Factors Influencing Physical Therapists’ Use of Standardized Measures of Walking Capacity Post-Stroke across the Care Continuum

by

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A thesis submitted in conformity with the requirements for the degree of MSc
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Abstract

Background. Physical therapists report inconsistent use of valid and reliable measures of walking post-stroke.

Objective. To describe the methods physical therapists use to evaluate walking, reasons for selecting these methods, and the use of the evaluation results in clinical practice along the continuum of an organized system of stroke care.

Methods. A qualitative descriptive study involving semi-structured telephone interviews of physical therapists in Ontario was conducted. A thematic analysis was performed.

Results. Participants (n=28) used both standardized and non-standardized methods to assess walking. A hierarchy of factors influencing use of both methods was observed. Assessment results were commonly used for communication with other healthcare professionals or education of the patient.

Conclusions. A variety of factors influence physical therapists to use standardized assessment tools. Future knowledge translation interventions should focus on these factors to improve the standardized assessment of walking post-stroke.

Key words: physical therapist, standardized assessment tools, guidelines, qualitative, walking
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List of Abbreviations

PT: Physical Therapist
CMSA: Chedoke-McMaster Stroke Assessment
FIM: Functional Independence Measure
ICF: The International Classification of Functioning, Disability, and Health
Alpha FIM: Alpha Functional Independence Measure
TUG: Timed Up and Go
BBS: Berg Balance Scale
10mWT: 10 Metre Walk Test
FAC: Functional Ambulation Categories
2MWT: 2 Minute Walk Test
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Chapter 1

Introduction

In Canada, stroke is the third leading cause of death, and costs an estimated 3.6 billion dollars per year in both healthcare costs and lost productivity (Heart and Stroke Foundation, 2012a). A stroke can occur in any area of the brain and is a leading cause of neurologic disability (Heart and Stroke Foundation, 2012b). A common physical disability affecting people with stroke is walking limitation (Jorgensen, Nakayama, Raachou, & Olsen, 1995).

More than half of people with stroke lose the ability to walk independently immediately post-stroke (Jorgensen, et al., 1995). Adequate walking ability is necessary, as individuals who are unable to meet the requirements for community ambulation may experience a decrease in the level of meaningful activity within society (Mayo, Wood-Dauphinee, Cote, Durcan, & Carlton, 2002). Walking is also an important function as decreases in walking capacity are associated with decreases in physical activity (Michael, Allen, & Macko, 2005). Moderate to high levels of physical activity are needed to decrease the risk of subsequent stroke (Lee, Folsom, & Blair, 2003).

Many people with stroke undergo inpatient rehabilitation after their stay in an acute care hospital. For example, according to the stroke evaluation report of
2010/11, in Ontario, Canada, 30% of patients discharged from acute care hospitals went to an inpatient rehabilitation facility (Hall et al., 2012). Walking recovery is a focus in rehabilitation, as regaining the ability to walk is cited as a primary rehabilitation goal by individuals with stroke (Bohannon, Andrews, & Smith, 1988). Also a large component (25 – 40%) of physical therapy time in rehabilitation is spent on gait retraining (Latham et al., 2005).

The Canadian Best Practice Recommendations for Stroke Care (2012a) recommend the use of reliable and valid tools for assessing walking post-stroke. A standardized assessment tool is used to evaluate a patient’s ability, generate scores, and track change regarding health status or performance, based on a standardized evaluation (Potter, Fulk, Salem, & Sullivan, 2011). The appropriate use of a standardized assessment tool is considered to enhance the quality of physical therapy services (Beattie, 2001). Physical therapists (PTs) have stated that they use standardized assessment tools (not only those specific to walking) to monitor health status, provide information about the effectiveness of a treatment (van Peppen, Maissan, van Genderen, van Dolder, & van Meeteren, 2008), and to ease communication with healthcare professionals, family and the patient about the patients’ health status (van Peppen, Hendriks, van Meeteren, Helders, & Kwakkel, 2007).

Previous research has indicated that physical therapists inconsistently use standardized tools to assess walking post-stroke. A survey of 270 Ontario PTs in a variety of practice settings determined that the self-reported use of the
recommended standardized assessment tools for walking was low (Salbach, Guilcher & Jaglal, 2011). Participants in this study were asked if they consistently used a measure with more than 60% of patients. The rate of self-reported use of the Chedoke-McMaster Stroke Assessment (Gowland et al., 1993) (CMSA) was 61%, the 6-Minute Walk Test (Butland, Pang, Gross, Woodcock, & Geddes, 1982) (6MWT) 11%, and the Functional Independence Measure (Keith, Granger, Hamilton, & Sherwin, 1987) (FIM) was 45% (Salbach et al. 2011) all of which are standardized assessment tools recommended for use by the best practice recommendations (Canadian Best Practice Recommendations for Stroke Care, 2010b). Van Peppen et al. (2008) observed in a survey of 167 Dutch PTs, that only 52% used the core set of standardized assessment tools recommended in the Dutch guidelines for stroke rehabilitation. In a survey of 762 senior PTs in the United Kingdom, 28% used standardized assessment tools that they had created while 22% used no standardized assessment tools (Lennon, 2003). In an Ontario survey, fewer than half of PTs stated that they used standardized assessment tools to assess, to monitor change, to formulate prognosis and to plan discharge (Salbach et al., 2011). The guideline suggestions for standardized assessment tools are based on research and are of high quality, and have been found to be valid and reliable for use with the stroke population (Canadian Best Practice Recommendations for Stroke Care, 2010c). Not following suggestions made by the guidelines could affect the quality of care for individuals post-stroke as PTs use assessment results to monitor health status, provide information about the effectiveness of a treatment (van Peppen et al., 2008), to ease communication with healthcare professionals, family and the patient
about the patients’ health status (van Peppen et al., 2007), to formulate prognosis, and to plan discharge (Salbach et al., 2011).

A number of factors influence the use of standardized assessment tools, including characteristics of the measure, the clinician, the workplace, the patient, research, and guidelines. Characteristics of the measure include its reliability, validity, appropriateness, precision, responsiveness, interpretability, and feasibility (Salter et al., 2005). A clinician’s education appears to influence the use of standardized assessment tools (Korner-Bitensky, Menon-Nair, Thomas, Boutin, & Arafah, 2007) as well as the practice of colleagues (Maher & Williams, 2005). Physical therapists participating in qualitative research described that, in general, they must have confidence and the ability to administer the tool and to interpret results (Kay, Myers, & Huijbregts, 2001), and they also need to have a positive attitude towards standardized assessment tool use (Swinkels, van Peppen, Wittink, Custers, & Beurskens, 2011; Stevens & Beurskens 2010; van Peppen et al. 2008). For example, PTs must feel that standardized assessment tools are relevant in order to use them (McGlynn & Cott 2007). Characteristics of the workplace include the availability of funds for resources or continuing education (Salbach et al., 2009), physical space to carry out assessments (Swinkels et al., 2011), and availability of time required to administer the assessment tool (Copeland, Taylor, & Dean, 2008). Geographic location of the practice setting may also impact use given that PTs in urban settings are more likely than PTs in rural settings to use standardized assessment tools (Korner-Bitensky et al., 2007). Supervision of physical therapy students also
improved standardized assessment tool use, as students were up to date on newest assessment tool methods and could share with the supervising PT (Korner-Bitensky et al., 2007). Patients’ level of disability influenced whether a PT would use a standardized assessment tool as those with higher levels of disability had greater difficulty completing the standardized assessment (Jette, Halbert, Iverson, Miceli, & Shah, 2009).

Although many studies have been published on factors influencing the use of standardized assessment tools, none to date have considered the influence of an organized system of stroke care. Ontario, Canada is a unique location because of the system of organized stroke care facilitated by the Ontario Stroke Network (http://www.ontariostrokenetwork.ca/). This Network consists of 11 regions, each with a regional stroke centre that provides leadership in stroke care (Ontario Stroke Network, 2010b). A few Ontario studies have examined PTs’ choices of assessment tools post-stroke but have methodological weaknesses such as providing limited information on the specific influencing factors (Salbach et al., 2011) and not comparing PTs’ practice across the care continuum (McGlynn & Cott, 2007). No study has previously looked at whether a regional system of stroke care influences the assessment practices of PTs. This study will compare the assessment methods used and reasons for their use among PTs working in acute care, rehabilitation and community settings in an organized system of stroke care.

This study looks beyond determining overall barriers and facilitators to standardized assessment tool use, and examines circumstances in which one tool is
preferable to another from the PTs’ perspective. Qualitative methods were used to obtain insight into experiences and provide the opportunity for clarification and probing questions. (Galvin, Cusack, & Stokes, 2009).

In summary, the objectives of this study are to describe the methods that PTs who work in an organized system of stroke care use to evaluate walking, reasons for selecting those methods, and their use of evaluation results in clinical practice post-stroke in acute care hospitals, rehabilitation hospitals, and outpatient settings. The study is designed to examine why and how PTs use assessment tools. The results of this study will improve understanding of the important factors influencing PTs’ use of standardized assessment tools. This information will aid in subsequent knowledge translation interventions by providing the knowledge as to what factors to target in order to increase the use of standardized assessment tools by PTs in clinical practice post-stroke.
Chapter 2

Literature Review

The Epidemiology of Stroke

A stroke is a medical emergency that is the result of an interruption of blood flow to the brain (World Health Organization, 2013a). Worldwide, approximately 15 million people sustain a stroke each year (Stroke Center, 2013). Five million of these individuals die and another five million are left disabled (Stroke Center, 2013). In Canada, stroke is the third leading cause of death and the results of stroke cost an estimated 3.6 billion dollars per year in both healthcare costs and lost productivity (Heart and Stroke Foundation, 2012a). Women are more likely than men to die as a result of stroke (Statistics Canada, 2012) and after the age of 55, stroke risk doubles every ten years (Heart and Stroke Foundation, 2012a). In Canada, of the individuals who have a stroke, 15% die, 10% recover completely, 25% recover with minor disability, 40% recover with a moderate to severe disability and 10% require long-term care because of the severity of their disability (Heart and Stroke Foundation, 2012a). Currently, approximately 300,000 Canadians are living with at least one negative effect of stroke (Life after stroke, 2012). As a result, stroke is a leading cause of neurologic disability (Heart and Stroke Foundation, 2012b).
The ICF Framework

The International Classification of Functioning, Disability and Health (ICF) is a framework that is used to classify the impact of health and disability on the individual. It classifies health and the domains related to health (the body, the individual, and perspectives of society) as **body function and structure**, and **activity and participation** (The International Classification of Functioning, Disability and Health, 2013). Salter et al. (2005) have defined the ICF components as the following:

- **Body function and structure** - “Physiological functions of body systems including psychological. Structures are anatomical parts or regions of their bodies and their components. Impairments are problems in body function or structure.”

- **Activity** - “The execution of a task by an individual. Limitations in activity are defined as difficulties an individual might experience in completing a given activity.”

- **Participation** - “Involvement of an individual in a life situation. Restrictions to participation describe difficulties experienced by the individual in a life situation or role.”

The ICF also includes **personal factors** (characteristics of the individual themselves) and **environmental factors** (including social or physical characteristics) as a persons’ functioning and disability must occur within a context.
This framework shifts the focus from the cause of disability to the impact it has on the individual. The ICF provides a common language for healthcare providers and researchers to use when describing health and health status, so those with different roles and perspectives can exchange information in a meaningful way (De Kleijn-De Vrankrijker, 2003). Standardized assessment tools can fit under each of the components of the ICF (Salter et al., 2005).

**Impact of Stroke on Walking Ability**

Stroke can result in a range of impairments, activity limitations and participation restrictions. These impairments can affect cognition, communication and physical function (Heart and Stroke Foundation, 2008). A Canadian study (Mayo et al., 2002) determined that 53% of individuals with stroke lacked meaningful activity (including social, recreational or occupational activities) which can lead to decreased quality of life, function, and health.

A common activity limitation that results from sensorimotor impairment is walking limitation. More than half of people with stroke lose the ability to walk independently immediately post-stroke (Jorgensen et al., 1995). There is a rapid rate of motor recovery in the first six weeks post-stroke (Jorgensen et al., 1995), but walking deficits often remain after this period (Desrosiers et al., 2008). Walking capacity enables individuals to carry out activities of daily living at home and in the community independently. There are certain distance and speed requirements to walk in the community. For example, an individual needs to travel an average of 607 m in an American superstore. In addition, the mean speed needed to cross the
street within the time of a walk signal in the United States is 0.49 m/s (Andrews et al., 2010). Individuals unable to meet the requirements for community ambulation may experience a decrease in the level of meaningful activity and in health-related quality of life (Mayo et al. 2002). This inactivity places the patient at risk of becoming more disabled leading to their engagement in even less activity, resulting in co-morbidities such as heart disease and a risk of a subsequent stroke (Gordon et al., 2004).

Walking limitation post-stroke decreases an individual’s level of physical activity (Michael et al., 2005). This is a problem as walking is also a preferred activity as a means of maintaining health in neurological populations (Elsworth et al., 2009). Walking disability is a barrier to regular exercise as those with walking disability feel there is limited access to appropriate exercise programs and lack of knowledgeable exercise trainers (Elsworth et al., 2009).

The severity of walking limitation post-stroke can be minimized through rehabilitation. Rehabilitation is an individualized process that aims to enable each patient to reach their full functioning potential (World Health Organization, 2013b). Regaining the ability to walk is often cited as a primary rehabilitation goal by individuals with stroke (Bohannon et al., 1988) and a large component (25 – 40%) of physical therapy time in rehabilitation is spent on gait retraining (Latham et al., 2005).
The Canadian Stroke Strategy

In Canada, the province of Ontario initiated development of a coordinated approach to stroke care in 1997 (Ontario Stroke Network, 2010a), established as the Ontario Stroke Strategy in 2000. This strategy had the goal of ensuring that all Ontarians have access to appropriate stroke care, in a timely manner across the care continuum (Teasell, Meyer, Foley, Salter, & Willems, 2009). In 2008, the Ontario Stroke Network was instituted as the provincial leader for stroke care (Ontario Stroke Network, 2010a) (http://www.ontariostrokenetwork.ca/). The Ontario Stroke Network has responsibility for implementing the Ontario Stroke Strategy (Ontario Stroke Network, 2010a). To form the network, Ontario was divided into 11 geographical regions (Figure 1). Hospitals in each region were classified as regional or non-regional stroke centres, district stroke centres, and community hospitals (Ontario Stroke Network, 2010b).
Figure 1. The 11 regions of the Ontario Stroke Network. (Ontario College of Family Physicians, 2012)

There is one regional stroke centre per region in Ontario (see list in Appendix A) (Ontario Stroke Network, 2010b). These hospitals provide leadership in stroke care in their respective regions. They aim to provide the most up-to-date neurologic care, and are a resource for education for the other hospitals in that region (Ontario Stroke Network, 2010b). They are also expected to implement best practice care based on research evidence and guided by the Canadian Best Practice Recommendations for Stroke Care (Heart and Stroke Foundation of Ontario, 2001).

The Ontario Stroke Network (2010f) has a board of directors, a management team with members such a best practice leader (Ontario Stroke Network, 2010c), and a number of committees such as the Stroke Evaluation & Quality Committee (Ontario Stroke Network, 2012). All of these individuals work together to reach their mission
goal, which is to provide “provincial leadership and planning for the Ontario Stroke System by measuring performance, partnering to achieve best practices, and creating innovations for stroke prevention, care, recovery and reintegration.” (Ontario Stroke Network, 2010e). A recent study showed that the Ontario Stroke Network has succeeded in improving stroke care and decreasing mortality and admission to long term care as a result of stroke (Kapral et al., 2013). This study indicates that future research needs to determine the parts of the Ontario Stroke System responsible for these improvements (Kapral et al. 2013). As a result of an organized system of care post-stroke, Ontario has a unique context in which to examine PTs’ selection and use of walking assessment tools post-stroke because of the assistance and suggestions for stroke treatment provided to them.

**Best Practice Recommendations for the Organization of Stroke Rehabilitation Services in Canada**

The Canadian Best Practice Recommendations for Stroke Care (2010c) provide evidence-informed recommendations for care of those with stroke to be used by health professionals in all disciplines. These recommendations are published online and are publically accessible (http://www.strokebestpractices.ca/). The Canadian Stroke Network began publishing the Canadian guidelines for stroke care in 2006 and they update the recommendations every 2 years (The Canadian Best Practice Recommendations for Stroke Care, 2013a). Following guidelines in post acute rehabilitation has been associated with positive effects by improving physical
function (Duncan et al., 2002). The guideline was not specific to PTs but included baseline assessment of the patient (Duncan et al., 2002).

The Canadian guidelines for stroke care recommend a multidisciplinary team approach for rehabilitation (Canadian Best Practice for Stroke Care, 2010b). This multidisciplinary team is made up of clinicians who have expertise in stroke rehabilitation should include physicians, nurses, PTs, occupational therapists, speech-language pathologists, psychologists, and recreation therapists (Canadian Best Practice for Stroke Care, 2010a). For optimal inpatient acute care, the guidelines suggest that there be early access to rehabilitation assessments and therapies for patients (Canadian Best Practice Recommendations for Stroke Care, 2013b).

Those with stroke often have persistent impairments and activity limitations after they are discharged home and so it is important that they continue to receive rehabilitation as an outpatient (Green, Foster, Bogle, & Young, 2002). Outpatient rehabilitation minimizes the decreases in mobility that individuals post-stroke often experience after they have been discharged from inpatient care (Paolucci et al., 2001). The Canadian stroke guideline has recommendations specific to acute care (Canadian Best Practice Recommendations for Stroke Care, 2013b), rehabilitation (Canadian Best Practice Recommendations for Stroke Care, 2010d), and community settings (Canadian Best Practice Recommendations for Stroke Care, 2010e). Harmonized assessment approaches across the continuum of these settings could
improve care post-stroke and communication among health care professionals as well as patients and their families.

**Best Practice Recommendations for Assessment Post-stroke**

Recommendations are provided for not only the organization of care and therapeutic interventions, but also for assessment practices. For example, it is recommended that standardized assessment tools be administered early in acute care, within the first few days after admission (The Canadian Best Practice Recommendations for Stroke Care, 2010a), to determine the deficits caused by the stroke and the individuals’ rehabilitation needs. The individuals’ needs should be reassessed using the standardized assessment tools every week for the first month post-stroke for those who have sustained a moderate to severe stroke (The Canadian Best Practice Recommendations for Stroke Care, 2010a). Standardized assessment tools assist in determining when the patient is ready for discharge and what type of rehabilitation facility or outpatient care the individual should attend (Canadian Best Practice Recommendations for Stroke Care, 2010a).

**Measures of Walking Post-stroke**

To support implementation of the recommended assessment procedures, suggested measures are provided by the Canadian best practice recommendations. These suggestions are found online in a section entitled “SCORE Recommendations for Lower Limb and Gait” within the best practice website. The recommendations
are divided into sections of gait, lower limb mobility and transfer skills as well as rehabilitation and outpatient and community settings. In acute care, the FIM and Alpha Functional Independence Measure (Uniform Data System for Medical Rehabilitation, 2005) (Alpha FIM) are the only recommended assessment tools that have a component of walking (Canadian Best Practice Recommendations for Stroke Care, 2013c). The FIM, CMSA, and 6MWT are recommended for gait while in rehabilitation care (Canadian Best Practice Recommendations for Stroke Care, 2010f). To evaluate lower limb mobility and transfer skills, use of the FIM, the CMSA, the Timed Up and Go test (Podsiadlo & Richardson, 1991) (TUG) the 6MWT, the Berg Balance Scale (Berg, Wood-Dauphinee, Williams, & Maki, 1989) (BBS) and the CMSA lower limb activity inventory (Gowland et al. 1993) is recommended (Canadian Best Practice Recommendations for Stroke Care, 2010f). For outpatient and community settings, the FIM and CMSA are the only standardized assessment tools with a gait component that are recommended by the guidelines (Canadian Best Practice Recommendations for Stroke Care, 2010e).

Other countries have also developed recommendations for the assessment of walking post-stroke. Dutch guidelines for physiotherapy post-stroke recommend the use of the 10 metre walk test (Wade, 1992) (10mWT) and the Functional Ambulation Categories (Holden, Gill, & Magliozzi, 1986) (FAC) for the assessment of walking (van Peppen et al. 2007). The American Department of Veterans Affairs Clinical Practice Guideline for the Management of Stroke Rehabilitation, The National Clinical Guideline for Stroke from the United Kingdom, and the Clinical
Guidelines for Stroke Management in Australia all recommend that assessment tools used to evaluate walking should be standardized but do not specify standardized assessment tools for walking ability (Department of Veterans Affairs and Department of Defense, 2010; Intercollegiate Stroke Working Party, 2012; National Stroke Foundation, 2010).

**Suboptimal Use of Recommended Standardized Assessment Tools Post-stroke**

Despite recommendations for the use of specific assessment tools in Canada, suboptimal use of these recommended tools has been found for walking as well as other activities post-stroke. A survey of Ontario PTs in a variety of settings examined self-reported use of the recommended standardized assessment tools for walking (Salbach et al., 2011). Use was defined as administering the standardized assessment tool to six of every ten patients treated (ie with 60% or more of patients). Less than half of PTs stated that they used standardized assessment tools to evaluate (44%), to monitor change (42%), to formulate prognosis (19%) and to plan discharge (28%) (Salbach et al., 2011). Of the tools that were reported as being used, the rate of use of the CMSA was 69% in acute care, 83% in rehabilitation hospitals, and 50% in private practice. Use of the 6MWT was 10% in acute care, 20% in rehabilitation, and 17% in outpatient settings and use of the FIM was 51% in acute care, 65% in rehabilitation and 28% in private practice. Only 14% of all the PTs surveyed reported using the 10mWT (Salbach et al. 2011).

Van Peppen et al. (2008) surveyed 167 Dutch PTs across four types of practice settings (acute care hospitals, rehabilitation centres, nursing homes and private
practice) and reported 49% used the FAC, 48% used the BBS, 44% used the 10mWT, 43% used the Trunk Control Test (Franchignono, Tesio, Ricupero, & Martino, 1997), 40% used the Motricity Index (Demeurisse, Demol, & Robaye, 1980), 26% the Barthel Index (Collin, Wade, Davies, & Horne, 1988) and 7% the Frenchay Arm Test (Heller et al., 1987). All of these standardized assessment tools are recommended by the Dutch guidelines for post-stroke care.

Some PTs are using assessment tools (not specific to walking assessments) that they have created but have not been standardized for use with stroke. In a survey of 762 senior PTs in the United Kingdom, 28% used assessment tools that they had created while 22% used no assessment tools (Lennon, 2003). Torenbeek, Caulfield, Garrett, & van Harten (2001) determined that in Europe many rehabilitation settings use measures they created. This demonstrates that use of standardized assessment tools is suboptimal in physical therapy practice across other countries as well as Canada.

Factors Influencing the Use of Standardized Assessment Tools

A variety of factors influence PTs’ selection and use of assessment tools. These factors can be considered as characteristics of the measure itself, the clinician, the work setting, the patient, and the research literature.

A critical review of the measurement tools used post-stroke in the United Kingdom suggested that important characteristics of the measure to aid in successful rehabilitation outcomes include evidence of reliability, validity,
appropriateness, precision, responsiveness, interpretability, and feasibility (Salter et al., 2005). Physical therapists are more likely to use standardized assessment tools if they perceive an advantage to using the tools (Swinkels et al., 2011). In an Ontario-based survey, 36% of 212 PTs indicated that they did not use standardized assessment tools of walking post-stroke to determine prognosis because they believed that there was no supporting evidence for these tools (Salbach et al., 2011). In another study focusing on lung transplant patients, just over half (55%) of American PTs surveyed indicated that a factor influencing their use of a standardized assessment tool was that there had to be evidence of validity and reliability for that population (Maher and Williams 2005). Standardized assessment tools need to be easy to use to encourage their use (Wedge et al., 2012) as well as quick to administer (Abrams et al. 2006) and to analyze (Jette et al., 2009). They also need to be readily available to PTs (Swinkels et al., 2011). Physical therapists need to perceive a tool as relevant, valid, and easy to administer and access before they will use it.

Clinician characteristics that can influence the use of standardized assessment tools include knowledge about the measure, competence to administer the measure, and perceptions about the measure. Physical therapists were most likely to choose interventions and assessment tools based on what they learned in school (Korner-Bitensky et al., 2007). In a qualitative study, American PTs described how academic education influenced their use of standardized assessment tools for measurement of balance (McGinnis, Hack, Nixon-Cave, & Michlovitz, 2009). Familiarity with or
knowing about an assessment tool was a factor strongly influencing the use of standardized assessment tools (Stevens & Beurskens 2010; McGinnis et al., 2009; Copeland et al., 2008; van Peppen et al., 2008; Abrams et al., 2006; Akinpelu & Eluchie 2006; Turner-Stokes & Turner-Stokes, 1997). A survey of 243 Ontario PTs and occupational therapists determined that clinicians who were younger, or had specialty certification, were more likely to use evidence to choose an assessment tool (Korner-Bitensky et al., 2007). In a qualitative study, some PTs with less clinical experience indicated that standardized assessment tools were used to provide support for treatment decisions (McGlynn & Cott, 2007). In a sample of 270 PTs, 40% indicated that they were not aware or unsure of the existence of valid and reliable walking assessment tools post-stroke (Salbach et al., 2011). Having knowledge about an assessment tool is the first step to using a specific tool.

After a PT gains knowledge about an assessment tool, they must become competent in its use (Swinkels et al., 2011). Numerous clinician characteristics related to competence, including insufficient knowledge, self-efficacy, and ability to acquire, administer, and interpret results, limit the use of standardized assessment tools. Physical therapists have described that lack of ability to search and find valid standardized assessment tools negatively influenced their use (Salbach et al., 2009). Confidence to administer and ability to interpret the results of standardized assessment tools may also influence their use (Kay et al., 2001).

A PT may not wish to become competent to use an assessment tool unless they feel the results will be relevant to their clinical practice. In a qualitative study of 12
neurological PTs in Ontario, participants did not appear to value the results of standardized assessment tools. They described placing greater importance on information from their patients, their clinical knowledge and intuition over the results from a standardized assessment tool (McGlynn & Cott, 2007). The PTs felt that standardized assessment tools may not be relevant to their client, and may not provide the information needed for treatment (McGlynn and Cott 2007). Interviews and surveys showed that a positive attitude towards standardized assessment tools increased their use (Swinkels et al., (2011), & van Peppen et al. (2008)). Other influencing factors included the quantitative data about the patients' ability that standardized assessment tools provide and the PTs' perceived value of the information (McGinnis et al., 2009).

A PT's perception of the importance of a standardized assessment tool may be influenced by the work setting. For the purpose of this study, characteristics of the workplace setting have been defined as factors that are controlled by the PTs' place of employment. Lack of space to administer a measure is a negative influencing factor to the use of standardized assessment tools (Swinkels, et al. 2011). Time or more specifically lack of time is also a major barrier to the use of standardized assessment tools (Copeland et al., 2008; Maher & Williams, 2005; Salbach et al., 2011; Swinkels et al., 2011). This can be perceived as both a characteristic of the setting, when the caseload is too high, and a characteristic of the measure, in that it takes too long to administer. Organizational policy may also influence the use of standardized assessment tools as was observed in a study that developed a model
for the implementation of measurement instruments in physical therapy (Stevens & Beurskens, 2010). Presence of a policy was a facilitator while absence was a barrier to the use of standardized assessment tools (Stevens & Beurskens, 2010). In a cross-sectional survey of Canadian occupational therapists and PTs, geographic location of practice setting also influenced use of walking assessment tools as clinicians in an urban setting were more likely to use a standardized assessment tool than clinicians in rural settings (Korner-Bitensky et al., 2007). In a qualitative study, PTs described that practicing in geographically isolated rural location negatively influenced the use of standardized tools as they did not have as much opportunity to discuss with peers (Salbach et al., 2009). Korner-Bitensky et al. (2007) determined that occupational therapists and PTs who were employed at a university-affiliated hospital, and those who were a member of a stroke unit were more likely to use evidence to choose an assessment tool. Physical therapists who supervised PT students were also more likely to use research evidence to choose an assessment tool (Korner-Bitensky et al., 2007). The cooperation of colleagues to use the same assessment tool were facilitators while change in routine associated with a new assessment tool was a barrier to the use of standardized assessment tools (van Peppen et al., 2008). Influence of colleagues has also been observed to encourage use of a certain method of assessment in other patient populations (lung transplant) (Maher & Williams, 2005). In summary, influencing factors that are characteristics of the workplace include physical aspects of the setting, number of patients, policy, and colleagues.
Patient characteristics, including physical function, and cognitive and communication status, may influence a PT’s decision to administer a standardized assessment tool. In an American survey, over 29% of 238 PTs who did not use standardized assessment tools indicated that the tools were difficult for the patients to complete independently which threatened the validity of the results (Jette et al., 2009). In a qualitative study of 11 PTs, participants described how patients’ physical abilities and medical diagnosis or history helped them determine what balance assessment tool they should use (McGinnis et al. 2009). For example, PTs expected a patient with a certain diagnosis to present with similar balance issues as previously treated patients; thus, the PT chose assessment tools based on previous experience (McGinnis et al. 2009).

Research as an influence to a PTs’ selection of assessment tools, pertains to guideline recommendations, and how the information about assessment tools are presented. Research suggests they need to present more information about the standardized assessment tools available (Wedge et al., 2012) and they need to be easy to access (Abrams et al., 2006) to encourage the use of standardized assessment tools. Van Peppen et al. (2008) observed that PTs have a positive attitude towards the recommended standardized assessment tools but that in order for implementation to occur, setting specific educational strategies tailored to the needs and understanding of PTs in that type of work place are needed to further promote the use of standardized assessment tools post-stroke.
Rationale

Although a number of studies have examined the rate at which PTs are using recommended measures and the barriers and facilitators to use of standardized assessment tools, a number of gaps exist. Studies have identified the factors influencing PTs’ use of standardized assessment tools in people with balance deficits, lung transplant, low back disorders, neurological conditions, and general physical therapy but no studies have completed an in-depth examination of use of standardized measures of walking post-stroke. Using stroke specific walking assessment tools is necessary because there are measures that have been created and validated specifically for use with individuals post-stroke (for example the CMSA (Gowland et al., 1993). It is important to understand how the characteristics of stroke-specific measures of walking act to facilitate or prevent their use by PTs. No previous studies have examined the specific characteristics of the walking assessment tool itself that either facilitate or prevent its use.

It is also important to examine walking assessment tool use across the continuum of care to determine if the same assessment tools are used in each care environment. It would be ideal to use the same battery of tests in all settings to promote interprofessional communication and the use of a common metric would allow evaluation of patient progress across settings. For example, if someone uses the 6MWT in acute care, rehabilitation, and outpatient settings, the improvement from acute to outpatient care would be easily seen and could be used to educate the patient and their family regarding their progress. The test could also be used in
long-term follow up to determine walking deterioration after formal rehabilitation is complete.

Many of the previous studies on barriers and facilitators to standardized assessment tool use have taken place in countries other than Canada. Studies that have addressed Ontario PT's uses of standardized assessment tools have been published but have provided limited information on the influencing factors (Salbach et al., 2011) or were not specific to walking assessment tools and did not examine and compare use across the care continuum (McGlynn & Cott, 2007). No studies have previously evaluated the influence of system level factors such as provincial stroke networks in regards to a PT's decision to use walking assessment tools. The relative importance of the network, as well as the level of importance of other influencing factors to the use of standardized assessment tools for walking is unclear. This information is an important component for the creation of knowledge translation resources and education interventions to facilitate the appropriate use of high quality standardized measures of walking post-stroke in physical therapy practice across the care continuum.

**Research Objectives**

The objectives of this thesis were to describe the methods PTs working in an organized system of stroke care use to evaluate walking, the factors influencing the selection of those methods, and the use of evaluation results in clinical practice post-stroke in acute care hospitals, rehabilitation hospitals, and outpatient settings.
Chapter 3

Factors Influencing Physical Therapists’ Use of Standardized Measures of Walking Capacity Post-Stroke across the Care Continuum

Pattison, K.M., Brooks, D., Cameron, J.I., & Salbach, N.M

This manuscript will be submitted for consideration for publication in the journal *Physical Therapy.*
Abstract

**Background.** Physical therapists in Canada report inconsistent use of valid and reliable measures of walking post-stroke. An in-depth understanding of physical therapists’ approaches to walking assessment is needed to develop strategies to advance assessment practice.

**Objectives.** The aim of this study was to determine the methods physical therapists working in an organized system of stroke care system use to evaluate walking, reasons for selecting these methods, and the use of the assessment tool results in clinical practice along the continuum of care.

**Design.** A qualitative descriptive study involving semi-structured telephone interviews was conducted.

**Methods.** Physical therapists registered in Ontario assessing a minimum of 10 people with stroke per year were purposively recruited from acute care, rehabilitation, and outpatient settings. Interviews were audio recorded and transcribed verbatim. Transcripts were coded line-by-line by the interviewer. Credibility was ensured through triangulation, use of an audit trail and collection of field notes.

**Results.** Participants worked in acute care (n=8), rehabilitation (n=11) or outpatient (n=9) settings. Of the 28 participants, 50% were >40 years of age, 89% were female and the median number of years of clinical experience with stroke was
12 (SD=7.0). Both movement observation and standardized assessment tools were used to evaluate walking. The decision use a specific method to assess walking, was influenced by characteristics of the clinician, the measure, the patient, the practice setting, and by individuals and organizations. These factors varied in importance with clinicians’ familiarity and patients’ ability being the most important. Results from standardized assessment tools were most commonly used to communicate progress to the patient and healthcare professionals.

**Conclusions.** Multiple factors influence physical therapists’ use of standardized assessment tools of walking. These findings are necessary to inform development of a knowledge translation intervention aimed at increasing the use of standardized assessment tools in clinical practice.

Key words: physical therapist, standardized assessment tools, guidelines, qualitative, walking
Introduction

Worldwide, 15 million people experience a stroke each year (Stroke Centre, 2013). More than half of these people lose the ability to walk independently immediately post-stroke (Jorgensen, Nakayama, Raachou, & Olsen, 1995). Walking is an important function, as sufficient walking ability is needed for meaningful activity and health-related quality of life (Mayo, Wood-Dauphinee, Cote, Durcan, & Carlton, 2002) as well as adequate levels of physical activity (Michael, Allen, & Macko, 2005). In neurologic populations, walking is a favored method of physical activity but walking limitation is a barrier to regular exercise (Elsworth et al., 2009). Barriers to exercise can decrease participation in physical activity and this can increase morbidity and the risk of subsequent stroke (Lee, Folsom, & Blair, 2003). Regaining the ability to walk is important to patients who cite recovery of walking ability as a primary rehabilitation goal post-stroke (Bohannon, Andrews, & Smith, 1988).

An element of evidence-informed rehabilitation is the use of standardized assessment tools (Canadian Best Practice Recommendations for Stroke Care, 2010a; van Peppen, Hendriks, van Meeteren, Helders, & Kwakkel, 2007). The Canadian Best Practice Recommendations for Stroke Care suggest that valid and reliable standardized assessment tools be used (The Canadian Best Practice Recommendations for Stroke Care, 2010a) to assess and monitor patients’ abilities. The appropriate use of a standardized assessment tool may enhance the quality of physical therapy services by increasing the relevance of treatment to the patient, and providing reliable results regarding a patient’s ability. The successful
completion of a standardized assessment tool can also increase a patients’ confidence (Beattie, 2001).

Specific standardized assessment tools have been recommended in clinical practice for use post-stroke. The Canadian Best Practice Recommendations for Stroke Care (2010f) suggests the Functional Independence Measure (Keith, Granger, Hamilton, & Sherwin, 1987) (FIM), the Chedoke-McMaster Stroke Assessment (Gowland et al., 1993) (CMSA), and the 6-Minute Walk Test (Butland, Pang, Gross, Woodcock, & Geddes, 1982) (6MWT) as standardized tools for the assessment of gait post-stroke.

Previous research has indicated that physical therapists (PTs) inconsistently use standardized assessment tools of walking post-stroke. A survey of 270 Ontario PTs in a variety of settings established that the self-reported use of the recommended standardized assessment tools for walking was low (Salbach, Guilcher & Jaglal, 2011). For example, 44% of participants reported using standardized assessment tools to evaluate a patients walking ability, 42% reported using them to monitor change in patients’ walking ability, 19% reported using them to determine the prognosis of recovery of walking, and 28% reported using them to determine when a patient was ready for discharge (Salbach et al. 2011). In a survey of 167 Dutch PTs, only 52% used the core set of recommended standardized assessment tools that were suggested by the Dutch guidelines for physical therapy post-stroke. In a survey of 762 senior PTs in the United Kingdom, 28% used standardized assessment tools that they had created while 22% used no standardized assessment tools at all.
(Lennon, 2003). From these results it can be seen that PTs use of standardized assessment tools post-stroke is less than optimal.

A variety of factors that influence PTs clinical decision making related to the selection of standardized assessment tools have been explored. These factors can be grouped into categories and include characteristics of the measure, the clinician, the workplace, the patient, research, and guidelines (Salter et al., 2005; Swinkels et al., 2011; Salbach et al., 2011; Maher and Williams 2005; Wedge et al., 2012; Abrams et al., 2006; Jette, Halbert, Iverson, Miceli, & Shah, 2009; Korner-Bitensky, Menon-Nair, Thomas, Boutin, & Arafah, 2007; McGinnis, Hack, Nixon-Cave, & Michlovitz, 2009; Stevens & Beurskens, 2010; Copeland et al., 2008; Akinpelu & Eluchie, 2006; Turner-Stokes & Turner-Stokes, 1997; van Peppen, Schuurmans, Stutterheim, Lindeman, & Van Meeteren, 2009; McGlynn & Cott, 2007; Salbach et al., 2009; Kay et al., 2001; van Peppen, Maissan, van Genderen, van Dolder, & Meeteren, 2008).

Little attention has been paid to the influence of the healthcare system and Ontario Canada provides an ideal location to examine this influence. Ontario was the first province in Canada to form a network to implement an organized system of stroke care known as the Ontario Stroke Strategy (http://www.ontariostrokenetwork.ca/). This Network consists of 11 regions each with an acute care hospital serving as a regional stroke centre and a leader in stroke care for the region (Ontario Stroke Network, 2010b). The Network has a number of leadership positions including a best practice leader who provides knowledge and resources to encourage best practice in stroke care (Ontario Stroke Network, 2010c).
A few studies have specifically explored PTs’ choices of assessment tools post-stroke in Ontario but have methodological limitations. A survey based study of 270 Ontario PTs from different practice settings across the care continuum did explore the specific factors influencing use of walking assessments post-stroke (Salbach et al., 2011). Authors determined that PTs perceived lack of time, knowledge, usefulness, ease of administration, and consensus on what to use as barriers to standardized assessment tool use to evaluate walking ability. The study was quantitative and as a result did not provide detail on the relative importance of specific influencing factors. A qualitative study of 12 Ontario PTs examining clinical decision-making processes and the sources of information for PTs from a variety of practice settings (McGlynn & Cott, 2007). Authors observed that PTs did not value the results of standardized assessment tools and placed greater importance on information gained from their patients, their clinical knowledge and intuition over the results from a standardized assessment tool (McGlynn & Cott, 2007). The PTs felt that standardized assessment tools may not be relevant to their client, and may not provide the information needed for treatment (McGlynn and Cott 2007). Responses across the continuum were not compared, however, and the study did not focus on the assessment of walking. This study provides a unique opportunity to examine the influence of the Ontario Stroke Network on PTs choices post-stroke.

The objectives of this study were to describe the methods that PTs working in an organized system of stroke care use to evaluate walking, reasons for selecting those
methods, and their use of assessment results in clinical practice post-stroke in acute care hospitals, rehabilitation hospitals, and outpatient settings.

Study findings will inform the creation of a knowledge translation resource and education interventions to facilitate the use of standardized walking assessment tools post stroke in physical therapy practice across the care continuum.

Methods

Study Design

A qualitative study using a descriptive approach (Sandelowski, 2000) was conducted to determine how physical therapists assess walking and why they chose these methods. A qualitative approach allowed for a detailed exploration of the specific factors that caused a PT to choose an assessment method to assess walking. The University of Toronto Research Ethics Board approved the study protocol (Appendix B).

Participants

To be included in the study, physical therapists had to be working in the organized stroke care system of Ontario, Canada, registered with the College of Physiotherapists of Ontario (the provincial regulatory body), employed in an acute care hospital, rehabilitation hospital, or outpatient (both public and private) healthcare setting, provide services to 10 or more patients with stroke per year and have more than 5 months of experience treating people with stroke. These eligibility criteria were designed to ensure that participants had a sufficient knowledge of and
personal experience with the research topic. The criteria of 10 patients per year and
5 months experience was the result of relaxing the inclusion criteria to reach the
needed necessary number of participants. The original criteria were providing
services to 12 or more patients with stroke per year and 12 months of experience.
The results of those with the relaxed inclusion criteria did not differ from those
using the original criteria.

**Sampling and Recruitment**

Purposive sampling was undertaken to ensure that participants would represent
acute, rehabilitation, and community care settings. In acute care, the goal was to
sample 5 PTs from regional stroke centre hospitals and 5 from non-regional stroke
centre hospitals to enable a comparison of responses.

Participants were recruited using a variety of methods. Electronic invitations
were sent through the Ontario Stroke Network by the Best Practice Leader, and the
provincial professional association (http://www.opa.on.ca/) (Appendix C).
Recruitment notices were advertised in the monthly electronic newsletter sent to
members of the national professional association (Appendix D) and members of the
Neuroscience Division of the national professional association
(http://www.physiotherapy.ca/Divisions/Neurosciences) (Appendix C). A
recruitment letter was mailed to 85 PTs selected by setting who had participated in
a previous study by Salbach et al. (2011) and provided permission to be contacted
for future research (Appendix E). The first mailing was followed by an
information/reminder email (Appendix F). To ensure the recruitment of PTs in acute care and rehabilitation settings, 14 acute care and rehabilitation hospitals across Ontario that had stroke care and PTs were selected for contact by the author KMP. Directors or managers of physical therapy departments were given a brief description of the study and the eligibility criteria and asked to help identify potential participants (Appendix G).

Interested individuals were asked to contact the graduate student (author KMP). Following initial contact via email, a screening email (Appendix H) outlining the study along with a consent form (Appendix I) were sent to potential participants. If PTs met the eligibility criteria and were willing to participate, a date for a telephone interview was scheduled.

**Data Collection**

Prior to the beginning of each interview mechanisms to ensure confidentiality were discussed and verbal informed consent was obtained. The interviewee’s location was recorded during the interview to allow for insight as to whether or not they were able to speak freely. One semi-structured interview exploring the use of standardized assessment tools post-stroke was conducted with each participant. The interview was structured with the use of an interview guide (Appendix J) consisting of a series of questions regarding how a PT assessed walking post-stroke, why these specific methods were chosen, and how the results of these assessments were used in clinical practice. Interview questions and probes about influencing
factors were created based on what was described in the literature. A thorough literature review was undertaken involving searching multiple databases using key words such as “physiotherapists” (or “physical therapist”), “outcome measures”, and “stroke”. Each interview question was followed by probing questions to clarify participants’ responses or ask for greater detail and examples. Questions were neutrally worded where possible to avoid leading the participant. For example, PTs were asked to describe their method of assessing walking as opposed to what specific standardized assessment tool was used. The interview guide was pilot tested with one PT who met the eligibility criteria and was included in the study. During and immediately following all interviews the interviewer (KMP) documented field notes describing the workplace setting, thoughts on how the interview went, and the participants’ thoughts on methods of walking assessment tools post-stroke. Each interview was audio recorded and transcribed verbatim by a professional transcriptionist. Prior to analyzing the data, the interviewer checked each transcript for accuracy by listening to the audio-recording while reviewing the wording of the transcript by the interviewer. After interviews a thank you letter (Appendix K) along with a gift card were mailed to each participant.

**Potential Bias**

Author KMP has background in kinesiology. The potential bias was that PTs should use research findings and guidelines to guide their approach to walking assessment. To avoid this bias the interview questions were worded neutrally to allow participants responses to be unguided. For example, the term “walking
assessment” instead of “walking test” or “outcome measure” was used. Bias did not influence analysis and interpretation of results.

**Sample Size**

The estimated sample size was between 20 to 30 PTs, including 10 participants from acute care (5 from regional stroke centre hospitals and 5 from non-regional stroke centre hospitals) with between 5 and 10 participants from rehabilitation hospitals and outpatient settings. Within each setting, interviews were conducted until data saturation was reached. Data saturation refers to the point at which no new information is gained during the interviews and to continue to collect data is redundant (Mackey, 2012). Group sizes were expected to be 5 – 10 participants for each practice location, which is based on the sample sizes of previous research. One study by Salbach et al. (2009) that examined PTs’ use of research evidence for the clinical management of walking post-stroke, was made up of 3 groups of PTs and data saturation was reached with 6 to 9 participants in each group. Another study of PTs’ choices of balance assessment tools sampled from two populations, rehabilitation and outpatient settings, and reached data saturation with a sample size of 5 and 6 participants from each (McGinnis et al. 2009).

**Data Analysis**

Data sources included interview transcripts and field notes. Open coding methods were used and all transcripts were coded line-by-line. To create a coding scheme, one author (KMP) created a list of codes after reading the first two transcripts from
each setting. The coding scheme was continually revised while reading the remaining transcripts. A second author (NMS) read the first five transcripts from each setting and reviewed and revised the coding scheme. Finally, all authors met to review, discuss and finalize the list of codes. Once the coding scheme (Appendix L) had been finalized, author KMP coded all transcripts line-by-line and created nodes of each code using NVivo 7, a qualitative analysis software (NVivo qualitative data analysis software, 2006). Once complete, nodes were reviewed and organized into categories. From these categories of data, overarching themes were determined. These themes were distinct and represented all data. Similarities and differences in PTs’ experiences across the continuum were examined. All researchers discussed, revised, and finalized the themes. Data were stored on a password protected computer on a secure network. Only authors KMP and NMS had access to the data.

**Strategies to Ensure Trustworthiness**

Credibility was ensured through triangulation, audit trail and collection of field notes. This study used two types of triangulation, these being triangulation of sources and analyst triangulation (Patton, 1999). Triangulation of sources was ensured by the collection of multiple data sources including the transcripts and field notes from participants in multiple types of settings as well. Analyst triangulation involved multiple analysts discussing and creating the overarching themes. These analysts were mainly authors KMP and NMS but did include all researchers in the final decision of the themes. Author KMP documented records of decisions that were made throughout the data collection and data analysis. Field notes were collected
regarding setting characteristics, important points the participants made as well as
the student researcher’s impression of how the interview went. The field notes were
used to provide information about general mood and tone of the interview.

Results

A total of 61 PTs (this included those who responded to notices, were part of the
previous research list, and those who were directly contacted at acute and
rehabilitation hospitals) were screened for eligibility. Of the 61 PTs screened, 23
were not eligible. Of the 38 that were eligible, 10 decided not to participate, and 28
were interviewed. Of the 28 participants, 18% were 20 – 29 years of age, 32% were
30 – 39 years of age, 36% were 40 – 49 years of age, 14% were 50+ years of age,
89% were female and the median number of years of clinical experience with stroke
was 12 (standard deviation (SD)=7.0, Range 0.4 – 25). Seven held a Master of
Science degree, twenty participants held a Bachelor of Science degree, and one held
a certificate in physical therapy.

Participants worked in acute care (n=8) (5 in regional centres and 3 in non-
regional centres), in-patient rehabilitation (n=11) or outpatient care (n=9) (7 from
outpatient rehabilitation centres and 2 from private practice) settings. Interviews
lasted an average of 28 minutes (Range 14 - 36). It was suggested to all participants
to choose a private location but this was not enforced. During the interviews, 13
participants were at work not in a private location, 8 were at home, 5 were at work
in a private location, 1 was in a car and for 1 the location was missing.
The Context of Participants’ Clinical Practice

Participants were asked to describe their practice. Participants working in acute care hospitals generally saw patients Monday to Friday. Few acute or rehabilitation settings provided formal treatment on the weekend, but in some facilities PTs worked with patients during the weekend especially if the patient was being discharged on that weekend. Participants indicated that some patients in more rural areas wait in acute care for rehabilitation beds to open. Participants generally treated patients in inpatient rehabilitation Monday to Friday. In some work settings, PTs enlisted the help of patients’ family members or nurses if they had time over the weekend to help with physical therapy activities. Patients in outpatient rehabilitation were generally seen by PTs 1-3 times per week. In private practice the number of visits and how often varied by patient. Most participants believed that PTs were the only healthcare professionals at their workplace to formally assess walking ability post-stroke; the remaining participants were unsure.

Five themes emerged from the data that addressed the study objectives: (1) methods to evaluate walking vary; (2) knowledge about walking assessment methods is derived from formal education, physical therapy students, the provincial stroke network, and research; (3) a hierarchy of factors influences choice of walking assessment method; (4) clinical use of walking assessment results vary; and (5) there is little consensus on ways to assess walking across the continuum.
Methods to Evaluate Walking Vary

Physical therapists’ approaches to assess walking post-stroke varied in terms of the number of therapists involved in the assessment, the type and frequency of assessment.

Some of the PTs indicated that they often collaborated or co-assessed with an occupational therapist in their facility. For example, one therapist would demonstrate a task for the patient and the other therapist would score the patient’s task performance. Also sharing the administration of the assessment, for example the Chedoke-McMaster Stroke Assessment (Gowland et al., 1993) CSMA, which is a standardized assessment tool that is used to measure physical impairments and disability (Chedoke-McMaster Stroke Assessment, 2005). Some PTs were responsible for the assessment of the lower leg and foot using the CSMA while the occupational therapist was in charge of evaluating the arm and hand. There was no difference in collaboration across the settings. A total of nine PTs (three from each setting) indicated that they worked closely with the occupational therapists. Collaboration included the timing of certain assessments to ensure patients would not become overly fatigued.

Of the 28 participants, 20 (72%) indicated regularly using a standardized tool to assess walking ability post-stroke. Eight PTs (28%) indicated that they do not use or rarely use standardized assessment tools of walking post-stroke (5 from acute care, 2 from rehabilitation and 1 from outpatient settings). Some PTs used modified versions of standardized assessment tools, or created their own assessment tools.
Some PTs in this study specifically mentioned wanting to use standardized assessment tools of gait quality but were unsure of their existence. Table 1 lists the 17 unique standardized assessment tools that PTs described using on a regular or infrequent basis and the number of PTs using the measure in each setting and in total. Not all assessment tools in the table are strictly measures of walking, some only have components of walking. The “Walking Task” column provides a brief description of the walking component. Standardized assessment tools mentioned by 10 or more PTs were the Timed Up and Go (Podsiadlo & Richardson, 1991) (TUG) the CMSA (Gowland et al., 1993), the 2-Minute Walk Test (Butland et al., 1982) (2MWT), and the 6MWT (Butland et al., 1982).

Many of the PTs interviewed also described using and seemed to value using observational gait assessment as a method of assessing walking ability in addition to or instead of administering standardized assessment tools. “It’s observational. For me it’s very observational” (PT012 Acute setting). While observing, PTs noted that they specifically evaluated gait pattern, foot placement, and control while the patient walked independently, with assistance, with an aid, or using parallel bars. These notes were written down and were used as a basis for comparison when reassessing.

Table 1
# Standardized Assessment Tools that Participants Reported Using

<table>
<thead>
<tr>
<th>Measure</th>
<th>Walking Task</th>
<th>Setting of Participant, n (%)</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>Acute (n=8)</td>
</tr>
<tr>
<td>Timed Up &amp; Go (Podsiadlo &amp; Richardson, 1991)</td>
<td>Time taken to stand up from an armchair, walk 3 m, turn, and return to the seated position is recorded</td>
<td>4 (50%)</td>
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<tr>
<td>Chedoke McMaster Stroke Assessment¹ (Gowland et al., 1993)</td>
<td>Includes a walking index that rates indoor walking, outdoor walking, longer walking outside, and stairs using 7 point scale and distance walked in 2 minutes</td>
<td>1 (12%)</td>
</tr>
<tr>
<td>2-Minute Walk Test (Butland et al., 1982)</td>
<td>Distance walked in 2 minutes</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>6-Minute Walk Test (Butland et al.,1982)</td>
<td>Distance walked in 6 minutes</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Functional Independence Measure (Keith, Granger, Hamilton, &amp; Sherwin,)</td>
<td>Includes a measure of walking and stairs using 7 point scale</td>
<td>1 (12%)</td>
</tr>
</tbody>
</table>

¹ Unclear if all PTs used full version of CSMA or just a component such as the activity or impairment inventory
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<tr>
<td></td>
<td></td>
<td>Acute (n=8)</td>
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<tr>
<td></td>
<td></td>
<td>Rehabilitation (n=11)</td>
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<tr>
<td></td>
<td></td>
<td>Outpatient (n=9)</td>
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<tr>
<td></td>
<td></td>
<td>All (n=28)</td>
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<td>1987)</td>
<td></td>
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<tr>
<td>Community Balance and Mobility Scale (Howe, Inness, Venturini, Williams, &amp; Verrier 2006)</td>
<td>Includes measures walking mobility such as tandem walking, stairs, and running. Measured using 5 point scale</td>
<td>1 (12%)</td>
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<tr>
<td>Alpha Functional Independence Measure (Uniform Data System for Medical Rehabilitation. 2005)</td>
<td>Estimation of ability. Can include FIM walking components for those who are able to walk</td>
<td>4 (50%)</td>
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<tr>
<td>10-metre Walk Test (Wade, 1992)</td>
<td>Walking speed over 10 metres</td>
<td>1 (12%)</td>
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<tr>
<td>Clinical Outcome Variables Scale (Seaby, &amp; Torrance, 1989)</td>
<td>Using 7 point scale measures ambulation (notes assists and aids needed, endurance and speed)</td>
<td>0 (0%)</td>
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<tr>
<td>Tinetti Balance Assessment Tool (Tinetti, Williams, &amp;</td>
<td>Walking component measuring gait quality (such as step length, symmetry, path etc)</td>
<td>0 (0%)</td>
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<tr>
<td></td>
<td></td>
<td>Acute (n=8)</td>
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<tr>
<td>Mayewski, 1986)</td>
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<tr>
<td>Goal Attainment Scale</td>
<td>May involve walking if patients goal is walking, patient specific 5 point scale</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>(Turner-Stokes, 2009)</td>
<td></td>
<td></td>
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<tr>
<td>Rancho Los Amigos Gait Analysis</td>
<td>Biomechanical analysis of gait</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>(Ranchos Los Amigos Medial Centre, 1989)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rivermead Mobility Index</td>
<td>Includes questions on walking ability</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>(Lord, Halligan, &amp; Wade, 1998)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elderly Mobility Scale</td>
<td>Gait component measures assistance and speed measured on 4 point scale</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>(Smith, 1994)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scale for Assessment and Rating of Ataxia</td>
<td>Includes walk a specified distance, turn around and tandem walk back</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>(Schmitz-Hubsc et al., 2006)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dynamic Gait Index</td>
<td>3 point scale with 8 measures of gait including level</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Measure</td>
<td>Walking Task</td>
<td>Setting of Participant, n (%)</td>
</tr>
<tr>
<td>------------------------------------------</td>
<td>-------------------------------------</td>
<td>------------------------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Acute (n=8)</td>
</tr>
<tr>
<td>Cook, &amp; Woollacott, 1995)</td>
<td>surface, stairs, gait with pivot</td>
<td>1 (12%)</td>
</tr>
<tr>
<td>Balance Evaluation Systems</td>
<td>Balance during gait rated on a 4 point scale</td>
<td>1 (12%)</td>
</tr>
</tbody>
</table>

Regardless of the method of assessment, all PTs indicated that, at the very least, they assessed patients on admission and discharge and recorded this information in the medical chart. Frequency of interim reassessment varied but reassessment using observations tended to be carried out most frequently. “Because it’s not so formal then you know, then I’m assessing it daily” (PT015, Acute setting). In general, PTs working in acute care settings tended to reassess after shorter time intervals than those in rehabilitation and PTs in rehabilitation settings tended to reassess after shorter time intervals than those in outpatient settings. Physical therapists in acute care often indicated that they informally reassessed daily. In rehabilitation settings, reassessment was usually performed at discharge and midway through treatment. In outpatient settings, PTs usually assessed at admission and discharge. Most PTs also formally assessed midway through treatment. In outpatient settings, reassessment ranged from every couple of weeks to months.
Knowledge about walking assessment methods is derived from formal education, physical therapy students, the provincial stroke network, and research

Physical therapists from each setting described learning about methods of assessing walking through their professional university-based degree program. “I’m a fairly recent grad I’ve only been out for two and a half years so I guess I still rely on what I learned in school a lot.” (PT002 Rehabilitation setting). This PT consistently used the 2MWT, a standardized assessment that the participant had learned in school.

Other PTs felt that post-graduate courses had provided them with information about assessment methods. A few PTs mentioned that Neurodevelopment Treatment courses were the source of the methods they used to assess walking. Post-graduate courses that were hands-on provided the PTs with opportunity to practice. In some cases, PTs only remembered the general suggestions from courses or in-services, for example that measures of walking speed are valuable but these suggestions did not translate into change in assessment practice.

A few PTs mentioned that supervising physical therapy students taught them about new methods of assessment. Physical therapy students were able to provide information about the newest standardized assessment tools for stroke care. “I love taking students because I love when students teach me things. So I have a student right now and I’m always asking, what’s new in the world of outcome measures ...so I’m very influenced by that.” (PT023 Rehabilitation setting).
Some PTs described how the Ontario Stroke Network influenced their methods to assess walking through receiving information from the best practice leader or one of the coordinators, informal discussions, in-services, and training sessions. There were also many who did not feel that the information received through the network changed their knowledge, instead, it reinforced what they already knew. One PT in acute care mentioned that although they had an in-service focusing on gait speed they struggled to incorporate the test into their actual practice. A few PTs mentioned that they did not feel an influence from the network regarding walking assessment tools post-stroke at all. Some had stated that this was likely because they did not receive any information. Across settings, it was not clear why some PTs received information while others did not.

Physical therapists also described gaining knowledge about assessment methods through involvement in a research study, and by reading the research literature. An example of involvement in a research study was a workplace involvement in the Stroke Canada Optimization of Rehabilitation by Evidence – Implementation Trial (SCORE-IT) (Bayley et al., 2012), this led to the use of the 6MWT as this was required for the trial. Being involved in a research project also provided PTs with new information. One rehabilitation PT was part of an outreach project on what standardized assessment tools were most often used. They determined it was the CMSA and now this PT uses it as well. One outpatient PT had been on a school placement when the Community Balance & Mobility tool was being created, they
were part of a pilot trial to see if the Community Balance & Mobility tool would be
effective and because of this involvement they still use it.

Uses of the TUG, 2MWT, and walk tests to derive gait speed were all begun after a
PT from an outpatient setting had read literature about them. It was also mentioned
by a few PTs that if they came across research regarding a new method of assessing
walking and they thought it would be useful, they would add it to their assessment
tool battery.

**A Hierarchy of Factors Influences Choice of Walking Assessment Method**

Physical therapists’ descriptions of factors influencing the use of standardized
assessment tools of walking post-stroke suggested that there was a hierarchy of
importance. Figure 2 depicts this hierarchy. The level of importance of a factor was
determined by how many PTs indicated each one as an influencing factor and their
descriptions of how strong of an influencing factor it was. Each factor in the figure is
described in the sections below in order of those, which are most to least important.

All study participants indicated that regaining walking ability is a high priority
goal for almost all patients. “*Almost every last one of them wants to walk as they
walked before.*” *(PT012 Acute setting)*.

This study was also able to identify a hierarchy to demonstrate different levels of
importance of factors influencing use as well as the connection between these
factors. The influencing factors described by PTs appear to affect a two-stage
decision process (Figure 2). The first stage is adoption, here the clinician has to
decide to select a particular tool for their clinical practice. This first stage is more of a long-term stage that does not change on a day-to-day basis. For example, a PT may see a colleague using a particular assessment method and they may decide to become familiar with the method and begin to use it on a regular basis. The second stage is administration. This stage depicts the decisions that do change from day-to-day or even patient-to-patient. For example if the PT has a large caseload on a certain day they may not be able to use their usual method to assess walking ability with each patient and will have to chose something that is faster.

Stage 1 begins with familiarity. Familiarity with a measure exerts the strongest influence on the decision to adopt a measure in clinical practice. A PT has to be familiar with an assessment method before they will use it. The remaining factors depicted in stage 1 of Figure 2, including colleagues, guidelines, results having meaning, ease of use, time to administer, space, control, validity and reliability, and cost, are less important than familiarity. Stage 2, the decision to administer a measure with each patient, is influenced first and foremost by patient factors, then caseload, time and priority, and documentation by others.
Figure 2: Decision to Use an Approach to Assess Walking in Clinical Practice

This figure depicts the 2 stages (adoption and administration) of decision making as well as the hierarchy of importance of each factor. A PT moves from stage 1 which is adoption to stage 2 administration. Adoption refers to the factors that relate as to whether or not a PT will use a specific method of assessment. Administration refers to the assessment method used with each individual patient. The hierarchy moves from factors of highest importance at the top to the lowest importance at the bottom of each stage.
Patient Factors

Patient factors influenced PTs’ choice of assessment tools across all settings. Physical therapists found it easier to assess walking when the patient had adequate postural control, had limited functional impairments, was able to walk even if it was with assistance, was not fatigued, and had good control of balance. Even if a patient was physically able to walk some PTs found it challenging to administer standardized measures if the patient had cognitive impairment because they felt their cueing of the patient invalidated the test result. One PT explained:

“I have another gentleman right now who is walking with fairly minimal assistance. However, his cognition and language ... it’s tough to tease them apart when there is language involvement. They limit him in such a way that things have to be kept very, very functional and very, very concrete. I think with him the trouble I would have with him trying to do a standardized assessment is that he wouldn’t necessarily understand the directions. He would need a lot of cueing throughout the entire process and once again that invalidates your results.” (PT025 Acute setting).

Physical therapists in acute care also mentioned that certain standard hospital clothing made it difficult to see a patient’s feet and medical tubing or lines restricted movement. Some PTs felt that as they were often assisting during gait it was difficult to observe how the patient was ambulating. It was common for PTs in acute care to report that standardized assessment tools of walking ability such as the 6MWT were not appropriate in acute care and were better to administer in later stages of recovery.

Other patient factors that were not setting specific, included language barriers, visual neglect, and proprioception. The choices and validating reasons for
assessment tools varied. For example, one PT commonly used the 2MWT as it is easy for patients to understand even if they have cognitive deficits. In contrast, another PT found it difficult to use the 6MWT in patients with cognitive deficits as it is difficult for the patients to stay on track. Some PTs described only using standardized assessment tools of walking with patients who were independent ambulators as opposed to those who needed a lot of physical assistance. Those who required more assistance were often assessed using observational methods.

**Clinician Factors: Familiarity**

After becoming aware a new assessment tool, PTs described a need to become personally familiar with it before they used it in clinical practice as they already had clinical experience with their current methods. When asked about the strongest influence to assessment tool choice one PT indicated “I would say unfortunately it falls back into old habits” (PT015 Acute setting).

Skill and confidence to administer a walking assessment tool are components of familiarity and also influenced use. Many indicated that they were not comfortable using assessment tools that they had not learned in detail, “the tests that we really practiced in labs I’m much more comfortable with and so I would choose them over a test that I learned more as a professional” (PT002 Rehabilitation setting).

**Colleagues**

Physical therapists from all settings described how colleagues influenced the methods they used to assess walking post-stroke. Recent graduates of physical
therapy described being influenced by more experienced or senior PTs. “Definitely I work with some more senior therapists than me, so I do consider their input and, I think if they were using a certain one particularly I would definitely lean towards doing that” (PT008 Acute setting). One PT indicated that what they chose to use was setting dependent. This individual stated that in their previous workplace setting, there had been a strong focus on quality of gait for stroke patients and so assessments had focused on quality. At their current workplace the focus was on the distance walked to increase FIM scores regardless of the quality.

**Best Practice Guidelines**

The influence of best practice guidelines was discussed by PTs across all three settings. Two PTs in acute care thought that the walking assessment tools recommended in the best practice guidelines were not appropriate for acute care stroke patients due to patient ability in acute care settings. Physical therapists working in rehabilitation hospitals more often described how guidelines influenced their selection of assessment method than PTs practicing in acute care settings. Use of guidelines was mixed in outpatient settings.

**Characteristics of the Measure: Ease of use, administration time, and results have meaning**

Physical therapists described how the characteristics of the measure itself, including ease of use, administration time, and meaning of results, strongly affected their decision to administer it. Qualitative analysis of gait was cited as being easy to
administer. The TUG, and the 2- and 6MWTs were also cited as being easy. These assessment tools were also easy to explain, and simple for a patient to understand. Walk tests for deriving gait speed were also noted as being easy to administer by a PT from acute care.

The time that an assessment tool takes to complete influenced use across all care settings. A few PTs mentioned that they limited their use of or did not use assessment tools that took a long time to administer in favor of methods of assessment tools which took less time. For example the 2MWT was used instead of the 6MWT because it did not take as long. The CMSA was described as taking a long time to administer.

Some PTs described that they were more likely to use a measure if they perceived that the information it provided was useful to inform their practice. Assessment tools of walking, such as the 6MWT and the 10-Meter Walk Test, were used because they gave indication of how the patient would manage in the community. For example was the patient fast enough to cross a street? The TUG was used to determine fall or safety risk.

"Timed Up and Go is very functionally relevant. You are looking at obviously walking speed but you are looking at functional ability to sit to stand and turn which are ... indicative of functional ability in the community and fall risk. So... I like the Timed Up and Go because it’s quick to under-take and it gives... for me as a therapist, it gives me a lot of insight into where I need to manage them. Sit to stand, turning are all problems of a lot of our clients. So I get a lot of insight using that one" (PT005 Outpatient setting).
**Setting Characteristics: Space, and time and priority**

Physical therapists discussed the availability of space to administer the assessment tools as a factor that influenced their use. Some PTs from all settings did not have adequate space and assessments had to be done in the hallway or the patients’ room. Some PTs indicated that they had a small gym or treatment area but certain equipment needed for tests would not fit. These PTs felt that lack of space limited what they could do. “I think we struggle here because we don’t have an environment that’s always conducive to gait assessment and working on gait.” (PT021 Acute setting). The 2MWT or 6MWT were the standardized assessment tools most affected by lack of space as hallways were often crowded.

Physical therapists were also limited with what they could do in their space. Two PTs indicated that in their workplaces, leaving paint or tape on the floors to mark out an assessment tool distance was not allowed due to infection control. These PTs mentioned that measuring these distances out for every assessment was tedious and time consuming.

Time and priority were discussed as factors influencing assessment tool use in all care settings. Some PTs mentioned that they had very little time with patients and so determining walking ability was not on their list of priorities. This occurred especially when the patient was high functioning because they were often not in acute care long or the PT may only have a few minutes with each patient.

“So the first way is just for myself to decide on what’s the most important thing to treat so ... I ... yeah if I only have ten minutes to treat them or they are going home
that day and I have to give them a home program with the most important exercise, what’s it going to be?” (PT015 Acute setting).

It was also mentioned that PTs believe that they should be spending their time treating. “I guess just timing, like resources for treatment, that kind of thing. I think sometimes we get too involved in wanting to treat as opposed to using standardized assessments ...” (PT022 Rehabilitation setting). One PT from private practice felt that because their patients were often paying out of pocket they wanted to be treated and so they may forgo assessments to get into treatment.

Characteristics of the measure: Validity and reliability

Some PTs, mainly PTs in outpatient settings described the validity and reliability of a measure as a factor that influenced use. “I probably think that it’s the most important thing in an assessment tool is that it has some ... it’s been shown to be valid. There is some validity and there is also some literature telling me what degree of change is significant.” (PT003 Outpatient setting).

Characteristics of the setting: Cost, caseload, and availability of patient records

A few PTs mentioned that if a certain assessment tool needed specific equipment it would have to be affordable as there were limited funds available to them. An example of expensive equipment mentioned was a computerized pressure sensitive mat to measure gait.
Caseload limitations were mentioned by few PTs. Large caseloads did not allow them to administer all the assessment tools they would like to with patients post-stroke. Many PTs working in a rehabilitation setting mentioned caseloads that were large, up 16 patients a day in one case.

Some PTs indicated that documentation by others (such as charts or admission notes) helped them decide what walking assessment tools to use. For example, if they look at the patient’s chart and saw that the patient had been up walking with nursing it suggests that this patient will likely be a higher level ambulator and assessment of walking should be possible. Two other PTs in rehabilitation used the records to determine what walking assessment tools were completed in acute care. These records were used to see how the patient had progressed from acute care to rehabilitation but it was not mentioned whether these PTs then used the same assessment tool methods that had been used in acute care.

**Clinical Use of Walking Assessment Results Vary**

Physical therapists reported using assessment results to formulate a prognosis for walking recovery, plan treatment, communicate with other healthcare professionals on patient status, plan discharge, and educate the patient regarding his/her progress. Education of the patient and communication with other healthcare professionals were most commonly cited uses of the results from walking assessment tools. In acute care and rehabilitation, some PTs felt that walking
assessment tool results influenced the prognosis for recovery while others felt that it did not. Only one PT in outpatient care mentioned prognosis for walking recovery.

Descriptions of using assessment tool results in planning treatment varied across the care continuum. In acute care most PTs used the results of walking assessments to help focus their treatment approach. For example, a PT indicated that if during a qualitative observation of a patient they notice an impairment in hip extension then that is where they are going to focus their treatment.

In rehabilitation most PTs felt that assessment tool results did not guide their treatment planning. One PT who indicated that they commonly used the 2MWT and the TUG stated “I find the walking test specifically doesn’t change what I suggest” (PT002 Rehabilitation setting). Or the PT felt that they had amassed sufficient expertise that the standardized assessment tool results validate their professional judgment. “At this stage of my career they would help me validate the decisions I’m making. Earlier in my career they would help direct the decisions I was going to make.” (PT014 Rehabilitation setting). Most outpatient PTs stated that they used results to guide their treatment.

Physical therapists from all settings that used standardized and non-standardized methods of assessment stated that they communicated the walking assessment results to other healthcare professionals in rounds, team or multi-disciplinary team meetings. The information communicated was most often regarding patient safety with walking within the facility and in the community. Other reasons to communicate the results were to communicate the goals for therapy (especially
when communication was between two PTs) and the patient’s general walking functional status. “We have a multi-disciplinary meeting every week where we are discussing how people are doing on the whole, what we’re working towards, what the goals are” (PT028 Rehabilitation setting). Those in acute care and rehabilitation indicated that they often shared walking assessment results with the nursing staff as to whether or not the patient is ready to walk to the bathroom. “I tell the Nurses when they can start walking to the bathroom with supervision.” (PT015 Acute setting).

Sharing results with occupational therapists and rehabilitation assistants was also mentioned. One outpatient PT spoke about sharing specific walking assessment results only when another PT is also working on walking with the patient while another stated that there is a constant sharing of assessment tool results within the team of healthcare professionals treating the patient.

> Oh there is constant education that happens on an ongoing basis with regards to, you know, what... what the objective scores mean and what we are seeing and ... and practical application in every day life. And how it kind of all fits together, what's being done with all the other therapists as well as with the Occupational Therapist. (PT013 Outpatient setting)

A couple of PTs used the results to justify a longer stay in inpatient rehabilitation.

“I use it to justify length of stay, which is a huge pressure right now in the hospital setting. And, if I can show that a patient is improving then they stay longer.” (PT026 Rehabilitation setting). Physical therapists working in outpatient care used the results to determine when a patient will end outpatient care.

Across all settings, education of the patient involved showing or describing their change and progress in walking speed or function regardless of the PT’s method of
assessment. This approach was to encourage the patient, build confidence and to motivate them to keep working. A PT who used the 2MWT and TUG stated “I find the patients really want to know, and so it often gives them a lot of hope if I say look this it what you were when you came in and now look how great you are doing.” (PT002 Rehabilitation setting).

Some PTs, who described sharing information with the patients’ family stated that they used the results to show the improvements that had been made as well as in some cases to show why the patient was or was not safe to be alone in the community. One PT described using the results of observational gait analysis to educate how poor quality of gait could lead to injury down the road:

I use it to educate patients. Like some of them want to walk independently, they don’t care what the quality looks like, they just... they don’t care if they are dragging their leg or hyper extending or whatever and that’s fine. But I use it to educate on, okay... if you walk like that there is a good chance that you’ll get sore knees down the road or a sore back down the road as they’re, you know, asymmetrical or whatever so I just kind of use it to educate them on the risks of, you know, if the quality is not there then you might get pain here and there down the road. (PT015 Acute setting)

Another PT in acute care did not share assessment results with the patient. A PT who rarely used standardized assessment tools but indicated that they occasionally used the CMSA stated “We just don’t have them long enough to see that much of a change so I don’t find that as helpful for patients or families” (PT021 Acute setting). In rehabilitation some PTs used assessment results to integrate the community setting by demonstrating whether or not the patients’ gait speed was fast enough to cross the street in the time of a light signal:
To integrate it to real life in the community setting. So when we are going outside and we are actually crossing streets and things like that, to be able to say, oh well your gait speed may not be quick enough so you may have to ... you know, either rethink how you cross the street light or... different strategies to manage that in real life. (PT009 Rehabilitation setting)

Many PTs used assessment tool results in a patients’ discharge planning to a rehabilitation hospital or home. In acute care PTs used the results from both observational gait analysis and standardized assessment tools such as the TUG to help form recommendations for the type and duration of rehabilitation needed as well as to determine whether or not a patient would be safe to discharge to the community.

And, in terms of the more quantitative Timed Up and Go, it’s a matter of sort of looking at it and figuring out is this person going to be safe and do we need, you know... are they close to being safe in the community? Should I send homecare therapy in to address this? Should we be looking more rehab so we can help with the decision on in terms of discharge destination? (PT025 Acute setting)

The results were used to back up recommendations for location of discharge. Some PTs in rehabilitation had agreed but not all felt that the results of walking assessments had any influence to discharge. One PT from a rehabilitation setting who used the CMSA and the 6MWT, indicated the scores do not influence discharge planning.

There is Little Consensus on Ways to Assess Walking Across the Care Continuum

Physical therapists were asked what they would suggest as assessment methods of walking to be used across the care continuum. Their responses were mixed and
contradictory. Some PTs were not comfortable suggesting specific standardized 
assessment tools for settings that they did not have experience with.

Many PTs across all settings believed that the assessment tools should be 
different across the continuum as the focus of therapy and patients’ ability changes 
and, therefore, appropriate methods to assess walking changes.

“So, in the acute care setting if it’s a more heavily affected stroke patient they often 
don’t have the time to address walking if it is very complicated and takes 
assistance of two or three people to begin with. So, it’s really hard to say across the 
continuum and if you actually get a person to the point of the longer stay rehab 
their walking ability will be changing so much that you can then entertain using 
different outcome measures as they go and certainly as an out-patient, they would 
be maybe even higher functioning and you can look at community walking types of 
assessments also.” (PT028 Rehabilitation setting).

The specific standardized assessment tools that PTs suggested could be used in 
one setting included the 6MWT, and the TUG. Physical therapists did not agree on 
what standardized assessment tool should be administered in which setting.

Some PTs from rehabilitation suggested methods and/or tools to be used across 
two settings but not across the care continuum because of the different care focus in 
settings, and ceiling and floor effects. The purpose of a standardized assessment tool 
being used across settings allows the PT to track change in ability from the previous 
setting. “I’d just like an outcome measure to follow at least two continuums so that we 
speak the same language.” (PT023 Rehabilitation setting). The suggested 
standardized tools were the 2MWT, the TUG, and the CMSA because PTs indicated 
they thought that these standardized assessment tools were possible to use with 
patients of varying abilities and were not too simple or too difficult for the patient.
Some other PTs suggested that certain standardized assessment tools could be used across the continuum in order to detect change across each setting. Participants suggested the following standardized assessment tools: the FIM, the 2MWT, 10 metre walk test (10mWT), the TUG and the 6MWT. These choices were justified by the PTs as being feasible and easy to use and provide useful information across. A few participants felt that observation, specifically examining gait patterning, was the best method of assessing walking ability across the continuum post-stroke. “I’ve never read anything that assisted me in assessing it. For me it’s always feeling the weight, seeing what’s going on. That’s how I do it.” (PT012 Acute setting).

Discussion

The present study is the first to describe how Ontario PTs assess walking across the care continuum post-stroke. The 5 themes suggest that PTs used both standardized and non-standardized methods to assess walking post-stroke; they learn about specific assessment methods from formal and informal sources, the factors that influence selection and use of measures have different levels of importance; they use the results from assessment tools mainly for education, communication, and planning; and they have variable perceptions on how walking should be assessed across the continuum.

Physical therapists in this study identified observation of walking as a valuable assessment method, and for some it was their only method. This preference for
observational assessments is similar to what has reported in previous research examining PTs’ uses of standardized assessment tools with other populations (those with low back pain (Copeland et al., 2008).

In the present study, those in acute care were the least likely to use standardized assessment tools. Of the 8 (28%) PTs in this study who did not use or rarely used standardized assessment tools to assess gait, 5 were from acute care 2 were from rehabilitation and 1 was from an outpatient setting. Physical therapists in acute care may have not been using standardized assessment tools due to lack of time and high level of patient disability. Lack of time was cited as a barrier to standardized assessment tool use in multiple studies (Copeland et al., 2008; Maher & Williams, 2005; Salbach et al., 2011; Swinkels et al., 2011). Patient length of stay in acute care was cited as being the shortest of the 3 settings and so PTs would have the least amount of time with them. This is consistent with The Ontario Stroke Evaluation Report as the mean reported length of stay for acute care is 8.5 days (Hall et al., 2012). Many patients experience walking limitation immediately post stroke and require time to recover (Jorgensen et al., 1995). This immediate decrease in walking ability and in general shorter length of stay may in part explain why PTs in acute care reported using standardized tools to assess walking to a lesser extent than PTs in rehabilitation or outpatient settings.

This study also described variability in where PTs gained knowledge of assessment methods. Physical therapists seemed to prefer learning about a new standardized assessment tool in ways that allowed them to have hands on
experience such as in the laboratory sessions during their professional degree program, hands on post-graduate courses, or personally being involved in a research study that used certain assessment tools. The ability to practice the standardized assessment tool increased their confidence and familiarity with the tool. These findings could be used to advocate for more post-graduate learning methods to be hands on with opportunity to practice. This preference for hands-on learning has been observed in a previous qualitative study of PTs providing services post-stroke in Ontario (Salbach, Veinot, Jaglal, Bayley, & Rolfe, 2010). Physical therapists reported that they felt more comfortable using clinical methods they had learned in detail and had the chance to practice (Salbach et al., 2010). These findings indicate that interventions or education sessions aimed at changing physical therapy clinical practice should be interactive in nature.

Although education was a preferred knowledge source, PTs also mentioned research as a source of information regarding standardized assessment tools of walking. It has been previously determined that the quality of research sources of information are not equal (Straus, & Haynes, 2009; Robeson, Dobbins, DeCorby, & Tirilis, 2010). Hierarchies regarding the access of evidence by decision makers have been presented, known as the “5S” (Straus & Haynes, 2009) and “6S” (Robeson et al., 2010). The “6S” pyramid starts at the bottom with single studies, then to synopses of single studies, next is synthesis, followed by synopses of synthesis, then summaries which are the integration of the best available evidence (for example best practice guidelines) and at the top is systems with detailed services for decisional support (Robeson et al., 2010). Research findings that the PTs used as an
information source could fall under any of the bottom 4 levels. The PTs did not mention how they assessed the quality of the research evidence. It would be ideal for PTs to start at the upper levels of the pyramid when making decisions of how they will assess walking.

An interesting finding relating to PTs’ colleague influence is that some new PTs mentioned assessing walking in the same way that more senior PTs in their workplace do. As professional education was described as a common source of knowledge, older PTs would be less likely to have up to date information on standardized measures of walking. As PTs mentioned that supervising physical therapy students helped them remain current, perhaps the older PTs were using up to date assessment tools, which they had learned about from students.

Physical therapists indicated that they used the results from the walking assessment tools for prognosis of walking recovery, treatment planning, communication with other healthcare professionals on patient status, education of the patient regarding their progress, and discharge planning. Physical therapists in previous studies have used standardized assessment tools to assess, monitor quality, to evaluate, to communicate, plan treatment and discharge (Chesson, Macleod, & Massie, 1996), to give feedback to the patient, and to provide baseline status (Bruton Conway, & Holgate, 2000). Results from this study did not indicate that PTs use results of standardized assessment tools of walking to provide a baseline status.
Suggestions for walking assessment tools across the continuum were inconsistent. The standardized assessment tools recommended for use across the care continuum were the 6MWT, TUG, 2MWT, CMSA, FIM and 10mWT. All of these assessment tools are endorsed by the Canadian Best Practice Recommendations (Canadian Best Practice Recommendations for Stroke Care, 2010f) except the 10mWT, which is recommended by the Dutch guideline (van Peppen et al., 2007).

Participants indicate that patients’ cognitive and physical abilities strongly influence their choice of walking assessment tools. For those patients in acute care hospitals who are severely physically affected by a stroke and have very slow gait speeds (0.3 m/s or less) standardized assessment tools of physical function based on ordinal scales appear most responsive to change (Salbach et al., 2001). For patients who can walk at faster gait speeds, timed gait assessment tools, such as the 10mWT, are more responsive to change in walking capacity over time (Salbach et al., 2001). The ideal battery of walking assessment tools likely involves multiple standardized assessment tools and the type of standardized assessment tool is dependent on the patients’ ability. Cognitive and communication ability would also have to be taken into account when creating the ideal battery. The limitation to the use of a battery to assess walking is that it would add time to PTs assessments and lack of time is already seen as a barrier to use of standardized assessment tool use.

These findings highlight the fact that suggestions and guidelines need to be improved upon if they are to be adopted by the majority of PTs. Merely recommending that a measure be used is not enough, efforts need to be made to
encourage use such as ensuring all PTs are able to attend interactive courses teaching the suggested assessment tools.

**Limitations**

This study had a number of limitations. The method of sampling through recruitment notices may have attracted PTs who regularly use standardized assessment tools for walking post-stroke more than those who do not. By limiting the sample to Ontario, which has a highly organized approach to healthcare post stroke, the results may not be generalized to other Canadian provinces. Also interviewing over the telephone prevents observation of any non-verbal responses such as facial expressions or body language, which could potentially show if a participant is uncomfortable with a question.

Another methodological limitation is that the hierarchy of factors influencing the adoption and administration of standardized assessment tools was not based on ratings that all PTs gave. It was based on the number of PTs who mentioned the factor as an educational source or influence so there is potential that PTs may have forgotten to mention a factor they felt strongly about.

Location of interviews was recorded and although it was suggested to all PTs that they be in a private location during the interview, many were at work in shared offices. This may have caused them to not speak as freely as they otherwise would have.
There was also not enough acute care PTs to be able to compare those in regional centres to non-regional centres. There were five PTs from regional centres (two of which were from the same centre) and three from non-regional centres, which are not sufficient numbers to make a valid comparison.

**Conclusion**

The results of this study show that PTs currently use standardized and non-standardized methods to assess walking post-stroke. Education is important for learning about assessments and PTs prefer the lessons to be interactive. Physical therapists are most influenced to use these assessments by their personal familiarity and patient characteristics. Physical therapists used the results of the assessments for communication with other healthcare professional and education of the patient. These findings can be used to inform the development of knowledge translation resources and education interventions by providing information on how PTs most commonly learn about new assessments and how they are influenced to adopt new assessment methods. These findings will facilitate use of standardized walking assessment tools post-stroke use in physical therapy practice across the care continuum. As the published best practice recommendations are Canada wide, future research is needed to examine if PTs in other provinces are using the same methods to assess walking post-stroke for similar reasons.
Chapter 4

Discussion and Conclusion

Study findings provide an in-depth description of what PTs are using to assess walking post-stroke, why they are using these methods and how the results guide their clinical practice. Five themes emerged from the data: (1) methods to evaluate walking vary; (2) knowledge about walking assessment methods is derived from formal education, physical therapy students, the provincial stroke network, and research; (3) a hierarchy of factors influences choice of walking assessment method; (4) clinical use of walking assessment results vary; and (5) there is little consensus on ways to assess walking across the continuum.

Physical therapists in this study identified observation of walking as a valuable assessment method. A few indicated observation as their only or primary method of assessment of walking. This has been demonstrated in previous research examining PTs’ uses of standardized assessment tools. Physical therapists in an American qualitative study used movement observation to determine what balance assessment tools to administer post-stroke (McGinnis et al., 2009). In some cases PTs strongly relied on visual observation and preferred it over the use of standardized assessment tools when treating patients with low back pain (Copeland et al., 2008).
While there are many objective standardized assessment tools of walking that have been recommended for use post-stroke, such as the 6MWT, and TUG (Canadian Best Practice Recommendations for Stroke Care, 2010f) there are fewer qualitative standardized assessment tools of walking (Turani, Kemiksizoglu, Karatas, & Ozker, 2004; Lord, Halligan, & Wade, 1998; Wolfson, Whipple, Amerman, & Tobin, 1990; VanSwearingen, Raschal, Bonino, & Yang, 1996; Ranchos Los Amigos Medial Centre, 1989; Tinetti, 1986; & Daly et al. 2009). The subjective nature of observational gait assessment tools may compromise some of the psychometric properties (Toro, Nester, & Farren, 2003). One PT from an outpatient setting described using the Ranchos Los Amigos Gait Analysis (Ranchos Los Amigos Medial Centre, 1989) and two PTs (one from rehabilitation and one from outpatient) mentioned using the Tinetti Balance & Gait Assessment (Tinetti, 1986). The reason for so few using standardized qualitative walking assessment tools is not clear.

The results of this project identify less than perfect regular use of standardized tools with 28% of participants not using or self-identifying that they rarely use standardized tools for walking. This finding is similar to what has been demonstrated in previous research. Just over half of Dutch PTs used the assessment tools that were recommended by the Dutch best practice guidelines (van Peppen et al., 2008). Lennon (2003) observed that 22% of PTs in the United Kingdom did not use standardized assessment tools at all.

Physical therapists in this study reported variability in the type of standardized assessment tool used and cited a large number of different tools. In total, 17
standard assessment tools of walking or with a walking component were mentioned. Those in acute care settings were the least likely to use standardized assessment tools with acute care PTs only citing 7 (rehabilitation and outpatient setting PT groups cited 11 and 13 respectively). Not all of the measures recommended by the Canadian guidelines are suggested for use across all settings. In acute care the only assessment tools with a component of gait are the Alpha FIM and the FIM (Canadian Best Practice Recommendations for Stroke Care, 2013c), the FIM, CMSA, and 6MWT are recommended in rehabilitation (Canadian Best Practice Recommendations for Stroke Care, 2010f), and the FIM and CMSA for outpatient and community settings (Canadian Best Practice Recommendations for Stroke Care, 2010e).

Of the 8 (28%) PTs who did not use or rarely used standardized assessment tools to assess walking post-stroke, 5 were from acute care hospitals. Less use of standardized assessment tools in acute care could potentially be due to time and patient ability. Patient ability was found to be very high on the list of influencing factors by this study. Lack of time was cited as a barrier to standardized assessment tool use in multiple studies (Copeland et al., 2008; Maher & Williams, 2005; Salbach et al., 2011; and Swinkels et al., 2011). Patient length of stay in acute care was cited as being the shortest of the 3 settings and so PTs would have the least amount of time to implement best practice recommendations.

The difference in frequency of reassessment between the settings appears to be related to the different lengths of patient stay in each setting. The shortest time
between reassessment is when assessment is observation based, as PTs who used observational methods to assess reassessed most often. For most PTs who used observational methods, it is unclear whether or not these observational reassessments are charted.

Two PTs from outpatient settings were in private practice. One of these PTs mentioned that they will sometimes forgo an assessment to get into treatment because the patient is paying out of pocket and wants to be treated. This only affects Canadians who are receiving therapy from a private system, as hospital care post-stroke in Canada is publically funded (Teasell et al., 2009). It is interesting as the purpose of a standardized assessment tool is to assess patients’ abilities, generate scores, and track change regarding health status or performance based on a standardized evaluation (Potter et al., 2011). It could be argued that by not assessing walking ability, a PT could potentially mistreat by not identifying the patients’ true deficits.

Some of the participants mentioned being influenced by or being aware of the best practice guidelines while others did not mention it. It is not possible to know how many PTs are familiar with the guidelines as that specific question was not asked. It is possible that not all PTs in Ontario are adequately versed in the Canadian guidelines for stroke. If this is the case, the next question is whose responsibility it is to ensure PTs know what is suggested in these guidelines? It could potentially be the PTs own responsibility, the place of the PTs’ employment, or the provincial organization for stroke care. Part of the Ontario Stroke Network’s
mission is use of best practice (Ontario Stroke Network, 2010e) as recommended in the best practice guidelines. The PTs should also ensure that they apply the information sent to them by the provincial organization and the workplace should support PTs with the resources needed. Therefore, it is the PT, their workplace, and the provincial organization that should be responsible for ensuring PTs are applying up-to-date best practice guidelines.

The Ontario Stroke Network has resulted in fewer deaths and long term care admissions post-stroke (Kapral et al., 2013) but the results from this study do not indicate that the network is of strong importance to PTs when it comes to walking assessment tool choices post-stroke. All participants were aware that there was provincial organized stroke care. Some referred to it as the Ontario Stroke System while others called it the Ontario Stroke Network. Most were aware that they were related. Lack of background knowledge of the Ontario Stroke Network may also indicate that the PTs are not familiar with the goal or the teachings of the organization. To encourage PTs to see the Ontario Stroke Network as a stronger influencing factor, perhaps a simple summary should be provided to PTs on what they are to distinguish between the strategy and the network. In order for PTs to learn about standardized assessments from the Ontario Stroke Network, efforts should be made to ensure that workshops and knowledge translation initiatives be as interactive as possible with the opportunity for practice. This preference to hands on, interactive learning sessions was discussed by PTs in this study and aligns with pervious findings (Salbach et al. 2010).
Physical therapists are most often using assessment tool results to educate the patient and communicate with other healthcare professionals. While it is excellent to communicate the results, the Canadian guidelines suggest the tools assist in determining when the patient is ready for discharge and where they should go (Canadian Best Practice Recommendations for Stroke Care, 2010a). As determining readiness for discharge was rarely cited as a use of assessment tool results, this is an aspect that could be improved upon. Whether or not PTs had any control over determining readiness for discharge was not clear in this study.

Previous research has also not explored PTs suggestions for assessment methods of walking post-stroke across continuum. In this study, suggestions for walking assessment tools across the continuum were inconsistent; some PTs thought it was useful to have assessment tools follow a patient across all settings to compare improvement while others thought patients’ abilities were too different in each setting. The standardized assessment tools mentioned were the 6MWT, TUG, 2-Minute Walk Test (2MWT), CMSA, FIM and 10mWT. An interesting point about the CMSA is that participants mentioned it takes a long time to administer and time was a relatively important influencing factor to the walking assessment choices but the CMSA was one of the main standardized assessment tools cited. This could potentially mean that some of the influencing factors such as results having meaning or this having been a standardized assessment tools taught during their training may over ride others such as time to administer.
Other PTs believed that assessment tools should be different across all settings as patients’ abilities change. This reinforces the finding that patient factors are at the highest level of importance in the hierarchy. A limitation to using different assessment tools in each setting as a patients’ ability changes could be that it is not possible to measure progress from one setting to the next. Many did not feel comfortable suggesting specific assessment tools for settings other than the setting in which they currently worked. This may indicate that there is variability in the familiarity with standardized assessment tools in PTs working across the care continuum. Some physical therapists may only be familiar with the assessment tools that are commonly used in their setting. This may mean that PTs are unfamiliar with patients’ ability levels in other settings.

**Future Research**

Patient ability was one of the most important influencing factors as to whether or not an assessment tool would be used. There is great variability in walking ability in acute care alone. Some patients can walk unassisted while others cannot walk at all. Perhaps instead of having assessment recommendations based on setting they should be based on patient ability but still be able to follow the patient from one setting to the next. Researchers also need to listen to PTs about what they need an assessment to do and what characteristics make an assessment more useful than others. Once future research has determined what these specific assessments are, a positive attitude towards these assessment tools needs to be fostered among all PTs. This could be done through demonstrating the clinical relevance and ensuring that
all PTs are given the opportunity to learn the assessment tools in hands on interactive courses.

A checklist with 57 determinants fitting into 7 domains was created based on a systematic review of frameworks for determinants to practice in healthcare (Flottorp et al., 2013). Many of these 7 domains align with the categories of influencing factors observed in the current study. These domains include: guideline factors, individual health professional factors, patient factors, professional interactions, incentives and resources, capacity for organizational change, and social, political, and legal factors. The aim of this checklist was to guide use and research on factors influencing change in practice. The checklist helps to determine what influencing factors will be most important (Flottorp et al., 2013). Once tested, this checklist could potentially aid in the implementation of the use of standardized assessment tools of walking post-stroke by PTs. This study did not explore PTs’ perceptions on the influence of incentives, and political and legal factors in regards to walking assessment choice. As these are components of the checklist, future research is needed to determine whether those factors should be part of the hierarchy of influencing factors identified in the current study.

The findings of this study provide information on what forms of education PTs rely on and what the most important factors are to encouraging the use of standardized assessment tools of walking. The findings of this study could have a positive impact on standardized assessment tool use by PTs in relation to walking as well as providing an example for future research in other areas of physical therapy.
Increasing the use of standardized assessment tools is expected to improve physical therapy practice, and, ultimately result in better patient outcomes to increase meaningful participation after stroke.

**Conclusion**

In summary, PTs currently use non-standardized methods and many types of standardized methods to assess walking post-stroke. They prefer to learn about assessment tools through interactive learning opportunities with the opportunity to practice. Physical therapists are most strongly influenced to use an assessment tool by personal familiarity and patient characteristics. The results of the assessment tools are used primarily for communication with other healthcare professionals on patient status, and education of the patient regarding their progress. There is also a lot of variability as to which assessment tool should be used in which setting. These findings can be used to inform future research on the creation of knowledge translation resources and education interventions by providing information on how PTs most commonly learn about new assessment tools and how they are influenced to adopt new assessment methods. These efforts will facilitate the increased use of standardized tools to evaluate walking post-stroke in physical therapy practice across the care continuum.
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Appendices

Appendix A

Regional Stroke Centres of Ontario

Central South and Central West: Hamilton General Hospital

Central East: Royal Victoria Hospital

Southeastern Ontario: Kingston General Hospital

West GTA: Trillium Health Centre

Toronto West: Toronto Western Hospital

North and East GTA: Sunnybrook Health Sciences Centre in Toronto

South East Toronto: St Michaels Hospital

Southwestern Ontario: University Hospital, London Health Sciences Centre

Champlain: Ottawa Hospital

Northeastern Ontario: Sudbury Regional Hospital

Northwestern Ontario: Thunder Bay Medical Centre

(Thunder Bay Regional Health Sciences Centre, 2012)
Appendix B: Ethics Approval from the University of Toronto

PROTOCOL REFERENCE # 27561

April 26, 2012

Dr. Nancy Salbach     Miss Kira Pattison
DEPT OF PHYSICAL THERAPY     DEPT OF PHYSICAL THERAPY
FACULTY OF MEDICINE     FACULTY OF MEDICINE

Dear Dr. Salbach and Miss Kira Pattison,

Re: Your research protocol entitled, "Contextual factors influencing physiotherapists' use of standardized measures of walking capacity post-stroke across the care continuum"

ETHICS APPROVAL     Original Approval Date: April 26, 2012
Expiry Date: April 25, 2013
Continuing Review Level: 1

We are writing to advise you that the Health Sciences Research Ethics Board (REB) has granted approval to the above-named research protocol under the REB's delegated review process. Your protocol has been approved for a period of one year and ongoing research under this protocol must be renewed prior to the expiry date.

Any changes to the approved protocol or consent materials must be reviewed and approved through the amendment process prior to its implementation. Any adverse or unanticipated events in the research should be reported to the Office of Research Ethics as soon as possible.

Please ensure that you submit an Annual Renewal Form or a Study Completion Report 15 to 30 days prior to the expiry date of your current ethics approval. Note that annual renewals for studies cannot be accepted more than 30 days prior to the date of expiry.

If your research is funded by a third party, please contact the assigned Research Funding Officer in Research Services to ensure that your funds are released.

Best wishes for the successful completion of your research.

Yours sincerely,

Judith Friedland, Ph.D.     Daniel Gyewu
REB Chair     REB Manager
Appendix C

Recruitment Notice Disseminated Through the Best Practice Leader of the Ontario Stroke Network, Ontario Physiotherapy Association iblast, and Canadian Physiotherapy Association Neurosciences Division Newsletter “Synapse”

Opportunity for Participation in a Research Study: Physiotherapists’ Choices of Walking Assessments Post-Stroke

We invite Ontario physiotherapists to participate in a study to discuss the methods they use to evaluate walking post-stroke and their use of the results in clinical practice. Participants should work with stroke patients at least twice a week, have more than one year of clinical experience and be employed in acute care, rehabilitation or outpatient settings. Study participation will involve one telephone interview. This research is being conducted by Kira Pattison, an MSc student in Rehabilitation Science supervised by Nancy Salbach, PhD, PT and Dina Brooks, PhD, PT at the University of Toronto. Kira is interested in increasing understanding of choices of walking assessments post-stroke. Clinician input is valuable and essential to this work. We hope that you will collaborate with us in this research. If you are interested to participate or desire more information, please contact Kira Pattison at kira.pattison@mail.utoronto.ca.
Appendix D

Recruitment notice for the Canadian Physiotherapy Association Electronic Newsletter “Scout”

Physiotherapists’ choices of walking assessments post-stroke

We invite Ontario physiotherapists to participate in a study to discuss the methods they use to evaluate walking post-stroke and their use of the results in clinical practice. Participants should work with stroke patients at least twice a week, and have more than one year of clinical experience. Study participation will involve one telephone interview. If you are interested to participate or desire more information, please contact Kira Pattison at kira.pattison@mail.utoronto.ca.
Appendix E

Letter to Participants in Previous Research

June 19, 2012

Firstname Lastname
Institution name
Street address
City, ON, postal code

Dear Firstname,

I am writing to ask for your help in my study on physiotherapists' choices and uses of standardized walking assessments post-stroke. In 2005, you participated in a survey conducted by Dr. Nancy Salbach on evidence-based practice in stroke rehabilitation and this study yielded many interesting results about how physiotherapists access, evaluate and implement new information in practice.

I am interested in determining the methods that physiotherapists in Ontario use to evaluate walking, reasons for selecting these methods and their use of evaluation results in clinical practice along the continuum of care post-stroke. I am currently conducting one-on-one telephone interviews with physiotherapists who work in acute care hospitals, rehabilitation hospitals and public or private outpatient settings, are still registered with the College of Physiotherapists of Ontario, currently provide assessments and treatments to at least 15 adults with stroke per year, and who have more than one years experience with stroke patients. When you sent in your questionnaire in 2006, you expressed interest in participating in subsequent research by signing a Permission to Contact form. We are inviting you to participate in a telephone interview to learn about your approach to walking assessment post-stroke.
The interview would take approximately 45 minutes and it would be arranged at your convenience either during or outside of work hours. The consent form included in this mailing contains additional details about the interview process and how we will analyze your responses. The consent form is for your information only as informed consent will be audiorecorded prior to the beginning of the interview. Your participation in the interview is voluntary. I will be in contact with you shortly by email or telephone using the information you previously provided. If you do not wish to participate, you may send me an e-mail at kira.pattison@mail.utoronto.ca or call me at 416-946-7579 to inform me of your decision. You will not receive additional communications by mail regarding this project. You may also contact me if you do not consider yourself eligible for this project based on the criteria provided.

I am conducting this study as part of my MSc thesis in Rehabilitation Science at the University of Toronto. I strongly feel that clinician input is valuable and essential to my work. I hope that you will collaborate with me in this research project. If you have any questions or comments about the study, do not hesitate to contact me by telephone, 416-946-7579, or by email, kira.pattison@mail.utoronto.ca.

Sincerely,

Kira Pattison, MSc Student
Appendix F

Follow up Email to Mailings

Dear Firstname,

My name is Kira Pattison, I am a Rehabilitation Science MSc student at U of T, supervised by Dina Brooks and Nancy Salbach. I am contacting you as a follow up to a letter I recently mailed to you regarding a study I am conducting looking at physiotherapists’ choices of walking assessment tools post-stroke. I am interested in determining what assessments physiotherapists use, why they use them, and how the results are used in treatment. I am looking for physiotherapists who are registered members of the Ontario College of Physiotherapy and in good standing, are currently employed in an acute care hospital, or a rehabilitation hospital, currently treat and/or assess more than 15 patients with stroke per year, and have greater than 1 year experience working with those with stroke.

This study involves a 45 minute telephone interview at a time and place that is convenient for you. I would like to know if you would be interested in participating. If so please suggest a date and time that is convenient for you as well as a telephone number that I can reach you at.

If you have not received the mailing yet, please let me know and I will forward the documents by email.

Thank you,

Kira
Appendix G

Email to Managers

Letter if manager contact not available

Hello,

My name is Kira Pattison and I am a Masters student in rehabilitation science at the University of Toronto. I am currently conducting a study looking at physiotherapists’ choices of walking assessments post-stroke involving one short telephone interview with the physiotherapist participants. I was wondering if your could put me in contact with either the head physiotherapist or rehabilitation director at your hospital to discuss potential participation? This study has had full ethics approval from U of T’s Research Ethics Board.

Thank you for your time and assistance,

Kira Pattison

Letter to manager

Hello,

My study consists of one short telephone interview with Ontario physiotherapists to determine how they assess walking post-stroke, why they choose these assessments, and how the results influence treatment. The study is looking at physiotherapists across the care continuum but at this point I am only looking for those employed in acute care. My inclusion criteria is that participants must be employed in acute care, must treat a minimum of 15 stroke patients per year, have more than a year of clinical experience with stroke, and be members of the college in
good standing. I have included a recruitment notice and an informed consent sheet to this email which outlines the study in more detail. What has been done at other hospitals is that an individual such as yourself forwards the recruitment notice to physiotherapists in the hospital and they contact me if they are interested in participating. My supervisors for this project are Dr. Dina Brooks and Dr. Nancy Salbach. This study has been fully approved by the University of Toronto's Research Ethics Board.

If you would like to discuss the possibility of participation in more detail or have any questions please suggest a time at which can reach you.

Thank you very much for your interest and assistance with this project

Kira
Appendix H

Screening Email

Thank you for your interest in my study, the following is a quick screen to ensure that you meet the eligibility criteria of this study.

Are you a registered member of the Ontario College of Physiotherapy and in good standing?
Are you currently employed in a acute care hospital, a rehabilitation hospital or a public or private outpatient setting?
Do you currently treat and/or assess more than 15 patients with stroke per year?
Do you have greater than 1 year experience working with those with stroke?

If you have answered yes to all of these questions you are eligible for this study.

This study involves a 45 minute telephone interview at a time and location that is convenient for you. We are currently booking interviews beginning the week of Monday June 11th and on. My schedule is very flexible so please suggest a day, time and number at which you can be reached. This may be in or outside of work hours and I will confirm the appointment prior to the arranged time. It is suggested for confidentiality reasons that if possible you choose a private location for the telephone interview.

I have also included an informed consent form for your interest and records. I do not need a signed copy returned as verbal consent will be audio recorded prior to the beginning of the interview.

Should you have any questions regarding the study or would like to change or cancel your interview date and time please do not hesitate to contact me.

Thank you for your interest,

Kira
Appendix I

Consent Form

INFORMED CONSENT FORM

Title of Study: Contextual factors influencing physiotherapists’ use of standardized measures of walking capacity post-stroke across the care continuum

Student Researcher:
Kira Pattison MSc student in Rehabilitation Science at the University of Toronto

Supervisors:
Dr. Nancy Salbach Assistant Professor, Department of Physical Therapy, University of Toronto, Associate Member, Graduate Department of Rehabilitation Science, University of Toronto

Dr. Dina Brooks Professor, Department of Physical Therapy, University of Toronto, Graduate Coordinator, Graduate Department of Rehabilitation Science, University of Toronto

Background and Purpose of the Study
Physiotherapists are a key part of the rehabilitation team post-stroke and they often spend a large portion of therapy time working on the walking recovery of individuals with stroke. Standardized walking assessments aid this process by providing information on the extent of an individuals walking deficit and providing
feedback as to the effectiveness of therapy. The overall purpose of this study is to determine the methods physiotherapists use to evaluate walking post-stroke, their reasons for selecting these methods and their use of the evaluation results in clinical practice post-stroke.

**Who is being invited to participate in this study?**

I am inviting an expected 20 – 30 physiotherapists to participate in a confidential interview. For this project a participant is someone who feels comfortable describing his/her uses of walking assessments post-stroke in clinical practice. To identify potential participants I am contacting directors of acute care hospitals, rehabilitation hospitals and public or private outpatient settings to ask for the identification of physiotherapists who meet my inclusion criteria. I am also sending out an invitation to participate through the Ontario Stroke Network and the Ontario Physiotherapy Association and placing a recruitment advertisement in Synapse, the Neurosciences Division of the Canadian Physiotherapy Association as well as in Scout, the newsletter for the Canadian Physiotherapy association. I am looking for physiotherapists who are currently working in acute care hospitals, rehabilitation hospitals, or public outpatient settings, treat individuals with stroke at least twice a week with a minimum of one years experience providing physiotherapy to people with stroke.

**What is involved in participation for this study?**

I am inviting you to participate in a one-to-one interview over the phone. The interview will last approximately 45 minutes. The interview will be audio recorded and transcribed verbatim. During the interview I will ask you about the methods you choose to evaluate walking post-stroke, your reasons for selecting these methods and your use of the evaluation scores of these walking assessments in clinical practice.

**Potential Risks and Benefits:**

Your participation in this study is voluntary and you may withdraw from the study at anytime without any negative effect. If you accept to participate and then change your mind simply inform the student researcher, Kira Pattison, by email
(kira.pattison@mail.utoronto.ca) or by telephone (416 946 7579). There are no foreseeable risks or immediate benefits to participating in this study. The information gained, however will help us better understand what influences physiotherapists’ uses of walking assessments post-stroke and help to provide the background information to help physiotherapists make informed choices about which walking assessments to use.

Privacy and Confidentiality:

Information collected during the interview will remain confidential. Each study participant will be assigned a code and this code will be the only identifying mark on the audiotape and the transcription. Only the student researcher, co-investigator and supervisors will have access to the accompanying codebook. Audiofiles will be stored on a secure server and will be destroyed after transcription. Transcripts will be stored in a locked filing cabinet at the University of Toronto and will be destroyed after 10 years. If you cannot complete the interview, data that has been collected up until that time will be used unless you specify that you would not like it included at which point it will be deleted.

When reporting the results of this type of study, general themes from the interviews are highlighted and quotes are sometimes used to illustrate a theme. Any quotes containing potential identifying information, however, will not be used.

Compensation:

The cost of any long-distance phone calls for the interview will be covered. A small gift (monetary value < $10) will be provided in compensation to study participants.

Contact Information:

If you require any additional information regarding this study, please contact the student researcher, Kira Pattison at 416 946 7579 or kira.pattison@mail.utoronto.ca.
If you have questions about your rights as a research participant, please contact the Office of Research Ethics at ethics.review@utoronto.ca or 416-946-3273.

Copy of informed consent for participant:

This consent form is provided for your records and interest, as verbal consent will be audio recorded prior to the beginning of the interview.

By signing below, I am indicating that I have read and understood the above information and have had the opportunity to ask questions about my involvement in this research.

Name ________________________________________________

Signature ______________________________________________

Date_________________________ Telephone____________________

Email address ___________________________________________
Appendix J

**Interview Guide**

Contextual factors influencing physiotherapists’ use of standardized measures of walking capacity post-stroke across the care continuum

Opening Remarks for Interview

Thank you for agreeing to take part in this interview. We will be speaking about the assessments, specifically your approach to evaluating walking when treating individuals post-stroke. I am interested in determining the methods physiotherapists in Ontario use to evaluate walking, reasons for selecting those methods, and their use of evaluation results in clinical practice in acute care hospitals, rehabilitation hospitals, and public outpatient settings.

The information gained from this interview will be kept strictly confidential

This interview will last approximately 45 minutes

Can you hear me adequately?

Before we begin may I have your verbal consent to this interview for my study entitled “contextual factors influencing physiotherapists’ use of standardized measures of walking capacity post-stroke across the care continuum”
Thank you, for the duration of this interview I’d like you to provide examples from your practice when possible and appropriate.

Do you have any questions before we begin?

First can you tell me about your work setting?

1. Where do you work?

2. What type of setting do you work in? (acute care, rehabilitation, or outpatient)
   
   *Note: If acute ask if regional stroke centre*

3. Could you describe your practice with stroke?
   
   a. For example What type of patients do you see, are they generally ambulatory?
   b. Is walking recovery a common goal for patients?
   c. how many days do you generally have to treat a stroke patient?
   d.

4. Describe the other healthcare professionals that you work with?

5. Does your institution require you to use any specific standardized assessment tools in your clinical practice with people with stroke?

6. Does anyone other than you formally assess walking ability in people with stroke?

1. Think of when you are referred a new patient with a stroke. Describe a typical first assessment of walking ability with this person.
   
   *Note: If brief ask for an example, describe an assessment that was done recently?*
2. What are the standardized assessment tools that you use when evaluating a person with stroke?

3. What standardized assessment tool of walking do you use with individuals post-stroke?
   *Ask for description of assessment if not familiar*
   a. Do you use standardized walking assessment tools with evidence of reliability and validity for individuals with stroke?

4. After your initial evaluation of a new patient, when do you typically re-assess walking?
   *Clarify if they use tool to reassess each time*

Rationale for use of measure:

1. Think back to when you first started using this measure, what were the reasons why you began using this measure?

Note: I am referring to assessments that measure ambulation not mobility. Mobility: ability to move, may include transferring, walking etc.

Examples of walking assessments: 6MWT

Characteristic of the measure: *REVIEW the list of measures the PT uses to assess walking, for each measures ask the following two questions:*

5. What do you like about the walking assessment tool that you use?  
   [wait for response, explore why]

6. *What about this method of assessment do you think needs to be changed?*  
   [wait for response, explore why]

Characteristics of the patient
7. When administering this walking assessment to people with stroke, what patient characteristics or circumstances make it easy to use this walking assessment tool?
   a. [If no response, prompt:] Think about the patient's clinical profile, such as their motor deficits, cognitive deficits, aphasia, fatigue, etc.
      Ask for a recent example of a patient

8. What patient characteristics make it difficult to use this assessment tool?
   [wait for response, explore why]
   Ask for a recent example of a patient

Comparison to other measures

9. Have you ever considered using other assessment tools of walking?
   a. If no, please explain.
   b. If yes, which measures? Why did you decide not to use them?

10. [if the 6MWT is not mentioned, prompt] Have you ever considered using the Six Minute Walk Test?
    a. If no, please explain why.
    b. If yes, why did you decide not to use this test?

11. [if the 10mWT is not mentioned, prompt] Have you ever considered using a measure of walking speed, like the 10-metre walk?
    a. If no, please explain why.
    b. If yes, why did you decide not to use the measure?

Other influences on choice of walking assessment

External pressures (includes employment setting recommendations or protocol, influence of colleagues use similar walking assessments, the College)

12. As healthcare providers, our actions, such as whether or not to administer a specific assessment tool of walking, are often influenced by people around us. What individuals or groups might influence your choice of walking assessment tools?
[wait for response, explore why, how; If no response, prompt]

For example, sometimes our peers (e.g., mentors, specialists, managers, patients) can influence what we decide. Is this something that resonates with you?

Ask for an example or description of when this happened

13. How much is the selection of standardized assessment tools of walking up to you and within your control?

14. Are there other factors that influence your choice of walking assessment?
   a. [If participant is unsure of what this means, prompt] Other factors could include:
      i. research literature (e.g., evidence of reliability, validity, etc) or recommended measure in clinical practice guidelines
      ii. familiarity (e.g., what you learned in school)

15.

16. The Ontario stroke system has provided organized stroke care across the province, is there any influence of the individuals representing the Ontario stroke system or activities of the OSS that influence your selection of assessment tools?

17. Given all of the factors that we have discussed, what factor had the strongest influence on your decision to use this (or these) standardized assessment tools of walking?

18. In what ways do you use the results of your assessment in your clinical practice?
   Can you give an example or describe a situation when this has happened

- think of what you do after your initial assessment of walking. What do you do with the results of your assessment?

PROBES;

- What does the score mean to you?
- Do you chart it?
- To what extent does the result influence treatment planning?
- To what extent does the result influence a prognosis for walking recovery?
- To what extent do you discuss the score with the patient and/or family
- To what extent do you discuss the score with other healthcare professionals

Think of what you do after you re-assess walking. What do you do with the results of your assessment?

- What does the score mean to you?
- Do you chart it?
- To what extent does the result influence treatment planning?
- To what extent do you discuss the score with the patient and/or family
- To what extent do you discuss the score with other healthcare professionals
- To what extent does the score influence discharge planning?
- Are the scores analyzed as part of program evaluation

19. What assessment methods would you recommend for evaluating walking ability across the care continuum, meaning from acute care, to rehab, to the community setting?

20. We are now approaching the end of this portion of the interview; do you have any final thoughts for me about assessing walking abilities in stroke survivors?
The following section inquires about personal demographic and practice information.

1. What is your age range?
   - 20 – 29
   - 30 – 39
   - 40 – 49
   - 50 and above

2. What is your entry-level degree for physical therapy?
   21. certificate
   22. bachelor
   23. entry level Masters

3. What year did you graduate?

4. What province and or country did you receive your training in?

________________________________________

5. What is your highest degree attained?
   24. Bachelor
   25. Entry-level Masters
   26. Applied or Research Masters
   27. Doctoral
6. Do you belong to one or more professional practice-oriented organizations, for example OPA or CPA?

7. For how many years have you been practicing?

8. How many years of clinical experiences do you have with a stroke clientele?

9. Do you supervise physical therapy students in your practice?

10. In a typical week, how many hours do you work?

11. In a typical day how many clients with stroke do you see?

12. How many physical therapists in your primary workplace, other than you, treat persons with stroke?

13. Does this facility provide any funds for continuing education?

14. Do you work in a team that includes professional from other disciplines, if yes, is the team a stroke team? (a team that focuses primarily on the assessment and treatment of individuals with stroke)

A final couple of questions

15. Where did you hear about this study and where were you while we were having this discussion (at work, in an office, at home)?
Conclusion

This brings us to the end of our interview, I would like to thank you very much for your time and valuable input. If you require more information or want to be kept informed of our progress, please do not hesitate to call at 416 946 7579 or email kira.pattison@mail.utoronto.ca.
Appendix K

Thank you Letter

June 18, 2012

Name
Institution name
Address
City, ON, postal code

Dear first name,

Thank you for your recent participation in an interview to assist in the understanding of physiotherapists’ use and choices of walking assessments post-stroke. I greatly appreciate the time you generously donated to help us progress in the development of this knowledge.

Sincerely,

Kira Pattison, MSc student
Appendix L

Codebook

Categories and codes V5

Legend

**Bold: Major code**

Normal: subcode (subcodes may also be bullet pointed)

*Italic: definition of code or subcode*

**Assessment** – methods used by physical therapists to assess people with stroke

Non ambulation assessments – assessments that physiotherapists use that are not ambulation, such as strength, range of motion, balance

Assessment of walking

Approach

- Standardized – assessments that have been standardized and physiotherapist uses name of assessment,
- non standardized – assessments that are not standardized, are qualitative/observational, or are individualized tools either created at the setting or a modification of a standardized assessment
- Name of tool – physiotherapist names the tool but does not explain what it is
- purpose – the goal of the assessments
- frequency – how often/when an assessment is reassessed

Use of 6MWT and 10mWT in clinical practice
- use of 6MWT
  o facilitators
  o barriers
- use of 10mWT
  o facilitators
  o barriers

**Contextual factors**

*Definition of Context: “Context is any information that can be used to characterize the situation of an entity. An entity is a person, place, or object that is considered relevant to the interaction between a user and an application, including the user and application.“ (Dey & Abowd)*

**Characteristics of the measure – Characteristics that influence a therapist’s decision to use an assessment method**

- valid – *valid for use with stroke*
- reliable – *reliable use with stroke*
- has meaning – *results have meaning to clinician and patient, results inform therapy*
- ease of use – *easy to administer*
- time – *amount of time it takes to carry out measure*

**Clinician – clinician factors that influence a therapist’s decision to use an assessment method**

- collaboration with other healthcare professionals – *timing of when to do which assessment, assessing together, someone else assessing ambulation*
- familiarity – *pts use the assessments they are most familiar with*
- skill - *to administer a specific measure (some measures require training)*
- confidence - *to administer a specific measure*

**Setting – hospital or clinic factors that influence a therapist’s decision to use an assessment method**
- space – is there physical space to carry out assessment
- ability to leave marks on floor – can measurement marks be left on the floor, for example, can marks be left on the floor for the 10mWT
- cost – are there funds to purchase needed equipment
- description of setting – what type of setting and where
- treatment schedule – when treatment is available, duration of treatment schedule
- caseload – how many patients are pts seeing daily
- control – clinicians control of what assessments to use
- medical records – records of what assessments patient has completed in past
- time and priority – what is considered most important eg need to complete referral form to rehab is higher priority than administration of assessment tools
- Influence of a Research Project - being conducted at a hospital eg SCORE IT

Patient – Patient factors that influence a therapist’s decision to use an assessment method such as cognitive status, aphasia, balance, proprioception, safety etc

- goals of therapy – matching the measure with the goal of therapy

Influence of people or groups of people

Peers

- Colleagues – pts or others
- practice leaders – hospitals professional practice leader
- Course instructors

Groups – networks or organizations, or learning group

- Ontario stroke network

Guidelines/research literature – use of best practice guidelines or research literature

Use of results in clinical practice

- education – both patient/family
- communication: verbal, vs e-referral form vs paper copy faxed
- discharge planning – *process and when they will be discharged eg applications for rehabilitation, stroke e-referral*
- prognosis for recovery
- treatment planning
- determine magnitude of deficit

**Recommendations** – *how physiotherapists recommend assessing ambulation post-stroke across the settings*

**Miscellaneous**

**Quotes**