INTRODUCTION

Background

To inform the Chronic Disease Initiative at Capital Health, a literature review was conducted to identify principles and best practices for integrated and coordinated chronic disease management, with an emphasis on managing multimorbidity.

Using the Expanded Chronic Care Model (Barr et al., 2003) as an overarching framework, this review aims to identify evidence relating to delivery systems redesign (reorientation of health care services) and self-management supports, the two components of the framework shown to have the strongest evidence base when implemented successfully. Through synthesis of the literature, this review describes:

- An overview of chronic disease and chronic disease management
- The impact of chronic disease on the health care system and across sectors
- Principles of coordination/integration
- Principles and best practices for service delivery planning from a patient-centred and multimorbidity perspective

This review includes systematic reviews, peer-reviewed articles, and grey literature. Databases searched include: PubMed, Ebsco Host, Canadian Health Research Collection, Canadian Public Policy Collection, the Cochrane Library, and Google/Google Scholar. High-level MeSH terms include: “Chronic Disease”, “Cluster Analysis”, “Delivery of Health Care, Integrated”, “Delivery of Health Care, Coordinated”, “Delivery of health care/organization and administration”, “Models/Organizational” and “co-morbidity/multimorbidity.”

Developing a Chronic Disease Management Strategy at Capital Health

The purpose of the Chronic Disease Initiative at Capital Health is to adopt or build a model and
change plan that supports patient-centred, integrated care for those citizens within Capital Health living with a chronic condition.

The scope of the project includes:

- Consideration of current processes, programs, and services related to the provision of chronic disease management care within Capital Health
- Recommendations related to streamlining and aligning opportunities across service areas in order to achieve an optimized service delivery model for chronic disease management that spans the continuum of care for patients and their families
- Model/strategy framework design and development to create the conditions to facilitate any changes in practice, processes, and procedures related to programs and services as required.

The Expanded Chronic Care Model (Barr et al., 2003) has been adopted as the overarching framework to guide the work and the development of a service delivery model that spans the continuum of care.

**AN OVERVIEW OF CHRONIC DISEASE & CHRONIC DISEASE MANAGEMENT**

**Defining Chronic Disease & Chronic Disease Management**

The World Health Organization (WHO, 2012) defines chronic disease as any disease that is long in duration and generally of slow progression that requires ongoing management. Chronic conditions typically do not go into spontaneous remission and they often limit the functioning, productivity, and quality of life of those afflicted, especially when poorly managed (Institute of Medicine (IOM), 2012). More detailed definitions of chronic conditions do exist to reflect their complexity as chronic conditions are increasingly being recognized as a systemic issue. Thus, their management requires cooperation between different sectors in the health care system and reaches beyond the scope of health providers to recognize the role of family, caregivers, and self-management (Nasmith et al., 2010).

Through looking at common themes between various definitions of chronic illness worldwide, Nolte & McKee (2008) suggest chronic disease is defined as:

“Conditions that require a complex response over an extended time period that involves coordinated inputs from a wide range of health professionals and access to essential medicines and monitoring systems, all of which need to be optimally embedded within a system that promotes patient empowerment” (p.1).

Historically, the scope of conditions considered ‘chronic’ has been limited to cardiovascular disease (e.g., stroke, hypertension), respiratory disease (e.g., COPD, asthma), diabetes mellitus, and arthritis. However, given advances in medicine and social welfare, many people are living longer with their diseases. Accordingly, the chronic disease definition has broadened to include others disease once considered to be acute, such as renal disease, some cancers, and some communicable disorders such as HIV and AIDS (Nasmith et al., 2010). As well, mental health disorders (e.g., depression, schizophrenia, and dementia), musculoskeletal disorders, and disabilities (e.g., sight and hearing impairment) are included in more modern definitions of chronic disease (Nolte & McKee, 2008; Busse et al., 2012; Nasmith et al., 2010).

Many current and past approaches for managing chronic, long term conditions of varying severity have taken multidimensional approaches, which have been largely uncoordinated and unsustainable. For example, Norris et al. (2003) describe current system approaches as being reactive as opposed to proactive, fragmented, and disorganized, with high levels of duplication, a lack of evidence-based decision making, and a failure to coordinate and align care.
making, and with the onus placed on the patient to navigate the system. Taken together, these factors often result in sub-optimal care for patients (Norris et al. 2003; Morgan et al., 2007; referred to as the “Quality Chasm,” IOM, 2003).

Recognizing the importance of viewing chronic disease from a systemic point of view, Singh (2008) defines chronic disease management as:

> “a systematic approach to coordinating health care interventions across levels (individual, organizational, local, and national), and good evidence indicates that such coordination across care settings and providers is more effective than single, uncoordinated interventions” (p. 4).

Care systems are historically designed to respond rapidly to acute and episodic illnesses and injuries where a patient’s role is largely passive. Chronic diseases, however, require prolonged management and control (as well as prevention) and an informed, activated patient to prevent exacerbations and maximize functionality and quality of life. This requires fundamental systems change and redesign (Wagner et al., 2001; Kreindler, 2009; Barr et al., 2003; Morgan et al., 2007).

**Multimorbidity Management**

Many chronic conditions, especially highly prevalent chronic conditions, frequently co-occur. According to van Weel and Hartman (2009), “in the primary care population, co-morbidity and multimorbidity have become a rule rather than an exception” (par. 2).

To support this assertion, Weiss et al. (2007) demonstrated that five highly prevalent chronic conditions (coronary heart disease, stroke, diabetes, arthritis, and chronic lower respiratory tract disease) rarely occur in isolation. In this analysis, each condition occurred in isolation less than 20% of the time, meaning 80% of the time, the condition was present with another chronic condition (exception: arthritis, 47%). Boyd and Fortin (2010) note that isolated presentation would occur even less frequently when considering a broader array of chronic conditions.

For the purpose of this review, Boyd and Fortin’s (2010) definition of multimorbidity is being adopted:

> “the coexistence of two or more chronic conditions, where one is not necessarily more central than the others” (p. 453).

From a patient perspective, multimorbidity affects quality of life (inverse relationship), ability to work and employability, level of disability, and life expectancy (Boyd & Fortin, 2010; Smith 2012a). Additionally, individuals with multimorbidity have greater self-care needs, place a greater reliance on caregivers, and generally have poorer quality of life than those with single or no chronic conditions (Boyd & Fortin, 2010; Nasmith, 2010).

The management of multimorbidity (and chronic disease generally) is affected by social, cultural, educational, behavioural, economic, and environmental circumstances. Historical approaches to chronic disease management tend to lack a multimorbidity perspective through operation of discrete, disease-specific programs, which act as an inhibitor in achieving integrated systems (Boyd & Fortin, 2010; Smith et al., 2012b). Boyd & Fortin (2010) suggest multimorbidity needs to be considered within the context of an individual person’s circumstances and
preferences, taking into account their individual values and priorities for life and health care when designing treatment or wellness plans. As well, each condition may influence the care and trajectory of other co-existing conditions. This contrasts an index disease perspective, which considers one of the chronic conditions to be dominant or central. This perspective is no longer supported by leading multimorbidity research (Boyd & Fortin, 2010; Smith et al., 2012a; Smith, 2012b).

**Epidemiological Data Related to Chronic Conditions**

### Chronic Disease Worldwide

Incidence rates of chronic disease are at epidemic levels, making chronic disease an international concern in high, middle, and low income countries (Barr et al., 2003; WHO, 2012; Nolte & McKeen, 2008). Worldwide, chronic disease is the leading cause of mortality, accounting for 63% of all deaths (WHO, 2012). Specifically in high income countries, chronic conditions account for up to 87% of all deaths (Busse et al., 2010). There is a high level of variance in current prevalence rates of chronic disease as there is no common or comprehensive definition used in the literature for chronic disease or multimorbidity (Norris et al., 2003; Fortin et al., 2012). In Canada, reported prevalence rates range from 33% of the population with a chronic condition (10 million Canadians) to approximately 50% of the population (16 million Canadians) living with at least one chronic condition (CIHI, 2012; Nasmith, 2010, respectively). Multimorbidity is being increasingly recognized as the most common chronic condition (Tinetti et al., 2012). Approximately 25% of adults have two or more chronic conditions and 50% of older adults have three or more chronic conditions (Boyd & Fortin, 2010).

### Chronic Disease within Capital Health

A 2009 survey conducted within Capital Health (n=2,819) revealed that 66% of respondents have at least one chronic condition. This was lower than the provincial average for Nova Scotia, which reports that 74% of citizens have at least one chronic condition. For the purpose of this survey, chronic conditions were defined as conditions diagnosed by a health professional, lasting six months or more in duration. The survey also revealed that the probability of having at least one chronic condition increased with age, was inversely related to socioeconomic status, and was more prevalent in females than males (71% and 61%, respectively) (Capital Health, 2009). Refer to Table 1 for disease-specific statistics for Capital Health and NS supplied by Statistics Canada (2012) via the Canadian Community Health Survey (2009-2010), Discharge Abstract Database (CIHI, 2011), and the Canadian Cancer Registry (2007-2009).

### Risk Factors for Chronic Disease

According to the WHO (2005), the cause of the vast majority of chronic conditions can be directly attributed to a number of leading risk factors. These risk factors can be classified as follows:

- **Common modifiable risk factors**: unhealthy diet, physical inactivity, tobacco use
- **Non-modifiable risk factors**: age, genetic composition, sex

<table>
<thead>
<tr>
<th>Table 1: Chronic disease related statistics</th>
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<tr>
<td>Chronic Condition</td>
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<td>COPD</td>
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<td>Hospitalized Stroke Event rate per 100,000</td>
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<td>Hospitalized Acute MI event rate per 100,000</td>
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<td>Ambulatory Care Sensitive Conditions per 100,000</td>
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<td>Cancer Incidence per 100,000</td>
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Primary Health Care, Capital Health

CDM Literature Review 4
Underlying socioeconomic, cultural, political, and economic factors: globalization, urbanization, population aging, poverty

Immediate risk factors: hypertension, hyperglycemia, dyslipidemia, being obese/overweight

Those with at least one chronic condition are at increased risk for acquiring another chronic condition (Boyd & Fortin, 2010). Furthermore, people with multimorbidity are at increased risk of acquiring two or more new chronic diseases than those with no existing diseases (Boyd & Fortin, 2010; Satariano & Ragland; 1994). Multimorbidity does increase with age; however, there is a growing body of non-elderly individuals being diagnosed with multimorbidity (Boyd & Fortin, 2010).

**IMPACT OF CHRONIC CONDITIONS**

**Health Services Utilization**

Those with chronic conditions, and particularly those with multiple chronic conditions, are heavy users of the health care system and utilization patterns highlight the urgency for organizing effective care for these individuals (CIHI, 2009; CIHI, 2012; Boyd & Fortin, 2010). It is well known that individuals with chronic conditions use more hospital care, physician services, prescription drugs, and home health services than individuals who do not have a chronic condition (Mollica & Gillespie, 2003).

Key statistics related to chronic disease health services utilization in Canada:

- Of those with one or more chronic conditions, 95% report having a family doctor (CIHI, 2009).
- In primary care, approximately 80% of physician visits are related to chronic disease (Rapoport et al, 2004).
- Rural residents and those with multimorbidity are more likely to visit emergency departments for conditions perceived as treatable by their primary health care provider (CIHI, 2012).
- Approximately 66% of emergency department visits can be attributed to exacerbations of chronic disease (Rapoport et al., 2004).
- Ambulatory care sensitive conditions (asthma, COPD, diabetes, hypertension, some heart diseases) account for 95,000 hospitalizations across Canada annually. These conditions can normally be managed with adequate primary health care (CIHI, 2012).
- Low income individuals with at least one of the five conditions listed above were higher users of primary care, make more visits to the emergency room for conditions perceived as treatable by primary care providers, and are less involved by physicians in their care management than those in higher income brackets (CIHI, 2012).
- 61% of those with ambulatory sensitive conditions report no access to after-hours care (CIHI, 2012).

For individuals with multimorbidity, as the number of chronic conditions a person has increases, so does their risk of inpatient admissions, preventable complications in hospital, adverse effects during transitions of care, polypharmacy, and post-operative complications. Generally speaking, individuals with multimorbidity are at greater risk for sub-optimal care in existing fragmented systems (Boyd & Fortin, 2010; Smith et al., 2012a). It is important to recognize many pressures on the health system may result from complications due to chronic disease. Formulating integrated system interventions to manage complications is an important factor for multimorbidity patients. For example, organizing prevention activities for falls and polypharmacy may help to keep pressure off of the acute care system. (Boyd & Fortin, 2010).
**Economic Burden**

According to the World Health Organization:

Approximately 50-80% of all global health spending can be attributed to chronic disease (Singh, 2008).

In the United States, there is an abundance of health care spending data related to chronic disease which shows 78% of all health care spending can be directly attributed to chronic illness (Mollica & Gillespie, 2003). For example, when looking at Medicare beneficiaries in the US, more than half of adults within this group had five or more chronic conditions, accounting for 76% of the total spending (Thorpe & Howard, 2006).

In Canada, estimates of spending related to chronic disease vary; however, Rapoport et al. (2004) estimate that two-thirds of all medical costs are related to chronic disease. Specific to Nova Scotia, a 2002 estimate suggested that direct medical costs for chronic disease accounted for 60% of health spending, or $1.2 billion per year (Colman, 2002). The diseases that account for the greatest use of resources are back pain, arthritis/rheumatism, high blood pressure, and migraines (< age 60 cohort) and arthritis/ rheumatism and high blood pressure (60+ cohort) (Rapoport et al., 2004).

Those with multiple chronic conditions are notably associated with high costs as a direct result of high utilization (Boyd & Fortin, 2010). In addition to health spending generally, out-of-pocket expenses for patients is directly correlated with the number of chronic conditions an individual has, with the association being particularly significant for individuals 65 years of age and older (Mollica & Gillespie, 2003). The economic burden of chronic conditions is not limited to the health care sector. Indirect costs such as productivity loss, loss due to premature death, disability, and financial loss to caregivers are significant financial burdens (Nasmith, 2010; Colman, 2002). Interestingly, Nova Scotia has the highest reported use of disability days in Canada with millions estimated to be lost annually as a result of indirect costs due to chronic disease (Colman, 2002).

**BROAD APPROACH TO CHRONIC DISEASE MANAGEMENT**

**The Expanded Chronic Care Model**

Models of care designed to manage chronic conditions must be population-based, patient-centred, and encompass health promotion, disease prevention, and disease management (Morgan et al., 2007; State of Victoria, 2008; Nolte & McKee, 2008). The Chronic Care Model (CCM; Wagner et al., 2001) and particularly its expanded version (CCM-E; Barr et al., 2003) are the most widely recognized models in the literature as comprehensive and successful frameworks for chronic disease management at a population-health level (Morgan et al., 2007; Singh & Ham, 2006).

Numerous reviews (including systematic) have shown that implementation of the CCM/CCM-E can improve patient outcomes, create improvements in care processes, reduce health services utilization, and reduce health care costs (Bodenheimer et al, 2002; Singh & Ham, 2006; Tsai et al., 2005; Hrosckoski et al., 2006). For example, through systematic review, interventions that identified positive outcomes showed improvements in process or outcome measures for patients with diabetes, and lower health care costs and less use of health services were observed in some interventions for individuals with diabetes, congestive heart failure, and asthma (Bodenheimer et al., 2002). In another meta-analysis, Tsai et al. (2005) identified improvements in clinical outcomes and processes of care with interventions that
contained one or more elements of the CCM for asthma, congestive heart failure, depression, and diabetes. As well, the CCM is recognized as an appropriate framework for chronic disease management system design from a multimorbidity perspective (Boyd & Fortin, 2010); however, there is a paucity of research evaluating the model for non-index disease interventions.

**The Expanded Chronic Care Model in Action**

Recent studies have highlighted the importance of implementing the CCM/CCM-E in a step-wise manner, suggesting that it may even be counter-productive to attempt to implement every aspect of the CCM at once (Kreindler, 2009; Hroscikoski et al., 2006). Despite its documented success, numerous barriers in implementing the model are noted, including competing priorities, lack of specificity of changes, agreement about care process changes, and physician engagement (Hroscikoski et al., 2006).

Kreindler (2009) lists suggested steps for implementing the CCM-E in health care organizations:

1. Start with a focus on delivery systems redesign, particularly on interventions that have proven most effective across a number of settings (e.g., advanced access, multidisciplinary teams, role redesign, and improving scheduling and location of care). Delivery systems redesign is the element of the CCM with the strongest evidence base (Kreindler, 2009; Tsai et al., 2005).
2. Next, consider ways to start to expand and improve self-management support (component with the second-largest evidence base)
3. Actively pursue opportunities for collaboration with other sectors, and with community organizations to address the unmet non-health needs that lead certain patients to overuse health services
4. Through inter-sectorial collaboration and advocacy, work to promote large scale policy changes

As delivery systems redesign and self-management are the two components of the model with the strongest evidence base, the remainder of this review will focus on exploring principles and best practices for coordination and integration of health service delivery and chronic disease management programs across settings and providers.

**PRINCIPLES OF COORDINATION & INTEGRATION**

**General Principles of Coordination and Integration**

The terms ‘coordination’ and ‘integration’ are often used interchangeably in the literature; however, they are not synonymous. Integration has organizational and managerial implications whereas coordination refers to organized linkages so that services are offered in tandem, when and where needed (Kodner et al., 2009).
Integration efforts may be applied to entire communities/rostered populations, at-risk sub groups (e.g., the frail elderly), or patients with complex illnesses (e.g., chronic conditions) (Kodner, 2009). There is no standardized definition of integration/integrated care; however, Kodner (2009) suggests the following as an example:

Kodner & Spreeuwenberg (2002): “a coherent set of methods and models on the funding, administrative, organizational, service delivery, clinical levels designed to create connectivity, alignment, and collaboration within and between the cure and care sectors to enhance quality of care and quality of life, consumer satisfaction, and system efficiency for patients with complex problems cutting across multiple services, providers, and settings.”

A major barrier in receiving optimal chronic illness care is the lack of coordination, or fragmentation, within the health care system (Bodenheimer, 2008; Busse et al., 2010; Schoen et al., 2011; Molica & Gilespie, 2003; Smith et al., 2012a). Patients’ perception of the quality of care received is strongly linked to how successful coordination is within the system (Kodner, 2009). From a patient-centred care perspective, coordination involves having access to the appropriate type of care in the appropriate setting, receiving adequate information, continuity across settings, providers, and the span of the disease (seamlessness), and effective navigation of the system (Busse et al., 2010; Kodner, 2009). Coordination of care is of particular importance for those with multimorbidity because care will occur across multiple settings with multiple providers and there is an increased likelihood that sub-standard care due to transitions and uncoordinated services will occur (Boyd & Fortin, 2010; Smith et al., 2012a, Smith et al., 2012b)

**Levels of Integration**

There are five levels of integration:

- **Funding:** shared pooling of funds
- **Administrative:** consolidation of responsibilities, inter-sectoral planning, needs assessments, joint purchasing
- **Organizational:** co-location of services, discharge and transfer agreements, inter-agency planning and budgeting, jointly managed programs and services, care networks
- **Service delivery:** interdisciplinary teamwork, case management, disease management, improved access, integrated information systems, centralized information intake and referral
- **Clinical:** shared diagnostic criteria, uniform assessment procedures, joint care planning, common decision support tools (e.g., clinical practice guidelines).

As well, organizations can link horizontally (similar units at the same level link together) or vertically (combinations of units at different levels; e.g., hospital, community health centre, nursing home).

There are many barriers in achieving full-systems integration, which also apply to specific areas of focus (e.g., chronic disease management). Some examples include: lack of physician and provider engagement in integrated models, cultural mindset, failure to place the patient at the center of the integration efforts, achieving critical population mass for integrated delivery zones (especially in rural areas), and lack of leadership (Sutter et al., 2009; Kodner, 2009).
INTEGRATED CHRONIC DISEASE MANAGEMENT SERVICE DELIVERY

Integrated Service Delivery and Chronic Disease Management

“Disease management strategies, such as eating healthy, being physically active, avoiding tobacco, and coping emotionally are similar across most chronic conditions. Given the prevalence of co-morbidities and the commonality in approaches, fragmented single disease management must be replaced with integrated care of the whole person to achieve both health system efficiencies and a more patient-centric approach (Alberta Health Services, 2012, p. 6).

Integrated care models are recognized as best practice for chronic disease management, given the high prevalence of multimorbidity being observed in today’s population, commonalities in treatment approaches, and the fragmented nature of existing services in the health care system (e.g., Kodner, 2009; Smith et al., 2012a; Smith et al., 2012b; State of Victoria, 2008; Nolte & McKee, 2008, Alberta Health Services, 2012, etc.). Integrated care models respond to the fact that chronic diseases can rarely be treated in isolation and that patients often need care from multiple providers in different settings. These models organize treatment (and prevention) so that services are better integrated across the continuum (Busse et al., 2010; Norris et al., 2003). Minkman et al. (2009) caution that integrating care services can be difficult to achieve in practice and planning requires a thoughtful and organized approach that draws upon multiple stakeholders.

Integrated chronic disease management is defined as:

“The provision of person-centred care in which health services work with each other and with the client (and/or their carer) with a chronic illness to ensure coordination, consistency, and continuity of care for clients over time and through different stages of their condition” (State of Victoria, 2008, p. 10).

The Canadian Academy of Health Sciences has put forth recommendations to achieve their vision of transforming care for those with chronic conditions across Canada through the reorientation of health services and better utilization of system resources. The vision recognizes the prevalence and implications of multimorbidity. When the vision is achieved, the healthcare system will be integrated, person-focused, and population-based, with primary care practices being the ‘hub’ for coordination and continuity of care with specialty and acute care and community-based services.

This integrated healthcare system will:
- have primary care practices that are responsible for a defined population
- be person-focused (and family or caregiver focused)
- provide comprehensive services through interprofessional teams
- link with other sectors in health and social care
- be accountable for outcomes
(Nasmith et al., 2010).

Healthcare system infrastructure and processes that enable integration for patients with chronic disease include:
- Changes in delivery system (redesign of scheduling systems to coordinate appointments, consolidation of services to allow for “one stop shopping,” and role redesign/delineation)
- Model of care redesign (advanced access, interdisciplinary teams)
- Patient group or cluster visits
Electronic information systems (registries, EMRs, reminder systems)
Support from upper management
(Norris et al., 2003; Kreindler, 2009)

Targeting population sub-groups, or stratifying based on risk and complexity, is a key component of integrated chronic disease management (State of Victoria, 2008; Norris et al., 2003; National Public Health Partnership, 2001; Singh, 2008). The Kaiser Permanente service delivery model depicted here has been widely adopted as a means to stratify the population based on complexity (NHS, 2012; State of Victoria, 2008). Principles from the National Public Health Policy framework (2001) for chronic disease prevention and control can be applied here in order to prevent movement of the population towards the top of the pyramid. Evidence from the US confirms that the Kaiser Pyramid model can provide more integrated care, improve quality of care, and reduce hospital admissions (Singh & Ham, 2006).

In addition to cooperation and collaboration between service providers, the following key strategies to integrate chronic disease management across and between stratification levels include:

- Joint planning across programs
- Joint governance or steering committee arrangements
- Workforce development or training opportunities across programs
- Consistency in evaluation indicators and methodologies where relevant
- Marketing for participants as a joint activity
- Rotation of staff through programs in each level to promote understanding of care across the continuum/disease progression
- Systems with central intake that can cross-refer across programs to avoid duplication (State of Victoria, 2008)

Another key component of integrated chronic care delivery is the recognition of both medical and social needs of individuals with chronic conditions (Mollica & Gilespie, 2003; Smith et al., 2012a; Kreindler, 2009). Forming partnerships with the social sector and with private organizations to meet unmet non-health care needs is a key component of the Expanded Chronic Care Model (Barr et al., 2003).

The challenge for the existing fragmented service system is to improve integration and continuity of care for clients over time, through different stages of disease progression and across the life span (State of Victoria, 2008). Detailed below are potential methods for enhancing integration and improving care for those with chronic conditions based best practice as identified in the literature.

**Linking Chronic Disease Programs**

Linking existing chronic disease management programs is a key step in achieving integration and in doing so, can result in resource efficiencies and improved communication and coordination among clients, providers, and program funders. Other benefits include leveraging of health human resources, time efficiencies, and elimination of duplication of effort (Slonim et al., 2007). Providing comprehensive chronic care through successfully integrated primary health care and disease management programs is expected to divert patients from acute care settings (State of Victoria, 2008).
Salinsky and Gursky (2006) suggest that chronic disease program integration is defined as follows:

“the strategic alignment of chronic disease categorical program resources to increase the effectiveness and efficiency of each program in a partnership without compromising the integrity of categorical program objectives” (as cited in Slonim et al., 2007, p. 2).

Slonim et al. (2007) have identified guiding principles for integrating existing chronic disease programs. They include: respecting categorical program identity, clearly stating mutual benefits and opportunities, and looking for efficiency-oriented processes, while being focused on evaluating health outcomes, engaging stakeholders, and mobilizing leaders. Of particular importance is respecting individual program identity. Success enables in respecting program identity include:

- Preserving successful interventions and categorical program expertise
- Maintaining accountability and existing goals
- Acknowledging each programs’ priorities, capacity, and successes
- Encouraging cooperation, coordination, and collaboration among program areas

Leigh (2008) suggests the following attributes be considered when planning for program integration:

- Degree of connectivity sought – linkage, coordination, integration
- Focus for change – connectivity of the services themselves (systems focus) or with the people and programs within (service provision focus)
- Origin of the impetus for change – top down or bottom up approach
- Level of the service system – horizontal or vertical connectivity
- Range of organizations involved – as the number of partners increase, so does the level of stakeholder engagement, costs, and time frame

Finally, Slonim et al. (2007) identified barriers to program integration:

- Categorical funding and accountability as well as competition for funding (turf protection)
- Concern that individual program identity would be lost
- Lack of leadership and organizational communication problems

A review of systematic reviews identified that integrating chronic disease management programs generally had a positive effect on the quality of patient care; however, there was no consistent definition of chronic illness or integrated care used between the systematic reviews that were reviewed (Ouwens et al., 2005).

**Coordination Across the Continuum of Care**

“A critical element of person-focused care is that people with chronic conditions experience care that is as seamless as possible as they move between primary, acute, specialty, and community care” (Nasmith, 2010).

Within the literature, having a strong primary health care system is repeatedly recognized as the strongest enabling factor in providing high quality chronic care for those with single and multiple chronic conditions (e.g., France et al., 2012; Norris et al., 2003; Smith 2012a, Smith 2012b; et cetera). Moreover, Brodenheimer (2008) suggests that care coordination is not possible without a strong primary health care system. The most effective primary health care is community-based and takes a population health approach (Nasmith, 2010). After an extensive review, Nasmith et al. (2010) concluded “Canada is lagging
behind other countries in performance and infrastructure to support people living with multiple chronic conditions, particularly in the critical primary health care sector” (p. 3).

The literature is supportive of the primary health care home concept as a means to provide patient-centred care and coordinate care across the continuum for those with chronic conditions (Boyd & Fortin, 2010; Brodenheimer, 2008; Smith et al., 2012a; Nasmith et al., 2010). The key patient-centred principles of the primary health care home incorporate the multimorbidity perspective (Boyd & Fortin, 2010). Key features of a primary health care home include:

- Attentive, to patients’ psychosocial as well as physical needs
- Explores patients’ concerns and priorities for care
- Conveys a sense of partnership between the patient and the physician
- Facilitates active patient involvement in decision making

In order to achieve integration, there must be a strong interface between primary, secondary, and acute care. The following activities may facilitate coordination between primary and specialty care:

- Electronic referral – can improve access to specialists, reduce costs and improve care coordination
- Referral agreements – agreements between primary care and specialist physicians as to what conditions are best managed in primary care and what would be best managed by a specialist to ensure all referrals are warranted
- Advanced practice nursing – through hospital visits, post-discharge home visits, and telephone consultations which collectively, have been shown to reduce readmissions, deaths, and costs
- Care coaches at transitions from hospital to community – activate and prepare patients and families to coordinate their own care, fostering independence and enhancing self-management skills (Brodenheimer, 2008).

**Coordination of Providers**

To provide care within an integrated system, providers are required to work collaboratively across settings to coordinate and plan services and care, thus working together to achieve a shared vision (State of Victoria, 2008).

Boon et al. (2004) suggest that coordination of service providers occurs across a continuum. The goal of the Expanded Chronic Care Model is to have providers working in interdisciplinary teams (Barr et al., 2003). There is a large body of evidence that supports the role of interdisciplinary (and multidisciplinary) teams in managing chronic conditions showing improvement of processes and outcomes of care (Busse et al., 2010; Kreindler, 2009; Bodenheimer et al., 2002; Suter et al., 2009; Nolte & McKee, 2008; Singh, 2008). Interestingly, shared care has received mixed reviews in the treatment of chronic illness (Smith et al., 2009) and more work needs to be done to determine the settings in which it is most effective.
Physician (and other team member) engagement is integral for strong collaborative interprofessional teams and a lack of provider engagement is a barrier in achieving truly integrated systems (Suter et al., 2009). Professional groups tend to be less involved in integrated care models unless they are remunerated appropriately and current fee-for-service models encourage providers to compete as opposed to collaborate (Busse et al., 2010). Thus, reimbursement mechanisms need to be adapted to compensate for participation in teams and in shared-decision making models and to promote communication between providers in different sectors; e.g., specialists and family physicians (Boyd & Fortin, 2010; Busse et al., 2010).

Role redesign is another element central to achieving systems redesign in the Expanded Chronic Care Model (Barr et al., 2003). Utilizing alternative practitioners (e.g., nurse practitioners, pharmacists, and physician assistants) has been shown to be particularly effective to expand scope of practice to provide comprehensive care (Barr et al., 2003; Kreindler et al., 2009; Busse et al., 2010). In multimorbidity management, there is a growing body of evidence looking at the role of the pharmacist for managing associated complications such as polypharmacy (e.g., Smith et al., 2010), evolving the role of the case manager to a “multi-disease” manager and navigator (e.g., Cornell et al., 2007), and involving general internal medicine as multi-disease specialists who can provide specialist care for multiple acute and chronic illnesses (e.g., Society of GIM, 2007). Furthermore, patients with multimorbidity are reported to be significantly more willing to see certain types of non-physician health care providers than those with a single chronic condition (Noel et al., 2007).

### Multimorbidity Focused Service Delivery

A recent systematic review (France et al., 2012) identified that in order to plan appropriate care for those with multimorbidities, a better understanding of the personal care experience, treatment, health services use, and biopsychosocial factors of the patient is needed.

The American Geriatrics Society (2012) proposes a best practice model for providing patient-centred care for those with multimorbidities that focuses on older adults with multiple chronic conditions. Many existing models and clinical practice guidelines focus on treating one disease at a time; however, the authors suggest an approach that looks at the care of the whole person. The holistic model focuses on the following guiding principles:

1. Identifying preferences (of both the patient and the caregiver)
2. Interpreting the evidence (recognizing the limitations of existing clinical practice guidelines in a multimorbidity context)
3. Assessing prognosis
4. Determining clinical feasibility
5. Optimizing therapies and care plan

Through analysis of multimorbidity patterns in the Medicaid population, Boyd et al. (2010) determined that the following service delivery interventions were most effective in treating patients with multimorbidities and serve as areas to explore for integration:

- Interdisciplinary primary care teams
- Care/case management
- Preventative home visits
- Outpatient comprehensive geriatric assessments/evaluation/management
- Pharmaceutical care
- Chronic disease self-management
- Proactive rehabilitation
- Transitional care
- Hospital at home and nursing homes

“An essential element of health system design that addresses people with multimorbidity is the elimination of the single disease focus” (Boyd & Fortin, 2010, p. 457).
A Cochrane Review (Smith et al., 2012a) looking specifically at randomized control trial interventions for multimorbidity in primary care and community settings yielded the following key findings:

- In 6/10 studies, the predominant intervention element was a change to the organization of care delivery, most often through case management or enhanced multidisciplinary teams.
- In the remaining 4/10 studies, the interventions were predominantly patient oriented.
- Overall intervention results were mixed; however, there was a trend towards improved prescribing and medication adherence.
- Interventions focusing on particular risk factors or functional difficulties may be most effective.
- Multimorbidity interventions need to be integrated into existing health care systems and services in order to achieve long term sustainability. Many of the studies identified integration at the provider level; however, integration into the system for service delivery is essential for long term sustainability of interventions.
- Cost data were limited with no economic analyses included, though the improvements in prescribing and risk factor management in some studies provided potentially significant cost savings (Smith et al. 2012a).

**Cluster Approach (Patterns of Risk Factors and Multimorbidity)**

Historically, clustering was specific to risk factors for chronic disease (e.g., Norris et al., 2003; National Public Health Partnership, 2001); however, a growing body of literature has looked at clustering chronic conditions based on similar metabolic abnormalities and those presenting together in care settings as multimorbidities (Kirchenberger et al., 2012; Prados-Torres et al., 2012; Cornell et al., 2007). This growing body of research is timely given the percentage of the population living with multimorbidity and the recognized need for health systems redesign to produce efficiencies and enhance quality of care. As well, identifying common multimorbidities is becoming an essential activity for insurers in the US to manage costs for high frequency systems users/high cost patients (Hartmann et al., 2011). An important limitation of multimorbidity and clustering research is that it predominately focuses on elderly populations due to high prevalence of multimorbidities (Boyd & Fortin, 2010; Prados-Torres et al., 2012; Smith et al., 2012a). Additionally, there is a lack of research outlining the reverse implications for the care of individuals with single chronic conditions in participating in integrated, multimorbidity cluster models.

The cluster approach, which groups together common health issues often addressed independently, can have application in the following areas:

- Provide a basis for integrated services planning
- Designing and implementing chronic disease management programs for complex patients with multimorbidities, including self-management and education programs. Consequently, improving patient-centred care and increasing efficiencies by adapting disease management programs for high-frequency clusters versus individual diseases
- Identify areas for forming partnerships
- Informing evidence-based guidelines for multimorbidities
- Allocating resources (time, money, prevention activities) to high frequency clusters
- Defining parameters for surveillance of leading risk factors to identify targets for prevention approaches (if understanding underlying pathogenesis)
- Transforming the role of case managers to “multi-disease specialists”
- Group visits/appointments for high-frequency clusters
- Highlights the link between physical and mental health (National Public Health Partnership, 2001; Cornell et al., 2007; Boyd & Fortin, 2010)
The National Public Health Partnership (2001) identifies common modifiable risk factors that can be managed together in clusters:

- **Behavioural factors:** diet, physical activity, smoking, alcohol misuse
- **Psychosocial factors:** sense of control, social support/social exclusion, resilience and emotional well-being
- **Early life factors:** maternal health, childhood infections, abuse and neglect
- **Biological markers:** obesity, hypertension, dyslipidemia, proteinuria, glucose levels

A Cochrane Review identified that appropriate risk factor management (and management of functional disabilities) can have clinically significant outcomes for patients with multimorbidity in primary and community care settings (Smith et al., 2012a).

Several studies have identified non-random clusters of multimorbidities (e.g., Kirchenberger et al., 2012; Prados-Torres et al., 2012; Cornell et al.). Some examples are listed below and they show many parallels:

1. Cornell et al. (2007) identified six cluster patterns in a rigorous, large scale study (n=1,327,328) looking at 45 different chronic illnesses in a primary care population served by Veterans Health Administration in the US.
   - **Metabolic Cluster:** diabetes, hypertension, hyperlipidemia, and ischemic heart disease. 83% of study participants (n=1,088,744) fell into one of the 15 possible subsets of the four diseases in this category. This cluster has been previously identified in the literature as well and the diseases have well-established epidemiological ties. For example, diabetes is a risk factor for the other three diseases (Cornell et al., 2007)
   - **Obesity cluster:** obesity, osteoarthritis, low back pain, enlarged prostate, GERD. This was the second most prevalent cluster. Recognition of this cluster is important given the high prevalence of these conditions and their potential for adverse events during treatment.
   - **Neurovascular:** peripheral vascular disease, stroke, TIA, Alzheimer’s disease, and seizures.
   - **Liver:** Hepatitis B, Hepatitis C, chronic liver disease, HIV
   - **Dual Diagnosis:** substance abuse, alcohol dependence, schizophrenia, bipolar disorder. The existence of this cluster is strongly supported in the literature
   - **Mixed-Anxiety Depression:** depression, PTSD, and other anxiety disorders

2. In factor-analysis study looking at patterns of multimorbidity in primary care (n=275,682), five patterns of multimorbidity were identified:
   - Cardio-metabolic
   - Psychiatric-substance abuse:
   - Mechanical-obesity-thyroidal
   - Psychogeriatric
   - Depressive

   The prevalence and what diseases were included in the clusters varied considerably between women and men and varied between age groups (Prados-Torres et al., 2012).

3. Kirchberger et al. (2012) identified four patterns of multimorbidity (n = 4127). Out of the participants aged 65-94, 44% had one of the four multimorbidity patterns:
   - Cardiovascular and metabolic diseases
   - Joint, liver, lung and eye disease
   - Mental and neurological disorders
   - Gastrointestinal diseases and cancer
Additionally, further grouping the patterns showed that the mental/neurological pattern often co-occurred with cardiovascular and metabolic disease and the joint/liver/lung/eye pattern.

When managing chronic conditions, there are two types of multimorbid conditions to consider:

- **Concordant conditions**: conditions that are often present together in clinical practice and can be managed synergistically (e.g., ace inhibitors for diabetes and hypertension)
- **Discordant conditions**: conditions presenting together, but cannot be treated synergistically, and thus increase the complexity of clinical decision making (Boyd & Fortin, 2010).

There are several examples of the successful management of concordant conditions including diabetes and renal disease (Dean, 2012) and diabetes, coronary heart disease, and depression (Katon, 2010). Clinical studies of discordant conditions show that patients routinely receive guideline inconsistent care and are at increased risk for complications (e.g., Lagu, 2008).

Few clinical guidelines account for multimorbidity and this complicates care delivery, especially for discordant conditions. Several authors also suggest that following disease-specific clinical guidelines can actually cause more harm than good for a patient with multimorbidity (Boyd & Fortin, 2010). Physicians receive limited guidance or evidence as to how to best approach care decisions for multimorbidity patients, further increasing the amount of time and effort needed to care for these patients. Moreover, reimbursement schemes do not account treating for these complex patients (Bodenheimer, 2008; Boyd & Fortin, 2010). More research is needed in this area and to establish clinical guidelines and care pathways for multimorbidity, especially for commonly observed condition clusters.

**SELF-MANAGEMENT**

**Self-Management**

Self-management to encourage individuals to be active in managing their health is a core component of the Expanded Chronic Care Model and a key aspect of providing integrated, person-centred care (Barr et al., 2003; Nasmith et al., 2010; Victoria DoH, 2012a) Self-management is the component of the Expanded Chronic Care Model with the second-largest evidence base in the literature, next to delivery systems redesign (Kreindler, 2009; Tsai et al., 2005). Integrating self-management principles into existing chronic disease management programs is strongly supported (Barr et al., 2003; Norris et al., 2003; State of Victoria, 2008; Nasmith, 2010) because approaches that aim to empower the client/patient are applicable across chronic conditions and are a part of many existing clinical practice guidelines (Alberta Health Services, 2012).

Self-management involves both empowering the patient/client and providing the appropriate resources to support their self-efficacy and ability. Self-management is defined as:

“the ability of the client to deal with all that a chronic disease entails, including symptoms, treatment, physical and social consequences, and lifestyle changes. The client (and family/caregivers) work with providers to know their condition(s), negotiate a care plan, engage in activities that promote and protect health, monitor and manage symptoms, and manage the impact of their condition on physical functioning, emotional well-being, and interpersonal relationships” (Victoria DoH, 2012a).

The systematic provision of this self-management assistance by health care providers and others (e.g., lay leaders) is known as self-management support. Self-management support is increasingly being
recognized as an essential component in the delivery of health care for people with chronic disease, especially those with multimorbidity (Health Council of Canada, 2012). Moreover, Noel et al. (2007) determined that patients with multimorbidity were significantly more likely to be willing to learn self-management skills than those with a single chronic condition (n=422).

Essential characteristics of self-management programs parallel guiding principles for multimorbidity and person-centred care. They include:

- Respects choices and individual circumstances
- Involves goal setting and problem solving, including goals of empowerment and enhanced capacity
- Shared responsibility for outcomes
- Ongoing collaborative and active partnership between the health care provider(s) and the individual so that self-management becomes a lifelong practice (Victorian DoH, 2012a; 2012b).

Individuals who are competent in self-management have reduced disease-related complications and use health services more appropriately because they are able to monitor their symptoms and know how to prevent and respond to certain health-related problems (Health Council of Canada, 2012; Nasmith, 2010). There is evidence that self-management is effective for a wide variety of conditions. Looking collectively at individual Cochrane Reviews on self-management interventions for diabetes, arthritis, and COPD, results indicate that overall, there were decreased presentations to acute care settings, improvements in clinical indicators (e.g., HbA1C), and increased self-efficacy and well-being (Victoria DoH, 2012a; Health Council of Canada, 2012).

In terms of self-management program delivery, the following models have been internationally recognized as best practice: the Stanford Chronic Disease Self-Management Program (US) and the Flinders Model of Chronic Disease Self-Management (AUS). However, as reported by the Health Council of Canada (2012), Alberta Health Services recently experienced difficulties in implementing the Flinders Model. Challenges included problematic time commitments, lack of buy-in by management and colleagues, logistical considerations (forms, flow, and communication), and the need for a Canadian adaptation. As well, a new and emerging best practice for self-management is health coaching (Alberta Health Services, 2012b; Victoria Department of Health, 2012b; Health Council of Canada, 2012). Health literacy (the ability to access, understand, and act on health-related information) is a key enabling factor for effective self-management. Lay-led self-management programs may be less effective than originally thought in terms of health outcome improvement as identified by a Cochrane Review (Foster, 2007) and at present, the most effective self-management interventions are those provided by health providers and/or in combination with lay-leaders and integrated into regular care.

In order for self-management to be truly integrated within an organization, some essential organizational changes are required to support effective self-management in chronic care delivery. They include:

- Engagement of senior leaders within an organization
- Integration of self-management support into existing systems (e.g. allotting time during visits, training providers)
- Planned delivery of self-management through adoption of a model (e.g. Stanford, Flinders)
- Addressing systemic barriers to change
- Enhancing workforce capacity
- Capitalizing on existing enablers of change (e.g. engaging physician champions, QI programs)
- Providing adequate self-management support to providers (Victoria DoH, 2012a)
Finally, it is important to be cognizant of the following health systems barriers for successful integration of self-management into existing programs and services:

- Lack of awareness at all organizational levels about the benefits and principles of self-management
- Misconceptions of the purpose of self-management (e.g. does not equate to, or take the place of, clinical care or patient education)
- Lack of tools, training, or supports for providers
- Inadequately designed delivery systems that do not allow time for providers to talk to their patients about self-management
- Inadequate linkages or pathways to connect patients with additional resources
- Reaching underserved populations

(Victoria DoH, 2012a)

CONCLUSION

Conclusion

Single and multiple chronic conditions are a major burden on the health care system worldwide, highlighting the need to re-organize health care delivery to improve patient-centred care and help ensure long term sustainability in the future. Addressing the existing reactive, disease-specific care delivery system requires fundamental systems change and redesign (Wagner et al., 2001; Kreindler, 2009; Barr et al., 2003; Morgan et al., 2007). Through implementation of the Expanded Chronic Care Model, re-orienting health services so they are offered in a more integrated, patient-centred manner is the first step in improving chronic illness care. Integrated care models respond to the fact that chronic diseases can rarely be treated in isolation and that patients often need care from multiple providers in different settings. Strengthening primary health care systems, enhancing multidisciplinary teams, linking chronic disease programs, redesigning clinical roles, clustering common conditions, and integrating self-management into existing programs and services are all ways to aid in achieving integration in a chronic disease management context. Chronic disease prevalence rates are going to continue to rise and having effective health care delivery for this subset of complex patients will be essential in the coming years.
REFERENCES


Primary Health Care, Capital Health

CDM Literature Review


