleson (2005) scale, it is important to know how the Swedish system functions in comparison to Canada’s health care system.

In Sweden, the central government’s role in health care is to set guidelines and policies related to the political agenda they set for health (Swedish Institute, 2007). County councils¹⁶ are responsible for the administration of population health care, with the exception that services for the elderly and people with physical and psychological disabilities are

¹⁶ County councils consist of elected representatives that are elected by the public every four years. Sweden is divided into 20 county councils (Swedish Institute, 2007).

delivered and managed by municipalities¹⁷ (Agren and Axelsson, 2005). The Canadian health care system is a publically funded system comprised of 13 interlocking provincial and territorial health insurance plans. All Canadians have equal access to medically necessary hospital and physician services in their province of residence through these provincial health plans, also known as Medicare (Health Canada, 2005). As in Canada, the residents of Sweden have equal access to health care services, although the method of health care financing and the level of privatization differ between the two countries (see Appendix 9). In Canada, medically necessary hospital and physician services are financed through taxes, and provincial health insurance plans are financed solely through public administration as per the Canada Health Act, however the majority of services are privately delivered (Health Canada, 2005). In Sweden, 71% of health care financing is provided through taxation (both municipal and county), with 16% of financing provided by the state, 3% provided by patient fees¹⁸ and 10% from 'other' contributions (Swedish Institute, 2007). The delivery of health care in Sweden is through health care districts, composed of numerous counties, similar to the structure of health authorities British Columbia (Swedish Institute, 2007).

Defining Coordination and Integration

Due to the similarities between Canada and Sweden's health care systems (universal health care, levels of governance, high-income countries, similar financing and delivery structures) and a focus on local care (or in a Canadian context primary care), the model

¹⁷ Sweden has 290 municipalities (Swedish Institute, 2007).

¹⁸ Patients pay a variety of fees to access services in Sweden, from hospital fees of 80 SEK per day (approximately \$11.50 Canadian dollars) to outpatient fees which are determined by the county and range from 100-150 SEK per day (approximately \$14.50-22.00 Canadian dollars). The government puts a cap on patient fees at 900 SEK (approximately \$130 Canadian dollars) per year (Swedish Institute, 2007).

proposed by Ahgren and Axelsson (2005) is a useful tool for evaluating coordination and integration for NSCDS.

However, the terms coordination and integration in health care require definition for each respective health care system to further elucidate their meanings in relation to the Scale of Functional Clinical Integration. In 2003, the Swedish National Board of Health and Welfare restructured health care delivery systems in two-thirds of county councils, to a system of Local Health Care (LHC). The National Board of Health and Welfare (2003) conceptualizes LHC as the collaboration of municipalities and counties to provide accessible, comprehensive patient centered primary care services. Local health care is tailored to the needs of major population groups such as children, elderly and people with chronic diseases and diseases of common occurrence while centered in a delivery structure that facilitates family and community focused primary care (National Board of Health and Welfare, 2003). Critics of the implementation of integrated local care in Sweden, argue that “it is unusual to find a high degree of organizational cohesiveness” between primary health care and social services (Ahgren, 2007, p14). Instead, Ahgren and Axelsson (2005) have found that it is more common for LHC in Sweden to be linked through collaborative networks, or chains of care.

These observations and critiques stimulated research into a model for in-depth evaluations of coordination and integration within LHC in Sweden (Ahgren, 2007; Ahgren and Axelsson, 2005). In Sweden, *integrated care* (which is can be interchangeable with the term chains of care) is used to describe seamless transitions between primary health and social care (Agren and Axelsson, 2005). For example, a chain-of-care can be said to exist for

an elderly patient leaving an acute care facility through to care in the community, including specialists, public health, housing and social welfare.

The definitions for coordination and integration that Aghren and Axlesson (2005) used could not be extrapolated for NSCDS, at this point in time as NSCDS is not looking to evaluate transitions between primary care and social care. To define coordination and integration for NSCDS, a literature review of these terms was conducted. Evaluating the coordination and integration of health care can be conceptualized and operationalized in a variety of forms. However, the foundational element of collaboration and integration in health care is the formation and maintenance of partnerships. “Service integration” was one main theme of particular relevance, which emerged from studies of programs with integrated service delivery.

Brown et al., (2004) states that service integration “describes types of collaboration(s), partnerships or networks in which autonomous organizations work together for specific community residents to improve health and social care” (p.2). For the purposes of this paper, the definition of collaboration and integration with regard to chronic disease care on the North Shore adapts this definition of Browne et al (2004) closely as follows:

Collaboration and Integration on the North Shore: NSCDS, other VCH programs and community partners (usually semi to autonomous organizations) work together to improve the health of the population of the North Shore, including those with chronic diseases.

The Scale of Functional Clinical Integration

In light of the reorganization of health care in Sweden, a scale was developed as a tool to measure the actual degree of integration between different health and social services. This Scale of Functional Clinical Integration was influenced by a model and a measure of human service integration (Appendix 7) proposed by Canadian researchers, Browne et al., (2004) to measure networks of services for the program Healthy Babies, Healthy Children in Ontario. The Measure of Human Service Integration (2004) can be used to understand integration between sectors (health, social services, education, housing, child care, recreation, labour and corrections) and services provided (prevention, early intervention and clinical) and funding (public, private and non-profit) in relation to a population group, in their example, families with children. This measure was designed to “quantify the extent, scope and depth of integration” by local health care professionals (Browne et al., 2004, p.6). The depth of integration is measured using a five domain ordinal scale¹⁹ where program staff or representatives are asked to rate their depth of integration with program listed.

Aghren and Axelsson (2005) used this measure of human service integration as a theoretical basis for their Scale of Functional Clinical Integration, changing the integration rank calculation from an ordinal to ratio scale. The use of a ratio scale is a superior method for program evaluation, as it includes an absolute zero point and equal units of measurement

¹⁹ 0=No Awareness: where programs and services are not aware of other programs or services; 1=Awareness, community programs and services are aware of other services available but organize their efforts independently.

2=Communication: programs share information/communicate on a formal basis

3=Cooperation: services or programs modify planning and delivery to avoid duplication and improve linkages.

4=Collaboration: programs and services are jointly planned. Services are modified as a result of stakeholder input and consultations.

(Encyclopædia Britannica, 2010). This instrument of measurement was designed to take advantage of a ratio scale, with the ability to calculate sum and mean ranks of coordination and integration. In this way, sum and mean ranks of coordination and integration can be tracked over time.

In 2004, the scale of functional clinical integration was shown to be reliable and valid in a pilot evaluation study in Kungbacka Local Health Care (KLHC) in Sweden. However, as instructions and terminology related to integration should be specific and tailored to each setting in which the evaluation is carried out, reliability and validity of the tool will need to be measured on a case by case basis.

The Scale of Functional Clinical Integration ranges from full segregation to full integration and can be used to analyze intra and inter-organizational coordination and integration, as well as vertical and horizontal integration between different organizational units (Appendix 5). The scale by Ahgren and Axelsson (2005) is defined as follows:

1. *Full Segregation*: organizations work independently, with little or no use of formalized pathways for patient referrals or consistent use of clinical guidelines.
2. *Coordination in Networks*: Individual operational units are more integrated than in linkages. Health services are coordinated between units with shared clinical information. Chains of care are in place and functioning at this level, however no network managers are in place.
3. *Full integration*: Resources from different organizational units are pooled (this implies the creation of a new organization). Comprehensive services are developed to

serve specific patient groups, with network managers in place to coordinate staffing and allocate resources.

The measurement categories for the scale of functional clinical integration purposed by Ahgren and Axelsson (2005) include: patient referrals, clinical guidelines, chains of care, network managers and pooled resources. It should be noted that the shaded boxes for each component of the scale denote varying ranks of integration (for example an evaluation rank for the component ‘patient referrals’ can be made closer to the rank of full segregation, with a ranking of 2, or can be ranked closer to ‘linkages’ with a rank of 20). These components are not adequately defined by Ahgren and Axelsson (2005), and are further defined and tailored for NSCDS below.

Tailoring the Scale of Functional Clinical and Community Integration for NSCDS

It should be noted that the major difference between the Swedish application of the clinical scale of functional clinical integration and the application proposed in this paper for NSCDS is that the Swedish model is intended to measure coordination between health and social or ‘integrated care’ (meaning both health and social care). The pilot study for KLHC also was only concerned with measuring clinical integration, which is defined as “the collaboration, coordination or cooperation with other health care units in clinical work for specific patient groups” (Ahgren and Axelsson, 2005, p.7). The intended use for the scale within NSCDS is not only to measure clinical integration, but also to measure collaboration, coordination and cooperation within and between disease specific programs and linkages with community partners on the North Shore.

Results

In order to tailor the scale to meet the integration and coordination needs for NSCDS, components of the scale had to be redefined and reorganized. The components of ‘clinical practice guidelines’ and ‘chains of care’ in the Ahgren and Axelsson (2005) model were changed to ‘information sharing’ and ‘networks of care’, respectively. The tailored version proposed below for NSCDS also defines ‘linkages’ and ‘cooperation’ (the Ahgren and Axelsson model only defined full segregation, coordination in networks and full integration) and reflects the specificities of chronic care delivery on the North Shore. A modified version of the Scale of Functional Clinical and Community Integration for NSCDS can be found in Appendix 10. The measures of the scale are defined below:

1. *Full segregation (rank=0)*: NSCDS, other programs in VCH, and community partners work independently, with little or no use of formalized pathways for patient referrals or consistent use of clinical guidelines.
2. *Linkages (rank=25)*: There is adequate referral of patients between NSCDS, other programs in VCH and the community partners. Good communication exists between health care professionals and program staff and clinical guidelines are readily available for consultation.
3. *Coordination in Networks (rank=50)*: NSCDS, other VCH programs and community partners are better coordinated than in ‘linkages’. Services and programs coordinate multiple health services, share clinical information and manage the transition of patients between different programs and services. Networks of care are included (see definition above) and other health care networks are in place and functioning at this

- level, however no network managers (see definition below) are in place. The existence of such managers would indicate a higher level of integration.
4. *Cooperation (rank=75)*: A form of coordination and integration exists in which network managers are appointed to improve the contacts between NSCDS, other VCH partners and community partners, however these units still function independently. Service agreements are in place between some NSCDS, other VCH programs and/or community partners and managed through network managers.
 5. *Full Integration (rank=100)*: The resources of NSCDS, other VCH programs and community partners are pooled (i.e. some human, physical and fiscal) to a certain extent to reduce and avoid duplication of services and programs. The aim is to develop comprehensive services attuned to the needs of specific patient groups. These comprehensive services are backed by service agreements with all other relevant VCH programs and community partners. This level of integration and coordination requires cooperation between different professional groups to assemble the necessary services and to allocate the appropriate resources.

The measurement components (the aspects of the programs and services are to be taken into consideration when staff are ranking the integration between and within programs and services) of the Scale of Clinical and Community Integration for NSCDS are as follows:

1. *Patient Referrals*: Referrals from one health care provider to another (GP, specialist, health promotion specialists and other health care providers and partners) often occurs between two levels of care (i.e. between primary and secondary care, but it can also include referrals between primordial and tertiary levels of care).

2. *Information Sharing*: Pertinent patient information is readily shared between different providers to ensure continuity of care.
3. *Networks of Care*: Programs and services collaborate to offer a more comprehensive level of care where program redundancies and duplications are avoided.
4. *Network Managers*: Network managers work to improve communication and coordination and integration between programs and services within NSCDS, other VCH programs and community partners and have the authority and resources to do continuous improvement work to a network of care.
5. *Pooled Resources*: All earmarked resources for a specific group of patients are put together so that all the health care activities for this patient group can be fully integrated more easily.

Putting It Together: Practical User Guidelines for the Scale of Functional Clinical

Integration on the North Shore

After the Program Logic Model and Evaluation Framework were drafted, a comprehensive evaluation guideline (Appendix 8) was compiled. This document's intended use is as a comprehensive guide to the evaluation process for program managers and staff of NSCDS. The evaluation guideline is organized by broad evaluation outcome categories (patient and caregiver, health care professional and community and health care system) and includes all necessary evaluation tools as appendices. The outcome of interest for this paper, coordination and integration can be found on pages 19-21 in Appendix 8. Complete instructions for staff and program managers can also be found in Appendix 8. A draft of the Integration Ranking Form for NSCDS can be found in Appendix 11.

To carry out the evaluation, it is important that a program manager, staff or hired evaluator is familiar with the Scale of Functional Clinical and Community Integration in order to facilitate the evaluation. The procedure of deriving ranks of integration requires consensus and input from different professional groups (administration, managers, nurses, physicians, exercise specialists, occupational and physiotherapists). It is not necessary for all staff from each of the programs or initiatives of NSCDS to be present during the evaluation; only one or two staff members are required to participate so that all programs are equally represented. Staff and community partners will have the opportunity to read and discuss background on the scale to thoroughly understand terminology and ranking associated with the scale. A unique feature of this scale is that a consensus from the evaluation team is necessary in order to rank the level of coordination and integration for each program and service. Each one of the different patient services and initiatives receives a consensus rank as well as the rank that the team considers the optimum level of functioning for all of NSCDS, other VCH programs and community partners. The results are then discussed and confirmed through group consensus.

Limitations

Although the importance of program evaluation is emphasized in theory and by public health agencies in North America, it is not practiced consistently across the diverse range of public health programs or integrated in a systematic fashion into managerial duties of programs (CDC, 1998). The lack of consistent, systematic evaluation may be partially due to barriers to program evaluation. Major barriers in program evaluation include staff's perceptions of evaluations (Taut and Alkin, 2003) and the high turnover of stakeholders involved in the evaluation process (Patton, 2002). These two barriers are not mutually

exclusive, as program managers or evaluation consultants would need a thorough understanding of the program staff's perceptions of program evaluation in order to manage the reality of stakeholder turnover in health care. Taut and Alkin (2003) examined staff perceptions as a barrier in the implementation of evaluations and established three broad categories: human (evaluator characteristics), evaluation (methods and quality of outcomes) and context (political and organizational climate). Ideally, planning for program evaluation would occur during the early stages of the planning and implementation of a new program.

Limitations related specifically to the Scale of Functional Clinical and Community Integration for NSCDS include feasibility, time constraints and scheduling and clarifying concepts within the scale. Also, it should be noted that this scale has not been piloted with NSCDS and additional limitations and issues surrounding staff feedback and perception of the scale and evaluation documents would need to be further examined. In the pilot evaluation study Ahgren and Axelsson (2005) found some units within KLCH had difficulty distinguishing between the different forms of integration included in the scale. This particular limitation can be overcome by a discussion with evaluation teams that the degree of integration will differ between and within programs and services; in some cases it may be necessary to pool resources, in others integration may be limited to sharing clinical information systems or referrals. It should be made explicit that not all programs and services can or will ever achieve the rank of 'full integration', but realistic optimal integration ranks should be determined on an individual program basis.

There are other important limitations discussed by Ahgren and Axelsson (2005) that should be discussed in relation this scale. This model measures *actual* integration between and within programs and not staff's perceptions of integration. When planning and

evaluating integrated chronic care, data on staff's perception of coordination and integration may be important for program developing and monitoring. A mixed methods approach (quantitative and qualitative) to measure and understand the meaning of coordination and integration in chronic care could be a useful approach to identifying barriers and staff and patient's perceptions.

Discussion

Traditionally, health and other human services have been funded and designed to deliver programs to a specific population in isolation from other programs and services. In health care, the integration and coordination of services has the potential to be more cost-effective than addressing single health outcomes alone, by reducing redundancies in programming, sharing resources and improving health outcomes. The Scale of Functional Clinical and Community Coordination and Integration for NSCDS, does not have the ability to measure the potential effects of integration mentioned above, but measures the level of coordination and integration among programs and services within NSCDS, other VCH programs and community partners. However, when used in combination with a comprehensive evaluation of programs and services, the introduction of a tool that quantifies coordination and integration in a health care setting adds to the legitimacy of integration and coordination efforts and is an integral strategy for delivering evidence-based results to managers, policy and decision makers. Evaluation tools such as this can also be a catalyst for innovation in the planning and delivery of health care. The use of representative evaluation teams for these types of evaluations can have potential positive outcomes for chronic care delivery and management such as the formation of strategic alliances, partnerships and coalitions with parties outside the traditional health system, or the 'usual suspects' and as a

tool for continued professional development. To obtain integration ranks (both actual and optimal) the evaluation team needs to reach group consensus. As a group activity, the process of rating coordination and integration has the ability to foster group learning as well as defining obstacles, problems and potential solutions. By selecting optimal integration ranks within, between and across programs and services, staff and community partners can work together towards a common, established level of coordination and integration.

Beyond Integration and Coordination in the Health Care Silo: Implications for Population and Public Health

In British Columbia, where the provincial government has adopted the ECCM as the foundation for chronic disease management, evaluation of programs and services that address disease prevention and health promotion are essential to the longevity of this framework. The next step for chronic disease management services in programming and evaluation in British Columbia is to create buy-in from stakeholders for comprehensive interventions and programs that address multiple risk and protective factors operating across multiple sectors. These interventions would include a multitude of community partners and across a continuum of services (Browne et al., 2004). This concept is visually represented by the Model for Human Service Integration proposed by Browne and colleagues (2004) (see Appendix 7). This model identifies three dimensions of integrated human services: sectors (i.e. health, education, housing, social services, labour, judicial system, business), services (prevention, early interventions and clinical) as well as sources of funding (public, private and non-profit). It is models such as these that can serve as a planning tool for chronic disease services, such as NSCDS, to go beyond integration and collaboration with traditional partners (other chronic disease related VCH programs and community partners) to promote

service integration at the macro level. The delivery of truly collaborative and integrated chronic disease care would require integration across most human services. This model and its subsequent measurements can be useful in identifying the level of total and partial integration of human services along each axis (sectors, services and funding sources). However, integrating service delivery through multiple sectors and varying funding structures is not without its own unique challenges (Browne et al., 2004). Evidence related to the integration of school-aged programs in Ontario has found barriers in identified funding, turf and autonomy as major barriers to integration (Volpe, Batra and Bomio, 1999).

Conclusion

This paper has offered both the background and methods involved in the process of tailoring the Scale of Functional Clinical and Community Integration for NSCDS as part of a comprehensive program evaluation framework. Through the application of an evaluation planning tool, program logic model, evaluation framework and evaluation guideline, this paper also speaks to the feasibility of comprehensive program evaluations for chronic disease strategies. The addition of a tool that measures actual integration and coordination between programs and services is an exciting and new addition to Canadian evaluation research. Additional research needs to be conducted to determine reliability, validity and feedback from staff and stakeholders regarding evaluation processes and results. Further implementation of this tool should be utilized and expanded to evaluate and improve coordination and integration not only in chronic disease services, but other health care and social services that could benefit greatly from measuring coordination and integration with and between services.

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Appendix 1: NSCDS Program Logic Model and Evaluation Framework

OUTCOME MEASUREMENT FRAMEWORK—NORTH SHORE CHRONIC DISEASE SERVICES (NSCDS)

<p>PURPOSE:</p> <p>To develop and implement a coordinated and patient-centered chronic disease management and prevention strategy for the North Shore.</p>	<p>SITUATION ASSESSMENT:</p> <p>While several CDM initiatives have been undertaken at VCH, to date there is no coordinated regional approach. This framework addresses this gap in the North Shore through the design and implementation of an integrated and coordination effort in chronic disease management. These initiatives link the other departments, as well as community and academic agencies. This logic model shows the two-year plan in this multi-year effort. Some of the components are beyond the scope of the CDS portfolio and require collaboration with other departments. Collaboration with the Primary Care teams for better support of GP practices is a critical component, as they are the cornerstone of chronic care in BC.</p>
<p>TIMEFRAME:</p> <p>June 2008 June 2010</p>	<p>PROFILE OF CHRONIC DISEASES ON THE NORTH SHORE¹</p> <p>The health service delivery area of the North Shore is comprised of West and North Vancouver. In 2006, the total number of residents living on the North Shore was 169 858. As in other communities around British Columbia and in the rest of Canada, the population on the North Shore is aging. Approximately 15.9% of the population are 65-years of age or older, with 1 in 5 residents in West Vancouver being 65-plus years of age. Age is an important risk factor in developing chronic diseases, as the number of individuals 75 years or older are three times more likely to have four or more chronic conditions than individuals in the 50-64 year-old age group. Approximately 34% of the North Shore population is comprised of immigrants with 28% of the population on the North Shore self-identified as a visible minority. The proportions of visible minorities vary significantly between the City of North Vancouver (26%) and West Vancouver (22.6%). Overall, there is a greater representation of West Asian, Korean, Filipino and Japanese on the North Shore in comparison to the rest of British Columbia. The majority of the population on the North Shore speaks English, followed by Persian (Farsi), Korean and Chinese. Just over 1% of the North Shore population self-identifies as Aboriginal (First Nations, Métis or Inuit). Specific health statistics for immigrants and Aboriginal populations on the North Shore is not available. Approximately 35% (N=34 904) of adults on the North Shore have one or more chronic diseases. In 2005-2006 the most common chronic conditions included hypertension (N=26 667) followed by depression (N=14 847), asthma (N=12 154) and osteoarthritis (N=11 465).</p>
<p>TARGET POPULATION:</p> <p>People with chronic diseases or at risk of developing chronic diseases and their families including:</p> <ul style="list-style-type: none"> -Marginalized populations -Adults and older adults -Children 	<p>The Medical Day Centre at Lion's Gate Hospital houses many of the ambulatory chronic disease services offered on the North Shore. Chronic disease services at the MDC include: The Diabetes Education Centre (DEC), Foot Clinic, Cardiac Rehabilitation, Nutritional Counseling, Breath Program, COPD and Asthma Education and Liver Services. The MDC is also the site for Medical Group Visits (MGVs) on the North Shore. MGVs involve many patients with the same or similar chronic condition sharing an appointment with a physician.</p>

NORTH SHORE CHRONIC DISEASE SERVICES PROGRAM LOGIC MODEL

INPUTS	STRATEGIES	ACTIVITIES	OUTPUTS	PROCESS INDICATORS	OUTCOMES
Human Resources <ul style="list-style-type: none"> • DEC <ul style="list-style-type: none"> -Registered Nurses: 2 x 1.0 FTE, 1 x 0.9 FTE -Dieticians: 1x 0.62 FTE, 1x 0.7 FTE • Breath Program <ul style="list-style-type: none"> -Registered Nurses 1x 0.2 FTE -Respiratory Therapists 1x 0.2 FTE • Cardiac Rehab <ul style="list-style-type: none"> -Exercise Specialists 2x 0.136 FTE, 1x 0.58 FTE • Nutritional Counseling <ul style="list-style-type: none"> -Dieticians 1x 0.25 FTE • Asthma/COPD Education <ul style="list-style-type: none"> -Respiratory Therapists 1x 0.2 FTE • Foot Clinic <ul style="list-style-type: none"> -Registered Nurses 1 x 0.4 FTE -Occupational Therapist 1x 0.1 FTE • Liver Service <ul style="list-style-type: none"> -Registered Nurse x FTE • Patient Care Navigator 1 x 0.4 FTE • Clerical 1.8 FTE • Chronic Disease Team Leader 1 x 1.0 FTE Material Resources <ul style="list-style-type: none"> • Medical Day Centre (MDC) • 3 Education Rooms • 1 Gym • 7 Assessment rooms Fiscal Resources <p>Partners</p> <p>1)VCH PSP Program IHN Program Population Health Healthy Living</p> <p>2)Industry</p> <p>3)Community</p>	Strengthen Primary Care Networks	Support local GP practices to incorporate evidence-based chronic care services	<ul style="list-style-type: none"> __ GP Partners Engaged __ of people attending CDM networking sessions __ of presentations/collaborations with primary care teams (IHN, PSP) 	<ul style="list-style-type: none"> # of GP partnerships # of people attending CDM networking sessions # of physicians reached through GP engagement tour 	Knowledge/Awareness Patients and caregivers on the North Shore are aware of CDS offered for their chronic disease(s) Satisfaction Patients and caregivers on the North Shore are satisfied with CDS received. Self-Efficacy Patients and Caregivers on the North Shore are able to confidently and effectively self-manage their chronic disease(s) Clinical Practice Guidelines Patients and caregivers chronic disease(s) are managed according to best-practice guidelines.
		Re-align Community Services	Engage patient as partner in the design and implementation of chronic disease programs and services	<ul style="list-style-type: none"> __ of patients consulted on service gaps and program design 	
	Provide evidence-based direct chronic care services to people living with a chronic condition on the North Shore		<ul style="list-style-type: none"> __ of patients accessing CDS at the MDC __ Breath __ DEC __ Nutritional Counseling __ COPD/Asthma Education __ Cardiac Rehab 	<ul style="list-style-type: none"> # of people accessing services @ MDC # of patients in MGVs 	
	Build an integrated Chronic Care Centre on the North Shore		<ul style="list-style-type: none"> Clinics at the MDC operate efficiently to support patients with multiple chronic conditions 	<ul style="list-style-type: none"> # of initiatives to integrate clinics (training, operational) # of cross referrals 	
	Build community partnerships and develop community agency capacity to strengthen networks of chronic care		<ul style="list-style-type: none"> __ of partnerships established __ of service agreements 	<ul style="list-style-type: none"> List and #'s of partnerships explored/list # of service agreements signed List and #'s of community capacity initiatives implemented 	
	Increase access to chronic disease services through outreach clinics		<ul style="list-style-type: none"> __ of chronic care clinics offered in the community that target vulnerable groups 	<ul style="list-style-type: none"> # of people attending community clinics # of clients served # of partners engaged 	
	Develop case management and patient navigation services for frail patients with complex conditions.		<ul style="list-style-type: none"> Chronic disease prevention nurse assists __ of patients in accessing chronic care programs in VCH and the community 	<ul style="list-style-type: none"> # of patients served# of linkages between navigation services and other programs 	
	Establish closer linkages between Lion's Gate Hospital and NSCDS		<ul style="list-style-type: none"> __% of patients discharged from acute care are directly linked to CDS 	<ul style="list-style-type: none"> # of training sessions with discharge coordinators and acute care staff % of patients discharged from acute referred to CDS 	
	Collaborate in development of Acute Transition Services that ensure continuity of care between acute and community services		<ul style="list-style-type: none"> __ of Acute Transition Services established 	<ul style="list-style-type: none"> # of Acute Transition Services List of Acute Transition Services 	
	Support Acute Services	Develop professional training programs for staff	<ul style="list-style-type: none"> __ of chronic care staff trained in best practices in chronic care __ of staff attending programs % of staff attending programs 	<ul style="list-style-type: none"> % of staff attending programs __ of staff attending programs 	Coordination of Care CDS on the North Shore are well coordinated with strong linkages within and between chronic disease services. Efficacy CDS on the North Shore efficiently provide the most appropriate care by the most appropriate provider. Partnerships Partnerships are created and sustained with traditional and non-traditional partners to address the social determinants of health Population Outcomes North Shore CDS supports population health and primary prevention strategies
		Provide research planning and information management support in CDM to clinical & administrative staff teams on the NS	<ul style="list-style-type: none"> A comprehensive CDS plan for the NS is developed 	<ul style="list-style-type: none"> # of information products developed (directories) 	
		Design and implement a process and outcome evaluation for all chronic care programs	<ul style="list-style-type: none"> Evaluation Strategy and Framework Process and Outcome Evaluation Completed 		
Build Effective Support Strategies					

PROGRAM EVALUATION FRAMEWORK

	OUTCOMES	EVALUATION QUESTIONS	INDICATORS (indication of how you know you achieved the outcome)	COLLECTION METHODS (tools or methods used)	DATA SOURCES (from who or where)	WHO (will collect the data)	WHEN (how often data collected)
PATIENT AND CAREGIVERS	<p align="center">SATISFACTION</p> <p>Patients and caregivers on the North Shore are satisfied with the chronic disease services received.</p>	<p>1. Do the CDS being offered:</p> <p>a) Emphasize patient patient-health care team interaction?</p> <p>b) Emphasize self-management supports?</p> <p>2. Are the CDS programs on the North Shore accessible (locations, hours, costs, materials)?</p>	<p>1. a-b)Level of patient satisfaction, delivery system design and decision support, goal setting, problem solving/contextual counseling and follow-up and coordination.</p> <p>2. Reported accessibility</p>	<p>Patient Assessment of Chronic Illness Care (PACIC, 2004)</p> <p>(Adding questions on accessibility)</p>	<p>Participants in North Shore Chronic Disease Services at the Medical Day Centre.</p>	<p>Health Care Professionals and Educators</p>	<p>At the beginning and end of each program</p>
	<p align="center">SELF EFFICACY</p> <p>Patients and caregivers on the North Shore are able to confidently and effectively self-manage their chronic disease(s).</p>	<p>1. How do CDS effectively improve patient's ability to self-manage their chronic disease?</p> <p>2. Do patients in CD programs understand the role of the health care provider in assisting them to self-manage their disease?</p>	<p>1.a) Patient's level of confidence in self-managing their chronic disease(s).</p> <p>b) Patients report a change in knowledge, skills, attitude in behaviour pre and post program.</p> <p>2. Self-management supports</p>	<p>1. a) Self-Efficacy for Managing Chronic Disease 6-Item Scale (Stanford Patient Research Education Centre)</p> <p>b.)Disease/Program Specific Surveys (ie. DEC)</p> <p>2. Health Literacy Study</p>	<p>Participants in North Shore Chronic Disease Services at the Medical Day Centre.</p>	<p>Health Care Professionals and Educators</p>	<p>At the end and beginning of each program</p>
	<p align="center">KNOWLEDGE/AWARENESS</p> <p>Patients and caregivers on the North Shore are aware of the Chronic Disease services offered.</p>	<p>1. Is information about CDS readily available in sites commonly accessed by people on the North Shore?</p> <p>2. Are CDS being advertised effectively to key stakeholders?</p>	<p>The degree to which information regarding the programs is readily available in sources that is shown to be frequently accessed by residents on the North Shore.</p>	<p>Interviews with Program Managers</p> <p>Health Literacy Study</p>	<p>Program Manager-Interview</p> <p>Comparison to Health Literacy Study</p>	<p>Evaluator</p> <p>Program Manager</p>	<p>Annually</p>
	<p align="center">CLINICAL OUTCOMES</p> <p>Patients and caregivers on the North Shore are managed according disease specific clinical practice guidelines.</p>	<p>1. Are patients in CDS programs being managed using clinical practice guidelines for their condition?</p>	<p>Specific disease indicators for each chronic disease (to be determined by clinical practice guidelines and health care professionals) ⁱⁱ</p>	<p>Database Search (EMR)</p>	<p>Electronic Medical Records (EMR)</p>	<p>Evaluator</p> <p>Program Manager</p>	<p>Annually</p>

	OUTCOMES	EVALUATION QUESTIONS	INDICATORS (indication of how you know you achieved the outcome)	COLLECTION METHODS (tools or methods used)	DATA SOURCES (from who or where)	WHO (will collect the data)	WHEN (how often data collected)
HEALTH CARE PROVIDERS	<p>SATISFACTION</p> <p>Health care providers on the North Shore are satisfied with the quality of chronic disease services they offer.</p>	1. Are health care providers on the North Shore satisfied with the quality of programs and services offered?	Level of provider satisfaction	Provider Satisfaction Survey (DMAA, 2008) Interviews Focus Groups	Health Care Providers	Department Program Manager Evaluator	Annually
	<p>SELF MANAGEMENT SUPPORTS</p> <p>Health care providers on the North Shore feel confident in their ability to help patients self-manage their chronic disease(s).</p>	1. Do health care professionals in the North Shore feel confident in their ability to help patients self-manage their chronic disease(s)? 2. How well do North Shore health care professions understand their role in patient care regarding self-management?	1. Level of provider confidence in providing patient care. 2. Health care providers level of understanding of self-management support (SMS).	Survey Interviews Focus Groups	Health Care Providers	Program Manager	Annually
	<p>KNOWLEDGE/AWARENESS</p> <p>Health care providers on the North Shore are aware of chronic disease services available in VCH and the community and are linked into a network of care.</p>	1. Are health care professionals on the North Shore aware of chronic disease services offered in VCH and the community? 2. Do health care providers on the North Shore feel they are linked in to a network of care?	1. Level of awareness of services available 2. Self-reported level of linkage to a network of care	Survey Interviews Focus Groups	Health Care Providers	Program Manager	Annually
	<p>EVIDENCE-BASED CARE</p> <p>Health care providers on the North Shore provide evidence-based care within the continuum of chronic disease care.</p>	1. Are North Shore health care providers aware: a. Of clinical practice guidelines in their discipline? b. The benefits of evidence-based practice? 2. Are North Shore health care providers confident in their programs ability to provide evidence based care?	1. Level of awareness of best practice guidelines (disease specific) 2. Level of confidence in ability of program to provide evidence-based care.	Survey Focus Group Interview	Health Care Providers	Program Manager	Annually

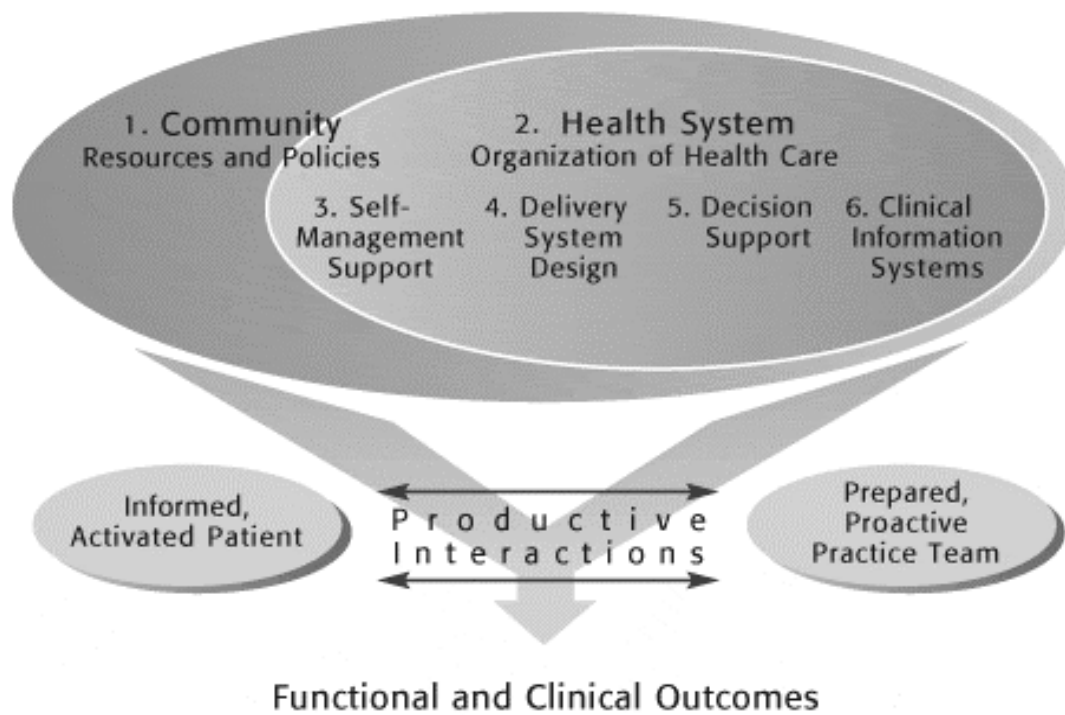
	OUTCOMES	EVALUATION QUESTIONS	INDICATORS (indication of how you know you achieved the outcome)	COLLECTION METHODS (tools or methods used, numbers correspond to indicators measured)	DATA SOURCES (from who or where)	WHO (will collect the data)	WHEN (how often data collected)
COMMUNITY AND HEALTH CARE SYSTEM	<p>COORDINATION AND INTEGRATION</p> <p>Chronic disease services on the North Shore are well coordinated and linked into a network of care.</p> <p>[Delivery Design/Reorient Health Services]</p>	<p>1. How well are NSCDS connected to other programs in VCH and the community?</p> <p>2. How well is patient information shared between chronic disease services?</p>	<p>Ratio scale of integration (0=full segregation, 100=full integration regarding:</p> <ul style="list-style-type: none"> -patient referrals -information sharing -network of care -network managers -pooled resources 	Scale of Functional Clinical Integration ⁱⁱⁱ	Program Managers	<p>Evaluator</p> <p>Program Manager</p>	Annually
	<p>EFFICIENCY</p> <p>Chronic disease services on the North Shore efficiently provide the most appropriate care by the most appropriate provider.</p> <p>[Delivery Design/Reorient Health Services]</p>	<p>1. Are Chronic Disease Services as lean as possible regarding:</p> <p>a. human and material resources?</p> <p>b. time management?</p>	<p>1. Ratio of patients to staff</p> <p>2. Cost-efficiency</p> <p>3. Productive staff time</p> <p>(see evaluation guideline for more details)</p>	<p>Operational Reviews</p> <p>Interviews</p>	Program Managers	<p>Evaluator</p> <p>Program Manager</p>	Annually
	<p>PARTNERSHIPS</p> <p>NSCDS creates and maintains partnerships with traditional and non-traditional partners to address social determinants of health.</p> <p>[Proactive Community Partner and Build Healthy Public Policy and Strengthen Community Action]</p>	<p>1. Does NSCDS have a strategic map of community partners that address SDoH?</p> <p>2. Do partnerships exist between key organization in the community and the North Shore Chronic Disease Services?</p> <p>3. Are service agreements in place between the North Shore Chronic Disease Services and key organizations in the community?</p>	<p>1. Knowledge and understanding of related programs in the community.</p> <p>2. Number of existing partnerships</p> <p>3. Number of service agreements</p>	<p>Operational Reviews</p> <p>Interviews</p>	Program Managers	<p>Evaluator</p> <p>Program Manager</p>	Annually
	<p>POPULATION OUTCOMES</p> <p>North Shore Chronic Disease Services supports population health and primary prevention strategies.</p> <p>[Create Supportive Environments and Delivery Design/Reorient Health Services]</p>	<p>1. How well does North Shore Chronic Disease Services support population health and primary prevention and advocate for healthy public policy?</p> <p>2. Within the core functions framework, how has the NSCDS implemented these public health strategies?</p>	<p>The degree to which programs and services offered align with Core Functions for Public Health Programs</p> <p>The degree to which programs and services align with the vision and mission of VCH.</p>	<p>Operational Reviews</p> <p>Interviews</p>	Program Managers	<p>Evaluator</p> <p>Program Manger</p>	Annually

ⁱ Sarte, A.F. (2008). Chronic Disease Management Inventory of North Shore Programs and Services. *Vancouver Coastal Health*

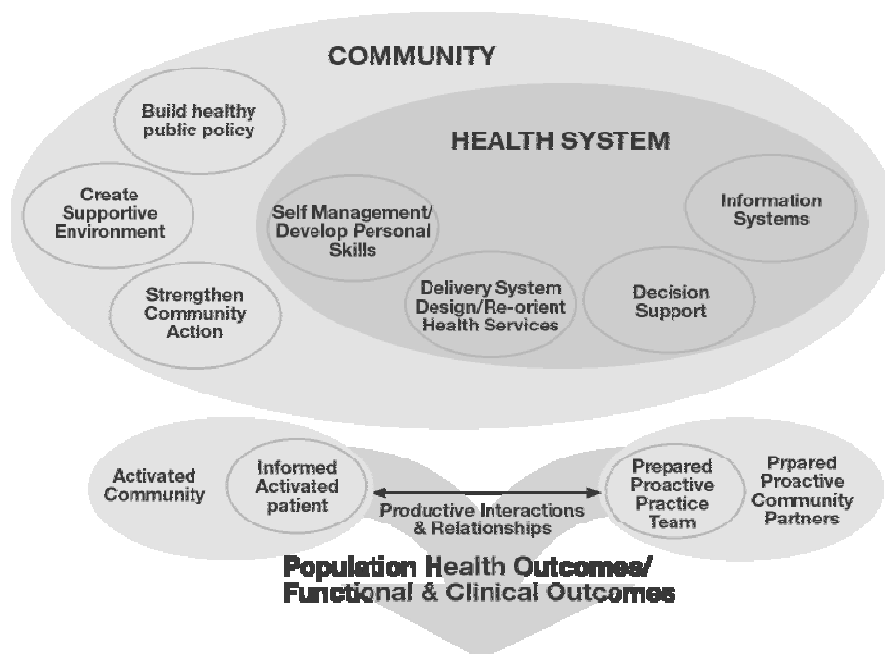
ⁱⁱ Disease Specific

1. Diabetes (Canadian Diabetes Association-Clinical Practice Guidelines for the Prevention and Management of Diabetes in Canada, 2008) <http://www.diabetes.ca/files/for-professionals/CPGExecSummaryEssentials.pdf>
 - i. At least: 2 HBA1c tests per year
 - ii. One eye exam within 2 years
 - iii. One microalbumin test per year
 - iv. One lipid test within 3 years
2. Chronic Respiratory Diseases
 - a. COPD (COPD Guidelines (<http://www.copdguidelines.ca/pdf/07COPD%20guidelines.pdf>) Goals of COPD Management:
 - i. ACE-1 (or ARB)
 - ii. ARB, Beta blockers, diuretic Digoxin
 - iii. LV ejection fraction by ECHO or RNV
 - b. Asthma (Canadian Asthma Consensus Guidelines http://www.cmaj.ca/cgi/content/full/173/6_suppl/S3)
 - i. Prevention
 - ii. Pharmacotherapy
 - iii. Education and follow-up
 1. Pulmonary function (spirometry) should be done regularly, PEF (peak expiratory flow)
 - 2.
3. Mental Illness (<http://publications.cpa-apc.org/browse/documents/67&xwm=true>)
 - a. Anxiety
 - b. Depression
- 4.

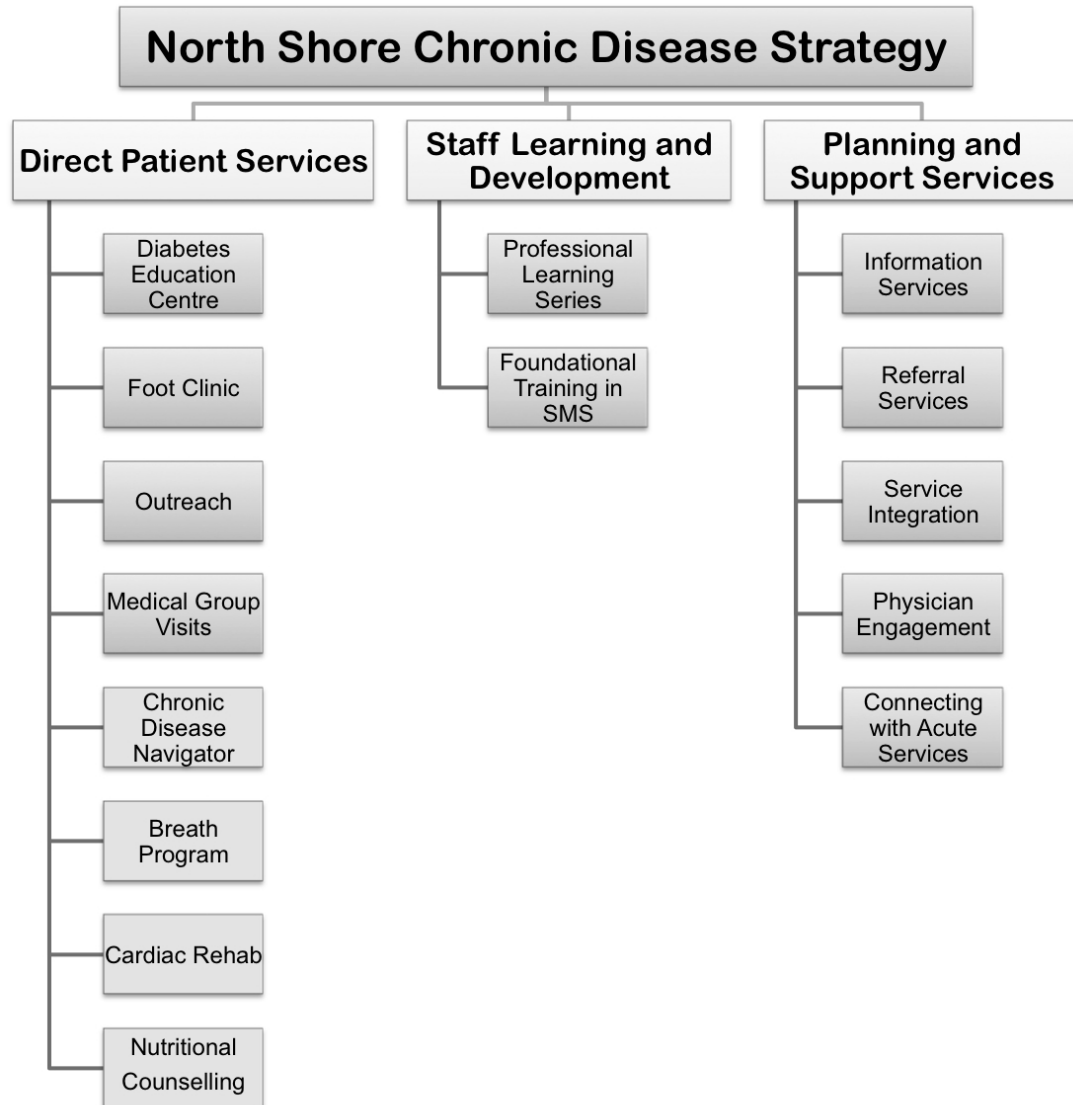
Measures from Chronic Disease Management (Sept. 2003), BC Ministry of Health Services

Appendix 2: Chronic Care Model (CCM)

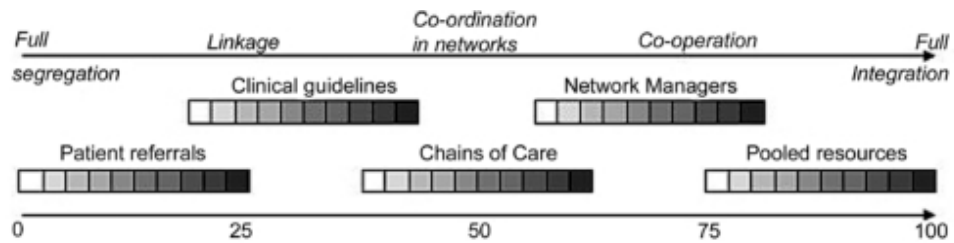
Appendix 3: Expanded Chronic Care Model (ECCM)



Created by: Victoria Barr, Sylvia Robinson, Inés de Marin-Liak, Lisa Underhill, Anita Datta & Darlene Rowlands (2002)
 Adapted from Glasgow, R., Grimsa, C., Wagner, E., Chung, S., Soberg, L. (2001). Does the Chronic Care Model also serve as a template for improving prevention? *The Milbank Quarterly*, 79(4), and World Health Organization, Health and Welfare Canada and Canadian Public Health Association. (1986). *Osaka Charter of Health Promotion*.

Appendix 4: NSCDS Program Map

Appendix 5: Scale of Functional Clinical Integration



Aghrem and Axelsson (2005)

The spectrum of grey squares in the model represents an increasing relative number of cases in that specific category.

Appendix 6: Evaluation Planning Tool NSCDS

Steps	Tasks	Timeline	Complete	Deliverables
Focus the Evaluation	Evaluation Purpose	August 2009	√	Evaluation Questions and Dissemination Plan
	Program Logic Model	August 2009	√	
	List Stakeholders	August 2009	√	
	Evaluation Questions	August 2009	√	
	Feasibility Check	August 2009		
	Plan for Dissemination			
Methods	Outline expectations of stakeholders	August 2009	√	Evaluation Framework/Guideline
	Create a data collection plan	August 2009	√	
	Logics Plan and Feasibility Check			
Data Collection	Collect Data			Data/Findings
	Data Analysis			
Decisions	Interpret Findings			Reports to Stakeholders
	Follow dissemination/action plan			
	Report			

Appendix 7: Model of Human Service Integration

Relevant RESEARCH - INTEGRATION						
GOAL/FOCI	UNIVERSAL	EARLY INTERVENTION	CLINICAL/REMEDIAL	PUBLIC	PRIVATE	NON-PROFIT
Health						
Social Services						
Education						
Housing						
Child Care						
Recreation						
Labour						
Corrections						

From Browne et al. 2004

**Appendix 8: NSCDS Evaluation Guideline 2009-2010 Excerpt for Evaluating
Coordination and Integration**

III. Health Care System and Community Outcomes

Coordination and Integration: *Chronic disease services on the North Shore are well coordinated and linked into a network of care*

Efficiency

Partnerships

Population Outcomes

Evaluation Questions:

1. How well are NSCDS connected to other programs in VCH and the community?
2. How well is patient information shared between chronic disease services?

Indicators:

1. Ratio scale of integration (0=full segregation, 100=full integration):
 - a. Patient referrals
 - b. Information sharing
 - c. Network of care,
 - d. Network managers
 - e. Pooled resources

Collection Methods:

1. *Scale of Functional Clinical and Community Integration for NSCDS* (Modified from Ahgren and Axelsson, 2005)

- a. **Background:** This model for measuring integrated care measures both structural aspects and behavioural aspects (professional behaviour and attitudes) of integration in chronic disease care (Ahgrem and Axelsson, 2005). This tool can be used to measure intra-organizational and inter-organizational integration. This model of measurement is based on a continuum of integration (see Figure 2) and has been operationalised into a ratio scale of different categories with an equidistant graduation of ranks as follows:
- b. **Coordination and Integration on the North Shore means:** NSCDS, other VCH programs and community partners (usually semi to autonomous organizations) work together to improve the health of the population of the North Shore, including those with chronic diseases.
 - i. **Full segregation** (rank=0): NSCDS, other programs in VCH, and community partners work independently, with little or no use of formalized pathways for patient referrals or consistent use of clinical guidelines.
 - ii. **Linkage** (rank=25): There is adequate referral of patients between NSCDS, other programs in VCH and the community partners. Good communication exists between health care professionals and program staff and clinical guidelines are readily available for consultation.
 - iii. **Coordination in networks** (rank=50): NSCDS, other VCH programs and community partners are better coordinated than in 'linkages'. Services and programs coordinate multiple health services, share clinical information and manage the transition of patients between different programs and services. Networks of care are included (see definition above) and other health care networks are in place and functioning at this level, however no network managers (see definition below) are in place. The existence of such managers would indicate a higher level of integration.
 - iv. **Cooperation** (rank=75): A form of coordination and integration exists in which network managers are appointed to improve the contacts between NSCDS, other VCH partners and community partners, however these units still function independently. Service agreements are in place between some NSCDS, other VCH programs and/or community partners and managed through network managers.
 - v. **Full integration** (rank=100): The resources of NSCDS, other VCH programs and community partners are pooled (i.e. some human, physical and fiscal) to a certain extent to reduce and avoid duplication of services and programs. The aim is to develop comprehensive services attuned to the needs of specific patient groups. These comprehensive services are backed by service agreements with all other relevant VCH programs and community partners. This level of integration and coordination requires cooperation between different professional groups to assemble the necessary services and to allocate the appropriate resources.
- b. This instrument was designed to take advantages of a ratio scale and sum and mean ranks of integration can be calculated. However, when teams are

evaluating the level of integration of care, it is important to avoid the normative implications of a ratio scale, that higher ranks of integration are always 'better' than lower ranks.

- c. For the purposes of evaluation within NSCDS, we have slightly modified the evaluation tool to measure the level of integration of the following categories: (see Figure 1)
 - i. **Patient referrals:** Referrals from one health care provider to another (GP, specialist, health promotion specialists and other health care providers and partners) often occurs between two levels of care (i.e. between primary and secondary care, but it can also include between primordial and tertiary levels of care).
 - ii. **Information Sharing:** Pertinent patient information is readily shared between different providers to ensure continuity of care
 - iii. **Networks of Care:** Programs and services collaborate to offer a more comprehensive level of care where program redundancies and duplications are avoided.
 - iv. **Network Managers:** have the authority and resources to continually improve a network of care. Network managers' work to improve communication and coordination and integration between programs and services within NSCDS, other VCH programs and community partners.
 - v. **Pooled Resources:** All earmarked resources for a specific group of patients are put together so that all the health care activities for this patient group are fully integrated.
- d. **Reliability and Validity of Tool:** An explorative study tested the reliability and validity of the functional clinical integration scale in the southwest part of Sweden in 2005, found that this model of measurement seems to have a good inter-respondent reliability and a Pearson-correlation co-efficient of 0.821 (P-value=0.000).
- e. **Evaluation Steps: (instructions)**
 - i. An evaluator who is familiar with the scale of functional clinical integration will be required to conduct the evaluation sessions for health care teams. Some statistical analysis of the data will also be a required skill set of the evaluator.
 - ii. Team members from each of the direct patient services at NSCDS (see program map) should be assembled so that different professions within the program are represented. This work should be as comprehensive as possible and preferably should be accomplished as a team, not by a single person, or profession.
 - iii. The data we are collecting concerns the level of actual clinical and community integration (collaboration, coordination or cooperation between programs here at NSCDS). Thus, this evaluation does not include integration effects such as changes of health status among patients, health care costs, etc.

- iv. A continuous scale is used (see Figure 1) for measuring integration rank. As an evaluation team, derive *an actual integration rank* for each NSCDS service, program or initiative between and within other VCH and community programs and services.
- v. The derivation of integration ranks starts with identification of the highest existing form of integration (for example, pooled resources). The grayish square in Figure 1 represents the increasing relative number of cases in the different categories. Please observe that the scale is *continuous* and any rank between 0-100 can be used, as the scale consists of some overlapping parts.
- vi. As well as ranking the level of integration for your program and within programs, we will ask you to register the level of integration that you consider the *optimum* level for developing a well functioning chronic care service on the North Shore. Please use the same continuous ranking scale from 0-100, and place your results in the column marked 'optimum' on the Integration Ranking Form.
- vii. These results should be reviewed to make sure the evaluation team reaches consensus and any questions will be answered at this time by the evaluation facilitator.

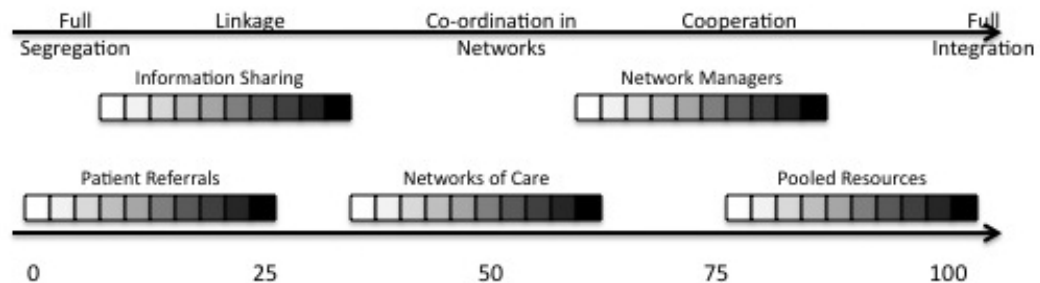


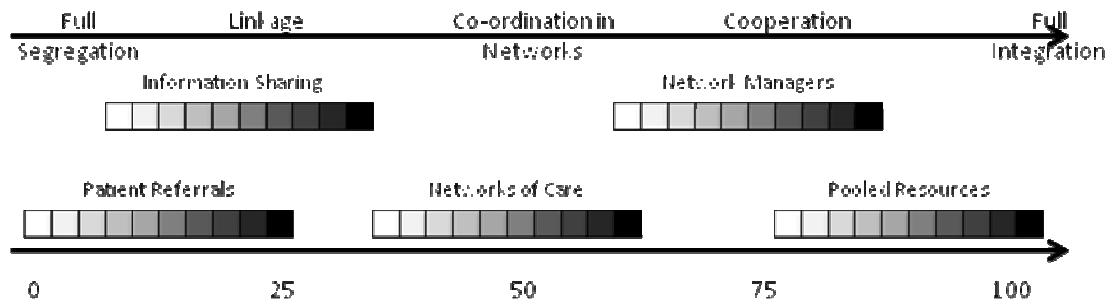
Figure 1: Modified scale of functional clinical integration (Ahgrem and Axelsson, 2005).

Appendix 9: Health and Economic Comparison of Canada and Sweden

	Canada	Sweden
Population, total (million)	33.3	9.2
Life expectancy at birth, total (years)	80.6	80.9
Government Structure	Parliamentary government	Parliamentary democracy and constitutional monarchy
GDP ²⁰	\$1.4 trillion USD	\$480 billion USD
% of GDP health and medical care	9.9%	9%
Health Care Financing	Provincial territorial (69.9%) and municipal taxes make up the majority of funding. A smaller portion (30.1%) comes from private contributions (health insurance and out of pocket costs)	Mix of county and municipal taxes, central governments grants, patient fees and payroll tax from employees and employers
Health Care Delivery	Providers are mostly private practitioners. Hospitals are mostly not-for-profit entities.	Majority of health care providers are public. Hospitals are mostly independent public facilities with the degree of privatization varying between counties.

²⁰ World Bank, Development Indicators Data Finder

Appendix 10: NSCDS Scale of Clinical and Community Integration



Scale modified from Ahgren and Axelsson (2005) by NSCDS

