

# We Can't Address What We Don't Measure Consistently: Building Consensus on Frailty in Canada



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Consistently: Building Consensus on  
Frailty in Canada**

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# National Institute on Ageing Report on Frailty In Canada

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# Table of Contents

02

About the National  
Institute on Ageing

04

Authors and  
Reviewers

05

Executive  
Summary

08

Setting  
the Context

09

What is Frailty?

12

Who is Living  
With Frailty?

16

Is Frailty Preventable  
And Treatable?

22

What Are the  
Current Main  
Viewpoints on  
Frailty?

28

What Are the Issues  
Arising from Our  
Current Lack of  
Consensus?

33

Where Should  
We Go From Here?

40

Conclusion

41

References

# About the National Institute on Ageing and the Canadian Frailty Network

The National Institute on Ageing (NIA) is a new policy and research think tank based at Ryerson University in Toronto. The NIA is dedicated to enhancing successful ageing across the life course. It is unique in its mandate to consider ageing issues from a broad range of perspectives, including income and retirement security, health and wellbeing, and social inclusion and participation.

The NIA is focused on being a leader in cross-disciplinary, evidence-based research to better understand and contribute to interventions, insights, innovative policies, practices, and products needed to address the many challenges and opportunities presented by Canada's coming of age. The NIA is also committed to engaging in collaboration and partnership with other ageing-related organizations, businesses, academic institutions, and governments at all levels.

The NIA is also the academic home for the National Seniors Strategy (NSS). Established in October 2015, the NSS is an evolving, evidence-based policy document co-authored by leading researchers, policy-experts, and stakeholder organizations from across Canada. The NSS outlines four pillars that guide the NIA's work to advance knowledge and inform policies through evidence-based research on ageing in Canada that include Independent, Productive and Engaged

Citizens; Healthy and Active Lives; Care Closer to Home; and Support for Caregivers.

This report was produced in collaboration with the Canadian Frailty Network (CFN), which provided an unrestricted educational grant, expertise, and research support. CFN is Canada's federally funded Network of Centres of Excellence (NCE) for older Canadians living with frailty. It is dedicated to improving care of older Canadians living with frailty and supporting their families and caregivers.

CFN is funded by the Government of Canada's Networks of Centres of Excellence (NCE) program. The NCE program's goal is to mobilize collaborations between researchers, industry and other organizations to produce programs and products that further Canada's economic strength and improve the quality of life of Canadians. As a research network, CFN collaborated with industry, health care, academic, non-governmental organizations and private partners to improve the care of older adults living with frailty and support their families and caregivers.

This is the foundational report in the NIA's ongoing examination of frailty in Canada. It explores the complex nature of frailty, and how it affects Canadians, their caregivers, health systems and broader communities.

This report is informed by and builds on the four pillars of the National Seniors Strategy: Independent, Productive & Engaged Citizens; Healthy and Active Lives; Care Closer to Home; and Support for Caregivers.

The National Institute on Ageing is the home of the National Seniors Strategy. Learn more about the strategy at [www.nationalseniorsstrategy.ca](http://www.nationalseniorsstrategy.ca)

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We would like to sincerely thank our expert reviewers for their thoughtful feedback on the content and final recommendations of this report. Any opinions or errors reflected in this report are of the NIA alone.

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**Disclaimer:** The NIA has developed this document to provide a summary of general information about frailty in Canada, as well as provide evidence-informed recommendations to better support Canadians living with frailty. The NIA's work is guided by the current evidence. This document can be reproduced without permission for non-commercial purposes, provided that the NIA is acknowledged.

## Executive Summary

Frailty is a common condition that impacts the quality of life of older adults, their unpaid caregivers, and the sustainability of health care systems. However, health systems are not consistently measuring frailty, which in turn makes it difficult for health care providers to recognize and address it appropriately. Governments, on the other hand, may not currently have a clear enough understanding of frailty to address its related issues through effective public policies.

Broadly, there is agreement among clinicians and researchers that the concept of frailty is a state of vulnerability that becomes more prevalent with age and affects an individual's resilience and ability to deal with minor and major stressors, which can include illnesses or infections. The reduced ability to deal with stressors can result in negative health outcomes, such as hospitalization, institutionalization, and death. There is also broad agreement that identifying frailty in individuals can help improve patient health outcomes, quality of life, and contribute to the sustainability of health and social care resources with tailored interventions. There is not consensus as to which method of measuring frailty should be routinely used in a variety of health care settings.

This poses a challenge to creating both appropriate and effective health and social

care interventions and public policies to address this important and growing issue.

Determining whether a patient is frail – and the degree to which they are frail – can help health and social care providers avoid negative health outcomes and inform the level of support frail individuals need in order to remain as independent as possible and reverse aspects of frailty whenever possible. The stakes of properly assessing frailty, therefore, are high individually and for the overall sustainability of our health and social care systems.

Two models of frailty currently dominate the views of both researchers and care providers: the Phenotype Model and the Accumulation of Deficits Model. The first model views frailty as a phenotype, which is defined as an individual's observable traits that result from the interaction of their genetic information with their physical environment. The phenotype model of frailty is characterized by a specific and narrow range of indicators: walking speed, grip strength, exhaustion, physical activity, and weight loss.

The second model views frailty as an accumulation of deficits, which can be physical, cognitive, and clinical challenges an individual may be facing, including falls, changes in the ability to carry out everyday activities, depression, restlessness, memory changes, and congestive heart failure – the



more deficits an individual has, the greater their level of frailty. The accumulation of deficits model typically surveys between 40 and 70 potential deficits; the degree of frailty is the proportion of deficits found over the number surveyed.

While both models tend to identify frailty in overlapping groups of people, neither one has received a broad consensus of support among frailty researchers or health care providers. Missing from both models, however, is a consideration of how socioeconomic factors may contribute to an individual's ability to respond to frailty. Assessing and treating frailty, therefore, requires consensus within both the research and the health care communities.

Assessments and treatments should also consider the whole person, including their social determinants of health, such as how much an individual smokes or drinks, their educational level, or whether they live alone or in poverty.

While socioeconomic factors may not determine whether or not an individual will have frailty, they can certainly influence how well an individual may develop, recover, and generally cope with frailty.

To the detriment of individuals living with frailty, interventions and treatments continue to vary widely amongst health care providers, with many being either under-treated or over-treated in the absence of a clear understanding of how their level of frailty should specifically influence the care they receive.

This report argues that we now need to move towards a consensus on assessing and treating frailty, but also that any approach to managing frailty should consider an individual's socioeconomic and psychosocial circumstances as well.

In spite of the lack of agreement as to which frailty measure to routinely use, there are several approaches to the prevention and management of frailty that are currently worth the attention of policy makers and health system administrators alike.

The promotion of physical activity and maintaining a healthy diet are effective means to prevent, manage, and, in some cases, reverse the level of frailty an individual may be living with. Indeed, by engaging in these healthy behaviours, individuals can better manage and prevent frailty across the life course. Policies that promote the development of stronger social networks and the alleviation of poverty as we age can also improve some of the socioeconomic factors that may further influence a person's experience with frailty.

In addition to supporting individuals to modify lifestyle factors and behaviours, innovative models of care that promote access to elder-friendly care protocols and appropriately trained clinical disciplines including family physicians, geriatricians, nurses, pharmacists, physiotherapists, occupational therapists, and social workers, among others, can also be effective at managing frailty and health care costs while also maintaining the overall sustainability of health and social care settings.

Governments could consider supporting individuals living with frailty through the provision of rehabilitation programs, which focus on promoting independence and function, rather than addressing health or physical challenges.

They have been shown to reduce the use of health care and home care services, as well as the risk of emergency department visits, long-term care admissions and death.

In the following pages, we recognize that there is an absence of consensus around the measurement of frailty in clinical settings. Nevertheless, there are steps that individuals and governments can currently take to decrease the prevalence or severity of frailty, such as combatting social isolation, and promoting better nutrition and a greater engagement in physical activity. Finally, we discuss some areas of consideration for researchers, health care providers, policy makers, and governments to improve the measurement and management of frailty, including standardizing outcome measures for frailty in research studies, promoting physical activity, improved nutrition, and considering more innovative models of community-based care to better support individuals living with frailty.

# Setting the Context



## Defining our Terms

**Functional Decline:** A common issue associated with older patients, which is characterized by reduced ability to perform tasks related to self-care and activities of daily living (ADLs).

**Activities of Daily Living:** Activities that a person typically performs on a daily basis, such as bathing, getting in and out of bed, maintaining continence, dressing and undressing, and eating.

**Instrumental Activities of Daily Living (IADLs):** Activities that allow a person to live independently in and to actively engage with a community, such as shopping for groceries, accessing transportation, managing household finances, doing housework, and managing medications.<sup>5</sup>

**Minor Illness:** A health issue that patients are typically able to manage themselves, such as diarrhea, fever, migraine, nausea, cough, influenza symptoms, among others.<sup>6</sup>

**Disability:** Difficulty with carrying out activities of daily living (ADLs), such as meal preparation, shopping and managing household finances, which becomes more prevalent with age.<sup>7</sup>

## What is Frailty?

Frailty is a clinical syndrome, distinct from but related to ageing, disability, and the presence of co-morbidities. It is multidimensional and characterized by declining reserve and diminished resistance to stressors.<sup>1</sup> It is the result of a number of impairments that in aggregate reduce an individual's functional ability.

Unlike cancer or diabetes, frailty is not a specific medical condition. Further, it is not a disability, but is rather more like a syndrome that results from multiple factors - including disability - in which an individual may need additional support with activities such as housekeeping, bathing, and managing their finances. Frailty puts individuals at an increased risk of functional impairment, falls, hospitalization, long-term care use, and death, following stress such as a minor illness or infection. In addition, frailty can result in progressive loss of function, as well as an increased susceptibility to disease, falls, disability, institutionalization, acute illness, hospitalization and death.<sup>2</sup>

A longer life does not necessarily mean a healthy life at advanced ages. Canadians may need greater levels of health care services for longer periods of time, which can pose challenges to public health care systems.

While it is distinct from ageing, disability, and the presence of chronic health

conditions, frailty describes the effect of different conditions on the function of an individual. About 10% of community-dwelling older adults are believed to be frail,<sup>8</sup> but more than 40% are at risk of becoming frail.<sup>9</sup> Disability is characterized by difficulty in carrying out activities and tasks central to independent living, such as housework, self-care, bathing, and shopping.<sup>10</sup> Depending on how frailty is measured, disability can be a component of frailty or a result of it.<sup>11</sup>

Frailty is an evolving concept. The specific factors included in measuring frailty are subject to debate. Some measurements of frailty include a range of factors, such as chronic health conditions, sleep quality, mental health, and disability, among others.<sup>12</sup>

Other measurements of frailty view it as distinct from disability, and recommend that disability not be included in a frailty measurement.<sup>13</sup> The disagreement around whether disability is a component or outcome of frailty, is one example why greater consensus is needed around the conceptualization and measurement of frailty.

About 10% of community-dwelling older adults are believed to be frail.<sup>8</sup>

With the advent of the longevity revolution, older adults will constitute a greater proportion of our population.<sup>14</sup>

In 2016, seniors aged 85 and older made up 2.2% (or over 770,000) of the population; by 2031 as the oldest boomer reaches 85 this cohort is set to increase to 4% of the Canadian population (or over 1.25 million), and by 2051 as the youngest boomer reaches this milestone, it is set to increase to 5.7% (or about 2.7 million).<sup>15</sup> A longer life does not necessarily mean a healthy life at advanced ages. Canadians may need greater levels of health care services for longer periods of time, which can pose challenges to public health care systems. But how clinicians can and should identify frailty continues to be a source of contention.

### **What Does Frailty Look Like?**

Frailty is not a single condition, but rather a dynamic state in which an individual can improve or decline in their ability to perform tasks independently. As such, not all older adults living with frailty will look the same or have the same level of abilities. The Canadian Study of Health and Aging (CSHA) outlines nine points on a spectrum from fitness to frailty: very fit, well, managing well, vulnerable, mildly frail, moderately frail, severely frail, very severely frail, and terminally ill.<sup>16</sup> With this range of physical function, an individual's ability to perform tasks and their level of independence can change based on what

level of frailty they are assessed as living with.

Each stage of fitness or frailty on the CSHA Clinical Frailty Scale is associated with a variety of limitations imposed on an individual's ability to be independent and perform tasks essential to ageing in place. The described characteristics of each stage are:

1. Very fit – Robust, active and motivated; these people exercise regularly and are among the most fit members of their age group.
2. Well – Living without active disease, but not as fit as those in the first category.
3. Managing well – Living with disease symptoms that are well controlled and managed.
4. Vulnerable – While not dependent, these individuals face challenges that slow them down.
5. Mildly frail – Living with limited dependence on others to perform activities of daily living, such as transportation and house work.
6. Moderately frail – Help is needed for all activities of daily living, including house work, bathing, getting around inside a house and possibly dressing.
7. Severely frail – Completely dependent on others for personal care.
8. Very severely frail – Completely dependent and approaching the end of life.
9. Terminally ill – Approaching the end of life with a life expectancy of less than six months.



Since there are many differences between individuals at different points on the Clinical Frailty Scale, the challenges faced by two individuals living with frailty are different as well. For example, an individual who is in the early stages of mild frailty may need assistance managing finances and medications but may still be able to perform activities of personal care and house work, such as cleaning and bathing. On the other hand, an individual who is assessed as being severely frail is dependent on others for personal care and is likely benefitting from the support of an unpaid caregiver.

Adding further contention, some researchers and clinicians do not view the end-stages of disability and life - what would otherwise be categorized as being severely frail on the Clinical Frailty Scale - as states of frailty,<sup>17</sup> while many others do.<sup>18</sup> This view has emerged from the notion that frailty should only be considered when it may have a reversible component.

### **Living at and With Risk**

It is most accurate to view frailty as a dynamic state in which multiple variables impact an individual, resulting in a loss of physical, psychological or social capacity, to one degree or another,<sup>19</sup> not as a threshold before which a person is fit and beyond which a person is frail. The variables that influence the likelihood that an individual will have frailty can also impact their level of risk for negative health outcomes.

Furthermore, the level of frailty and their corresponding level of risk for negative outcomes that an individual may be living with can change over time, possibly improving, but more likely worsening, declining, and becoming more severe.<sup>20</sup>

Individuals living with frailty are living with some level of risk, including risk of falling, risk of negative health outcomes related to treatment, or risk of losing independence. As capable adults, older Canadians have the right to know what their options are in order to make informed decisions on their care. As a society, we should appreciate and acknowledge that older adults deserve to be supported even if they make informed decisions that allow them to live at and with risk.

## **Who is Living With Frailty?**

While disparities remain in how frailty is measured, it has been estimated that up to 50% of people over 85 are believed to be frail.<sup>28, 29</sup> However, identifying which factors or preconditions can put a person at greater risk of becoming frail will be critical to more effectively address frailty as a public health issue.

While the prevalence of frailty increases with age, it is not synonymous with age. In fact, among Canadians aged 18-79, between 6.6% and 7.6% are believed to be frail, depending on how it is measured.<sup>30</sup>

While the prevalence of frailty increases with age, an individual's level of physical fitness, their overall health status, and other variables also contribute to their level of frailty. In order to determine a precise conceptualization of frailty, its causes and targeted interventions to address it, clinicians, researchers, policymakers and the public need to move beyond 'age' as a key determining factor and come to a consensus around what factors should be considered when measuring frailty.

### **Factors and conditions that affect frailty**

#### **Chronic conditions and cancer**

While the lack of consensus on the measurement of frailty belies the difficulty of concretely identifying its risk factors, there are some conditions that lead to a greater risk for frailty, including a diagnosis of stroke, diabetes, hypertension, arthritis, cancer, or chronic obstructive pulmonary disorder.<sup>31</sup> A 2015 systematic review of the prevalence and outcomes of frailty in older cancer patients found that over half of the patients were either frail or pre-frail, while 42% were frail and found to be at increased risk of intolerance to chemotherapy, post-operative complications including mortality, and mortality for any number of reasons.<sup>32</sup> Knowing that a patient is living with frailty can help clinicians determine how appropriate a treatment, such as chemotherapy, is for them.

#### **Cardiovascular disease**

There is a particularly striking connection between frailty and cardiovascular disease. About 60% of individuals diagnosed with cardiovascular disease are believed to have frailty, which is remarkable, considering only 10% of community-dwelling older adults are considered frail.<sup>33</sup> The relationship goes even deeper. Not only is frailty more common in individuals diagnosed with cardiovascular disease than the general population of older adults, it leads to more severe negative outcomes as well. In fact, in individuals with cardiovascular disease, frailty has been found to double or triple their risk of death.<sup>34</sup>

#### **Multi-morbidity and Polypharmacy**

More important than any single condition, living with multiple chronic health conditions puts individuals at risk for becoming frail.<sup>35</sup> While an individual's health conditions contribute to their level of frailty, the number of medications an individual is taking in order to manage those conditions can also contribute to frailty. Polypharmacy - defined as being prescribed five or more medications - is also considered a risk factor for frailty.<sup>36</sup>

50% of individuals over 85 are believed to be frail.<sup>28, 29</sup>



## Prevalence of Frailty

7% of Canadians aged 18-79 have frailty.<sup>21</sup>

16% of Canadians aged 65-74 have frailty.<sup>22</sup>

28.6% of Canadians aged 75-84 have frailty.<sup>23</sup>

52.1% of Canadians aged 85 and over have frailty.<sup>24</sup>

Up to 50% of nursing home residents have frailty.<sup>25</sup>

42% of older cancer patients have frailty.<sup>26</sup>

60% of cardiovascular disease patients have frailty.<sup>27</sup>

The Canadian Alliance for a National Seniors Strategy points out that 65% of older Canadians are taking medications belonging to five or more medication classes, while 39% of adults over the age of 85 are taking medications belonging to 10 or more medication classes.<sup>37</sup> While evidence-based lists of inappropriate medications for older adults, such as the *Beers List*, are widely accepted, published and accessible, nearly 40% of older Canadians are still found to be taking at least one inappropriate medication.<sup>38</sup>

An additional 12% take multiple inappropriate medications, the use of which is associated with avoidable hospitalization and hospital readmissions due to adverse drug events.<sup>39</sup> Often, reducing older adults' intake of inappropriate medications could help reduce their risk for becoming frail.

Finally, depression may also be a risk factor for frailty.<sup>40</sup> However, the association between depression and frailty may also be due to the symptoms of depression, which are associated with moderate frailty, or may be driven by the use of antidepressants, which increases risk for falls and fractures.<sup>41</sup>

60% of individuals diagnosed with cardiovascular disease are believed to have frailty.<sup>33</sup>

## Medication Classes and Interactions

A medication class is a group of medications that have something in common, but which are not identical.

Medications may be in the same class because they have similar chemical structure, are used in the same way or for the same purpose.<sup>42</sup>

Adverse drug reactions (ADRs) occur when the effects of one medication are affected by another medication. Older adults are at greater risk of for adverse drug reactions due to the number of medications they are typically prescribed.<sup>43</sup>

### Socio-demographic factors

Socioeconomic, demographic, and gender factors appear to contribute to an individual's level of risk for becoming frail. With respect to gender, women are twice as likely to be diagnosed with frailty when compared to men.<sup>44</sup> This discrepancy may be due to the fact that women have lower muscle mass than men, which contributes to their overall level of frailty.<sup>45</sup>

While low education and/or income have been demonstrated to be risk factors for frailty,<sup>46</sup> there are socio-demographic factors that may not contribute to whether or not an individual will have frailty, but still influence how well they are able to manage their frailty status. Having a lower income, being socially isolated are associated with frailty.

On the other hand, having access to secure, stable and affordable housing can support an individual to avoid the negative outcomes associated with frailty.<sup>47</sup>

40% of older Canadians are taking at least one inappropriate medication.<sup>38</sup>

For example, a 2015 study from the United Kingdom showed that the average 80-year-old individual in the top third of the income scale had a comparable frailty score as an average 70-year-old individual in the bottom third.<sup>48</sup> Another study looked at the relationship between frailty and neighbourhood deprivation, which is a measure that includes the level of crime in a neighbourhood, access to housing and services, among other measures.

It found that individuals who lived in communities with greater levels of neighbourhood deprivation also had higher levels of frailty.<sup>49</sup> The researchers concluded that an individual's socioeconomic status and the neighbourhood they lived in was independently associated with frailty.<sup>50</sup> In addition to income, social isolation and loneliness have been found to be conditions of and risk factors for physical frailty.<sup>51</sup> Factors such as income, social connections, and the communities individuals live in can be considered assets. Individuals with more assets are more likely to cope better with frailty than individuals with fewer assets.

### Care Settings

Where you live and receive care are also important factors in frailty. About 10% of community-dwelling older adults are frail, compared with more than half of older adults who live in long-term care or nursing homes.<sup>52</sup> While there is little known about frailty in long-term care homes, the high prevalence could result from the negative outcomes that frailty puts individuals at risk for, such as falls, disability, and functional

decline, which can result in requiring a greater level of care and admission to a long-term care home.

It is also important to note that the prevalence of pre-frailty - those at risk for becoming but who are not yet frail - is about the same in both community and long-term care settings, with the prevalence being 41.6% and 40.1% respectively.<sup>53</sup> Despite the fact that more than half of long-term care residents are frail, 40% of residents could still potentially improve their overall health status and benefit from interventions. Better assessing frailty, therefore, can have implications on whether or not an individual will be able to remain at home or require institutional care.

## Is Frailty Preventable and Treatable?

Addressing its individual contributors can reduce the total level of frailty an individual may be living with.<sup>54</sup> Given this, there are several interventions that have been shown to have some efficacy in managing frailty, including exercise, nutritional support, increasing the amount of Vitamin D in an individual's diet, and reducing the number of medications an individual may be prescribed.<sup>55</sup>

In addition to the physical contributors to an individual's level of frailty, policy makers also need to consider the social determinants of frailty, such as poverty, exercise levels, and social inclusion and

participation, and tailor policy responses to meet the needs of individuals, including those living in urban, rural and remote communities.

In Ontario, more than 300 Seniors Active Living Centres offer programming including exercise classes.<sup>56</sup> While exercise is known to be beneficial to preventing frailty,<sup>57</sup> the exercise classes also help combat social isolation by empowering older adults to be connected to their communities. Some Seniors Active Living Centres also couple their exercise programs with a nutritious snack or meal.

Intergenerational housing, the development of age-friendly communities, and home sharing programs that enable older adults to share their home with a younger individual, also help address social isolation and loneliness. The Alliance for a National Seniors Strategy has noted that these initiatives should be understood as ways of promoting the contributions and well-being of older adults and supporting them to live independently in their communities.<sup>58</sup> Furthermore, promoting vaccination uptake among older adults can help to prevent influenza-related complications, which can lead to negative health outcomes, such as hospitalization and death, especially among older adults living with frailty.<sup>59</sup>

Finally, addressing frailty among our older population means governments will need to tackle poverty. The Alliance for a National Seniors Strategy has noted that in order to address poverty among older Canadians, the federal government will need to consider cost-effective and equitable means of financial support.<sup>60</sup> While these interventions do not directly target frailty, they do help to prevent the likelihood that someone will have frailty, or, if they do have frailty, they can help prevent it from becoming more severe.

Another intervention that governments could consider to support individuals living with frailty is the concept of reablement, which consists of teaching older adults with physical or mental challenges the skills they need in order to function in their daily lives.<sup>61</sup>

## What is Reablement?

Reablement is a short and intensive service, usually delivered in the home, which is offered to people with disabilities and those who have frailty or are recovering from an illness or injury. The purpose of reablement is to support people who have experienced deterioration in their health and/or have increased needs by enabling them to relearn the skills required to keep them safe and independent at home. Individuals who benefit from reablement programs often experience greater improvements in physical functioning and improved quality of life compared with using standard home care.<sup>65</sup>

Reablement programs focus on promoting independence and function, rather than addressing health or physical challenges. They have been shown to reduce the use of health care and home care services, as well as the risk of emergency department visits, long-term care admissions and death.<sup>62</sup> It is possible to improve the independence and health status of older adults living with frailty through restorative approaches to care that help them re-learn skills that support them to adapt to their condition.<sup>63</sup>

This approach has proven to be successful in Denmark, where it is national policy that anyone receiving home care is enrolled in a reablement program to ensure they are functioning at the highest levels.<sup>64</sup> While reablement interventions do not specifically target an individual's frailty status, they can help promote

independence and physical function among individuals living with frailty.

Governments and health policy makers should consider these initiatives as frailty interventions alongside interventions that more directly target frailty, such as exercise and improving nutrition.

### **Move It or Lose It**

Frailty is often preceded by sarcopenia, which is the loss of muscle mass that can often occur as you age. In the phenotype model of frailty, the condition is characterized by decreased strength, weight loss, slow walking speed, tiredness, and inactivity, all of which are related to the loss of muscle mass.<sup>66</sup> This suggests that frailty is influenced by more than simply genetics, but also by one's

level of physical activity and nutrition.<sup>67</sup>

Physical activity or exercise has been shown to be beneficial in the management of more than 30 chronic conditions, including cardiovascular disease, which is a chronic condition that is highly associated with frailty. It has further been shown to generate positive clinical outcomes, such as reduced blood pressure, improved mental health, reduced risk of depression, and improved cognitive function in older adults with dementia and Alzheimer's disease.<sup>68</sup>

Additionally, in a 2015 study, increased physical activity was found to reverse the severity and prevalence of frailty among older adults.<sup>69</sup>

In reducing the risk of frailty among the participants, researchers concluded that frailty could be reversible when treated with physical activity. They suggested that addressing one aspect of frailty, in this case mobility, can significantly affect the overall level of frailty an individual may be living with.<sup>70</sup>

Beyond influencing the level of frailty, however defined, that an individual is assessed with, physical activity can also have a powerful influence on the negative outcomes associated with frailty, especially falls.

In a 2011 study of a number of exercise interventions for frailty amongst older

adults, researchers found that exercise was an important factor in reducing falls risk, although different exercises had varying outcomes.<sup>71</sup> For example, resistance training reduced the risk of falls by 57%, while a combination of aerobic and resistance training reduced falls by only 17% in community-dwelling older adults.<sup>72</sup> Physical activity was also found to have a positive effect on disability in relation to performing activities of daily living (ADLs); although, it most likely only benefits moderately frail older adults, and not severely frail older adults.<sup>73</sup> These results led researchers to conclude that exercise can be a powerful intervention for treating frailty and that clinicians should recommend physical activity to frail older adults.

While physical activity can be an effective treatment intervention for frailty in older adults, it can also serve as a successful preventive measure as well. A 2009 study found that individuals who regularly engaged in exercise were less likely to develop frailty in five years than sedentary older adults.<sup>74</sup> By the same token, sedentary older adults were three times more likely to transition from a moderate to a severe level of frailty than were their peers who exercised regularly.<sup>75</sup> To better promote physical activity among older adults, the Alliance for a National Seniors Strategy has recommended that the Public Health Agency of Canada leverage its ParticipACTION Program to highlight the

benefits of physical activity to promote healthy ageing.<sup>76</sup>

The Canadian Society for Exercise Physiology (CSEP) has physical activity guidelines recommending that adults, including older adults, get 150 minutes or 2.5 hours of moderate-to-vigorous exercise each week. These guidelines are also appropriate for older adults with frailty, however they should consult with a health care provider regarding specific activities.<sup>77</sup> Currently, at least 80% of Canadians do not meet the recommendation of 150 minutes of physical activity each week.<sup>78</sup> At the same time, physical activity is one of the most cost-effective preventive measures, as well as having few barriers to entry.

Improving the level of physical activity that Canadians - and older Canadians living with frailty - engage in could help reduce their overall level of frailty, promote independence, and produce significant savings for our health care systems. An exercise prescription, in which a physician prescribes a certain level of physical activity to a patient, can help achieve this. The physician works with the patient to assess their level of physical activity and develop exercise goals. The prescription has been found to be cost-effective and to increase physical activity by 10% in inactive patients, which has been estimated to save \$2.1 billion per year in health care and related costs, if it were spread across the entire Canadian population.<sup>79</sup>

Among older adults living with frailty, the means of improving the level of physical activity to decrease the level of frailty could just be a phone call away. A 2011 study found that simply calling older adults living with frailty to encourage them to exercise decreased the prevalence of frailty by 18%.<sup>80</sup> This could be a promising, low-cost model of exercise promotion among older adults living with frailty that communities could take up at the local level.

An exercise prescription has been found to increase physical activity in inactive patients by 10%, which could save \$2.1 billion per year in health-related costs.<sup>79</sup>



## Moving to Prevent Falls

Recognizing the important role exercise plays in preventing falls among older adults, Ontario provides older adults 2,000 free exercise and falls prevention classes across Ontario. The exercise classes emphasize improving and maintaining balance, strength, and mobility, and are taught by a physiotherapist or other health professional that also provides information on preventing falls amongst older adults. This program was deliberately created at an annual cost of \$10 million to help prevent falls and their related injuries. Falls and related injuries cost the Ontario health care system \$750 million per year. The program also aims to better promote social interactions amongst older adults to strengthen social networks and reduce social isolation and loneliness.



## You Are What You Eat

Along with exercise interventions, better nutrition has also emerged as an effective strategy to manage frailty. In fact, while nutritional interventions have been found to reverse frailty,<sup>81</sup> 23% of older adults living with frailty are malnourished.<sup>82</sup>

As the fuel for all bodily functions, nutrition plays a crucial role in the development of muscle mass and strength, which in turn influence an individual's risk for having frailty.<sup>83</sup> Nutrition also has a significant influence on an individual's overall health, function, and level of independence. By the same token, malnutrition is associated with an increased risk of chronic conditions, decreased antioxidant defenses, peripheral arterial disease, and frailty.<sup>84</sup> Optimal nutrition can therefore be an important way to promote healthy ageing and prevent or manage frailty.

In the context of older adults living with frailty, nutrition has long been identified, along with physical activity, as a contributor to whether an individual will be assessed as being frail, as well as the level of frailty they may be living with. By following a healthier diet, older adults can decrease their risk of becoming frail, and optimal nutrition can slow the progression of frailty.<sup>85</sup>

Specific micronutrients, such as vitamins D, E and C, have been observed to be associated with a lower prevalence of

frailty.<sup>86</sup> However, the challenge of clinically applying how micronutrients can prevent frailty is that people do not eat micronutrients, they eat food. With that understanding, a nutrition-based intervention for preventing and managing frailty is emerging around promoting foods and diets that can help reduce an individual's risk of becoming frail.

While more research is needed, some evidence has shown that a high intake of fruits, vegetables, coffee, and green tea is associated with a lower risk of frailty.<sup>87</sup> At the same time, emerging evidence also suggests that adherence to the Mediterranean Diet can also decrease the likelihood that an individual will be assessed as living with frailty.<sup>88</sup> The Mediterranean Diet emphasizes fruits, vegetables, leafy greens, olive oil, fish and nuts. A recent cross-sectional study found that higher adherence to the diet was associated with lower odds of frailty, irrespective of the definition used, among older adults.<sup>89</sup>

## What are the Current Main Viewpoints on Frailty?

### Two Similar Yet Different Models of Frailty: Specificity vs Quantity

There are two common models used to

identify, measure, and diagnose frailty: the **Phenotype Model** and the **Accumulation of Deficits Model**. The Phenotype Model measures frailty as a process characterized by an individual's independence in physical abilities and function that are measured by a specific set of physical indicators. The Accumulation of Deficits Model measures frailty as the result of an accumulation of a large number of deficits, which are physical, cognitive, and clinical challenges an individual may be facing, such as hearing loss, depression and chronic health conditions.<sup>90</sup> The more commonly used model in frailty research is the Phenotype Model. It suggests that frailty can be measured by five physical indicators: self-reported exhaustion, slow walking speed, low levels of physical activity, decreased grip strength, and unintended weight loss.<sup>91</sup>

The strength of the Phenotype Model lies in its specificity. The model measures the same five indicators in each individual, and those five indicators are the only components it considers to be part of frailty. It aims to describe a specific process which can be targeted by specific interventions.<sup>92</sup>

However, there are several challenges to the Phenotype Model. Since it focuses on physical function, it does not consider how cognitive or psychological factors may affect frailty. Only some of the indicators it measures, such as slow walking speed, low levels of physical activity, and unintended weight loss, predict negative outcomes associated with frailty.<sup>93</sup>

A 2008 study found that cognitive impairment was associated with disability, long-term care admission and death, while exhaustion and weakness were not independently associated with those frailty-associated outcomes.<sup>94</sup> This suggests that there may be factors that the Phenotype Model does not consider that also contribute to frailty and its outcomes.

The second common measurement of frailty is the Accumulation of Deficits model, which presents frailty as the result of many deficits which eventually wear down an individual's physical resilience and ability to recover from an illness or infection. It measures frailty by considering a large number of deficits, typically ranging from 40-80 individual data points, comprised of lab results, chronic conditions, and aspects of physical functioning, among other considerations.<sup>95</sup>

The Accumulation of Deficits model is highly flexible in that the individual deficits that are measured are not fixed, nor is the number of deficits considered.<sup>96</sup> The model suggests that the more deficits an individual may be living with, the more likely they are to be frail. It further proposes that considering enough deficits can consistently predict frailty, even if the individual deficits being measured are not consistent across assessments.<sup>97</sup> In short, this model focuses on the quantity of limitations an individual has rather than the specific challenges they may encounter. Indeed, according to the Accumulation of Deficits model, the more deficits a person

has determines not only their likelihood of having frailty, but also the level of frailty an individual may be living with. The model conceptualizes frailty as a spectrum along which individuals are placed depending on the degree of frailty they are living with.

The strengths of the Accumulation of Deficits models are that it is flexible in terms of what measurements contribute to frailty and it is open in that it views frailty as a dynamic state in which people can become more or less frail over time.

In addition to being flexible and open, the model can also identify older adults who may appear healthy, but may benefit from interventions to address frailty. By considering a large number of variables in determining the level of frailty, however, the model may inadvertently mask a single variable acting as a key driver of frailty.<sup>98</sup>

The Accumulation of Deficits and the Phenotype Models approach the measurement of frailty differently. However, the two approaches have also been shown to have a considerable degree of overlap between them.<sup>99</sup>

The Phenotype Model views frailty as a specific physiological process that can be measured by five indicators. Furthermore, the Phenotype Model says that any other factors, such as mental health, cognitive challenges, disability, and chronic health conditions are not part of frailty.

The Accumulation of Deficits model, on the

other hand, views frailty as the outcome of a large number of indicators, which, taken together, result in a state of vulnerability and lack of reserve, the severity of which depends on the number of deficits an individual may have. Crucially, it says that it doesn't matter which individual deficits you measure because if you measure enough deficits – about 40 to 80 – then you can consistently determine any individual's level of frailty and predict their risk for experiencing negative outcomes

### **Diagnosing and Assessing Frailty from Routinely Collected Information**

There are instruments commonly being used in Canada - such as the interRAI assessment systems - that can enable health care providers to easily assess an individual's level of frailty and other functional and psychosocial needs within a wide variety of acute, home and community, and long-term care settings that may require attending to. InterRAI is a 'collaborative network of researchers and practitioners in over 35 countries committed to improving care for persons who are disabled or medically complex.'<sup>100</sup> Its assessment instruments are now required in home care, long-term care, and inpatient mental health settings across Canada. To date over 10 million assessments have been conducted on over 3.1 million Canadians.

The anonymized data collected through each of these assessments is housed and made accessible through the Canadian Institutes for Health Information (CIHI).

The interRAI-Home Care, Long-Term Care, Emergency Department and the Acute Care assessment systems can each be used to derive a single score on the frailty index to predict multiple adverse outcomes in older patients in their respective settings.<sup>101-104</sup>

The benefit of the interRAI assessments is that it can measure frailty according to both the Accumulation of Deficits Model and the Phenotype Model.

InterRAI assessments work by asking patients, clients, or suitable proxies and care providers to answer a series of questions, and the answers are then used to determine a frailty index score on a scale from 0 – 1. A score greater than 0.4 derived from the assessment is strongly associated with multiple negative outcomes, including likelihood of death.<sup>105</sup> While the assessment can tell you that an individual is at risk for negative outcomes, such as hospitalizations, death, and functional decline, a drawback of the assessment is that it does not yet tell health care providers exactly what treatments they should be providing to their patients who have some level of frailty.<sup>106</sup> This, however, is a common challenge with virtually all existing frailty measures at the moment and perhaps why this aspect of the interRAI assessments is not being actively implemented at the moment in Canada.

In the United Kingdom, researchers have developed an Electronic Frailty Index (EFI) that uses health information that is already routinely collected as part of the general

practice Over 75 Health Check to provide primary care providers with frailty index scores for their patients.<sup>107</sup> The EFI uses the Accumulation of Deficits model of frailty diagnosis. It considers 36 deficits in the calculation of an individual's frailty index score. Its creators note that by implementing a frailty index score in primary care should allow their health care providers to organize more appropriate treatments and interventions to meet their patients' goals and needs.<sup>108</sup>

The main innovation of this tool is that it uses data that is already being collected in primary care settings to inform health care providers about the level of frailty that their patient has. While it has not yet been clearly established what a specific frailty index score means in this setting, it is a good example of allowing a frailty score to be derived at the point of assessment to allow for more proactive actions to be taken amongst better informed care providers and their patients.

### **Moving Beyond Physical Concepts of Frailty**

The two dominant models of frailty commonly conceptualize frailty as a fundamentally physical process that contributes to an individual's overall function and ability to live independently.<sup>109</sup> There may be other factors beyond the bio-physical model, however, that can further influence both an individual's level of frailty and their ability to manage or reverse frailty.

In order to come to a full view of what is driving an individual's diagnosis of frailty, clinicians may need to consider both a micro- and macro-level assessment of factors. A focus on only the physical aspects of frailty may lead to fragmented care that does not address the sum of an individual's needs or all of the contributors to their degree of frailty. A full analysis of an individual's frailty and socioeconomic status would determine how all of its components fit together to produce negative health outcomes. By broadening the concept beyond physical frailty, clinicians could see that each individual's trajectory of frailty is unique and could tailor services and interventions to meet their unique needs.<sup>112</sup>

Furthermore, public policy is most acutely effective when operating on evidence supplied by experts and when directly addressing social and economic factors that impact wellbeing. Incorporating socioeconomic and psychosocial factors into our technical understanding of frailty will open the door for effective policy interventions, in addition to more tailored delivery of health and social care.

The quality of an individual's social life is increasingly being recognized by researchers as an important factor in determining whether they will be living with frailty, how severe their level of frailty will be, and the likelihood that they will

experience negative health outcomes as a result. The role of what is becoming increasingly described as 'social frailty' in contributing to an individual's risk of negative outcomes, such as falls, hospitalizations, and death, should be seen as an important one.<sup>113</sup> For example, social and behavioural factors, such as having less than a high school education, and living alone, are associated with both being frail and living with a more severe level of frailty.<sup>114</sup>

In addition, the kind of community that an older adult living with frailty lives in can also influence frailty and its associated outcomes. Having a lower income and fewer social connections is associated with frailty in older adults.<sup>115</sup> On the other hand, having a well-functioning, supportive social and community network can help prevent frailty in older adults, leading them to be more resilient, less depressed, and to live longer and healthier lives.<sup>116</sup> Since increasing age is associated with greater reliance on the support of neighbours, the ability to depend on others who live in their community may also prevent frailty and premature institutionalization among older adults by managing its social determinants.<sup>117</sup>

### **Can Accurate Assessment of Frailty Help to Better Personalize Care?**

There are clear reasons why it is important for clinicians to consider frailty when providing care to older patients. Failing to identify

frailty can expose patients to treatments that may cause them harm and can add to caregiver burden and inappropriate use of health care resources. Furthermore, if health care providers do not consider frailty when providing care to older patients, they increase the likelihood that they will do harm to patients.<sup>118</sup>

There are also positive reasons why clinicians should be thinking about frailty among their older patients. While controversies about its measurement and clinical definition make identifying frailty in clinical settings somewhat challenging, determining the level of frailty a patient may be living with can help clinicians better personalize the care they provide to older patients.

Knowing that an older patient may be living with a certain level of frailty can empower care providers to better manage their symptoms.

Evidence suggests that the process of a Comprehensive Geriatric Assessment (CGA) and management, typically provided through a geriatrician-led interprofessional team, not only reduces the risk of adverse outcomes, including admission to long-term care and premature death, but also helps to avoid unnecessary use of health services, improve depressive symptoms, and slow a patient's functional decline.<sup>119</sup> In fact, an accurate frailty diagnosis may provide both patients and clinicians with valuable information about the level and type of care that may be

appropriate for older adults living with frailty. Often, this can be according to patients' wishes to prioritize quality of life over extending life for as long as possible.<sup>120</sup>

While a frailty assessment can inform what type of care may be appropriate for an individual, advance care planning can clarify what an individual's wishes and values may be and communicate them to their health care providers and caregivers. Occasionally, the care an individual receives at the end of life is not the type of care they would have chosen for themselves.

Advance care planning can help ensure an individual's wishes are respected at the end of life. The Alliance for a National Seniors Strategy has noted that advance care planning has a significant impact on improving end-of-life care.<sup>121</sup> It has further noted that as many Canadians as possible, in particular older Canadians, should have the opportunity to engage in timely, comprehensive advance care planning.

The Canadian Institute for Health Information (CIHI), an independent, non-profit organization that provides essential information on Canada's health systems and the health of Canadians, is currently embarking on a two-year initiative using their vast pan-Canadian holdings of clinical and administrative data to develop a frailty measure for acute care settings, anticipated to be released in 2018-2019.<sup>122</sup>

However, if the frailty measure under development assesses an individual's level of frailty after hospitalization, like the one that was recently developed in the United Kingdom,<sup>123</sup> it may only be of interest to researchers and health care administrators who may use it to characterize the outcomes of patients considered to have frailty after admission to acute, hospital based care.

However, in order to be clinically useful, frailty measures will need to be able to determine an individual's level of frailty at earlier stages of care before any treatment decisions have been made.

Frailty informs not only the types of services that should be provided in a hospital setting or a physician's office, but also in community settings as well. Given the reality that some have called the 'hazards of hospitalization of the elderly,'<sup>124</sup> which refers to a process in which older patients experience negative health outcomes as a result of being hospitalized, it is critical that older adults who have frailty avoid using hospital-based acute care services whenever possible. Their symptoms and issues may be better and more proactively managed in community settings.<sup>125</sup> Knowing that a community-dwelling older adult may be frail and at risk for negative outcomes can help care providers proactively target services and interventions to help support them to stay as healthy and independent as

possible. If they require an acute care hospitalization, ensuring they can do so in an 'elder-friendly hospital' that can minimize the risks and maximize the benefits of hospitalization will be essential.

## What are the Issues Arising from Our Current Lack of Consensus?

### Health Care Providers and Policy Makers Are Still Not Clear on How Best to Develop Frailty-Informed Care

Given the close relationship between frailty and negative health outcomes, it seems obvious that it should matter to health care providers. Knowing that a patient has a certain level of frailty can provide their care providers with valuable information about the level of care their patients may need to remain as independent as possible. For example, knowing that an individual is frail can tell a clinician that they will likely need more support than someone who has the same conditions but is not frail. The support for older adults living with frailty can also be better delivered through integrated case management and interdisciplinary care that can better meet their physical, cognitive and social needs.<sup>129</sup>



## Advancing Models of Elder-Friendly Hospital Care in Canada and Beyond

While an increasing number of hospitals are recognizing the importance of geriatric care, only a minority of hospitals in North America have made the needs of older adults a core strategic priority, despite the fact that they represent a majority of inpatient bed days. In 2010, in Toronto, Mount Sinai Hospital committed to launch an integrated Acute Care for Elders (ACE) Strategy as a core strategic priority for the organization to improve how it delivers care for its older patients.

Under its ACE Strategy, the hospital and its home, community, and primary care partners collaborated to implement a series of evidence-informed but tailored interventions, such as geriatrics education designed for emergency department professionals, an Acute Care for Elders (ACE) Unit, ongoing home and community care supports and a regional community paramedicine program, among many others. Between 2009 and 2015, Mount Sinai Hospital reduced the average length of stay for older patients by 25%, and readmissions within 30 days by 13%.<sup>126</sup> Mount Sinai Hospital's ACE Strategy has achieved this by linking all its interventions together to create a more seamless, integrated delivery model spanning the continuum of care through strong partnerships with local home, community and primary care partners.

Mount Sinai Hospital's ACE Strategy is not only benefiting its patients, but older adults across Canada and around the world. In 2016, the Canadian Foundation for Healthcare Improvement and the Canadian Frailty Network partnered with Mount Sinai Hospital to spread ACE Strategy interventions to 18 quality improvement teams across Canada and in Iceland over 12 months.<sup>127</sup> The result has been that over 58 ACE Strategy models of care or care practices have been introduced at the 18 sites.

In the United Kingdom, a similar quality improvement and education initiative exists. The Acute Frailty Network was launched in January 2015 to support the improvement of acute care for older people living with frailty in England. It provides conferences, master classes, site visits, one-on-one coaching, and sustainability assessments. The Acute Frailty Network has increased awareness and knowledge of frailty among health care providers, and has enabled more acute care sites to better identify and respond to frailty and its associated issues in their settings.<sup>128</sup>



Assessment of frailty can not only tell clinicians what type of care a person may need, but also the treatments they may no longer benefit from. Cancer patients have a particularly high prevalence of frailty. Older cancer patients who are also frail are at increased risk of chemotherapy intolerance, postoperative complications, and overall mortality.<sup>130</sup>

This has helped to create a growing interest or development of geriatric oncology that helps to better understand a person's inherent level of frailty through a Comprehensive Geriatrics Assessment (CGA) and then determine how best they should approach or avoid various treatment options to achieve the best possible outcomes, including survival and improved quality of life.

### **The Medical and Research Communities Are Unclear on How to Put Frailty on the Policy Agenda**

The appropriate identification of frailty, matched with effective management and interventions, ought to be of interest to every health care policy maker. While reducing the negative outcomes associated with frailty are a goal of many health systems around the world, there remains an absence of policy focus on older adults in general and those becoming frail in particular.<sup>131</sup> Since frailty is a means of identifying the highest-volume users of health services,<sup>132</sup> its effective assessment and management should be a high priority for health policy makers.

The challenge for health policy makers is that as our population is ageing, the prevalence of frailty will increase as well. While age and frailty are not synonymous, they are closely associated with one another. As our population continues to age, the prevalence and burden of frailty, as well as its outcomes, should occupy a larger space on our health policy agenda. However, there are interventions, such as the promotion of physical activity and optimal nutrition discussed below, that can help reduce the prevalence of frailty in our population.

The **European Union** is one entity that has made frailty a focus of its public policy, by outlining 10 areas that policy makers in each of the 28 member states would need to focus on in order to address frailty across Europe.<sup>133</sup> It has recognized that the successful management of frailty requires community-based assessment, prevention, and integrated case management. More specifically, the EU has noted that, while frailty is not inevitable, there are some policy priorities that can be pursued, including a greater focus on prevention, early diagnosis, and screening, as well as the promotion of physical activity to reduce functional and cognitive decline.<sup>134</sup>

The EU has further recognized that the success of these policy avenues depends on a shift in health care systems away from hospital-based, disease-centred, acute care towards community-based, person-centred ongoing care and case management.

In **Canada**, while health care systems are investing more in home- and community-based care, they remain largely centred around the provision of hospital-based care that is focused on treating individual health issues, such as a single illness or fractured bone. The current organization of health care services is not optimal for older adults who are living with a given level of frailty because they will likely need more integrated care, which will require health care systems to restructure in order to meet their needs.<sup>135</sup> This requires empowering health care providers with basic skills for managing syndromes that are common in frail older adults, as well as ensuring clinicians are competent to manage multi-morbidity and multi-system impairment, falls, functional decline and other negative outcomes associated with frailty. Health care restructuring and putting frailty at the heart of health care policy can help better manage the negative outcomes associated with frailty, and prevent those negative outcomes from occurring in the first place.

While provincial and territorial health systems have yet to fundamentally shift from hospital-based care to home- and community-based care, Canada does have important and promising research and policy infrastructure around frailty. In 2012, the Canadian Frailty Network (CFN) was launched as a Centres of Excellence-funded network for older Canadians living with frailty. CFN works to improve the care of

older adults living with frailty and support their families and caregivers by increasing recognition and assessment of frailty, increasing evidence for decision-makers, advancing evidence-based changes to care, educating future care providers, and engaging with older adults and caregivers.<sup>136</sup>

As a network focused on spreading awareness and increasing the amount of research conducted in Canada around frailty, CFN funds research and knowledge translation projects that can improve frailty screening and clinical practices for providing care to older adults living with frailty.<sup>137</sup> CFN has funded 102 research and knowledge translation projects to date under four broad themes: End-of-Life Care/Advance Care Planning, Acute/Critical Care, Optimization of Community & Residential Care, and Optimization of Transitions in Care.<sup>138</sup>

### **We Do Not Have Standardized Ways of Researching and Comparing Frailty Outcomes**

In order to develop sound, effective policies, governments and other institutions rely on high-quality, comparable evidence.



However, in a recent review of the literature, CFN found that the majority of randomized controlled trials studying frailty either did not define frailty or used a definition for their study that was not comparable to other common definitions of frailty, such as the Accumulation of Deficits Model or the Phenotype Model.<sup>139</sup>

CFN also found further disparities in terms of the outcomes that the articles reported, such as the specific Activities of Daily Living, cognitive status and medication use.<sup>140</sup> It concluded that the disparity leads to limitations in comparability between frailty studies and a decreased ability to generalize and apply their findings.<sup>141</sup>

In addition to consensus in how frailty is measured in clinical settings, we also need consensus in how researchers define frailty and measure its outcomes. By harmonizing the design of studies, researchers, policy makers and health care providers can benefit from more clarity in how frailty is measured, what its outcomes are, and which interventions are most effective at preventing and reversing it.

### **The Presence of Frailty Significantly Impacts the Experiences of Caregivers**

In general, the care of older patients is a process that includes not only a physician and a patient, but also many others who are involved in the care of older patients, including families and unpaid caregivers.<sup>142</sup>

As Canadians increasingly want to age at home, they will increasingly rely on the support of caregivers to make this desire a reality. Caregivers also provide considerable social and economic value by offsetting costs and capacity in the public health care system. In fact, unpaid caregivers contribute approximately \$25 billion annually to health care systems through offset costs,<sup>143</sup> and in 2012, approximately 8.1 million Canadians had provided care to another person within the previous year.<sup>144</sup>

In the context of frailty, the relationship between the management of frailty and caregiver well-being is deep and reciprocal. Older adults living with frailty, and their formal health care providers, rely on unpaid caregivers to support them. In fact, older adults who have severe frailty are more likely to combine both formal and informal care from the health care system and unpaid caregivers.<sup>145</sup> While older adults living with frailty often rely on unpaid caregivers to maintain their independence, caregiver burden increases in the absence of proper, formal care.

The level of frailty of the care recipient can in fact influence the level of burden their caregiver experiences. Caregivers of older adults living with frailty can experience physical, financial, and psychological burden. The financial and emotional strain of caregiving can be further associated with reduced quality of life and life satisfaction.<sup>146</sup> Furthermore, the burden of being a caregiver to an older adult who has frailty can also elicit negative reactions to

the role, including anxiety and depression.<sup>147</sup>

In general, caregiver well-being fluctuates with the overall health status of the care recipient. This is a reality and dynamic that should be accounted for when considering the clinical management of frailty in older adults.

Since frailty is a dynamic state in which an individual can decline or improve, the individual's health outcomes and prospects also influence caregiver burden and well-being. Over the 12 months following a diagnosis of frailty, the level of severity may worsen, increasing the risk of a decline in caregivers' quality of life, leading to more mental health problems, more physical health problems, and more difficulty balancing caregiving and other daily activities.

A decline in psychological well-being may bring communication problems, which can add to caregiver burden and contribute to feelings of helplessness. However, an improvement in the psychological well-being of the care recipient can have a positive effect on their caregiver's well-being and lead to improved quality of life for the care recipient.

Given the strong relationship between caregiver burden and frailty management, accurate assessment and treatment of frailty is important for caregivers as well.

The National Institute on Ageing has previously shown that caregivers are integral to enabling care recipients to remain at home safely and out of costly institutional care, thereby contributing to the sustainability of our publicly funded health care systems. Improving the assessment of frailty and tailoring interventions to its management can put sharper tools at the disposal of caregivers to enable them to provide much-needed care to care recipients.

Caregivers save the Canadian health care system approximately \$25 billion annually.<sup>143</sup>

## Where Should We Go From Here?

### We Need to Standardize How Researchers and Health Care Providers Measure Frailty and Report Frailty Outcomes

One of the enduring challenges in addressing frailty at both the clinical and population levels is that there remains no commonly recognized and agreed upon way to measure it.

From a research perspective, CFN found that there was a high degree of variability in the definition of frailty and its outcome measures used in research studies. In a recent international consensus effort led by the International Consortium for Health Outcome Measures (ICHOM) around the development of a standard set of health outcome measures for older persons, it was agreed upon that the presence and level of frailty needed to be understood amongst older people and that the Canadian Study on Health and Aging's Clinical Frailty Scale was the measurement tool that clinicians most identified with and could most easily utilize in the absence of more robust and internationally comparable tools.<sup>152</sup>

In order to plan and resource our health care systems to sustainably provide care to older adults living with frailty, health policy makers and health system administrators will need high-quality comparable data that they can use to design interventions and models of care.

Before health policy makers have comparable data about frailty, the research community will need to harmonize its design of research studies that investigate frailty. A consistent approach to research will mean deciding on one definition of frailty for all studies, as well as deciding on what the key outcome measures will be.

Standardizing outcome measures has proven to be successful in improving the comparability of studies among other research communities.

The Outcome Measures in Rheumatoid Arthritis Trials (OMERACT) was initiated in 1992 to standardize outcomes in interventional trials of rheumatoid arthritis. Since its inception, OMERACT-determined core outcome set has increasingly been used over time, and it was integrated into 81% of randomized controlled trials of rheumatoid arthritis published between 2002 and 2016.<sup>153</sup> Its outcome measures are also recognized by multiple international health organizations, including the World Health Organization.<sup>154</sup>

OMERACT uses a rigorous process of expert review, patient engagement and consensus-building to ensure that outcome measurements are valued by both the producers and users of evidence, which is to say that the common measurements benefit researchers, health care providers and patients.<sup>155</sup> Over 20 years, the OMERACT process has been successful in achieving consensus around outcome measures, which significantly improves the impact, comparability and generalizability of research studies on rheumatoid arthritis. This is a model that frailty research can consider emulating to build consensus over the long term.

### **We Need to Consistently Measure and Respond to Frailty In Clinical Settings**

In addition to standardizing how frailty is defined and measured in academic research, health care providers should also consistently measure frailty in clinical settings.

According to CFN, tools to measure frailty are readily available. It recommends that all older adults who come into contact with the health care system and who meet pre-specified criteria should be assessed for frailty.<sup>156</sup> It further points out that 'implementing standardized ways to determine frailty will support comparisons between jurisdictions and identify variations in care, outcomes, and healthcare resource utilization. This can increase value from healthcare resources by avoiding underuse and overuse of care by frail people.'<sup>157</sup> Assessment of frailty in older adults, however, is currently not a part of standard clinical practices within health care settings across Canada and beyond.

Health systems, especially like those in Canada, where the use of interRAI assessments is ubiquitous in the assessment and delivery of home care, long-term care and inpatient mental health care, should further look to their interRAI suite of assessments as an available, reliable and standardized measurement of frailty that can be integrated into existing procedures that exist in many health care settings.<sup>158-161</sup> To date over 10 million assessments have been conducted on over 3.1 million individuals.

While the assessments are not, as yet, able to specifically drive treatment strategies, they do provide health care professionals with valuable information about their patients' physical and psychosocial

functioning. They also have the added advantage that the information captured through an existing standardized assessment process includes a range of data points that can be used to derive a frailty index score in line with both the Accumulation of Deficits Model and the Frailty Phenotype Model. In any case, the frailty index scores that interRAI tools can already generate can help start a conversation between health care providers and patients who have been assessed as having frailty about what kind of health care services are appropriate and which are inappropriate, given an individual's level of frailty. Furthermore, the standardized collection of frailty scores can allow Canada and other jurisdictions to leverage their data assets to continue to better understand how frailty can impact the treatments health care providers deliver to their patients.

Over 10 million interRAI assessments have been conducted on 3.1 million individuals.



Other efforts to standardize measurement tools in health care settings have already been successful, such as how we now routinely categorize a person's need for care across Canadian emergency departments. The Canadian Triage and Acuity Scale (CTAS) is a well-established tool used in every Canadian emergency department to define a patient's level of acuity, to ensure that patients in the greatest need for care are given priority.<sup>162</sup>

The tool has also been applied outside of the emergency department by paramedics to help determine how best to prioritize their pre-hospital emergency medical system responses. As such, paramedics and health care providers in emergency departments use common tools and measurements in the assessment of patients' needs, which in turn helps support patients' appropriate treatment in an emergency and their overall continuity of care when they transition into the emergency department of a hospital and beyond for additional care.

The CTAS experience is instructive in the context of frailty, because, along with the InterRAI assessments, there are many validated frailty measurement tools that can determine an individual's frailty status. However, while some tools are being used in individual settings, frailty measurement is not part of standard clinical practice for older patients, but it should be.

The authors of this paper are unaware of any tool that is currently and consistently being used to measure frailty in home care,

long-term care, or acute care network settings in Canada. Canadian health care providers should therefore choose one of the many validated tools to measure frailty and start incorporating the measurement and consideration of their patient or client's level of frailty into the care they wish to provide. Furthermore, any tool that health care providers agree to use should be more systematically integrated into the provision of care for older adults in order to better ensure that their frailty status can inform future treatment and care decisions. Finally, researchers and health care providers should continue to enhance an agreed upon frailty measurement tool to improve its accuracy, ability to inform treatment decisions and ability to predict negative health outcomes.

### **We Need to Routinely Screen for Frailty in Individuals Aged 70 and Over**

In addition to standardizing how researchers and others measure frailty, health care providers should be measuring frailty in patients aged 70 and over. The prevalence of frailty increases with age.<sup>163</sup> Health care providers should consider frailty when providing care to older patients because otherwise they increase the risk of providing care that is either inappropriate or harmful to older patients.

While there is ongoing work to develop tools that can assess frailty in all Canadian health care settings, including hospital, primary care, as well as home and community care, health care providers should at a minimum use the Canadian

Study on Health and Aging's frailty scale diagram as a guideline to determining whether their patients may be living with some degree of frailty. This is an option that could have a significant impact on the health outcomes of individuals living with frailty. Incorporating the Canadian Study on Health and Aging's frailty scale diagram into clinical practice is also a step that every health care provider could take tomorrow without any additional investment or policy change. The Clinical Frailty Scale can help health care providers to conceptualize frailty and start a conversation with their patients about what treatment options may be most appropriate for them.

**We Need to Prevent and Reverse Frailty Whenever Possible Through the Promotion of Healthy Behaviours and Addressing Underlying Drivers of 'Social Frailty'**

In addition to standardizing how we measure frailty, we also need use our frailty measurements to identify opportunities to better prevent and reverse frailty. We should do this to reduce the prevalence of frailty in older populations by employing evidence-based interventions that have been shown to reduce the level of frailty in individuals. Physical activity and improved nutrition are the key interventions that have shown to be effective at reducing the severity and prevalence of frailty among older adults.<sup>164</sup>

We should couple standardized measurement of frailty with standardized prevention strategies to help individuals

remain safe and independent for as long as possible. While we do not yet have clear guidelines about what specific actions health care providers should take if their patient has a given level of frailty, promoting behaviours and interventions that have been shown to prevent and reverse frailty, irrespective of the measurement used to determine the level of frailty, are sound and beneficial strategies to managing an individual's risk of negative outcomes, such as hospitalization, long-term care admission, disability and death.

Health policy makers should consider how to address factors that contribute to social frailty, which in turn influences how well an individual is able to cope with frailty. The factors that influence social frailty, which policy makers could address, include poverty, loneliness, social isolation, and housing. Ensuring that older adults are financially secure in retirement would support those living with frailty to have more positive outcomes. To this end, the Alliance for a National Seniors Strategy has successfully advocated for improvements to the Canadian Pension Plan, Old Age Security and for the creation of the new Canada Caregiver Credit.<sup>165, 166</sup> Enabling older adults to be as socially connected as possible as they age can support those living with frailty to maintain independence and mitigate challenges related to their activities of daily living.

To address this need, some Canadian jurisdictions, such as Ontario, have looked



to the creation of seniors centres to provide recreational and educational programming, but also to combat social isolation and loneliness among older adults.<sup>167</sup>

Finally, supporting older adults to remain in accessible, stable, and secure housing can help them live independently outside of hospital and long-term care homes. The creation of a national housing strategy that focuses on better supporting low-income older adults to age in their homes and communities could help meet this need.<sup>168</sup> One innovative model of housing support for older adults that has emerged as a popular option is home-sharing, in which an older adult shares their home with a younger individual who pays a reduced rent in exchange for contributions to the home, such as meal preparation, household chores or yard work.<sup>169</sup> The promise of this model is that it provides older adults with income, social connection and support with at-home tasks.

### **We Need to Promote Service Models That Better Support Older Adults Living with Frailty**

When our health system was designed more than 50 years ago, most adults tended not to live past 65 years or live with chronic illnesses and usually had only one active issue that brought them to hospital.<sup>170</sup> Some have recognized that while this model functions well for younger patients, it is increasingly recognized that the way in which acute hospital services are currently resourced, organized, and delivered often

disadvantages older adults with chronic health problems. At the same time, the loss of functional reserve among older patients - together with our traditional models of health care delivery - are costly and put older patients at risk for adverse outcomes such as falls, delirium, medical interactions, functional decline and death.<sup>171</sup>

In addition to modifiable risk factors that can prevent and manage the progress of frailty among older adults, there are opportunities to design innovative and more community-based models of care that may be able to better support them and aid in helping them to avoid the risk of hospitalization or institutionalization as well.

One trial studied the use of a community-based interdisciplinary team comprised of two physiotherapists, a geriatrician, a rehabilitation physician, a dietitian and nurse, which provided targeted, personalized interventions tailored to the needs of each patient based on their frailty characteristics. A control group received the usual care available to older adults, including family physicians and medical specialist consultations, as well as nursing and allied health interventions as appropriate. Frailty was found to be reduced at 12 months by 14.7% in comparison to a control group that received usual care.<sup>172</sup> At the same time, mobility remained stable, while it declined for the group of patients receiving usual care.

If we don't manage frailty well, the

implications for the health system could be costly, leading people living with frailty to end up in more expensive and less appropriate health care settings when their challenges could be better managed through more personalized care. A subsequent economic analysis of the interdisciplinary model found that the intervention was good value for money.<sup>173</sup> In fact, in the model's most frail patients, the interdisciplinary intervention was less costly than usual care.

As mentioned earlier, integrated models of care across the continuum that can promote more elder-friendly care and combat the hazards of hospitalization, which have been developed and are scalable, need to receive additional support to spread and embed these new ways of working across the health care system. The CFN/CFHI ACE Collaborative was a successful one-year initiative that enabled the adoption of 58 models of care and care and care practices across 18 health care organizations in Canada and beyond.<sup>174</sup>

Policy makers should also consider incorporating reablement programs into the delivery of home care, as has been successfully applied in Denmark, where individuals receiving home care services also receive a reablement program.<sup>175</sup> By focusing on independence, reablement programs can reduce the need for support from home care services and family caregivers.<sup>176</sup> Indeed, reablement programs have been able to reduce the use of health care and home care services, as well as the

risk of emergency department visits, long-term care admissions and death.<sup>177</sup> In addition, social activities can be built into reablement programs to ensure the individual does not become lonely or socially isolated.<sup>178</sup>

In addition to empowering individuals living with frailty through reablement programs, policy makers can also consider exercise programs to help individuals prevent and manage frailty, as well as promote social connection. In Ontario, more than 300 Seniors Active Living Centres offer programming including exercise classes to reduce falls and promote social connections.<sup>179</sup> While exercise is known to be beneficial to preventing frailty,<sup>180</sup> the exercise classes also help combat social isolation by empowering older adults to be connected to their communities. Promoting Seniors Active Living Centres can help older adults living with frailty stay connected to their communities, while also delivering an exercise intervention that can support them to maintain their independence and improve their physical function.

Indeed, in order to deliver care that is responsive to and considerate of the needs of older adults living with frailty, we should begin to reimagine and redesign how care is delivered, where it is delivered and who delivers it to ensure that our patients are receiving the most appropriate care designed to meet their needs and support their independence. In doing so, we must recognize that the provision of appropriate care delivered in home and community

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settings for older Canadians can improve their quality of life and also deliver significantly improved patient and system outcomes and costs.<sup>181</sup>

significant role in the health of older adults, the well-being of caregivers and the overall sustainability of our health care system.

## Conclusion

Frailty is a common health issue that is more prevalent among older adults, and can lead to negative outcomes, such as falls, disability, long-term care admissions, and death. Ensuring that older people living with frailty have access to tailored interventions and health services is critical to supporting them to remain as independent as possible. However, without consensus within both the health care and research communities about how to measure and manage frailty, health policy makers are left with imperfect evidence from which to design policy. In order to better allocate resources and tailor interventions to support individuals living with frailty, and to better inform the creation of effective policies that governments can also pursue that support Canadians to not only live longer but live better as well, frailty researchers will need to build consensus around the common measurement of frailty to enable greater comparability between studies. While building that consensus can take time, health care providers should employ tools that are available to assess frailty, such as the interRAI assessments. Health care providers, researchers and health policy makers need to realize frailty plays a