Benefits of an E-learning Intervention for Implementing Stroke Rehabilitation Best Practices

by

Anita Menon

A thesis submitted in conformity with the requirements for the degree of Doctor of Philosophy
Institute of Health Policy, Management & Evaluation
University of Toronto

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Abstract

Serious gaps between best and actual stroke rehabilitation practices continue to exist, even with the plethora of evidence and guidelines for stroke best practice management. To address this knowledge gap with an effective knowledge translation (KT) intervention, six steps of the Knowledge to Action (KTA) Model were applied to these specific research objectives: 1) to conduct a systematic review to examine evidence on the effectiveness of single/multi-component KT interventions for improving knowledge, attitudes, and rehabilitation practice behaviors of occupational therapists (OTs) and physical therapists (PTs), in order to inform the design of a KT intervention; 2) to conduct usability testing to explore factors that facilitate or hinder OTs’ and PTs’ use of an evidence-based, stroke rehabilitation-specific e-learning resource (Stroke Engine; www.strokengine.ca), as a preliminary step in its potential use as a KT intervention; and, 3) to conduct a KT intervention study to determine the extent of knowledge acquired regarding stroke rehabilitation best practices by OTs and PTs while using Stroke Engine as an e-learning KT intervention for three months. A sub-objective was to identify the association between knowledge acquired and factors related to the clinician, their work environment, and adherence to the KT intervention.

Main findings from this research agenda suggested that use of active, multi-component KT
interventions resulted in some knowledge gains among physical therapists, but additional research was needed to understand impact of these strategies on occupational therapists. During Stroke Engine testing, factors hindering its use were identified and the website was modified to maximize its usability as an e-learning KT intervention. Clinicians were satisfied with Stroke Engine as it provided them with the latest stroke evidence in a quick, user-friendly format. Finally, significant improvements in clinicians’ proportion of “evidence-based” responses on the Stroke Rehabilitation Knowledge Questionnaire were observed between baseline and following Stroke Engine use as a KT intervention. Intensity of Stroke Engine use was the most significant predictor for clinicians’ improved “evidence-based” knowledge on the Questionnaire. It was concluded that Stroke Engine has promise as an effective e-learning KT intervention for enhancing rehabilitation clinicians’ knowledge of stroke best practices.
Acknowledgements

I would like to acknowledge the following individuals who have directly shaped my PhD studies and my life over the last 6 years. Though my name appears on the cover of this dissertation, I owe my gratitude to the many people whose tremendous effort and sacrifices have helped me reach the finish line.

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CHAPTER 1
Background and research objectives

1.1 Preamble

My research interest in evidence-based practice (EBP) for stroke rehabilitation and knowledge translation (KT) was sparked during the course of my MSc. Degree in Rehabilitation Science at McGill University. I was interested in unilateral spatial neglect (USN), a disabling impairment post-stroke characterized by the inability to respond to stimuli appearing on the side contralateral to the brain lesion\(^1\). Timely and accurate USN assessment is crucial as this impairment is strongly associated with falls, longer inpatient stays and poor functional recovery\(^1,2\). Following a systematic review of USN screening and assessment tools, I identified 62 measures; 28 of them were standardized\(^3\). The next logical step was to examine the USN screening and assessment practices of health professionals (my MSc. work supervised by Dr. Nicol Korner-Bitensky and Dr. Sharon Wood-Dauphinee). Data collected from 248 randomly selected medical charts of patients admitted to 10 randomly selected Ontario acute care hospitals, indicated that USN screening was not routinely performed in patients with acute stroke\(^4\). Indeed, my findings indicated that only 13\% of patients were assessed using a standardized USN measure\(^4\). Following this discovery, I was invited to present these study findings at a national stroke consensus meeting held in Montreal in 2004 and was consulted regarding the best measures to recommend for easy clinical uptake. These recommendations were included in the Canadian Best Practice Recommendations for Stroke Care 2006\(^5\)- specifically the Line Bisection Test for USN screening and the Behavioral Inattention Test for further assessment\(^3,5\).

As I continued exploring the practices of stroke rehabilitation clinicians in general and for USN specifically, I coordinated a Canada-wide survey of 1800 stroke rehabilitation clinicians (PI: Dr.
Nicol Korner-Bitensky). This study highlighted variations in assessment and treatment practices among clinicians across Canada but more importantly, it identified serious practice gaps\textsuperscript{6-12} thus suggesting the need for further research to enhance clinicians’ use of EBP\textsuperscript{13}. Concurrently at the Canadian Institutes of Health Research, KT became a fundamental part of their research mandate\textsuperscript{14}.

As I developed a burgeoning interest in the role of KT in EBP for stroke rehabilitation, it became increasingly apparent that knowledge does not necessarily translate into application in daily clinical practice\textsuperscript{13}. This dilemma led to the development of my overall PhD research objective: to examine the effectiveness of a KT intervention for improving rehabilitation clinicians’ knowledge of stroke best practices, in order to narrow the existing knowledge to practice gap and promote best practices for stroke rehabilitation management (PhD work supervised by Dr. Sharon Straus and Dr. Nicol Korner-Bitensky). My PhD story began here…

1.2 Background

Chapter 1 of this PhD dissertation reviews the current research literature with the goals of: 1) stressing the importance of best practices for stroke rehabilitation; 2) identifying existing knowledge and practice gaps among rehabilitation clinicians; 3) highlighting effective knowledge translation (KT) interventions for promoting best practice uptake by this target group; and 4) identifying gaps in this area of research, thus building a strong rationale for my overall PhD research agenda and objectives. This chapter includes excerpts from Manuscript #1 of this dissertation, entitled “Best practice use in stroke rehabilitation: from trials and tribulations to solutions”.

2
1.2.1 Importance of best practices for stroke rehabilitation

Stroke is a leading cause of serious long-term disability in Canada, with more than 300,000 survivors living with impairments that impact on function and participation, and that require rehabilitation\textsuperscript{15}. Given that stroke costs the Canadian economy $3.6 billion a year and that stroke rehabilitation constitutes a significant portion of these costs\textsuperscript{15}, it is critical that the use of effective stroke interventions be optimized. This goal is relevant to a wide range of stakeholders: funders, policy makers, health professionals, and more importantly, to patients with stroke and their families.

In Canada, recognition that quality stroke care is essential has led to specific initiatives aimed at optimizing stroke care. The Heart and Stroke Foundation of Ontario (HSFO) and regional stroke centers have worked in partnership with the Ontario Ministry of Health and Long-Term Care and the Canadian Stroke Network (CSN) to develop an Ontario Stroke Strategy (OSS)\textsuperscript{16}. More recently this initiative has expanded to include a Canadian Stroke Strategy (CSS)\textsuperscript{17} that aims to provide organized stroke care in every province and territory. Organized stroke care involves an integrated approach to primary and secondary stroke prevention, and rehabilitation using evidence-based practice guidelines implemented by an interdisciplinary team. Occupational
therapists (OTs) and physical therapists (PTs), amongst others, are key members of this team and often it is the quality of the services they provide that differentiates between a successful return home post-stroke versus long-term care institutionalization. A recent Cochrane review concluded that patients receiving organized stroke care versus general medical care were more likely to survive, regain independence, and return home.

Given the key role that rehabilitation clinicians play in optimizing stroke outcomes, they are continually faced with a growing pressure to integrate research evidence with their clinical expertise and individual patient goals when making shared decisions on stroke management, which includes problem identification, assessment, and intervention. Fortunately there is a plethora of evidence to guide stroke rehabilitation practice: over 1200 published randomized controlled trials on stroke rehabilitation management exist for the acute, sub-acute and chronic stages of stroke recovery, along with a proliferation of reputable national and international best practice guidelines, such as Canadian Best Practice Recommendations for Stroke Care 2010 and American Management of Stroke Rehabilitation Care 2005.

Encouragingly there is an impetus among rehabilitation clinicians to increase their knowledge and embrace evidence-based practice (EBP), given that 63% of in-patient rehabilitation beds are dedicated to patients with stroke or orthopedic primary diagnosis and that their adherence to guidelines translates into improved patient outcomes. In the United States, Duncan and colleagues determined that greater adherence to 26 clinical care guidelines resulted in better functional outcomes post-stroke: level of compliance with post acute rehabilitation guidelines was significantly associated with items from the Functional Independence Measure and Stroke

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Evidence-based practice is defined as the "integration of best research evidence with clinical expertise and patient values."
Impact Scale, when case-mix was adjusted in a cohort of 288 patients with stroke admitted to one of 11 acute or post acute hospital sites. Both the Canadian Association of Occupational Therapists (CAOT)\textsuperscript{19} and the Canadian Physiotherapy Association (CPA)\textsuperscript{20} recommend that rehabilitation clinicians use all reasonable means to constantly expand their professional knowledge base through continuing education, with the ultimate goal of providing effective interventions. Clinicians have acknowledged these recommendations and seem to have a positive attitude toward the use of EBP: results from a survey of 488 PTs working in stroke rehabilitation found that 85% agreed or strongly agreed that they need to increase the use of evidence in their daily practice\textsuperscript{30}.

1.2.2 Current practice gaps in stroke rehabilitation

Yet, even with all these good intentions to embrace EBP a gap remains between stroke rehabilitation evidence and its application in clinical practice\textsuperscript{6,31}. Indeed, a 2005 Canadian study of 1800 stroke rehabilitation clinicians identified serious practice gaps and major areas of stroke rehabilitation management that could be improved upon by the use of standardized assessments and best practice treatments\textsuperscript{6-12}. There were low levels of screening for high-risk post-stroke sequelae such as dysphagia\textsuperscript{6}, and inconsistent assessment use for important aspects of stroke recovery such as driving\textsuperscript{11}, executive function\textsuperscript{12}, community integration and participation\textsuperscript{9,10}, contrary to the existing Canadian best practice guidelines\textsuperscript{25}. There was an underutilization of effective treatments, such as the use of behavioral management for urinary incontinence\textsuperscript{8} and an overutilization of ineffective ones such as neuro-developmental treatment\textsuperscript{6}. For example, unilateral spatial neglect (USN) is a prevalent and disabling feature of stroke\textsuperscript{1} and while numerous standardized tools can detect this serious impairment\textsuperscript{3}, only 27% of OTs, those primarily responsible for USN detection, reported using a standardized USN tool during
inpatient rehabilitation\textsuperscript{7}. Similarly, in a study of medical charts in a random sample of acute care hospitals in Ontario\textsuperscript{4}, only 13\% (n=32/248) of patients were examined with a standardized USN tool, and of these, only 4\% (n=9/248) were assessed within 48 hours as recommended by the National Clinical Guidelines for Stroke\textsuperscript{32}. So in this and numerous other analyses of stroke rehabilitation management, we concluded that despite existing research evidence, use of stroke rehabilitation best practices remains a major challenge\textsuperscript{31,33}.

1.2.3 Existing barriers for implementing best practices in rehabilitation

Obstacles to implementing EBP are multi-fold and include: the rapid rate of knowledge development that is especially evident in stroke rehabilitation\textsuperscript{23-26}, increased workload and patient complexity given the aging population with numerous co-morbidities\textsuperscript{27,31}, and, difficulty in translating evidence for use with individual patients\textsuperscript{34-37}. Lack of protected work time to search and appraise the research literature is by far the largest organizational barrier to knowledge uptake and application\textsuperscript{30,38-40}, as reported by 92\% of 649 OTs surveyed\textsuperscript{38} and 74\% of 270 PTs surveyed\textsuperscript{39}. Findings from our Canada-wide study of 1800 stroke rehabilitation clinicians indicate that clinicians dedicate between 5-7 hours a month to digest this huge amount of information as part of their continuing education activities\textsuperscript{7}. The evidence also suggests that personal barriers such as lack of confidence and skills to interpret, synthesize and apply research findings\textsuperscript{30,38-40} are limiting uptake of best practices: only 50\% of therapists indicated they were confident in their skills and ability to change clinical practice in response to new evidence\textsuperscript{39}. Thus this existing gap between knowledge development and implementation is likely to continue to widen unless effective actions are taken\textsuperscript{14,41}.

1.2.4 Possible knowledge translation solutions for rehabilitation clinicians

The existence of practice gaps in health care has led to interest in knowledge translation (KT),
which according to CIHR, is the exchange, synthesis and ethically sound application of knowledge within a complex system of interactions among researchers and users, along with the analysis of barriers and facilitators inherent in this process\textsuperscript{14}. A first step in closing the knowledge-to-practice gap is to identify which KT interventions are most effective in promoting knowledge acquisition. According to Miller’s pyramid\textsuperscript{42}, knowledge acquisition is an important initial outcome because it creates a strong foundation for promoting change in clinicians’ attitudes and practice behaviors, with the ultimate goal of improving patient-related outcomes.

When a systematic review by Grimshaw and colleagues of 235 studies including RCTs, controlled trials, controlled pre-post studies, and interrupted time series, examined the effectiveness of guideline dissemination and implementation strategies among of primary care physicians and other medical professionals (nurse practitioners, nurses, dieticians, pharmacists, and physician assistants), not surprisingly, no one KT intervention has surfaced as the ultimate solution for this group\textsuperscript{43}. Active KT interventions were more effective than passive strategies to produce change in practice behaviors\textsuperscript{43}. Other interventions that were modestly effective included education outreach (e.g. opinion leaders), and multi-component interventions based on a needs assessment and aimed at overcoming potential barriers to change\textsuperscript{43}.

However, when I attempted to identify which KT interventions were effective for OTs and PTs specifically, no systematic review on the effectiveness of KT interventions for improving rehabilitation clinicians’ knowledge, attitudes toward EBP, and practice behaviors had been published to date. It would be important to identify effective KT interventions specific to rehabilitation clinicians because according to the Ottawa Model of Research Use (OMRU)\textsuperscript{44} and the Knowledge to Action (KTA) Model\textsuperscript{45}, KT interventions are most successful when tailored to
meet the salient barriers and facilitators of the individual, their work environment, and evidence-based innovations found within their setting44,45.

1.2.5 Benefits of e-learning resources for knowledge translation

There are obvious benefits to a KT intervention based on e-learning for the dissemination of evidence-based information, including widespread availability (i.e. home and workplace; rural and urban settings), user-interactivity, and the potential for continuous updating of information in a cost-effective manner without the need to produce printed documents. A topic specific evidence-based e-learning resource can minimize the time required to access evidence: making information available within 90 seconds has been shown to increase the extent to which clinicians seek and incorporate evidence into their daily patient care decisions46. Furthermore, e-learning enables clinicians to access the latest evidence, while giving them the freedom to reflect on/revisit the content at a time and place convenient to them47,48, as well as to tailor the instructional method and content according to their individual learning needs, thus making this a preferred38,49 format for continuing education when compared to more traditional instructional methods, such as printed guidelines.

Encouragingly, there is sufficient evidence supporting the effectiveness of e-learning for improving the clinical competency of physicians, nurse, pharmacists and dentists specifically47,48,50,51: a 2008 systematic review of 201 studies examining the effectiveness of internet-based instruction compared to no intervention showed large positive effect sizes for improving knowledge, skills and practice behaviors of these health professionals50. More than half of the studies included in this review examined knowledge outcomes and found significant improvements50. The same authors further examined how to improve internet-based learning by comparing it with other computer-based instructional formats in a 2010 systematic review of 50
studies\textsuperscript{51}. The review concluded that features such as interactivity, practice exercises, repetition, and feedback provided from internet-based instruction were associated with improved learning outcomes\textsuperscript{51}.

The use of e-learning among rehabilitation clinicians overall, and its effectiveness for improving their knowledge of stroke rehabilitation best practices specifically, has yet to be studied. Encouragingly in a survey of 649 OTs examining their perceptions toward EBP\textsuperscript{38}, 76\% indicated that e-learning resources were very or extremely useful as a continuing education format. Thus given the variations in practices among stroke rehabilitation clinicians\textsuperscript{6-12} and the evidence suggesting that e-learning resources were well-accepted\textsuperscript{38,49} as a format for continuing education for this group, there was strong impetus for the creation/implementation of an interactive e-learning resource specific to best practices for stroke rehabilitation.

1.2.6 Stroke Engine: an e-learning resource for stroke rehabilitation clinicians

To address the practice gaps related to stroke rehabilitation assessment and treatment in Canada\textsuperscript{6-12}, researchers and relevant stakeholders collaborated to synthesize the stroke rehabilitation literature and create an interactive e-learning resource: Stroke Engine\textsuperscript{52-56} (www.strokengine.ca). Financial support to develop Stroke Engine was provided by CSN, HSFO, and Quebec Rehabilitation Research Network (REPAR/FRSQ; for the French version of Stroke Engine); content support was provided in part by the London Evidence Based Review of Stroke Rehabilitation team\textsuperscript{24}.

Stroke Engine provides rehabilitation clinicians with both in-depth reviews and “bottom line” summary statements on the effectiveness of rehabilitation interventions (Stroke Engine-Intervention\textsuperscript{52}) and psychometric properties of screening/assessment tools (Stroke Engine-
Assess\textsuperscript{53}). The ultimate goal of this resource is to assist clinicians in making informed decisions that will ultimately increase their use of effective stroke rehabilitation interventions in individuals with stroke, as well as use of standardized assessments with strong psychometric properties for screening, assessing and monitoring clinical change.

Stroke Engine-Intervention is composed of modules that have been created using a comprehensive and systematic review of all existing effective and ineffective treatment interventions, its optimal timing of use post-stroke (during the acute, sub-acute, or chronic stage of recovery) and the patient subgroups applicable for its use. Experts critically appraise all new studies in each area (acupuncture, constraint-induced therapy, virtual reality etc.) and create modules for clinicians, as well as for patients and their families. In each module, clinical questions are constructed using a PICO framework\textsuperscript{21} (e.g. “for a post-stroke patient (P) is acupuncture (I) more effective than usual therapy (C) at reducing spasticity (O)?”). Each question is presented to stimulate a clinician’s interest and provide them with a concise evidence-based answer.

Stroke Engine-Assess is comprised of an extensive list of screening and assessment tools for use by clinicians with specific emphasis on those identified by the Stroke Outcomes Rehabilitation Panel (funded by CSN and Heart and Stroke Foundation of Canada) and CSS. Each tool is critically appraised for its purpose, ease of use in clinical practice, psychometric properties, and client appropriateness using relevant studies from the measurement literature. It allows clinicians to compare the potential usefulness of various tools for measuring the same construct, and enables the comparison of costs, time and energy required. Experts in measurement are involved in conducting these systematic reviews.
In addition, one interactive learning module specific to USN was created to link content between Stroke Engine-Assess and Stroke Engine-Intervention. It included practical, “how-to” information on identification, assessment and treatment of USN, along with case vignettes, video clips with audio comments, printable hand-outs and pocket card summaries, and images. Similar interactive modules are being created on a continual basis to guide evidence-based stroke management.

More than 75 researchers, clinicians and decision makers nationally and internationally invest time and expertise into the creation and updating of this interactive e-learning resource. At the time when Stroke Engine was examined as part of my PhD research agenda (i.e. from September 2010 to March 2011), there were 37 treatment modules on Stroke Engine-Intervention and 75 assessment modules on Stroke Engine-Assess. Stroke Engine has received international recognition from stakeholders including students, clinicians, researchers, and policy makers, those with stroke and their family/friends. This resource is recognized by the Canadian Cochrane Center for its scientific rigor and is directly linked to its website. As these websites are continually being developed for international use, it is important to rigorously evaluate their usability as perceived by the intended end-users.

As a first step in a KT plan, prior to steps taken for the current PhD research agenda, Stroke Engine underwent two stages of testing: heuristic evaluation and the first iteration of usability testing. A preliminary prototype of Stroke Engine (i.e. homepage and two modules) was initially created by senior researchers and experts in stroke rehabilitation, through consultation with key

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†Heuristic evaluation involves a team of experts that inspect and test the prototype in order to identify usability issues that they assume will impact end users.
‡Usability testing is defined as measuring the ease of use of a computer interface or website with a sample of potential end-users. It is a systematic process that evaluates the ease with which a clinician can use an e-learning resource to achieve their educational goals.
decision makers and stakeholders from CAOT, CPA, CSN, HSFO and CSS. Heuristic evaluation of the prototype was completed during a focus group with these researchers and decision makers; refinements were made based on their feedback\textsuperscript{56}. The first iteration of usability testing of Stroke Engine was then conducted on a sample of 19 potential end-users in Montreal, Quebec\textsuperscript{56}. The objective of this evaluation was to compare usability and navigability of the following three web-based resources: 1) prototype version of Stroke Engine; 2) Google or other search engines for unstructured Internet searching; and 3) a general stroke-related website, such as Cochrane Database or Royal College of Physicians website. Clinicians consistently rated Stroke Engine higher than unstructured Internet searching and searching a general stroke-related website on all measures of perceived usability and navigability using a self-administered questionnaire. The Stroke Engine prototype was refined and further developed with their recommendations.

Another important consideration when testing usability is an iterative systems analysis, which involves evaluating the e-learning resource during the design phase followed by cycles of redesign and repeated usability testing\textsuperscript{58-64}. Therefore, to continue this iterative process of ensuring that Stroke Engine is perceived by clinicians as having maximal usability and navigability, \textbf{it was deemed important to conduct a second iteration of usability testing of Stroke Engine with stroke rehabilitation clinicians.}

While it is important to ensure that Stroke Engine is user-friendly, there is no guarantee that its occasional use will lead to improvements in clinicians’ knowledge of stroke rehabilitation best practices. An e-learning resource such as Stroke Engine needs to be coupled with an effective KT intervention in order to encourage use of the resource. The \textbf{effectiveness of Stroke Engine as an e-learning KT intervention for improving knowledge of stroke rehabilitation best practices among OTs and PTs would need to be studied.}
1.3 Overall research objective of my PhD research agenda

The overall research objective of my PhD research agenda is to examine the effectiveness of a KT intervention for improving rehabilitation clinicians’ knowledge of stroke best practices, in order to narrow the existing knowledge to practice gap and promote best practices for stroke rehabilitation management. Specific research objectives of this PhD agenda are addressed in three individual but connected manuscripts within my dissertation, representing a unique set of studies with different research methodologies and topic areas (i.e. stroke; rehabilitation science; knowledge translation; informatics and human factors engineering).

1.3.1 Specific research objectives

**Objective 1**: To conduct a systematic review to examine the evidence on the effectiveness of single and multi-component KT interventions for improving knowledge, attitudes toward EBP, and rehabilitation practice behaviors of OTs and PTs, in order to inform the design of a KT intervention (Chapter 3 of dissertation; manuscript entitled “Strategies for rehabilitation clinicians to move evidence-based knowledge into rehabilitation practice: a systematic review”). As part of this systematic review, I was hoping to identify KT interventions that are effective for improving clinicians’ knowledge related to stroke rehabilitation best practices specifically.

**Objective 2**: To conduct usability testing to explore factors that facilitate or hinder OTs’ and PTs’ use of an evidence-based, stroke rehabilitation-specific e-learning resource (Stroke Engine; [www.strokengine.ca](http://www.strokengine.ca)), as a preliminary step in its potential use as a KT intervention (Chapter 4 of dissertation; manuscript entitled “Usability testing of two e-learning resources: methods to maximize potential for clinician use”); and,

**Objective 3**: To conduct a KT intervention study to determine the extent of knowledge acquired
regarding stroke rehabilitation best practices by OTs and PTs while using Stroke Engine as an e-learning KT intervention for three months. A sub-objective was to identify the association between the extent of knowledge acquired and potential explanatory factors related to the clinician (e.g. age, clinical experience), their work environment (e.g. protected work time for continuing education, presence of a stroke unit/team on site), as well as clinician adherence to the KT intervention (e.g. total time spent using the e-learning resource) (Chapter 5 of dissertation; manuscript entitled “Maximizing clinicians’ knowledge of stroke rehabilitation best practices: effectiveness of an e-learning knowledge translation intervention).

The Knowledge to Action (KTA) Model\textsuperscript{45} and its first six steps (see Chapter 2 for description of the KTA Model) were applied as a conceptual framework for my specific research objectives, in order to guide the development of an effective KT intervention. As I developed this research agenda, I hypothesized that the use of Stroke Engine as a well-designed, theoretically-grounded KT intervention\textsuperscript{45} will result in a greater uptake of knowledge specific to patient care post-stroke, given the existing evidence supporting the use of e-learning resources in general for continuing education\textsuperscript{47,48,50,51} and that feedback from the first iteration of usability testing of the Stroke Engine prototype was positive\textsuperscript{56}. 
CHAPTER 2
Theoretical framework for knowledge translation

A conceptual map incorporating the Knowledge to Action (KTA) Model\textsuperscript{45} and revised Medical Research Council (MRC) Framework\textsuperscript{65} for complex interventions was used to guide the process of moving knowledge into action for this PhD research agenda. More specifically, the KTA Model and MRC Framework were selected because they provided an iterative approach for developing and implementing a knowledge translation (KT) intervention by addressing the methodological challenges in regards to study design, execution and generalizability\textsuperscript{66}.

2.1 Knowledge to Action (KTA) Model

The Knowledge to Action (KTA) Model\textsuperscript{45} was conceptualized by Graham and colleagues from a review of more than 30 planned action theories. It applies an evidence-based approach for highlighting practice gaps and designing effective KT interventions to address these gaps. The Model emphasizes a knowledge creation funnel and action cycle as the two main concepts for moving knowledge into practice.

Figure: Knowledge to Action Model\textsuperscript{§}

\textsuperscript{§} Copyright permission has been granted
In the knowledge creation funnel, research evidence is sifted through a process of knowledge inquiry (asking the right questions in single studies) to synthesis (pulling together research evidence from multiple studies/sources) to the development of knowledge tools and products (repackaging the information and delivering it in the right format), to become refined and presumably more useful for end users. The action cycle involves an iterative approach that guides knowledge application and involves: Step 1) identifying a gap in knowledge and selecting the knowledge to address the gap; Step 2) adapting knowledge for potential users; Step 3) assessing barriers to knowledge use; Step 4) selecting, tailoring and implementing a KT intervention for knowledge application; Step 5) monitoring knowledge use; Step 6) evaluating outcomes related to knowledge use; and Step 7) identifying strategies for ensuring sustained knowledge use. The KTA Model highlights the importance of partnering knowledge producers (researchers), implementers (such as policy makers) and users (e.g. rehabilitation clinicians) to ensure that the chosen KT interventions are relevant to its target users.45

While there are many theories for KT, the KTA Model and its first six steps were applied to guide project activities related to my specific research objectives (i.e. systematic review, usability testing, and KT intervention study). This Model provides a theoretically-grounded, systematic and rigorous approach to designing an effective KT intervention that is tailored to clinical settings and its multiple stakeholders.45 It has been widely applied in the KT implementation studies, and thus has been adopted by CIHR as the model for KT.14

2.2 Medical Research Council (MRC) Framework for complex interventions

The 2007 revised version of the MRC Framework uses a phased approach to the development, evaluation and implementation of complex interventions.65 Phase 1 involves identifying the
existing evidence and any theoretical basis for the intervention in order to describe components of the intervention (i.e. the development phase). Phase 2 is the exploratory phase where the acceptability of the intervention/testing procedures are assessed and pilot-tested, and the appropriate sample sizes are calculated (i.e. feasibility/piloting). Phase 3 is the explanatory phase where a randomized controlled trial (RCT) is conducted using a well-defined intervention in a relevant setting with appropriate eligibility criteria and outcome measures (i.e. evaluation). Finally Phase 4 is the pragmatic KT phase where key strategies are identified for widespread and effective implementation of the KT intervention across various clinical settings (i.e. implementation).

The first two phases of the MRC Framework were applied to guide project activities related to my specific research objectives (i.e. systematic review, usability testing, and KT intervention study). The Framework suggested combining the use of quantitative and qualitative methods to evaluate the effectiveness of Stroke Engine prior to promoting its widespread implementation among stroke rehabilitation clinicians.⁶⁵
Chapter 3 of this PhD dissertation addresses Objective 1 of my PhD research agenda; I conducted a systematic review to examine the effectiveness of single and multi-component knowledge translation (KT) interventions for improving knowledge, attitudes toward EBP, and rehabilitation practice behaviors of rehabilitation clinicians, in order to inform the design of a KT intervention. This chapter includes excerpts from Manuscript #2 of this dissertation, entitled “Strategies for rehabilitation professionals to move evidence-based knowledge into practice: A systematic review”.

3.1 Research objectives

The objective was to conduct a systematic review to examine the evidence on the effectiveness of single and multi-component KT interventions for improving knowledge, attitudes toward EBP, and rehabilitation practice behaviors of occupational therapists (OTs) and physical therapists (PTs), in order to inform the design of a KT intervention. This review also explored the effectiveness of KT interventions for improving clinicians’ knowledge related to stroke rehabilitation best practices specifically.
3.2 Methods

3.2.1 Sampling frame for data sources

An extensive systematic review of the literature was completed by searching four electronic databases (MEDLINE, CINAHL, AMED, and EBM Reviews) from their inception to June 2008. Three electronic databases specific to rehabilitation and KT (Physiotherapy Evidence Database [PEDro], Occupational Therapy Seeker, and Research and Development Resource Base) were also searched from their inception to June 2008. Reference sections of all journal articles retrieved were reviewed in search of other pertinent articles. Citation indexes were searched using the ISI Web of Science database to verify that all relevant publications were retrieved.

3.2.2 Search strategy and eligibility criteria

Key words and index terms were generated to describe the target population (OTs and PTs), KT interventions, and outcomes measured (knowledge, attitudes, and practice behaviors). Search strategies were created specifically for each database (see Appendix 3.1 for terms). Studies were eligible for inclusion if they were randomized controlled trials (RCTs) or observational studies (including before-after studies, cohort studies, case-control studies and case series); were published in English or French; and examined the effectiveness of KT interventions for improving knowledge, attitudes, and/or practice behaviors of OTs and PTs. For the purposes of this review, a KT intervention is defined as a means of exchanging evidence-based information (e.g. through educational outreach, opinion leader, journal club, lectures, audit and feedback, reminders, online resources) to improve knowledge, attitudes and practice behaviors of health professionals, with the ultimate goal of optimizing patient outcomes and maximizing the potential of the health system\textsuperscript{43}. KT interventions are considered as active when the participant is engaged in their learning process as opposed to being a passive recipient of information\textsuperscript{43}. 
Knowledge acquisition is operationally defined as the development and expansion of a health professional’s knowledge base\textsuperscript{42}. Attitude towards EBP is defined as a health professional’s agreement and/or acceptance of the evidence, their perceived clinical applicability of the evidence, and their motivation and sense of self-efficacy to adopt EBP\textsuperscript{68}. Practice behavior is defined as the process or actions used by a health professional to provide care for their patients (e.g. use of a standardized assessment tool). Studies measuring knowledge and practice behaviors objectively (e.g. knowledge questionnaires, chart audit), as well as those measuring knowledge, attitudes, and practice behaviors subjectively (e.g. perceived gain in knowledge, self-reported change in attitude or practice behavior) were considered.

3.2.3 Study selection
Once duplicate studies were removed, two investigators independently reviewed the titles and abstracts of citations. Any citation deemed potentially relevant was obtained in full text and assessed by both study investigators to determine eligibility for inclusion. Agreement between the investigators was almost perfect for selecting potentially relevant citations ($\kappa = 0.83$, 95\% CI 0.75-0.94). Once disagreements were resolved through consensus, there was perfect agreement ($\kappa = 1$) for selecting the relevant articles.

3.2.4 Data abstraction and quality assessment
Using a data abstraction form, the two investigators independently extracted data from each full-text article including type of setting; study design; population characteristics (inclusion/exclusion criteria, sample size, number of therapists assessed for eligibility and the number who met inclusion criteria); interventions (details about KT intervention and its goals; duration/intensity of intervention); outcomes; and results. For RCTs, methods for randomization, allocation
concealment, blinding, and completeness of follow-up (including intention-to-treat analysis, withdrawals, and reasons for dropouts) were extracted.

RCTs were evaluated for their internal validity by two investigators using the PEDro Scale (see Table 3.1 for PEDro scores). The PEDro Scale rates the methodological quality of RCTs, such as the randomization process, concealed allocation, baseline comparability, blinding of the subjects, assessors and therapists, intention to treat analysis and adequacy of follow up, out of a possible score of 10. Observational studies were evaluated for their internal validity based on the following criteria: selection and representativeness of sample, adequate description of intervention and outcomes measured, ascertainment of the study outcome, and adequate follow up (see Table 3.2 for specific criteria).

3.2.5 Data analysis

Once relevant articles were identified and reviewed, the possibility of performing a quantitative synthesis, specifically meta-analysis, was explored. Given that significant methodological and clinical heterogeneity was found among the included studies (to be described in the results section), it was not possible to perform meta-analyses and thus, the findings were synthesized in a qualitative manner to produce a narrative summary.

When creating the narrative summary, studies were first grouped according to their outcome: knowledge acquisition, attitudes, and practice behaviors. Then for each outcome, studies were grouped according to whether the KT intervention had a single component (e.g. use of opinion leader) or multi-component (e.g. combination of opinion leader, interactive educational sessions, and reminders). Using the PICO format (i.e. population/ intervention/ comparison/ outcome), questions were created that were deemed relevant to clinicians based on the current research.
Each PICO question was rated for its level of evidence using a scale developed by Sackett and colleagues, and adapted to include PEDro scores signifying the quality of RCTs included. For example, if two RCTs of high quality (PEDro ≥ 6) found an intervention to be effective, the PICO question relating to that intervention would receive a 1a rating indicating strong level of evidence. If one RCT of high quality found an intervention to be effective, the PICO question relating to that intervention would receive a 1b rating indicating moderate level of evidence. One or more fair quality RCTs (PEDro = 4-5) that found effectiveness would enable a 2a rating indicating limited level of evidence. Lower quality studies (PEDro ≤3) and non-randomized trials and strong single subject designs (for example those with multiple baselines) received a rating of 2b. A consensus by an expert panel or findings of a number of ‘pre/post’ design studies that showed similar results, received a 3. Conflicting findings of equally well-designed studies received a 4. Finally, a level of evidence of 5 indicated that no experimental studies explored the PICO question relating to that intervention.

3.3 Results

3.3.1 Included studies

3104 potentially relevant citations were identified and reviewed for relevance (see Figure 3.1 for flow chart). The PRISMA (Preferred Reporting Items for Systematic reviews and Meta-Analyses) statement was used to guide the reporting of this review. There was perfect agreement between two investigators for selecting 12 articles (four RCTs; five before-after studies; three case series) that met eligibility. Of the 12 studies that met the inclusion criteria, 7 involved PTs and 5 involved OTs. None of these studies examined the effectiveness of KT
interventions for improving clinicians’ knowledge related to stroke rehabilitation best practices specifically.

3.3.2 Sources of heterogeneity

Sources of methodological heterogeneity for these studies were presence of a control group (4 out of 12 studies) and method of randomization (4 out of 12 studies used sequence generation or concealed allocation). Sources of clinical heterogeneity included type of intervention (opinion leaders, outreach visits, reminders, interactive educational sessions, online resources, etc.); intensity of intervention (5-8 hours for five studies; 62 hours for one study; intensity not specified for six studies); and type of outcome measurement (e.g. use of self-report, chart audit, multiple-choice questions, knowledge questionnaires).

3.3.3 Description of results

Table 3.3 provides an overview of these studies including the citation, study design, number of participating clinicians, KT intervention, outcome measures and results. The following PICO questions were generated to synthesize the evidence regarding the effectiveness of single and multi-component KT interventions for improving knowledge, attitudes toward EBP, and practice behaviors of OTs and PTs.

What is the effectiveness of an active multi-component KT intervention for improving knowledge acquired by OTs and PTs respectively?

No evidence (level 5) supports the effectiveness of an active multi-component KT intervention for improving knowledge acquired by OTs specifically.

Moderate evidence (level 1b) from a high-quality RCT\textsuperscript{71} and two well designed before-after studies\textsuperscript{72,73} suggests that the use of an active multi-component KT intervention is effective for
improving knowledge acquired by PTs (see Table 3.3 for study details). One high quality RCT\textsuperscript{71} randomized 27 PTs to receive an active multi-component KT intervention (i.e. interactive educational sessions, opinion leaders, outreach visits, and printed materials) or passive dissemination (i.e. guidelines received by mail). At 12 months post-intervention, those in the experimental group had significant improvements in their self-perceived knowledge of whiplash guidelines as measured by a questionnaire, when compared to the control group (p=0.001).

Likewise, a before-after study\textsuperscript{72} of 94 PTs found that use of an active multi-component KT intervention (i.e. combination of opinion leaders, outreach visits, working groups, printed materials) improved self-perceived knowledge of fall risk factors and fall reduction strategies from baseline to 1-6 months post-intervention. Another before-after study of 63 PTs found that use of an active multi-component KT intervention (i.e. interactive educational sessions, problem-based learning, networking, and newsletters) improved their actual knowledge regarding the assessment/treatment of rheumatic diseases when their scores on a multiple-choice knowledge questionnaire were compared from baseline to post-intervention and 18-month follow up\textsuperscript{73}.

Therapists’ actual knowledge increased significantly from 37% correct answers (range 18-47%) at baseline to 54% (range 27-77%) at post-intervention and was maintained at the 18-month follow-up (median score 55%, range 33-79%).

What is the effectiveness of an active single KT intervention for improving knowledge acquired by OTs and PTs respectively?

Limited evidence (level 3) from two case series\textsuperscript{74,75} suggests that the use of an active single KT intervention may be effective for improving knowledge acquired by OTs (see Table 3.3). Sixty-nine OTs were led by an opinion leader for 18 months to establish clinical priorities for EBP, known locally as “burning questions” for specific conditions (e.g. osteoporosis, spinal injuries,
stroke, mental illness). This study found that 62% reported an increase in their knowledge of best practices for those conditions when responding to a feedback questionnaire. Another case series also found that of the 103 OTs who accessed an online evidence-based resource, 63% reported that the resource had increased their knowledge as per their responses on a feedback questionnaire.

No evidence (level 5) supports the effectiveness of an active single KT intervention for improving knowledge acquired by PTs specifically.

**What is the effectiveness of an active multi-component KT intervention for improving OTs’ and PTs’ attitudes towards EBP?**

No evidence (level 5) supports the effectiveness of an active multi-component KT intervention for improving OTs’ attitudes towards EBP specifically.

Moderate evidence (level 1b) from one high-quality RCT suggests that the use of an active multi-component KT intervention is ineffective for improving PTs’ attitudes towards EBP as compared to passive dissemination (see Table 3.3). This trial found no significant differences in PTs’ attitudes towards EBP when comparing questionnaire responses of the experimental and control groups at post-intervention (p=0.07-0.29).

**What is the effectiveness of an active single KT intervention for improving OTs’ and PTs’ attitudes towards EBP?**

There is limited evidence (level 3) from one before-after study suggesting that the use of an active single KT intervention may be effective for improving OTs’ attitudes towards EBP (see Table 3.3). Limited evidence (level 2a) from a fair-quality RCT suggests that the use of an active single KT intervention is ineffective for improving PTs’ attitudes towards EBP.
In the before-after study, 7 OTs participated in a journal club, which consisted of interactive discussions and a critical appraisal of the literature on evidence-based management of chronic obstructive pulmonary disease\textsuperscript{76}. All seven therapists reported that they experienced positive changes in their attitude towards EBP when comparing their questionnaire responses at baseline and three months post-intervention.

The trial\textsuperscript{77} examined the use of an opinion leader for providing evidence-based educational sessions as compared to passive dissemination (i.e. printed material). No significant differences in PTs’ attitudes towards EBP were found when comparing questionnaire responses of the experimental and control groups at post-intervention.

**What is the effectiveness of an active multi-component KT intervention for changing practice behaviors of OTs and PTs respectively?**

No evidence (level 5) shows the effectiveness of an active multi-component KT intervention for changing practice behaviors of OTs specifically.

Strong evidence (level 1a) from two high-quality RCTs\textsuperscript{71,78} and a well designed before-after study\textsuperscript{72} suggests that the use of an active multi-component KT intervention is effective for changing practice behaviors of PTs (see Table 3.3). The two high-quality RCTs found that PTs who participated in an active multi-component KT intervention reported significant changes in their actual\textsuperscript{71} and self-perceived practice behaviors\textsuperscript{71,78} when assessed at 12 months post-intervention, as compared to those who received passive dissemination. Bekkering et al.\textsuperscript{78} found that therapists in the intervention group reported that they were more likely to adhere to guideline recommendations when treating patients at 12 months post-intervention as compared to those in the control group (OR 2.05; 95% CI 1.15-3.65). The before-after study\textsuperscript{72} of 94 PTs
found that the use of an active multi-component KT intervention resulted in significant changes in self-perceived practice behaviors when assessed within 1 to 6 months post-intervention. Therapists’ self-reported use of fall prevention strategies increased significantly when comparing their practice behaviors from pre to post exposure to the intervention (p<0.0001).72

What is the effectiveness of an active single KT intervention for changing practice behaviors of OTs and PTs respectively?

Limited evidence (level 3) from two before-after studies76,79 and two case series73,75 suggests the effectiveness of active single KT interventions for changing practice behaviors of OTs (see Table 3.3 for study details). Limited evidence (level 2a) from a fair-quality RCT80 also suggests that the use of an active single KT intervention is ineffective for changing practice behaviors of PTs.

One before-after study76 of seven OTs participating in a journal club on evidence-based management of chronic obstructive pulmonary disease, found that participants experienced positive changes in their self-perceived practice behaviors when their questionnaire responses were compared at baseline and three months post-intervention. The second before-after study79 of 35 OTs who received interactive educational sessions (i.e. lectures, group discussions, follow-up support by phone/email) regarding outcome measurement, reported that they experienced significant changes in their use of outcome measures between baseline and post-intervention (p=0.012). One case series study of 69 OTs involving the use of an opinion leader to implement EBP found that 54% reported a change in their practice behaviors when responding to a feedback questionnaire73. The second case series found that of the 103 OTs who accessed an online evidence-based resource, 14% reported that the resource changed their practice behaviors when responding to a feedback questionnaire75.
One fair-quality RCT\textsuperscript{80} examined the use of an opinion leader for providing evidence-based educational sessions as compared to passive dissemination (i.e. printed material). No significant differences in PTs’ attitudes towards EBP were found when comparing the experimental and control groups at post-intervention.

3.4 Discussion

Findings from this systematic review suggest that participation in an active multi-component KT intervention results in improved self-perceived knowledge\textsuperscript{71-73}, as well as positive changes in actual and self-perceived practice behaviors of PTs\textsuperscript{71,72,78}. These gains did not translate into change in PTs’ attitude towards best practices. While this review found no studies examining the use of active multi-component interventions with OTs specifically, limited evidence suggests that single active KT interventions may improve knowledge, attitudes and practice behaviors of this professional group\textsuperscript{74-76,79}.

These results are generally consistent with systematic reviews involving other groups of health professionals where active, multi-component KT interventions were found to be more effective than passive dissemination or single KT interventions for improving evidence-based knowledge\textsuperscript{83} and producing change in practice behaviors\textsuperscript{43,82-84}. In reviewing the interventions, it is difficult to disentangle exactly which components, or the number of components, that led to these improvements in knowledge and practice behavior\textsuperscript{43,85,86}.

It is not clear from this review which KT strategy can effectively change clinicians’ attitudes towards the use of EBP\textsuperscript{71,76,77}. Underlying factors that influence how a clinician responds to new information are likely. For instance, Green and colleagues\textsuperscript{87} suggest that most individuals have their own “practice style trait” that causes them to differ in what they consider to be credible
sources of evidence (i.e. the value of evidence vs. experience), the weight they assign to practical concerns (e.g. the importance of managing workload vs. patient satisfaction), and their willingness to diverge from group norms (i.e. issues of non-conformity). Indeed, in two recent studies where we identified the prevalence of practice style traits of OTs and PTs, we found very few seekers, that is clinicians whose practice is driven by scientific evidence, and a very high prevalence of pragmatists whose practice is driven by practicality\textsuperscript{87,88}.

This review highlighted serious gaps in the literature on effective KT strategies to enhance best practice behaviors among OTs specifically. While this professional group has been shown, in general, to be positive about EBP, they rely more on their clinical experience, colleagues, and informal continuing education experiences to guide their practice as opposed to using research evidence\textsuperscript{38,89,90}. Surveys of OTs have identified that even when they do identify relevant research evidence, they often lack confidence and skills to interpret/apply these research findings into clinical practice\textsuperscript{38,40}. Therefore an important step will be to account for key barriers and facilitators of the therapist/work environment when tailoring KT interventions or designing future effectiveness studies to achieve successful uptake with these professionals, as recommended by the Ottawa Model of Research Use framework\textsuperscript{44}. Logan and colleagues suggest that the following four factors need to be considered when examining the effectiveness of KT interventions for changing practice behaviors: 1) characteristics of the intervention; 2) characteristics of the health professional; 3) characteristics of the behavior that the intervention is trying to change; and 4) characteristics of the organization and context\textsuperscript{44}. Thus, as we go forward with attempts to identify highly effective KT interventions, it will be important to consider matching of KT strategies not only to the environment in which the clinician works but also likely to the clinician’s specific learning styles and traits\textsuperscript{87}.  
3.4.1 Limitations

Findings for this systematic review were based on 4 randomized studies and 8 non-randomized studies, such that the methodological weaknesses of some of these studies may have reduced the validity of our conclusions for each PICO question. This review was also restricted to studies published in English or French, thus one case series involving 63 PTs published in Dutch was not reviewed\(^91\). Given that publication bias may have also been an potential threat to the validity in this systematic review, the following steps were taken to minimize this bias: a comprehensive literature search was conducted using well-defined terms and precise inclusion/exclusion criteria, articles were independently selected and screened by two investigators using standardized data abstraction forms, inter-rater reliability of these investigators was measured using kappa statistics, and potential sources of variability between relevant studies was examined using rigorous study quality assessments. However, this review summarized all of the existing evidence on KT interventions for rehabilitation clinicians specifically, thus will serve as a guide for the development of effective KT interventions for these knowledge users.

3.5 Conclusion

For the first time in the history of rehabilitation we have substantial evidence regarding the effectiveness and ineffectiveness of treatments. This knowledge needs to be utilized by clinicians to enhance patient outcomes. The growing realization that KT does not occur without intense efforts has led to a new field of research aimed at identifying the most effective KT strategies. While this review suggests the use of active, multi-component KT interventions does enhance knowledge and practice behaviors of PTs, additional research is needed to understand the impact of these strategies on OTs. In addition, it will be important to examine which KT strategies have a positive impact on patient outcomes.
CHAPTER 4
Steps 2 & 3 of KTA Model: Adapt knowledge to local context and assess barriers to knowledge use

Chapter 4 of this PhD dissertation addresses Objective 2 of my PhD research agenda; I conducted usability testing to explore factors that facilitate or hinder clinicians’ use of an evidence-based, stroke rehabilitation-specific e-learning resource (Stroke Engine; www.strokengine.ca), as a preliminary step in its potential use as a knowledge translation (KT) intervention. This chapter discusses a rigorous, evidence-based methodology to usability testing that can be applied to any health-related e-learning resource\(^5\)\(^{6-8}\). It includes excerpts from Manuscript #3 of this dissertation, entitled “Usability testing of two e-learning resources: methods to maximize potential for clinician use”\(^9\).

4.1 Research objective and evidence-based methodology

The objective of this study was to conduct usability testing to explore factors that facilitate or hinder occupational therapists’ (OTs) and physical therapists’ (PTs) use of an evidence-based, stroke rehabilitation-specific e-learning resource (Stroke Engine; www.strokengine.ca), as a preliminary step in its potential use as a KT intervention.

4.1.1 Evidence-based methodology for usability testing

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**ORIGINAL REPORT**

**USABILITY TESTING OF TWO E-LEARNING RESOURCES: METHODS TO MAXIMIZE POTENTIAL FOR CLINICIAN USE**

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Kushniruk and colleagues have developed an evidence-based approach to usability testing\textsuperscript{59-64}, which has been widely used and recognized as a rigorous methodology\textsuperscript{58,92-98}. This methodology includes: 1) identifying clear objectives for usability testing; 2) eliciting feedback from participants that represent typical resource users; 3) selecting tasks and contexts used during usability testing that reflect real-life application of the resource; 4) collecting data that includes audio/video recording of computer screen activity, as well as the participant’s verbal feedback and physical interactions with the resource; 5) using both structured and/or unstructured tasks during testing; and, 6) translating the usability testing results into recommendations and/or modifications.

4.2 Methods

4.2.1 Study population and recruitment

Given that Stroke Engine content is primarily aimed at stroke rehabilitation clinicians, specifically OTs and PTs, the goal was to conduct usability testing with a purposive sample of these clinicians delivering stroke rehabilitation across the continuum of care in Ontario, Canada. Ontario is the largest province in Canada and represents one-third of the 300,000 Canadians currently living with the residual deficits post-stroke. The College of Occupational Therapists of Ontario and College of Physiotherapists of Ontario provided contact details for clinicians working in adult neurology. Clinicians were contacted at work to elicit information regarding their eligibility and willingness to participate (Appendix 4.1 for consent form). Eligibility criteria included: working with a stroke clientele in an acute care hospital or in/out-patient rehabilitation site, their work site being within 20-km of the testing laboratory; and, varying levels of comfort with searching the Internet (Appendix 4.2 for recruitment form). Excluded were individuals with absolutely no computer skills and those enrolled in other research studies.
involving Stroke Engine. Ethics approval was attained from St. Michael’s Hospital and the University of Toronto, Ontario, Canada (Appendix 4.3 for ethics certificate).

4.2.2 Sample size considerations

Eight to ten participants is considered sufficient for identifying factors that facilitate or hinder clinicians’ use of web-based resources, and it has been found that four to five participants generally identify 80% of a website’s usability issues. To ensure that saturation would occur across most major usability issues, and, to account for potential “no-shows” on the day of testing, 14 clinicians were recruited.

4.2.3 Procedures

Usability testing procedures were based on the methodology developed by Kushniruk and colleagues as described in 4.1.1. Consenting clinicians participated in an individual 1.5 hour, in-person testing session, which was facilitated by a one of the two highly trained research assistants. Each clinician completed a form eliciting sociodemographic information (e.g. age, discipline, clinical experience, time spent on continuing education, access to Internet at work/home, etc.) (Appendix 4.4).

At the beginning of the session, the clinician was asked to read a vignette representing a typical patient seen in the clinician’s work environment. Three validated vignettes were available to choose from - one describing a typical patient with stroke admitted to an acute care hospital, one receiving in-patient rehabilitation, and, another receiving out-patient services (Appendix 4.5 for patient vignettes). Each vignette included salient information regarding the patient’s stroke sequelae (e.g. presence of unilateral spatial neglect, impaired balance and motor function, difficulty with ambulation, and decreased strength).
Next, the clinician was instructed to search Stroke Engine for information that would help answer five clinical questions specific to the patient depicted in the vignette (Appendix 4.6 for clinical questions). For example, if the question asked about the effectiveness of acupuncture in the acute phase post-stroke, the clinician would have to search Stroke Engine for information to answer the question. The participant was reassured that the accuracy of their answers was not important; rather, their search patterns (i.e. sequential order of web pages visited), and time required to find the correct web pages for answering questions, as well as their physical interactions with the resource were of interest.

While searching for information, the clinician was observed by a trained research assistant. The clinician was asked to “talk out loud” and provide feedback about features of the website that facilitated or hindered their ability to search for information. S/he was instructed to share their likes and dislikes about the screen format, layout and organization of information, consistency of operations, and ease of navigation for the homepage and modules. This “talk out loud” methodology facilitates a systematic assessment of usability by capturing the individual’s ongoing thought processes during task performance, and their reasoning/problem-solving skills while using a website. If the participant was silent for more than three consecutive minutes the research assistant used verbal cues (i.e. “remember to keep talking”) to encourage the clinician to verbalize his/her thoughts (Appendix 4.7 for tester instructions).

4.2.4 Measures of usability

Clinicians’ comments about the features of Stroke Engine that facilitated or hindered their ability to search for information, along with their responses to the five clinical questions, were audio-recorded. For each clinical question, a defined search pattern was established which consisted of a sequential series of web pages visited in order to retrieve the answer. For example, when
searching for information on the effectiveness of acupuncture for improving motor function, the clinician was expected to: 1) select “acupuncture” from the main homepage; 2) select Clinician Quick Review or Clinician In-depth Review within the acupuncture module; and, 3) find information specific to the outcome “motor function”. The clinician’s search patterns for finding information to answer each question were observed and recorded on a standard observation sheet (Appendix 4.8). Any deviations from the defined search patterns, along with any physical signs of frustration/confusion while searching (e.g. sighs, frowning, grimacing, fidgeting, hand gestures, looking away from screen, etc.), were documented as observed navigational errors. Any verbal cues provided by the research assistant during the searches were also recorded, along with specific features of Stroke Engine that produced the navigational errors (e.g. layout and organization of information, consistency of operations, etc.). The time required to find information for answering each of the five clinical questions was noted.

Given that some clinicians may not have had the opportunity to provide all of their comments during the searches and that some may have felt more comfortable providing their comments in writing, additional feedback was captured using a self-administered usability questionnaire (Appendix 4.9). The usability questionnaire consisted of open and closed-ended questions that were related to: 1) screen format, layout and organization of information, and ease of navigation for the homepage and modules (4 Likert-type questions); 2) their general opinion (i.e. likes, dislikes and areas for improvement) (3 open-ended questions); and 3) their likelihood of using Stroke Engine in the future (1 Likert-type question).

This mixed methods approach for data collection has been validated through extensive research\textsuperscript{59-61,63,64}. The main benefit of this rigorous methodology is that it permits the collection of rich data using multiple strategies (i.e. audio recording of verbal comments; direct observation
of physical interactions; self-administered questionnaire). Information can be captured in different ways depending on how a clinician prefers to communicate: some may be willing to spontaneously share their verbal feedback while interacting with the website, whereas others may prefer to provide their written feedback on a self-administered questionnaire after some reflection\textsuperscript{93,105}.

4.2.5 Data analyses

Clinicians’ socio-demographic data was described using proportions for categorical variables. Clinicians’ verbal comments about the features of Stroke Engine were transcribed verbatim. Content analysis was then used to identify dominant themes from clinicians’ verbal comments, their observed navigational errors (i.e. deviations from defined search patterns, physical signs of frustration/confusion), and their responses to the open-ended questions of the feedback questionnaire, and categorize them as factors that facilitated or hindered Stroke Engine use\textsuperscript{106,107}. The identification and categorization of dominant themes/factors was conducted by the principal investigator and then verified by one of the project team members. Specifically, the data were analyzed line by line and sentences that represented the same theme were grouped together and categorized as a factor that facilitated/hindered Stroke Engine use. For example, if a clinician verbally commented that the “font style for the homepage is clear and easy to read”, this comment was associated with the theme “screen format” and was categorized as a factor that facilitated Stroke Engine use. If a clinician deviated from the defined search pattern within a module and required cueing from the trained research assistant, this observed navigational error was associated with the theme “module layout” and was categorized as a factor that hindered use. If a clinician frowned while verbally stating “the link for Stroke Engine-Assess is difficult to find on the homepage”, this observation was associated with the theme “homepage layout” and
categorized as a factor that hindered use. Finally, if a clinician responded in their questionnaire that “it becomes easier to find information over time”, this written comment was associated with the theme “consistency of operations” and categorized as a factor that facilitated use.

Responses to the 10 Likert-type questions of the feedback questionnaire were described using proportions. The average and median time required to respond to each clinical question were calculated.

4.3 Results

4.3.1 Study demographics

Of 35 clinicians contacted, 21 did not work with a stroke population. The other 14 clinicians (13 female, one male) met eligibility criteria, and agreed to participate. While the majority were less than 35 years of age (n=9), they varied in terms of clinical experience with a stroke clientele: four had worked 1-3 years, seven had 4-10 years, and three had greater than 10 years of experience. At baseline clinicians ranged in their comfort with searching the Internet from somewhat comfortable (n=4), very comfortable (n=5), to extremely comfortable (n=5). All participants had access to Internet at home and at work. The average time spent on stroke-related continuing education per month ranged widely with some indicating they spent less than 2 hours (n=4); others between 4-6 hours (n=4), 7-10 hours (n=4) and, greater than 15 hours (n=2). The majority perceived that their worksites were supportive of their continuing education activities (i.e. provided funds and protected work time) (n=10). Eight clinicians worked in an acute care hospital, five in inpatient rehabilitation, and one in outpatient rehabilitation. Most had no prior experience with Stroke Engine (n=10). All identified their worksite as a teaching institution (i.e. hosts students for their clinical training).
4.3.2 Facilitators to use of Stroke Engine: major themes identified

Five key themes that facilitated Stroke Engine use were identified and related to screen format, layout/organization of information on the homepages and within modules, ease of navigation, quality of content, and likelihood of using Stroke Engine in the future. The following are details regarding the key themes identified:

a) Screen format

Ten clinicians mentioned in the questionnaire that the graphics used for the Stroke Engine homepages and modules were clear and visually appealing, such that they were very or extremely satisfied with the visual presentation of these sites. Eight clinicians verbally stated that “I like those blue buttons. They make it easier to browse between the different sections of a module”. Seven verbally commented that the topic headings listed on the homepage were “really easy to spot and select”. However one clinician was only somewhat satisfied with the screen format of the homepages for both sites, verbally stating that “they appear slightly busy”.

b) Layout and organization of information on homepages and modules

The majority of clinicians (n=11) pointed out verbally and on the feedback questionnaire that they were very or extremely satisfied with the overall organization and layout of information on the Stroke Engine homepages and modules (Figures 4.1 & 4.2), verbally stating that “I like how the clinician info and patient/family info are organized separately”, “it’s nice to see how information is categorized according to the patient’s stage of stroke- acute, sub-acute”, “good layout. The site is consistent and organized for efficient searching”. Three verbally commented that they were “happy to see when modules were last updated” on the homepage (n=3), thus speaking to the credibility of Stroke Engine. Two mentioned in the questionnaire that the categorization of tools on Stroke Engine-Assess according to domain type (i.e. tools measuring
c) Ease of navigation

The consistency of operations made it easy to get quickly familiarized with Stroke Engine and where to search for information. One clinician verbally commented that, “even for an individual with limited computer skills, the various links are easy to find on both sites”.

The time required to retrieve the answer to Question 1 (related to the benefits of acupuncture post-stroke, Appendix 4.6) ranged from 25 seconds to 8 minutes with a mean of 3.40 minutes (SD ± 2.03; CI 95%) for the group as a whole. The mean time to retrieve answers decreased for the subsequent four questions: 2.84 minutes (SD 2.73); 2.73 minutes (SD 1.37); 1.63 minutes (SD 0.86); 1.24 minutes (SD 0.97). The median time to retrieve answers for Question 1 to 5 was 3.28 minutes, 2.11 minutes, 1.95 minutes, 1.25 minutes, and 1.01 minutes respectively. Almost all clinicians found it very or extremely easy to search for information on a given topic or intervention, as well as browse between different topics (n=13), verbally stating that “it is easy to search for information once you get familiar with the site”; “Stroke Engine is very user-friendly”, and “having the topics in alphabetical order makes it easier for searching”.

d) Quality of the content

The open-ended feedback indicated that all clinicians had positive comments about the quality and breadth of content on Stroke Engine and the clinical relevance, stating that “the amount of information available on this website is excellent”. Ten clinicians reported on the questionnaire that they were impressed with the number of stroke-related assessments and interventions reviewed, along with appreciation for the content that they would find difficult to retrieve and synthesize themselves (e.g. psychometric properties of tools, treatment effectiveness, patient
information in lay terms, etc.). Four clinicians mentioned on the questionnaire that they “really like how you can view and download a copy of an assessment tool for free” from Stroke Engine-Assess. A few verbally commented that for Stroke Engine-Intervention “the Quick Review section is a great reference point, but if clinicians want to learn more, the In-Depth Review section provides them with all of the details...but in a busy clinic, I think clinicians are probably going to use the Quick Review”. Six clinicians verbally stated that the printable information for patients and families “is convenient, easy to understand and has lots of interesting pictures-great for patient education”.

e) Likelihood of using Stroke Engine in the future

All participants were very or extremely likely to use this website in the future to guide clinical decision-making, commenting verbally and in the questionnaire that “I will definitely use it (Stroke Engine), especially if it is free and available on the net”; “I will bring this website to my colleagues...it will also be useful for my students”; “it will help me make decisions about which assessments or treatments I should use with my patients”; “Internet-based learning is fantastic and very practical”, and “too bad I didn’t know about it sooner”.

4.3.3 Barriers to use of Stroke Engine: major themes identified

Three key themes that hindered Stroke Engine use were identified and related to screen format, layout/organization of information within a module, and system dysfunctions. A detailed list of all barriers is presented in Table 4.1. The following are details regarding the key themes identified:

a) Screen format

Five clinicians verbally stated that the link to navigate between Stroke Engine-Intervention and
Stroke Engine-Assess was not clearly visible: “The link to go to Stroke Engine-Assess from the Stroke Engine-Intervention homepage is hard to spot. Maybe this link could be larger in size and brighter in color to draw your eye to it” and “It is a bit confusing to go between Stroke Engine-Intervention and Stroke Engine-Assess....it's hard to find the link”.

b) Layout and organization of information within a module

Nine clinicians commented verbally or on their questionnaire that the organization of information was slightly different between the In-Depth Review section and Quick Review section of the Stroke Engine-Intervention modules, and this difference was identified as a barrier to use. In the Quick Review section, information for each outcome is summarized in a table (Figure 4.3) but for the In-Depth Review section, information for each outcome appears on separate web pages, requiring clinicians to click between them to retrieve this information (Figure 4.4). A few of them verbally stated that “it’s hard to find information on a specific outcome...you need to click on a tab to select information for that outcome...this is kind of confusing”; “I may miss this information all together because it doesn’t appear all at once” and “it’s hard to figure out that you need to click a tab in order to get the next level of information...if the Internet service is slow, it may also increase time to get to the information”. Similarly, seven clinicians found that the content for the Clinician How-To section of the Stroke Engine-Intervention modules also appeared on separate web pages, requiring the clinician to click between them to retrieve information. A few of them verbally stated that “this section is confusing...I didn’t realize I have to click on this tab to get the information...I expected it to open up immediately”. While these clinicians did not have any suggestions for modification, some later reported that “after getting used to the website, I was able to find my answers better” (n=3). They mentioned in the questionnaire that the consistency of the website made it easy to become
familiarized with the site and to know where to search for information.

c) System dysfunctions

Nine clinicians tried to use the search button to retrieve information but this feature was not working properly on Stroke Engine-Intervention and Stroke Engine-Assess: “It doesn’t seem to work…it keeps bringing you back to the homepage” and “I typed in prism therapy in the search box but nothing seems to come up…maybe the search box isn’t working. But I would rather use this feature than browse the site for information on prism therapy because it’s faster”. Five clinicians reported verbally and in the questionnaire that the links to stroke best practice guidelines within the Best Practices section of the Stroke Engine-Intervention modules were not working: “Every time I click on a link in the Best Practice section, nothing pops up…it doesn’t seem to work” and “It would be nice to have direct links to practice guidelines…these links don’t seem to take you anywhere”.

4.4 Discussion

This study identified factors that facilitated or hindered stroke rehabilitation clinicians’ use of Stroke Engine (comprised of Stroke Engine-Intervention and Stroke Engine-Assess), as well as illustrated the application of an evidence-based methodology for usability testing. Clinicians participating in this study commented that Stroke Engine provided them with the latest evidence regarding stroke-related assessment and intervention in a format that was quick and easy to review. They were satisfied with the layout and organization of content, as well as how easy it was to search for information on a given topic. In fact, clinicians’ mean time required to search for answers using Stroke Engine decreased with each of the five clinical questions. The consistency of the layout for these resources made it easy to get familiarized with them and to
know where to search for information. Clinicians reported on the quality of the content and clinical relevance, and all stated that they were likely to use this website in the future. Factors that hindered Stroke Engine use were related to the screen format, layout/organization of information within a module, and system dysfunctions. Each identified barrier was reviewed with a web developer and necessary website modifications were completed in order to maximize usability (Table 4.1 for details).

This study describes a rigorous methodology and detailed process for usability testing that can be applied to any health-related e-learning resource. Use of a mixed methods approach with multiple forms of data collection (i.e. verbal feedback, written responses to Likert-type and open-ended questions, observation of physical interactions) proved to be extremely valuable for this study because we were able to generate a comprehensive list of themes, as well as identify which key themes were repeated across the various data sources. To illustrate the advantage of having multiple data sources, one clinician had no navigational errors or signs of confusion during her searches, but she verbally stated “how do I get to Stroke Engine-Assess from here....can’t seem to see the link...oh there it is” during her testing session but failed to report this barrier in her feedback questionnaire. To illustrate how key themes were repeated across multiple data sources, one clinician not only mentioned verbally and in the feedback questionnaire that information was organized differently for In-Depth Review section and Quick Review section of the Stroke Engine-Intervention modules, she also made a navigational error because of this difference during her searches. By using multiple sources in order to identify barriers for Stroke Engine use, we were able to capture more of the needed changes and thus make relevant website modifications and tailor Stroke Engine for maximal usability and navigability. In fact, a systematic review has suggested that KT interventions that are tailored based on identified
barriers are more likely to change clinicians’ practice behaviors as opposed to no intervention or dissemination of guidelines, thus stressing the importance of rigorous usability testing of e-learning resources for the identification of barriers\textsuperscript{108}.

Early and ongoing usability testing with an understanding of the clinicians’ needs during the design process is essential to creating a sustainable and user-friendly e-learning resource\textsuperscript{58}. One time testing is insufficient. Given that “big problems often mask small problems”, iterative testing enables developers to employ user feedback to incrementally change product design. Indeed, our experience was that this second round of usability testing for Stroke Engine highlighted important barriers that may have been “masked” during the first round of testing. For example, during our second round of testing, clinicians reported that the link to navigate between Stroke Engine-Assess and Stroke Engine-Intervention was not clearly visible. This barrier may have not been detected during the first round of usability testing because there were only two modules (i.e. acupuncture and USN) for the clinicians to browse on the Stroke Engine prototype, whereas for this second round, clinicians were free to browse between the 36 intervention modules and 64 assessment modules of these two sites (i.e. Stroke Engine-Assess and Stroke Engine-Intervention). As such, we were able to comprehensively evaluate the ease with which a clinician can go back and forth between the two sites, between different modules within a site, and between different sections within a given module.

Ultimately, the efforts of iterative testing of these two e-learning resources allowed us to elicit clinician feedback and subsequently redesign components of the sites that will maximize the potential of Stroke Engine as an important knowledge resource.

4.4.1 Limitations
The most important limitation of this usability testing was that the study population, consisting of OTs and PTs working in stroke rehabilitation, was not representative of all potential Stroke Engine users (i.e. other health professionals working with a stroke clientele, such as physicians, nurses, speech therapists, etc.). Given that this study was conducted in preparation for a KT intervention study examining the effectiveness of Stroke Engine for improving knowledge acquired by OTs and PTs regarding stroke rehabilitation best practices, it was necessary to accrue a similar target population for usability testing. While the study sample was predominantly female, this gender imbalance is quite reflective of the population of practicing clinicians: according to 2010 membership statistics in Ontario, almost 90% of OTs and PTs are female\(^{109,110}\).

### 4.5 Conclusion

Researchers and clinicians have a responsibility to work together to develop effective tools for disseminating research evidence in a user-friendly format. This paper illustrates a systematic methodology for usability testing of health-related e-learning resources in order to optimize their KT potential.
Chapter 5 of this PhD dissertation addresses Objective 3 of my PhD research agenda; I conducted a knowledge translation (KT) intervention study to determine the extent of knowledge acquired regarding stroke rehabilitation best practices by clinicians while using Stroke Engine as an e-learning KT intervention for three months. A sub-objective was to identify the association between the extent of knowledge acquired and potential explanatory factors related to the clinician (e.g. age, clinical experience), their work environment (e.g. protected work time for continuing education, presence of a stroke unit/team on site), as well as clinician adherence to the KT intervention (e.g. total time spent using the e-learning resource). This chapter includes excerpts from Manuscript #4 of this dissertation, entitled “Maximizing clinicians’ knowledge of stroke rehabilitation best practices: effectiveness of an e-learning knowledge translation intervention”.

5.1 Research objectives

The primary objective of this study was to conduct a KT intervention study to determine the
extent of knowledge acquired regarding stroke rehabilitation best practices by occupational therapists (OTs) and physical therapists (PTs) while using Stroke Engine as an e-learning KT intervention for three months. A sub-objective was to identify the association between the extent of knowledge acquired and potential explanatory factors related to the clinician (e.g. age, clinical experience), their work environment (e.g. protected work time for continuing education, presence of a stroke unit/team on site), as well as clinician adherence to the KT intervention (e.g. total time spent using the e-learning resource)

5.2 Methods

5.2.1 Overview of research design

This repeated measures experimental study examined clinicians’ knowledge of stroke rehabilitation best practices at five time points - twice pre-intervention (Baseline 1, Baseline 2) and, at one-month intervals (Month 1, Month 2, Month 3) during a 3-month KT intervention. The KT intervention consisted of use of the stroke rehabilitation specific e-learning resource - Stroke Engine for at least one hour per week during three consecutive months. Change in a clinician’s knowledge of stroke rehabilitation best practices was measured by the online Stroke Rehabilitation Knowledge Questionnaire, which was developed and validated for the current study. The Questionnaire examined a clinician’s evidence-based knowledge for identifying critical problems, and choosing standardized assessments and effective treatments for a patient post-stroke as depicted in a case vignette. Ethics approval was attained from the Faculty of Medicine, McGill University, Quebec and from the Office of Research Ethics, University of Toronto, Ontario, Canada (see Appendix 5.1 for ethics certificate).
5.2.2 Study population

The goal was to accrue a representative sample of OTs and PTs delivering stroke rehabilitation across the continuum of care in Ontario, Canada. Ontario was chosen as it is the largest, most populace province in Canada, and includes one-third of the 300,000 Canadians with stroke\textsuperscript{111}. Clinicians were eligible if they: were English-speaking, worked full-time or part-time, had ≥3 months experience in the management of patients with stroke, and, had >2 patients with a recent stroke on their current caseload (see Appendix 5.2 for recruitment form). Excluded were clinicians with no access to internet (81% of OTs have internet access at work as per 2009 membership statistics\textsuperscript{112}); those unable to access the internet for ≥30 consecutive days during the intervention; as well as those actively participating in other research studies related to evidence-based practice (EBP). Prior exposure to Stroke Engine did not preclude participation.

Dillman’s Total Design Method\textsuperscript{113} was used to maximize recruitment. Lists of members working with a stroke clientele and their work phone numbers were obtained from the College of Occupational Therapists of Ontario and the College of Physiotherapists of Ontario. Computer-generated, stratified random sampling was used to ensure equal representation of each discipline.

5.2.3 Sample size considerations

The primary outcome was knowledge acquisition as quantified by a change in “evidence-based” knowledge on the Stroke Rehabilitation Knowledge Questionnaire. Using an estimated change of 20%\textsuperscript{114} in “evidence-based” knowledge (see Measures section for operational definition) as measured on the Questionnaire before and after the intervention, a 2-sided confidence interval of 95%, and a 6% margin of error, 246 clinicians were required to allow stable estimates\textsuperscript{115}. To account for a potential drop-out rate of 25%, 328 clinicians were recruited. This sample was deemed adequate to permit multivariate analyses of the 24 factors explaining extent of
knowledge change (i.e. 10 subjects per independent variable in a prediction equation).\textsuperscript{116}

5.2.4 Knowledge translation intervention: Stroke Engine

The KT intervention consisted of the clinician’s use of Stroke Engine for at least one hour per week over three consecutive months (i.e. \(\geq 12\) hours in total). Stroke Engine is an e-learning resource that is composed of two websites: Stroke Engine-Assess and Stroke Engine-Intervention (both accessible from \url{www.strokengine.ca})\textsuperscript{52-56}, which are aimed at improving clinicians’ evidence-based knowledge of stroke rehabilitation assessment and treatment. Content for this evidence-based resource is based on a comprehensive, systematic review of stroke rehabilitation literature, as well as national and international best practice guidelines\textsuperscript{25,26}. The Stroke Engine website was evaluated for its usability, navigability and clinical relevance using an iterative process\textsuperscript{58,59}: feedback was elicited from the international clinical, academic and research community\textsuperscript{54-55}, and two rounds of rigorous evidence-based usability testing were completed with stroke rehabilitation clinicians\textsuperscript{56,99}.

Clinicians were requested to continue participating in their usual educational activities for general professional development (e.g. journal clubs, conferences, web-based resources other than Stroke Engine, etc.).

5.2.5 Study procedures

A research assistant contacted each clinician, to confirm eligibility and interest in participating. After informed consent was obtained (see Appendix 5.3 for consent form), each clinician was asked to indicate their primary work setting - acute care hospital; in-patient rehabilitation centre; or out-patient rehabilitation clinic, to tailor the case vignette they would receive with each Questionnaire (see description of vignettes in Outcome measures section). Once enrolled, each
participant received an email with a link to the Questionnaire and case vignette (Baseline 1), along with instructions to complete the online Questionnaire. Once accessed, they had two hours to complete the Questionnaire. The clinician was required to submit their response to a given question first before proceeding to the next, with the goal of minimizing missing data. The clinician was unable to go back and revise their submitted responses to ensure that all questions of the Questionnaire were attempted at least once within the two-hour timeframe.

Thirty days later the participant received a second, slightly different online Questionnaire, a different case vignette and was again asked to complete the Questionnaire (Baseline 2).

Once a participant completed the two baseline Questionnaires, she/he received a brief online training session with Stroke Engine, including tips on how to search for information. For example, the clinician was instructed to formulate a question specific to stroke rehabilitation using the PICO framework\(^\text{21}\) (e.g. “for a post-stroke patient (Population) is acupuncture (Intervention) more effective than usual therapy (Comparison) at reducing spasticity (Outcome)?”) and guided on how to search for answers.

As the intervention period began, each participant was given a unique password to use when logging on to the website, and was requested to log out after each session. This access enabled them and the research team to track their time spent on Stroke Engine. Those who failed to use Stroke Engine for two consecutive weeks during the intervention period received a reminder email and follow-up phone call to determine if they had access problems. Post-recruitment retention and participation strategies beyond these were not undertaken as the attempt was to closely mimic future Stroke Engine use in the absence of a KT intervention; however clinicians received a participation certificate at study completion (see Appendix 5.4 for certificate).

Participants also reported on their time spent on usual educational activities per month. The
remaining three online Questionnaires (Month 1, Month 2 and Month 3) were sent to participants monthly during the 3-month intervention period. Each clinician, if they fully adhered with the study procedures, was expected to respond to all five Questionnaires, spend \( \geq 12 \) hours in total on Stroke Engine during the intervention, and participate in their usual educational activities.

5.2.6 Training of research assistants

Six full-time research assistants received a full-day training session along with a manual outlining the study procedures. The session included training on how to maximize recruitment; respond to questions regarding Stroke Engine usage and monitor website use during the intervention period; check for missing or inaccurate Questionnaire data when clinicians completed the online Questionnaire at the five points in time; and, verify accuracy of coding and classification of Questionnaire data prior to analysis. Any Questionnaire with missing data was immediately flagged; the clinician was then contacted by phone and requested to complete the Questionnaire within a 24 hour period.

5.2.7 Outcome measures

**Stroke Rehabilitation Knowledge Questionnaire and case vignettes**

Knowledge of stroke rehabilitation best practices was assessed at the five time points using the Stroke Rehabilitation Knowledge Questionnaire (Appendix 5.5). Five versions of the Questionnaire were created for the five time points (Baseline 1 to Month 3). Each Questionnaire has three sections: problem identification (3 questions), assessment (8-10 questions), and treatment (6-8 questions), for a total of 20 open-ended and/or multiple-choice questions (see Appendix 5.5 for the five Questionnaire versions). Some questions were presented only once while others were presented 2-3 times identically over the five Questionnaires to permit pre-post comparisons. The participant also received a different case vignette each time, depicting a typical
patient post-stroke that matched their primary work setting. Scoring of each Questionnaire proceeded as follows: each question had a maximum number of “evidence-based” or correct responses (denominator). The clinician’s number of responses coded as “evidence-based” (numerator) was used to determine a score for each question (refer to Section 5.2.8, page 55 for coding of clinician responses). The clinician’s scores were summed to generate three subtotal scores (i.e. one for questions related to problem identification, one for assessment and one for treatment). Finally, the three subtotal scores were summed to generate a total Questionnaire score (i.e. the sum of a clinician’s scores on all 20 questions). The total perfect Questionnaire score varied slightly for each Questionnaire: 125 for the Questionnaire at Baseline 1; 114 for the Questionnaire at Baseline 2; 121 for the Questionnaire at Month 1; 140 for the Questionnaire at Month 2; and 117 for the Questionnaire at Month 3. The total perfect subtotal score for problem identification, assessment and treatment also varied for each Questionnaire: subtotal scores ranged from 30-39 for problem identification across the five time points; 50-69 for assessment; and 26-32 for treatment. This variation occurred because the maximum number of “evidence-based” responses differed for each question given that the unique case vignette on which the clinician was to base their responses had a different series of critical problems embedded as cues. Proportions are thus used to compare total Questionnaire scores across the five time points (see Appendix 5.5 for complete scoring for each Questionnaire).

Questions were based on the six hierarchical levels of learning from Bloom’s Taxonomy\textsuperscript{117}: knowledge, comprehension, application, analysis, synthesis, and evaluation. As such, there were two types of questions included in each Questionnaire: 1) those assessing a clinician’s general evidence-based knowledge of the psychometric properties of screening/assessment tools and the effectiveness of stroke treatments, involving Bloom’s lower, more basic levels of learning\textsuperscript{117};
and, 2) those assessing a clinician’s applied evidence-based knowledge for identifying critical problems and choosing appropriate standardized assessments and effective treatments, involving Bloom’s higher, more complex levels of learning. Examples of these general and applied questions are described in the Data coding and classification section.

The following sources of evidence were consulted when creating the Questionnaire: Stroke Engine, the Canadian Stroke Best Practices Guidelines 2006 (NOTE: 2010 edition was not published at the time of study), American Stroke Clinical Practice Guidelines, Post-Stroke Recovery and Rehabilitation Guidelines, and Evidence-based Review for Stroke Rehabilitation. After reviewing the evidence, a master list of critical problems typically observed in patients with a right or left hemisphere stroke was generated, along with a master list of screening and assessment tools with strong psychometric properties and treatments with known evidence of effectiveness. These master lists were used to develop a bank of questions related to problem identification, assessment, and treatment; and, to identify “evidence-based” (i.e. correct responses) for each question. For problem identification questions specifically, they were posed in five key domain areas: function, perception, physical, cognition, and psychosocial. These five capture the critical problems typically observed in patients with stroke according to research evidence, and make use of a validated coding of stroke-related impairments and limitations identified by the International Classification of Functioning, Disability and Health (ICF) Core Sets for Stroke.

Patient case vignettes

Five different case vignettes were created- one for each Questionnaire version. Each vignette included a description of a “typical” patient post-stroke (age, gender, side of stroke lesion, stage of stroke recovery) and cues for critical problems post-stroke. Three slightly different versions of
each vignette were also created to match the patient to the clinician’s primary work setting (i.e. acute care, in-patient rehabilitation, or out-patient; see Appendix 5.6 for case vignettes). These case vignettes helped frame the questions that specifically assessed a clinician’s evidence-based knowledge for identifying critical problems, and choosing standardized assessments and effective treatments for that given patient. To develop these vignettes, the above-mentioned master list of critical problems observed in patients with a right or left hemisphere stroke was consulted, along with vignettes that had been previously validated for a Canada-wide study examining practices of stroke rehabilitation clinicians\(^6\text{-}^{12}\).

**Clinician/work environment factors**

Potential explanatory factors for knowledge acquisition specific to the clinician and their work environment were derived from factors previously identified\(^6\) (Appendix 5.7 for potential explanatory factors). The 10 potential clinician-related factors included the following categorical variables: age, gender, discipline (i.e. OT/PT), degree of professional training in OT or PT, employment (i.e. full/part-time), clinical experience with stroke clientele, number of clients with stroke on typical daily caseload, specialty certification related to stroke rehabilitation, teaching in a university, and comfort level with using internet. The 12 potential work-related factors included the following categorical variables: type of clinical setting (acute care, in-patient rehabilitation, or out-patient), academic affiliation, location of workplace (rural, suburban, or urban), host student placements on site, presence of stroke unit on site, number of stroke admission(s) per month, clients with stroke on waiting list, length of stay/rehabilitation for clients with stroke, protected work time for continuing education, departmental funds for continuing education, computer/internet access at work, and stroke rehabilitation research conducted on site.
 Stroke Engine adherence

KT intervention adherence was measured by computing the clinician’s total time spent on Stroke Engine per month as recorded by their log in/log out times during the 3-month intervention. Total time spent per month on usual educational activities for general professional development (e.g. journal clubs, conferences, web-based resources other than Stroke Engine, etc.) as reported by the clinician, was also computed at each time point as a potential confounder.

Validation of Questionnaire versions and case vignettes

A nine member expert group (four researchers and five rehabilitation clinicians from Quebec with extensive expertise in stroke) reviewed the five Questionnaire versions and their respective case vignettes for clarity and coherence. The group verified that each question per Questionnaire version was accurately matched with their “evidence-based” or correct responses identified. They also verified that the cues from each vignette captured the critical problems typically observed in patients with a right or left hemisphere stroke. The Questionnaire versions and vignettes were further validated with a convenience sample of ten rehabilitation clinicians to identify any omissions and/or redundancies; their recommendations were discussed by the research team in light of the existing stroke rehabilitation literature, and were included or not based on consensus across the research team. If more than 80% of these clinicians respond correctly to a question, it was either revised to increase the level of difficulty or deleted.

5.2.8 Data coding and classification of “evidence-based” responses

Data coding and classification were performed by three trained research assistants with expertise in rehabilitation, who did not participate in data collection and who were blinded to Questionnaire time point. As part of their training, each research assistant coded open-ended responses, and classified both open-ended and closed-ended responses on 20 randomly chosen
Questionnaires, (400 questions – 20 items each x 20 Questionnaires). After training, inter-rater reliability was assessed: substantial agreement was found between the three assistants (K=0.73-0.93). Minor discrepancies were discussed and decision rules were created to increase reliability. Inter-rater reliability was re-examined with one additional Questionnaire and almost perfect agreement was achieved (K=0.87-0.93).

Data coding and classification proceeded as follows: all responses to open-ended questions were listed in a coding sheet and each was assigned a numeric code. Next, each response was classified as being: 1) “evidence-based” or correct as per its appropriateness in relation to the specific case vignette and/or adherence to best practices for stroke rehabilitation management (problem identification, assessment and treatment) according to the aforementioned sources of evidence; or 2) not “evidence-based” (i.e. it was based on clinical experience or regarded as incorrect and/or vague). All responses to multiple-choice questions were automatically coded by the database as being “evidence-based” or not “evidence-based” (i.e. correct or incorrect responses) according to research evidence and expert consultation as described earlier.

Below is an example of how a clinician’s responses were classified as “evidence-based” for this problem identification question: “what potential psychosocial limitation(s) if any, would you like to investigate with Mrs. P based on the case vignette”. To achieve 100% of the correct responses for this question, the clinician was expected to list 10 “evidence-based” critical problems related to the psychosocial domain; a cue to each critical problem was present in the case vignette. The ten “evidence-based” critical problems included: depression, emotional status/affect, leisure and participation, community reintegration, occupational performance, role change, interpersonal relationships, coping skills, caregiver burden, and family support. If the clinician identified 8 of
these 10 “evidence-based” critical problems, their sub-score for this question would be 8/10 and their proportion of “evidence-based” critical problems identified or correct responses would be 80%. When classifying critical problems, a clinician might list similar responses (e.g. mood, affect, emotions/emotional lability, emotional status) to indicate one global construct. In this case, such responses were grouped under one “evidence-based” critical problem (i.e. emotional status/affect) and counted once to avoid artificially inflating the number of “evidence-based” critical problems identified.

Here is an example of how a clinician’s responses were classified as “evidence-based” for this assessment question: “what is the difference between a screening tool and assessment tool”. The clinician was expected to list the six following “evidence-based” responses for this question to achieve 100%: a screening tool detects the presence of a deficit, identifies need for further detailed assessment; an assessment tool is responsive to clinical change, a detailed assessment with multiple items, classifies or stratifies the severity of a deficit, guides treatment planning. Again, a clinician’s “evidence-based” response could have been stated in many ways, such as “it can detect change” or “it is responsive”; similar responses and its variations were grouped under one global “evidence-based” response (i.e. “detects change” in this case) and were counted only once.

Here is an example of how a clinician’s responses were classified as “evidence-based” for this treatment question is: “what are strategies that Mrs. P can use to compensate for her physical limitations during sexual activity”. The clinician was expected to list the eight following “evidence-based” responses for this question to achieve 100% perfect response: referral to other health professional, energy conservation techniques, attempt alternate sexual positions, communication with partner, medications, sexual aids, patient education, and other
forms of intimacy.

For more examples of data coding and classification for problem identification, assessment and treatment questions, refer to Appendix 5.8 and 5.9.

5.2.9 Data analysis

Data analyses were performed using SAS version 9.2 (SAS Institute, Cary, North Carolina, USA). Descriptive statistics were used to characterize factors related to the clinician and their work environment. KT intervention adherence (i.e. total number of hours spent on Stroke Engine during the intervention) was computed for each clinician.

The primary outcome of this study was change in a clinician’s knowledge of stroke rehabilitation best practices (i.e. problem identification, assessment and treatment) following use of Stroke Engine. Change in clinicians’ knowledge was assessed by comparing their proportion of “evidence-based” responses or their total score on the Stroke Rehabilitation Knowledge Questionnaire before (Baseline 1 & 2) versus during the intervention (Month 1, 2 & 3) using a linear mixed effects model with an unstructured covariance matrix (level of significance of 0.05). Next, changes in knowledge specific to problem identification, assessment and treatment were examined by comparing their proportion of “evidence-based” responses on each subtotal score before (Baseline 1 & 2) versus during the intervention (Month 1, 2 & 3). We also examined whether independent variables, such as potential explanatory factors for the clinician/work environment, time spent on usual educational activities per month, and total time spent on Stroke Engine per month during the intervention, were associated with knowledge change overall and for problem identification, assessment and treatment specifically. All analyses were undertaken using the MIXED procedure in SAS 9.2 and using available Questionnaire data, regardless of
missing data for some clinicians. By using mixed modeling it was possible to accommodate for any missing data points and to model nonlinear, individual characteristics related to knowledge change\textsuperscript{120}. We used a linear mixed effects model with an unstructured covariance model that included the dependent outcome (continuous) and all independent variables (categorical and continuous) for analysis because our longitudinal data had some missing data points, our sample size was sufficiently large (i.e. \textgtr=100), and the number of repeated measures was small or modest relative to our sample size (i.e. \textless=5)\textsuperscript{121,122}. Our decision was to use a simpler model to identify the most parsimonious fit; as opposed to choosing among other structured covariance models (e.g. compound symmetry, autoregressive, Toeplitz, etc.) that would potentially limit the generalizability of our findings to our specific dataset\textsuperscript{121-123}. Given that preliminary analyses comparing the two baseline assessments (pre-intervention) showed little or no variation in knowledge change, Baseline 1 and Baseline 2 were controlled in the mixed model as covariates.

Change in knowledge of stroke best practices for problem identification, assessment and treatment following Stroke Engine use was also explored descriptively across the five time points. For problem identification specifically, clinicians’ proportion of “evidence-based” critical problems identified per domain (i.e. functional, perception, cognitive, physical, and psychosocial) were described for the time points at which these respective domains were present within the Questionnaire (see Appendix 5.8 for the critical problems and respective domains at each time point). The percentage of clinicians identifying each “evidence-based” critical problem was explored per domain and at their respective time point; this was done separately for each discipline (OT/PT). While we were not comparing knowledge gains by discipline, we did want to explore clinicians’ evidence-based knowledge for problem identification specific to their professional training (e.g. activities of daily living for OTs; ambulation for PTs) but also specific
to the important potential problems/sequelae post-stroke (e.g. dysphagia, cognition, falls risk, etc.) that require early intervention. Organized stroke care involves a coordinated approach with an interdisciplinary team of health professionals who are expected to be trained and knowledgeable of all the important potential sequelae post-stroke, with the goals of reducing patient mortality and morbidity. For assessment and treatment questions specifically, the percentage of clinicians indicating each “evidence-based” response to questions repeated from baseline to intervention were also calculated for their respective time points.

5.3 Results

5.3.1 Participants

1673 clinicians across the continuum of stroke care were contacted (Figure 5.1 for flowchart). 849 were ineligible, of which 381 had <2 patients with stroke on their current caseload; 462 had <3 months of experience in stroke; five had no computer access; and, one was involved in research related to EBP. 380 clinicians were deemed untraceable. Of the 444 who were contacted and deemed eligible, 117 (26%) refused. The remaining 327 (74%) provided electronic consent.

98 participants withdrew during the study, the majority (n=70/98) before the intervention began (i.e. 60 at Baseline 1; 10 at Baseline 2). The remaining 28 withdrew during the intervention: 9 at Month 1; 8 at Month 2 and 11 at Month 3. The main reasons cited were: too busy (n=89); lack of interest (n=5); or personal issues (n=4) (Figure 5.1).

Analyses were performed on the final study cohort of 229 clinicians using all available data for these clinicians at each time point. Of the 229 clinicians, 94% responded to all five Questionnaires (n=215). Table 5.1 describes socio-demographic characteristics of the study participants and their work environment. 83% of participants had over 4 years of experience with
a stroke clientele. More than half (n=139) were very or extremely comfortable with using the internet and almost all had computer access at home and at work. 73% had protected work time and departmental funds to support educational activities. Data available on participants who withdrew (n=61/98) suggested this group was comparable to the final study cohort on most clinician and work related variables (Table 5.1) with the following exceptions: those who withdrew had fewer clients with stroke on their typical daily caseload (between 2-5 patients: 36% vs. 55%) and were less likely to have stroke rehabilitation research conducted on site (26% vs. 45%). Data available on the participants who dropped out at Month 3 (n=14) suggested that as a group they were comparable to the final study cohort on clinician and work environment characteristics, as well as the proportion of correct (i.e. “evidence-based”) Questionnaire responses at baseline (15% for drop-outs vs. 16% for final cohort at Baseline 1; 13% vs. 13% for Baseline 2); but slightly lower during intervention (11% vs. 16% at Month 1; 17% vs. 21% at Month 2). When compared to the final cohort, those who dropped out spent less time on Stroke Engine (mean time of 1.01 hour for drop-outs vs. 2.05 hours at Month 1; 0.29 hour vs. 2.71 hours at Month 2).

5.3.2 Knowledge of stroke rehabilitation best practices

Overall knowledge

The primary outcome was change in clinicians’ knowledge of stroke rehabilitation best practices following use of Stroke Engine, as measured by the Stroke Rehabilitation Knowledge Questionnaire. There was a significant improvement in the proportion of “evidence-based” (i.e. correct) total Questionnaire responses from Baseline 1 & 2 to Month 1, 2 & 3 (F=7.68; df=1; p=0.006). The mean proportion of correct responses was similar at Baselines 1 and 2 - 16% and 13% respectively, and increased slightly during the intervention (16% at Month 1; 21% at Month 2).
2 and 21% at Month 3). See Figure 5.2 for descriptive data on clinicians’ proportion of “evidence-based” responses for the total Questionnaire per time point. When we explored change for those clinicians with data available for all five time points (n=215), 67% (n=143/215) showed an increase in the proportion of correct responses between Baseline 1 and Month 3. Of these, 37% (n=53/143) had more than a 10% increase in correct responses between Baseline 1 and Month 3; while only 5 had more than a 20% improvement\(^\text{114}\). Clinicians who had no improvement or a decrease in their proportion of correct responses (n=72/215) spent a mean total time of 6.85 hours (±6.44) on Stroke Engine during the intervention, whereas those with any improvement (n=143/215) spent a mean total time of 7.41 hours (±6.01) on Stroke Engine and those with more than a 10% improvement (n=53/143) spent 8.40 hours (±6.87).

Next, we examined the association between the dependent outcome, change in proportion of “evidence-based” responses overall, and 16 independent variables (i.e. potential explanatory factors of the clinician/work environment, total time spent on usual educational activities per month, and total time spent on Stroke Engine during the intervention). Assumptions of linear regression were verified for independent and dependent variables in the final model and they generally held. Total time spent on Stroke Engine during the intervention was the only significant predictor in the final model that best explained the dependent outcome (F=42.53; df=1; p<0.0001; Table 5.2). Specifically, for every hour spent on Stroke Engine, this resulted in a 0.32% increase in the total Questionnaire score (Table 5.2). For example, spending 10 hours on Stroke Engine would result in a clinician having a 3.7 point increase out of 117 (3.2%) on their total Questionnaire score at Month 3.

**Problem identification knowledge**

No significant improvement in clinicians’ “evidence-based” critical problem identification was
found after using Stroke Engine (F=1.01; df=1; p=0.32; see Figure 5.3 for descriptive data). Given these findings, we did not explore the association between change in subtotal scores for problem identification and 16 independent variables but rather trends for the proportion of “evidence-based” critical problems identified overall and for domain-specific questions across the five time points (see sub-analyses in Section 5.3.3).

Assessment knowledge
A significant improvement in clinicians’ proportion of “evidence-based” responses was reported when comparing their subtotal Questionnaire scores for assessment before (Baseline 1 & 2) and during Stroke Engine use (Month 1, 2 & 3) (F=24.39; df=1; p<0.0001; see Figure 5.4 for descriptive data on clinicians’ proportion of “evidence-based” responses for assessment questions per time point). Next, we examined the association between the dependent outcome, change in proportion of “evidence-based” responses for assessment, and 16 independent variables. The final model that best explained the dependent outcome included total time spent on Stroke Engine during the intervention (F=22.54; df=1; p<0.0001; Table 5.3). More specifically, for every hour spent on Stroke Engine, this resulted in a 0.27% increase in subtotal Questionnaire score for assessment. For example, spending 10 hours on Stroke Engine would result in a clinician having a 1.5 point increase out of 55 (2.7%) on their subtotal Questionnaire score for assessment at Month 3 (Table 5.3).

Treatment knowledge
Similar to assessment, a significant improvement in clinicians’ proportion of “evidence-based” responses was reported when comparing their subtotal Questionnaire scores for treatment before (Baseline 1 & 2) to during Stroke Engine use (Month 1, 2 & 3) (F=9.31; df=1; p=0.002; see Figure 5.5 for descriptive data on clinicians’ proportion of “evidence-based” responses for
treatment questions per time point). Next, we examined the association between the dependent outcome, change in proportion of “evidence-based” responses for treatment, and the 16 independent variables. The final most parsimonious model included: discipline- PT vs. OT (F=3.80; df=1; p=0.05), total time spent on usual educational activities (F=4.10; df=1; p=0.04), and total time spent on Stroke Engine during the intervention (F=44.61; df=1; p<0.0001; Table 5.4). Specifically being a PT versus OT resulted in a 1.4% increase in subtotal Questionnaire score for treatment. For every hour spent on usual educational activities, this resulted in a 0.07% increase in subtotal Questionnaire score for treatment; whereas for every hour spent on Stroke Engine, this resulted in a 0.37% increase in subtotal Questionnaire score (Table 5.4). More concretely, spending 10 hours on usual educational activities would result in a clinician having a 0.2 point increase out of 32 (0.7%) on their subtotal Questionnaire score for treatment at Month 3. In contrast, spending the same amount of time on Stroke Engine would result in a 1.2 point increase out of 32 (3.7%) on their subtotal Questionnaire score.

5.3.3 Sub-analyses

Overall knowledge

We explored trends for the proportion of “evidence-based” or correct responses across the five time points (see Figure 5.2). At Baseline 1, only 19% of clinicians had more than 20% correct responses, whereas 55% had more than 20% correct at Month 3. Interestingly, clinicians who had less than 10% correct responses at Month 3 spent less time on Stroke Engine as compared to those who had more than 30% correct responses at Month 3 (mean total time of 5.86 hours ± 2.65 vs. 7.96 hours ± 8.41).

Problem identification knowledge
First we explored trends for the proportion of “evidence-based” critical problems identified overall (see Figure 5.3) and for domain-specific questions (i.e. functional, perception, cognitive, physical, and psychosocial; see Figure 5.3a to 5.3e) across the five time points. Differences in “evidence-based” critical problems identified were observed for some domain-specific questions. For example, clinicians had a small increase in the mean proportion of “evidence-based” critical problems identified for the cognitive domain from baseline to intervention period (from 28.88% to 35.48%; see Figure 5.3c). More specifically, while only 11% of clinicians identified 40% or more of “evidence-based” critical problems for the cognitive domain at Baseline 2, 52% did so at Month 3. In contrast, problem identification specific to functional, physical and psychosocial domains showed minimal changes from baseline to intervention period (Figures 5.3a, 5.3d, 5.3e).

Next, for each discipline separately, we explored the percentage of clinicians identifying each “evidence-based” critical problem for problem identification questions posed identically at their respective time point (Table 5.5). The purpose of this analysis was to examine the detection rates for critical “evidence-based” problems, such as dysphagia, driving, unilateral spatial neglect (USN), shoulder pain, executive function, community integration and participation, at baseline and during the intervention. While over 83% of OTs and PTs identified USN as an “evidence-based” critical problem when the cue was present in the case vignette, this was not the case for other important “evidence-based” critical problems such as swallowing and caregiver burden (Table 5.5). To exemplify, 50% of PTs and OTs identified swallowing/dysphagia as an “evidence-based” critical problem at baseline when a cue was present in the patient vignette, but this reduced to 30% during the intervention period. Similarly, 20% of OTs and PTs identified caregiver burden as an “evidence-based” critical problem at baseline when a cue was present in the patient vignette, but this dropped to 2% during the intervention period. OTs and PTs
improved in their ability to identify driving and interpersonal relationships as “evidence-based”
critical problems between the baseline and intervention periods. They also improved in their
identification of shoulder pain as an “evidence-based” critical problem between baseline and
during the intervention (from 42% to 67% for OTs; 47% to 70% for PTs). For driving, 45% of
OTs identified this critical problem at baseline and this increased to 50-62% during the
intervention period; an even greater improvement was observed in PTs: 21% at baseline and 33-
56% during the intervention period.

Irrespective of time point, the top five “evidence-based” critical problems cited by ≥40% of OTs
when a cue was present in the case vignette suggesting a problem or potential problem were:
unilateral spatial neglect (USN), activities of daily living, memory, attention and transfers. The
top five critical problems cited by PTs were USN, ambulation, memory, balance and transfers.

Assessment knowledge

Similar to problem identification, we explored trends for the proportion of “evidence-based” or
correct responses specific to the assessment questions across the five time points (see Figure
5.4). At Baseline 1, 11% of clinicians had more than 20% correct responses compared to 34% of
clinicians at Month 2.

We explored the percentage of clinicians indicating each “evidence-based” response for
assessment questions posed identically at various time points (Table 5.6). Overall, clinicians had
very limited “evidence-based” knowledge on the psychometric properties of various stroke
assessments at baseline. After using Stroke Engine, clinicians showed improvement in their
ability to correctly discriminate between a screening tool and assessment tool: they were more
likely to indicate that a screening tool can detect impairments (43% vs. 75%) and the need for
further testing (51% vs. 83%), and that an assessment tool can measure the severity of impairments (3% vs. 11%), provide a detailed assessment (1% vs. 19%) and detect clinical change over time (3% vs. 33%). There was also an increase in the proportion who chose a suitable screening tool for detecting post-stroke depression: they were more likely to choose an evidence-based screening tool that was appropriate for the specific patient depicted in the vignette (i.e. based on the presence of aphasia and stage of stroke recovery), as well as describe psychometric aspects of the measure including its reliability and psychometric strength. Clinicians improved in their ability to identify specific measures for specific purposes, for example the Line Bisection Test as the best screening tool for detecting USN according to Canadian Stroke Best Practice Guidelines (i.e. 38% of clinicians at Baseline 1 to 59% at Month 3). Finally, clinicians improved in their ability to correctly describe the timing of dysphagia screening according to Guidelines.

**Treatment knowledge**

Next, we explored trends for the proportion of “evidence-based” or correct responses for treatment questions for each Questionnaire across the five time points (see Figure 5.5). At Baseline 1, 58% missed 90% of the “evidence-based” treatment responses; at Month 3 only 18% of clinicians missed 90%. Only 9% of clinicians had more than 20% correct responses at Baseline 1, whereas 56% had more than 20% correct at Month 2.

We explored the percentage of clinicians indicating each “evidence-based” response for treatment questions posed identically at various time points (Table 5.7). Overall, clinicians had very limited “evidence-based” knowledge on the effectiveness of various stroke treatments at baseline. At post-intervention, there was an increase in “evidence-based” responses related to treatment effectiveness, stage of stroke recovery applicable for treatment, and best practice
recommendations, for all treatment questions posed identically at baseline and during the intervention. In contrast, minimal change in clinicians’ “evidence-based” knowledge for recognizing when a treatment is or is not appropriate according to the patient’s functional status was observed across the time points. However, important changes in clinicians’ knowledge on the effectiveness of body-weight supported (BWS) treadmill training for improving balance were reported at Month 1 as compared to Baseline 1. Specifically, clinicians improved in their ability to indicate that BWS treadmill training is generally ineffective for improving balance (3% vs. 34%), that best practice guidelines or research evidence exists for this treatment (4% vs. 19%), and in their ability to recognize when treatment is or is not appropriate according to the patient’s stage of stroke recovery (0% vs. 20%) and their functional status (5% vs. 18%). Clinicians also improved in their ability to identify strategies that patients can use to compensate for their physical limitations during sexual activity, such as suggesting that patients can attempt alternate sexual positions (28% vs. 42%).

5.3.4 Knowledge translation intervention (Stroke Engine) adherence

Of the 229 clinicians who completed the study, 13 (5.7%) never logged onto Stroke Engine during the 3-month intervention period; these clinicians were included in the analyses. Clinicians spent a mean total time of 2.05 hours (±2.06) on Stroke Engine during Month 1; 2.71 hours (±2.86) during Month 2; and 2.12 hours (±2.43) during Month 3. 28% of clinicians (n=64/229) adhered to 75% of the KT intervention protocol (i.e. ≥1 hour per week for 3 months or ≥12 hours in total). Figure 5.6 illustrates patterns of Stroke Engine use during the intervention: while 41% of clinicians spent between 1-3 hours on Stroke Engine at Month 1, this proportion dropped to 34% of clinicians at Month 2 and 22% at Month 3. In contrast, while 24% of clinicians spent >3
hours on Stroke Engine at Month 1, this proportion increased to 35% of clinicians at Month 2 and 3.

Mean self-reported time spent on usual educational activities (e.g. conferences, journal clubs, in-services) for participants decreased over time: 6.47 hours (±8.83) at Baseline 1; 7.44 hours (±9.22) at Baseline 2; 4.76 hours (±7.55) at Month 1; 5.02 hours (±9.47) at Month 2; 4.27 hours (±6.42) at Month 3. Figure 5.7 illustrates patterns of time spent on usual education activities during the study period. While 26% and 32% of clinicians spent >7 hours on usual educational activities at Baseline 1 and 2 respectively, this proportion gradually dropped during the intervention period (20% at Month 1; 18% at Month 2 and 17% at Month 3).

5.4 Discussion

This study examined the effectiveness of an evidence-based, stroke rehabilitation e-learning resource to improve clinicians’ knowledge of stroke rehabilitation best practices for critical problem identification, assessment, and treatment. Our main finding was that Stroke Engine use significantly improved clinicians’ knowledge of stroke rehabilitation best practices overall and their knowledge specific to assessment and treatment. Of the 16 independent variables examined (i.e. potential explanatory factors of the clinician and their work environment, time spent on Stroke Engine/usual educational activities), time spent on Stroke Engine was a significant predictor for explaining change in clinicians’ “evidence-based” knowledge overall and specific to assessment and treatment, thus suggesting a direct association between intensity of Stroke Engine use and knowledge gained. Other significant predictors explaining improved “evidence-based” knowledge specific to treatment were being a PT versus OT, and total time spent for usual educational activities.
This study highlighted serious baseline knowledge gaps specific to stroke rehabilitation best practices for problem identification, assessment and treatment. Detection rates for critical “evidence-based” problems, such as dysphagia, driving, executive function, community integration and participation, were extremely low for clinicians in spite of recommendations made by the Canadian Stroke Best Practices Guidelines\(^5\): detection of these problems was less than 50% for those critical problems at baseline with no or minimal improvements after Stroke Engine use. Clinicians had very limited “evidence-based” knowledge regarding the psychometric properties of stroke assessments and the effectiveness of stroke treatments at baseline; however significant improvements in their “evidence-based” knowledge for assessment and treatment were found during the intervention phase. These gaps were identified in a potentially representative group of stroke rehabilitation clinicians working in Ontario, or alternatively in a group of clinicians who may have been more “knowledgeable” than their colleagues and thus willing to participate in this study and have their knowledge assessed. This means that knowledge gaps specific to stroke rehabilitation best practices for problem identification, assessment and treatment may be similar to our study findings or possibly worse in the target population.

Clinicians were requested to use Stroke Engine for one hour per week for this KT intervention, thus requiring them to be self-directed in their learning process and as such, only 28% of participating clinicians adhered to 75% or more of the total recommended intervention time. However based on research literature, few clinicians identify themselves as being independent “seekers” of evidence-based information\(^87,88,124\). In a study where 243 stroke clinicians were tested on a standardized questionnaire that discriminated four clinician traits (seeker, receptive, traditionalist, and pragmatist) for responding to new scientific evidence and determining its value
in daily clinical practice, only 2% of OTs were identified as seekers of evidence\textsuperscript{124}. Perhaps examining the traits of participating clinicians in this study could have shed some light regarding their knowledge gains and patterns of Stroke Engine usage. A possible means of enhancing learning and knowledge uptake may be to increase the interactivity of modules currently existing in Stroke Engine. To address clinicians’ varying needs and learning styles, it is essential for e-learning resources to incorporate a variety of learning strategies and provide opportunities for clinicians to explore, reflect and apply new knowledge\textsuperscript{125}: use of varied presentations, interactive media, and content deemed relevant/applicable to practice was found to be effective for changing clinicians’ attitudes and practice behaviors\textsuperscript{126}. One interactive learning module on USN had been created for Stroke Engine at the time of this study (see Figure 5.8). It included practical, “how-to” information on identification, assessment and treatment of USN, along with case vignettes, video clips with audio comments, printable hand-outs and pocket card summaries, and images\textsuperscript{52,53}. This module may have possibly helped clinicians improve in their ability to identify the best USN screening tool: 38\% of clinicians identified the Line Bisection Test as per Canadian Stroke Best Practice Guidelines\textsuperscript{5} at Baseline 1 and this proportion increased to 59\% at Month 3.

5.4.1 Limitations

Participation bias may have been a limiting factor in this study: the main reason for withdrawal following recruitment was that clinicians were too busy or no longer interested in participating. As such, our study cohort may have consisted of a large proportion of clinicians who were keen to learn more about stroke best practices, given their clinical experience and its relevance to their practice. However, given that their baseline knowledge of stroke best practices was low, along with the fact that some never logged on to the e-learning resource; and, their improvements over
time were modest although significant, we can postulate that the effects of Stroke Engine would have been similar if the study was repeated with other stroke rehabilitation clinicians in Canada or even those working in countries with comparable standards of health care.

Another limitation was the short intervention and follow-up period (i.e. 3 months). Yet this can be considered as a normal “learning period” for new materials, especially given that university curriculum is typically based on a semester constituting 3 months. Extending the intervention period may possibly lead to more drop-outs as there will be a greater time commitment (i.e. Stroke Engine use/additional questionnaires). However it would be interesting to explore, in a future study, whether clinicians’ new knowledge is sustainable over a longer period. Finally, while the main outcome of interest was extent of knowledge acquired regarding stroke rehabilitation best practices, it would be interesting to examine in a future study, the impact of clinicians’ knowledge gains on actual practices and most importantly, patient outcomes.

5.5 Conclusion

Findings from this study conclude that Stroke Engine use resulted in significant improvements in clinicians’ knowledge of best practices for stroke rehabilitation, especially in regards to assessment and treatment. Intensity of Stroke Engine use was the predictor that best explained improved “evidence-based” knowledge as measured by change in total Stroke Rehabilitation Knowledge Questionnaire scores. Serious baseline knowledge gaps in critical problem identification, assessment and treatment were identified from this study; some gaps continued to exist even after the intervention. Knowledge regarding these gaps will help to refine Stroke Engine and on a larger scale, to better tailor educational content specific to occupational therapists and physical therapists who provide rehabilitation to individuals with stroke.
CHAPTER 6
Summary and Synthesis

6.1 Application of the KTA Model to address research objectives

The Knowledge to Action (KTA) Model and its seven steps were used as a conceptual framework to guide project activities related to my PhD research agenda and research objectives. This dissertation can serve as a step-by-step guide for addressing research objectives through the integration and application of KTA Model for developing effective e-learning knowledge translation (KT) interventions. The three research objectives of my PhD agenda aligned with the first six steps of the KTA Model as follows:

Objective 1 involved a systematic review to examine the effectiveness of single and multi-component KT interventions for improving knowledge, attitudes toward evidence-based practice (EBP), and rehabilitation practice behaviors of occupational therapists (OTs) and physical therapists (PTs), in order to inform the design of a KT intervention. This phase aligned with Step 1 of the Model whereby the goal was to identify, review and select an appropriate knowledge tool that would be relevant for addressing the knowledge gaps related to stroke rehabilitation best practices and informing the design of an effective KT intervention. Findings from this review suggested that use of active, multi-component KT interventions resulted in some knowledge gains among PTs, but additional research was needed to understand impact of these strategies on OTs. No KT interventions were specifically effective for improving clinicians’ knowledge related to stroke rehabilitation best practices. Given that this review suggested the use of active KT interventions, an interactive e-learning resource on stroke rehabilitation best practices (Stroke Engine) was selected and we examined its use as a potential KT intervention to meet the learning needs of stroke rehabilitation clinicians.
Objective 2 involved usability testing and explored factors that facilitated or hindered OTs’ and PTs’ use of Stroke Engine as a potential KT intervention. This phase aligned with Steps 2 and 3 of the Model whereby the goal was to adapt the knowledge and determine barriers to uptake and applicability to the local context through usability testing. Findings from usability testing of Stroke Engine with stroke rehabilitation clinicians identified multiple barriers hindering its use and the website was modified to maximize its usability and applicability to the local context as an e-learning KT intervention (see Table 4.1 for detailed list of barriers and website modifications). Overall, clinicians participating in this phase were satisfied with Stroke Engine as it provided them with the latest evidence regarding stroke-related assessment and intervention in a format that was quick and easy to review.

Objective 3 determined the extent of knowledge acquired regarding stroke rehabilitation best practices by OTs and PTs while using Stroke Engine for three months. This phase aligned with Steps 4, 5 and 6 of the Model whereby the goal was to implement a KT intervention, monitor knowledge use and evaluate specific outcomes (e.g. knowledge acquisition). Findings from this study indicate that Stroke Engine use resulted in significant improvements in clinicians’ knowledge of best practices for stroke rehabilitation, especially in regards to assessment and treatment. Intensity of Stroke Engine use was the predictor that best explained improved “evidence-based” knowledge as measured by change in total Questionnaire scores across five time points. Serious baseline knowledge gaps in critical problem identification, assessment and treatment were identified from this study; this will help tailor the educational objectives for Stroke Engine in order to better meet clinicians’ current learning needs.

6.2 Contributions to the knowledge translation, rehabilitation, and usability testing literature
This PhD agenda and its research objectives, as well as this thesis dissertation have produced the following original and major contributions to the knowledge translation, rehabilitation and usability testing literature:

Chapter 1 of this PhD dissertation reviewed the current research literature with the goals of: 1) stressing the importance of best practices for stroke rehabilitation; 2) identifying existing knowledge and practice gaps among rehabilitation clinicians; 3) highlighting effective knowledge translation (KT) interventions for promoting best practice uptake by this target group; and 4) identifying gaps in this area of research, and had built a strong rationale for my overall PhD research agenda and objectives. Excerpts from this chapter were published in *Disability and Rehabilitation* (2012 Impact factor: 1.541), in a manuscript entitled “Best practice use in stroke rehabilitation: from trials and tribulations to solutions”33. This manuscript was original and useful given that KT research within the rehabilitation context is considered to be a novel topic. 35 cited references were found according to Web of Science.

Objective 1 of my PhD agenda involved a systematic review to examine the effectiveness of single and multi-component KT interventions for improving knowledge, attitudes, and practice behaviors of rehabilitation clinicians, in order to inform the design of a KT intervention. This review was published in *Journal of Rehabilitation Medicine* (2012 Impact factor: 2.134), in a manuscript entitled “Strategies for rehabilitation professionals to move evidence-based knowledge into practice: A systematic review”67. This review was the first attempt to identify effective KT interventions for rehabilitation clinicians and provide them with a guide for developing such interventions. 45 cited references were found for this manuscript according to Web of Science.
Objective 2 of my PhD agenda involved usability testing to explore factors that facilitated or hindered stroke rehabilitation clinicians’ use of Stroke Engine as a potential KT intervention. This study was also published in *Journal of Rehabilitation Medicine* (2012 Impact factor: 2.134), in a manuscript entitled “Usability testing of two e-learning resources: methods to maximize potential for clinician use” ¹⁹. This manuscript was another novel contribution to the KT, usability testing and rehabilitation literature: it provided a systematic, rigorous evidence-based methodology for usability testing with quantitative and qualitative data collection that can be applied to other health-related e-learning resources. 41 cited references were found for this manuscript according to Web of Science.

Finally, Objective 3 of my PhD agenda involved an intervention study to examine the extent of knowledge acquired regarding stroke rehabilitation best practices by OTs and PTs while using Stroke Engine for three months. This study will be submitted in August 2013 to *Stroke* (2012 Impact factor: 5.729), in a manuscript entitled “Maximizing clinicians’ knowledge of stroke rehabilitation best practices: effectiveness of an e-learning knowledge translation intervention”. It is anticipated that this manuscript will be another novel contribution to the KT and rehabilitation literature as it was the first attempt to examine the effectiveness of a stroke-specific e-learning resource for improving clinicians’ evidence-based knowledge regarding stroke rehabilitation best practices. Findings from this study will be used to determine sample size for a well-designed randomized controlled trial to further examine the effectiveness of Stroke Engine for knowledge uptake. The Stroke Rehabilitation Knowledge Questionnaires and scoring grid, along with the patient case vignettes developed for this study can serve as useful tools for future studies examining clinicians’ evidence-based knowledge for stroke rehabilitation best practices.

While KT interventions often fail because of the lack of a rigorous, explicit methodology for
their design and implementation, this unique PhD research agenda helped advance the science of developing and testing KT interventions. This dissertation provides an overall conceptual framework using the first six steps of the KTA Model\textsuperscript{15} for future initiatives in developing evidence-based information systems to be applied in many fields other than stroke rehabilitation.

Stroke Engine was the first KT initiative to address the regional variations and serious practice gaps in stroke rehabilitation management across Canada\textsuperscript{6-12,31}. This e-learning tool was conceived with the goals of facilitating knowledge transfer of stroke rehabilitation best practices using a cost-effective medium for dissemination. Now that our study findings support that Stroke Engine has some promise for improving clinicians’ evidence-based knowledge of stroke best practices, efforts to continually update and improve Stroke Engine will be worthwhile. By adding more interactive modules to Stroke Engine, or more importantly by diversifying the KT intervention with additional educational components (e.g. outreach visits, local opinion leader, audit and feedback), we will be able to address clinicians’ varying needs and learning styles. Stroke Engine will become an important contribution for front-line clinicians to foster the next generation of “critical thinkers” in stroke rehabilitation.

6.3 Major limitations and important lessons learned

For Objective 1 of my PhD research agenda, a systematic review was conducted to examine the effectiveness of KT interventions for improving knowledge, attitudes, and practice behaviors of rehabilitation clinicians. Although the study selection criteria were wide-ranging, only 12 studies met the criteria and most of them had methodological weaknesses that may have reduced the validity of our conclusions. Furthermore, these 12 studies evaluated complex KT interventions and were quite heterogeneous in nature (e.g. single vs. multi-component intervention; varying
intensity of intervention; different outcome measures used), thus presenting similar challenges and limitations to other studies that evaluate complex interventions\textsuperscript{127}. Finally, publication bias may have also been an important threat of validity for this review. However, this review provides all of the evidence on KT interventions for rehabilitation and can be used by others when considered development of such an intervention.

For Objective 2 of my PhD research agenda, usability testing was conducted to explore factors that facilitated or hindered clinicians’ use of Stroke Engine as a potential KT intervention. A limitation was the study population of this study, consisting of clinicians who were predominately female and worked in stroke rehabilitation. This sample was not representative of all potential Stroke Engine users (i.e. other health professionals working with a stroke clientele, such as physicians, nurses, speech therapists, etc.), such that it would be important to repeat usability testing with a more varied sampling frame prior to widespread dissemination among these health care professionals. However given that the objectives of my PhD research agenda involved examining Stroke Engine as a potential KT intervention for stroke rehabilitation clinicians specifically, it was necessary to accrue a similar target population for usability testing. Furthermore, this gender imbalance in our sample was quite reflective of the population of practicing rehabilitation clinicians whereby almost 90\% of them are female\textsuperscript{109,110}.

For Objective 3 of my PhD research agenda, the extent of knowledge acquired regarding stroke best practices by rehabilitation clinicians was examined following Stroke Engine use. A limitation was the possibility of participation bias: our study cohort consisted of clinicians who were keen to learn more about best practices for stroke rehabilitation, whereas those who dropped out of the study were too busy or no longer interested in participating. Given that baseline knowledge of stroke rehabilitation best practices of participating clinicians was low and
their improvements over time were modest although significant, we can hypothesize that the
effects of Stroke Engine would have been similar even with a more representative sample.

6.4 Next steps: implications for future research and practice

The next steps and implications for future research and practice are as follows:

- To conduct an updated systematic review for identifying effective KT interventions for
  rehabilitation clinicians and publish these study findings in a peer-reviewed journal
- To diversify the KT intervention with additional educational components (e.g. outreach
  visits, local opinion leader, audit and feedback), and repeat steps of the KTA model in
  order to examine the effectiveness of this revised e-learning KT intervention
- To create more interactive modules for Stroke Engine (i.e. practical, “how-to”
  information on identification, assessment and treatment of USN, along with case
  vignettes, video clips with audio comments, printable hand-outs and pocket card
  summaries, and images) and continue iterative process of usability testing with stroke
  rehabilitation clinicians
- To consider expanding Stroke Engine as an interactive e-learning resource to a greater
  spectrum of end users: 1) clients with stroke, their family and friends by providing a
  layperson print-out on each intervention/assessment tool; 2) experienced rehabilitation
  clinicians who are provided with an in-depth comprehensive review of the evidence on
  the effectiveness of each intervention or psychometric properties of each assessment tool;
  3) students in health care, who require a quick and easy understanding of various
  interventions and assessment tools; and 4) administrators who must make decisions
  regarding the implementation of best practices for stroke management. However testing
of Stroke Engine for its effectiveness as an e-learning resource for these various stakeholders would be an important first step to complete.

- To submit abstracts for oral and poster presentations of study findings at national conferences (e.g. CAOT conference, CPA conference, Canadian Stroke Congress), as well as international meetings (e.g. World Stroke Congress, European Stroke Congress, World Federation of Occupational Therapists Conference)

6.5 Conclusion

The ultimate goal of my PhD research agenda was to improve stroke rehabilitation clinicians’ knowledge of stroke best practices, with the hopes of improving rehabilitation services for individuals with stroke. This research agenda successfully applied six steps of the KTA model and concluded that Stroke Engine has promise as a KT intervention for improving clinicians’ knowledge of stroke rehabilitation best practices. Finally, this PhD agenda and its research objectives have made important strides towards empowering rehabilitation clinicians with a knowledge tool for integrating stroke best practices.
References


74. McQueen J. Practice development: bridging the research-practice divide through the appointment of a research lead. *Br J Occup Ther.* 2008; 71(3): 112-118.


Tables
Table 3.1: Methodological quality assessment of randomized controlled trials included in review

<table>
<thead>
<tr>
<th>Study</th>
<th>Score on PEDro Scale</th>
<th>Total Score</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Rebbeck et al. 2006</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Stevenson et al. 2004</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Stevenson et al. 2006</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Bekkering et al. 2005</td>
<td>+</td>
<td>+</td>
</tr>
</tbody>
</table>

+ criterion was satisfied/ – criterion was not satisfied

Total score is determined by counting the number of criteria satisfied

Column numbers correspond to the following criteria on the Physiotherapy Evidence Database (PEDro) Scale:
1) eligibility criteria; 2) random allocation; 3) concealed allocation; 4) baseline comparability; 5) blind subjects; 6) blind intervention providers;
7) blind assessors; 8) adequate follow-up (at least 85%); 9) intention-to-treat analysis; 10) between-group comparisons; 11) point estimates and variability
Table 3.2: Methodological quality assessment of observational studies included in review

<table>
<thead>
<tr>
<th>Study† (sample size)</th>
<th>Study Design</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Verhoef et al. 2004  (n=63)</td>
<td>Before-after</td>
<td>+</td>
<td></td>
<td></td>
<td>+</td>
<td></td>
<td>+</td>
<td></td>
<td>+</td>
<td></td>
<td>+</td>
</tr>
<tr>
<td>McQueen et al. 2006  (n=7)</td>
<td>Before-after</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td></td>
<td>+</td>
</tr>
<tr>
<td>Leemrijse et al. 2006 (n=332)</td>
<td>Case series</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>McKenna et al. 2005  (n=213)</td>
<td>Case series</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>Brown et al. 2005    (n=94)</td>
<td>Before-after</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>+</td>
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<td>+</td>
</tr>
<tr>
<td>McKenna et al. 2008  (n=69)</td>
<td>Case series</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>Cook et al. 2007     (n=35)</td>
<td>Before-after</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Beggs et al. 1997    (n=34)</td>
<td>Before-after</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>-</td>
</tr>
</tbody>
</table>

+ criterion was satisfied/ – criterion was not satisfied

†Column numbers correspond to the following criteria:
1) adequate description of sample;
2) sample representative of physical therapists and/or occupational therapists in the community
3) outcome of interest not present at start of study;
4) intervention well described;
5) outcome measures well described;
6) outcomes assessed objectively by blind assessment or using secure records (i.e. patient charts)
7) study controls for key confounding variables
8) subjects assessed at least once at baseline and post-intervention respectively;
9) follow-up long enough for outcomes to occur;
10) adequate follow-up of subjects;
<table>
<thead>
<tr>
<th>Citation</th>
<th>Study Design</th>
<th>Sample</th>
<th>Intervention</th>
<th>Outcome and Significance</th>
</tr>
</thead>
</table>
| Rebbeck et al. 2006  | Cluster RCT  | 27 Physical therapists | - Active multifaceted KT intervention (experimental group):<br>  
  o Interactive educational sessions  
  o Opinion leaders  
  o Printed materials  
  o Outreach visit  
  - Passive dissemination (control group):<br>  
  o Guidelines by mail | AT 12 MONTHS POST-INTERVENTION  
  (-) Attitude towards guidelines (p=0.07-0.29)  
  (+) Self-perceived knowledge (p=0.001)  
  (+) Self-perceived/actual practice behavior (p=0.01-0.04) (chart audit) |
| Stevenson et al. 2004; 2006 | RCT          | 30 Physical therapists | - Opinion leader (experimental group):<br>  
  o Evidence-based educational sessions  
  o Identify research needs/priorities  
  o Critical appraisal of literature  
  - Passive dissemination (control group):<br>  
  o Printed material | AT POST-INTERVENTION (3 and 6 months)  
  (-) Attitudes towards EBP  
  (-) Self-perceived practice behavior |
| Bekkering et al. 2005 | RCT          | 113 Physical therapists | - Active multifaceted KT intervention (experimental group):<br>  
  o Didactic and interactive educational sessions  
  o Printed materials  
  o Follow-up discussion and feedback post-implementation  
  o Reminders  
  - Passive dissemination (control group):<br>  
  o Guidelines by mail  
  o Forms to facilitate discussion with other therapists  
  o Journal articles on guidelines | AT 12 MONTHS POST-INTERVENTION  
  (+) Self-perceived practice behavior  
  Therapists in the intervention group were also more likely to adhere to all four guideline recommendations as compared to those in the control group (OR 2.05; 95% CI 1.15-3.65) |
<table>
<thead>
<tr>
<th>Citation</th>
<th>Study Design</th>
<th>Sample</th>
<th>Intervention</th>
<th>Outcome and Significance</th>
</tr>
</thead>
</table>
| Verhoef et al. 2004 | Before-after | 63 Physical therapists  | • Active multifaceted KT intervention:  
  o Interactive educational sessions using a problem-based learning approach  
  o Lectures and workshops  
  o Therapists’ network for future communications  
  o Newsletters          | AT POST-INTERVENTION AND 18-MONTH FOLLOW UP  
  (+) Actual knowledge (156 multiple-choice questions)  
  Knowledge increased significantly from 37% correct answers (range 18-47%) at baseline to 54% (range 27-77%) at post-intervention and was maintained at the 18-month follow-up (median score 55%, range 33-79%) |
| McQueen et al. 2006 | Before-after | 7 Occupational therapists | • Journal club:  
  o Interactive discussions regarding guidelines  
  o Critical appraisal of literature | AT POST-INTERVENTION (3 months)  
  (+) Attitudes towards EBP (awareness/confidence)  
  (+) Self-perceived practice behavior |
| Leemrijse et al. 2006 | Case series | 332 Physical therapists | • Didactic educational session:  
  o Annual continuing education course  
  o Presentations, lectures and workshops at various conferences and colleges  
  o Guidelines and articles by mail | AT POST-INTERVENTION  
  (+) Attitudes towards EBP  
  69% had a positive attitude; n=158  
  (+) Self-perceived practice behavior  
  64% (n=214) had at least some knowledge of the content of these guidelines; of these 66% (n=141) applied the guidelines to more than half their patients  
  Factors that contributed significantly to compliance with guidelines: positive attitude towards guidelines in general (OR=11.6; 95% CI 4.5 to 29.8) and knowledge of colleagues using the guidelines (OR=2.4; 95% CI 1.0 to 5.8) |
| McKenna et al. 2005 | Case series  | 213 Occupational therapists  
  (103 of them) | • OTseeker  
  o Use of an online evidence-based database with systematic reviews and RCTs relevant to rehabilitation | AT POST-INTERVENTION  
  (+) Self-perceived knowledge  
  Of the 103 users of OTseeker, 63% (n=65) reported an increase in knowledge |
<table>
<thead>
<tr>
<th>Citation</th>
<th>Study Design</th>
<th>Sample</th>
<th>Intervention</th>
<th>Outcome and Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>accessed OT seeker</td>
<td></td>
<td>(-) Self-perceived practice behavior Of the 103 users of OTseeker, 14% (n=14) reported an change in practice behavior</td>
</tr>
<tr>
<td>Brown et al. 2005</td>
<td>Before-after</td>
<td>94 Physical therapists</td>
<td>• Active multifaceted KT intervention</td>
<td>AT POST-INTERVENTION (between 6-24 weeks following outreach visit):</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>o Opinion leaders</td>
<td>(+) Self-perceived knowledge</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>o Outreach visit</td>
<td>(+) Self-perceived practice behavior</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>o Training manuals/risk factor checklists (also available online)</td>
<td>Self reported use of fall prevention strategies increased significantly when comparing behaviors before and after exposure to the intervention (p&lt;0.0001), where 64% reported increased fall reduction practice behaviors. All targeted risk factors were mentioned by at least 30% of the participants. Post-intervention knowledge of the risk factors for falls was associated with an increase in self-reported fall prevention behaviors (O.R. 1.5; 95%CI 1.1-2.2) Those with greater knowledge of fall risk factors were 1.4 times more likely use them post-intervention (O.R. 1.4; 95%CI 1.0-2.1)</td>
</tr>
<tr>
<td>McQueen et al. 2008</td>
<td>Case series</td>
<td>69 Occupational therapists</td>
<td>• Opinion leader:</td>
<td>AT POST-INTERVENTION (18 months)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>o Identify research needs/priorities</td>
<td>(+) Self-perceived knowledge</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>o Critical appraisal of literature</td>
<td>62% (n=43) felt that involvement in clinical effectiveness projects enhanced their knowledge</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>o Journal clubs to search and implement evidence-based practice</td>
<td>(+) Self-perceived practice behavior</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>54% (n=37) felt that their involvement resulted in changes in practice behavior</td>
</tr>
<tr>
<td>Cook et al. 2007</td>
<td>Before-after</td>
<td>35 Occupational therapists</td>
<td>• Interactive educational session:</td>
<td>AT POST-INTERVENTION (4 months)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>o Lectures/practical sessions</td>
<td>(+) Self-perceived practice behavior</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>o Small group discussions</td>
<td>Significant change in outcome measure use</td>
</tr>
<tr>
<td>Citation</td>
<td>Study Design</td>
<td>Sample</td>
<td>Intervention</td>
<td>Outcome and Significance</td>
</tr>
<tr>
<td>---------------</td>
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<td>------------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Follow-up support by phone/email</td>
<td>(+) significant/(-) not significant between baseline and post-intervention</td>
</tr>
<tr>
<td>Begg et al. 1997</td>
<td>Before-after</td>
<td>16 Occupational therapists 16 Physical therapists</td>
<td>Didactic educational session: Teleconferences Individual consultations Seminars/on-site workshops Small group discussions</td>
<td>(+) Self-perceived practice behavior 61.8% (n=21) reported that they had <em>a lot or some opportunity</em> to utilize their skills and knowledge learned</td>
</tr>
</tbody>
</table>
Table 4.1: Barriers/suggestions from usability testing and website modifications for Stroke Engine-Intervention and Stroke Engine-Assess

<table>
<thead>
<tr>
<th>Barrier/Suggestions</th>
<th># clinicians</th>
<th>Resource</th>
<th>Modifications/Additions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Search function not working</td>
<td>9</td>
<td>Stroke Engine-Intervention Stroke Engine-Assess</td>
<td>Search function on the homepage was fixed</td>
</tr>
<tr>
<td>Content for the In-Depth Review section appears on multiple web pages</td>
<td>9</td>
<td>Stroke Engine-Intervention</td>
<td>In-Depth Review section is being reorganized so that all content will appear on one single web page</td>
</tr>
<tr>
<td>Stroke Engine-Assess icon not visible on homepage on Stroke Engine</td>
<td>5</td>
<td>Stroke Engine-Intervention</td>
<td>Background color and size of the icon was modified</td>
</tr>
<tr>
<td>Content for the Clinician How-To section does not appear by default as expected</td>
<td>7</td>
<td>Stroke Engine-Intervention</td>
<td>Content for the Clinician How-To section now appears by default</td>
</tr>
<tr>
<td>Layout for content of the Best Practices section not clear and links to best practice guidelines not working</td>
<td>4</td>
<td>Stroke Engine-Intervention</td>
<td>Layout of Best Practices section was reformatted with bullet points and links to published stroke best practice guidelines were added</td>
</tr>
<tr>
<td>Some links not working</td>
<td>2</td>
<td>Stroke Engine-Intervention Stroke Engine-Assess</td>
<td>Every link for all sections of both websites were verified for functionality and accuracy</td>
</tr>
<tr>
<td>Quick and direct reference to articles</td>
<td>2</td>
<td>Stroke Engine-Intervention</td>
<td>Direct access to a reference list of articles was provided for each module</td>
</tr>
<tr>
<td>E-newsletter</td>
<td>1</td>
<td>Stroke Engine-Intervention Stroke Engine-Assess</td>
<td>E-newsletter to update clinicians about the latest Stroke Engine developments was created and posted on homepage</td>
</tr>
<tr>
<td>Videos and pictures</td>
<td>1</td>
<td>Stroke Engine-Intervention Stroke Engine-Assess</td>
<td>More pictures and videos are being continually uploaded onto the websites</td>
</tr>
<tr>
<td>New modules: driver retraining, community reintegration, psychosocial issues, neuroanatomy of a stroke</td>
<td>1</td>
<td>Stroke Engine-Intervention</td>
<td>Creation of these new modules in progress</td>
</tr>
<tr>
<td>New modules: Cognistat&lt;sup&gt;40&lt;/sup&gt;, Community Balance and Mobility Scale&lt;sup&gt;41&lt;/sup&gt;, Cognitive Competency Test&lt;sup&gt;42&lt;/sup&gt;</td>
<td>2</td>
<td>Stroke Engine-Assess</td>
<td>Creation of these new modules in progress</td>
</tr>
<tr>
<td>Categorizing interventions according to domain type to facilitate searches</td>
<td>1</td>
<td>Stroke Engine-Intervention</td>
<td>Categorization of interventions by domain type in progress</td>
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</table>
Table 5.1: Sociodemographic characteristics of study participants & withdrawals

<table>
<thead>
<tr>
<th>CLINICIAN CHARACTERISTICS</th>
<th>Participants (n=229)</th>
<th>Withdrawals (n=61)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age n (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;30 years</td>
<td>25 (10.9)</td>
<td>11 (18.0)</td>
</tr>
<tr>
<td>31-35 years</td>
<td>42 (18.3)</td>
<td>11 (18.0)</td>
</tr>
<tr>
<td>36-40 years</td>
<td>51 (22.3)</td>
<td>11 (18.0)</td>
</tr>
<tr>
<td>41-50 years</td>
<td>64 (28.0)</td>
<td>15 (24.6)</td>
</tr>
<tr>
<td>&gt;50 years</td>
<td>47 (20.5)</td>
<td>13 (21.3)</td>
</tr>
<tr>
<td>Gender** n (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>206 (90.0)</td>
<td>56 (91.8)</td>
</tr>
<tr>
<td>Discipline** n (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physical Therapy (PT)</td>
<td>127 (55.5)</td>
<td>37 (60.7)</td>
</tr>
<tr>
<td>Degree of professional training in PT/OT n (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Certificate/Diploma</td>
<td>15 (6.6)</td>
<td>3 (4.9)</td>
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<tr>
<td>Baccalaureate</td>
<td>167 (72.9)</td>
<td>40 (65.6)</td>
</tr>
<tr>
<td>Entry-level Professional Masters</td>
<td>47 (20.5)</td>
<td>18 (29.5)</td>
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<tr>
<td>Employment n (%)</td>
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<td></td>
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<tr>
<td>Full-time</td>
<td>172 (75.1)</td>
<td>47 (77.1)</td>
</tr>
<tr>
<td>Clinical experience with stroke clientele n (%)</td>
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<td></td>
</tr>
<tr>
<td>0-3 years</td>
<td>38 (16.6)</td>
<td>14 (23.0)</td>
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<tr>
<td>4-10 years</td>
<td>79 (34.5)</td>
<td>17 (27.9)</td>
</tr>
<tr>
<td>&gt;10 years</td>
<td>112 (48.9)</td>
<td>30 (49.2)</td>
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<tr>
<td>Number of stroke clients on typical daily caseload n (%) (1 missing)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;2</td>
<td>62 (27.2)</td>
<td>26 (42.6)</td>
</tr>
<tr>
<td>2-5</td>
<td>125 (54.8)</td>
<td>22 (36.1)</td>
</tr>
<tr>
<td>&gt;5</td>
<td>41 (17.9)</td>
<td>13 (21.3)</td>
</tr>
<tr>
<td>Specialty certification related to stroke rehabilitation* n (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>104 (45.4)</td>
<td>29 (47.5)</td>
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<tr>
<td>Teaching at a university n (%)</td>
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<td></td>
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<tr>
<td>Yes</td>
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<td>15 (24.6)</td>
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<tr>
<td>Comfort level with using internet n (%)</td>
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<td></td>
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<tr>
<td>Not at all/a little comfortable</td>
<td>13 (5.7)</td>
<td>7 (11.5)</td>
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<tr>
<td>Somewhat comfortable</td>
<td>77 (33.6)</td>
<td>20 (32.8)</td>
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<tr>
<td>Very comfortable</td>
<td>110 (48.0)</td>
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<tr>
<td>Extremely comfortable</td>
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<td>12 (19.7)</td>
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<td>WORK ENVIRONMENT CHARACTERISTICS</td>
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<tr>
<td>Type of clinical setting n (%)</td>
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<tr>
<td>Acute care</td>
<td>40 (17.5)</td>
<td>15 (24.6)</td>
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<tr>
<td>In-patient rehabilitation</td>
<td>112 (48.9)</td>
<td>25 (41.0)</td>
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<tr>
<td>Out-patient rehabilitation</td>
<td>77 (33.6)</td>
<td>21 (34.4)</td>
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<tr>
<td>Academic affiliation* n (%)</td>
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<td></td>
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<tr>
<td>Yes</td>
<td>177 (77.3)</td>
<td>45 (73.8)</td>
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<tr>
<td>No</td>
<td>44 (19.2)</td>
<td>14 (23.0)</td>
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<tr>
<td>Not sure</td>
<td>8 (3.5)</td>
<td>2 (3.3)</td>
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<tr>
<td>Location of workplace n (%)</td>
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<td></td>
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<tr>
<td>Urban</td>
<td>134 (58.5)</td>
<td>31 (50.8)</td>
</tr>
<tr>
<td>Suburban</td>
<td>45 (19.7)</td>
<td>14 (23.0)</td>
</tr>
<tr>
<td>Rural</td>
<td>50 (21.8)</td>
<td>16 (26.2)</td>
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<tr>
<td>Presence of a stroke team/unit on site* n (%)</td>
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<td></td>
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<tr>
<td>Yes</td>
<td>102 (44.5)</td>
<td>24 (39.3)</td>
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<tr>
<td>Number of stroke admission(s) per month n (%) (1 missing)</td>
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<td></td>
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<tr>
<td>0-10</td>
<td>145 (63.3)</td>
<td>34 (55.7)</td>
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<tr>
<td>11-20</td>
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<td>19 (31.2)</td>
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<tr>
<td>21-30</td>
<td>17 (7.4)</td>
<td>6 (9.8)</td>
</tr>
<tr>
<td>&gt;30</td>
<td>11 (4.8)</td>
<td>2 (3.3)</td>
</tr>
<tr>
<td>Length of stay/rehabilitation for clients with stroke n (%)</td>
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<td></td>
</tr>
<tr>
<td>&lt; 1 day</td>
<td>14 (6.1)</td>
<td>9 (14.8)</td>
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<tr>
<td>1-5 days</td>
<td>31 (13.5)</td>
<td>5 (8.2)</td>
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<tr>
<td>6-9 days</td>
<td>74 (32.3)</td>
<td>22 (36.1)</td>
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<tr>
<td>10-15 days</td>
<td>44 (19.2)</td>
<td>10 (16.4)</td>
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<tr>
<td>16-25 days</td>
<td>14 (6.1)</td>
<td>2 (3.3)</td>
</tr>
<tr>
<td>&gt;25 days</td>
<td>52 (22.7)</td>
<td>13 (21.3)</td>
</tr>
<tr>
<td>Protected work time for continuing education n (%)</td>
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<td></td>
</tr>
<tr>
<td>Yes</td>
<td>179 (78.2)</td>
<td>43 (70.5)</td>
</tr>
<tr>
<td>Departmental funds for continuing education n (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>167 (72.9)</td>
<td>43 (70.5)</td>
</tr>
<tr>
<td>Computer/internet access at work* n (%)</td>
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<td></td>
</tr>
<tr>
<td>Yes</td>
<td>216 (94.3)</td>
<td>59 (96.7)</td>
</tr>
<tr>
<td>Stroke rehabilitation research conducted on site n (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>55 (45.0)</td>
<td>16 (26.2)</td>
</tr>
<tr>
<td>No</td>
<td>143 (62.5)</td>
<td>35 (57.4)</td>
</tr>
<tr>
<td>Not sure</td>
<td>31 (13.5)</td>
<td>10 (16.4)</td>
</tr>
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Table 5.2: Tests and estimates of fixed effects for TOTAL Questionnaires

Tests of Fixed Effects

<table>
<thead>
<tr>
<th>Effect</th>
<th>DF</th>
<th>F value</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (&lt;30 years; 31-35 years; 36-40 years; 41-50 years; &gt;50 years*)</td>
<td>4</td>
<td>0.66</td>
<td>0.6223</td>
</tr>
<tr>
<td>Discipline (PT; OT*)</td>
<td>1</td>
<td>1.45</td>
<td>0.2291</td>
</tr>
<tr>
<td>Degree of professional training in PT/OT (certificate; BSc; Prof. MSc.; MSc/PhD*)</td>
<td>3</td>
<td>1.55</td>
<td>0.2015</td>
</tr>
<tr>
<td>Academic affiliation (yes; no*)</td>
<td>1</td>
<td>2.83</td>
<td>0.0927</td>
</tr>
<tr>
<td>Clinical experience with stroke clientele (0-3 years; 4-10 years; &gt;10 years*)</td>
<td>2</td>
<td>1.39</td>
<td>0.2502</td>
</tr>
<tr>
<td>Number of stroke clients on typical daily caseload (&lt;2, 2-5, &gt;6*)</td>
<td>2</td>
<td>0.43</td>
<td>0.6491</td>
</tr>
<tr>
<td>Departmental funds for continuing education (yes; no*)</td>
<td>1</td>
<td>0.02</td>
<td>0.8780</td>
</tr>
<tr>
<td>Computer/internet access at work (yes; no*)</td>
<td>3</td>
<td>0.79</td>
<td>0.4992</td>
</tr>
<tr>
<td>Specialty certification re: stroke rehabilitation (yes; no*)</td>
<td>1</td>
<td>0.61</td>
<td>0.4367</td>
</tr>
<tr>
<td>Location of workplace (urban; suburban; rural*)</td>
<td>2</td>
<td>1.33</td>
<td>0.2643</td>
</tr>
<tr>
<td>Stroke rehabilitation research conducted on site (yes; no*)</td>
<td>1</td>
<td>0.56</td>
<td>0.4545</td>
</tr>
<tr>
<td>Presence of stroke unit/team on site (yes; no*)</td>
<td>1</td>
<td>0.10</td>
<td>0.7480</td>
</tr>
<tr>
<td>Protected work time for continuing education (yes; no*)</td>
<td>1</td>
<td>0.00</td>
<td>0.9730</td>
</tr>
<tr>
<td>Total time spent on Stroke Engine</td>
<td>1</td>
<td>42.53</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Total time spent on usual continuing education</td>
<td>1</td>
<td>0.33</td>
<td>0.5677</td>
</tr>
<tr>
<td>Intervention effect (Baseline 1 &amp; 2; Month 1, 2, 3*)</td>
<td>1</td>
<td>7.68</td>
<td>0.0057</td>
</tr>
</tbody>
</table>

*designated as the reference category

Estimates of Fixed Effects

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Estimate</th>
<th>SE</th>
<th>DF</th>
<th>T value</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>0.1619</td>
<td>0.0432</td>
<td>164</td>
<td>3.75</td>
<td>0.0002</td>
</tr>
<tr>
<td>Time spent on Stroke Engine (hours)</td>
<td>0.0032</td>
<td>8.35E-6</td>
<td>739</td>
<td>6.52</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Intervention effect</td>
<td>-0.0086</td>
<td>0.0031</td>
<td>739</td>
<td>-2.77</td>
<td>0.0051</td>
</tr>
<tr>
<td>Baseline 1 &amp; 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intervention (Month 1, 2 &amp; 3)</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
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</table>
Table 5.3: Tests and estimates of fixed effects for ASSESSMENT questions

### Tests of Fixed Effects

<table>
<thead>
<tr>
<th>Effect</th>
<th>DF</th>
<th>F value</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (&lt;30 years; 31-35 years; 36-40 years; 41-50 years; &gt;50 years*)</td>
<td>4</td>
<td>0.35</td>
<td>0.8406</td>
</tr>
<tr>
<td>Discipline (PT; OT*)</td>
<td>1</td>
<td>0.57</td>
<td>0.4522</td>
</tr>
<tr>
<td>Degree of professional training in PT/OT</td>
<td>3</td>
<td>1.09</td>
<td>0.3545</td>
</tr>
<tr>
<td>Academic affiliation (yes; no*)</td>
<td>1</td>
<td>0.08</td>
<td>0.7821</td>
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<tr>
<td>Clinical experience with stroke clientele</td>
<td>2</td>
<td>1.12</td>
<td>0.3282</td>
</tr>
<tr>
<td>Number of stroke clients on typical daily caseload (&lt;2, 2-5, &gt;6*)</td>
<td>2</td>
<td>0.42</td>
<td>0.6563</td>
</tr>
<tr>
<td>Departmental funds for continuing education (yes; no*)</td>
<td>1</td>
<td>0.04</td>
<td>0.8347</td>
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<tr>
<td>Computer/internet access at work (yes; no*)</td>
<td>3</td>
<td>1.61</td>
<td>0.1856</td>
</tr>
<tr>
<td>Specialty certification re: stroke rehabilitation (yes; no*)</td>
<td>1</td>
<td>0.43</td>
<td>0.5100</td>
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<tr>
<td>Location of workplace (urban; suburban; rural*)</td>
<td>2</td>
<td>1.46</td>
<td>0.2333</td>
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<tr>
<td>Stroke rehabilitation research conducted on site (yes; no*)</td>
<td>1</td>
<td>0.21</td>
<td>0.6442</td>
</tr>
<tr>
<td>Presence of stroke unit/team on site (yes; no*)</td>
<td>1</td>
<td>0.36</td>
<td>0.5488</td>
</tr>
<tr>
<td>Protected work time for continuing education (yes; no*)</td>
<td>1</td>
<td>0.14</td>
<td>0.7126</td>
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<tr>
<td>Total time spent on Stroke Engine</td>
<td>1</td>
<td>22.54</td>
<td>&lt;.0001</td>
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<tr>
<td>Total time spent on usual continuing education</td>
<td>1</td>
<td>0.01</td>
<td>0.9329</td>
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<tr>
<td><strong>Intervention effect</strong> (Baseline 1 &amp; 2; Month 1, 2, 3*)</td>
<td>1</td>
<td>24.39</td>
<td>&lt;.0001</td>
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</table>

*designated as the reference category

### Estimates of Fixed Effects

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Estimate</th>
<th>SE</th>
<th>DF</th>
<th>T value</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>0.1337</td>
<td>0.0497</td>
<td>164</td>
<td>2.69</td>
<td>0.0079</td>
</tr>
<tr>
<td>Total time spent on Stroke Engine (hours)</td>
<td>0.0027</td>
<td>9.53E-6</td>
<td>739</td>
<td>4.75</td>
<td>&lt;.0001</td>
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<tr>
<td><strong>Intervention effect</strong></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baseline 1 &amp; 2</td>
<td>-0.0199</td>
<td>0.0040</td>
<td>739</td>
<td>-4.94</td>
<td>&lt;.0001</td>
</tr>
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<td>Intervention (Month 1, 2 &amp; 3)</td>
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<td>0</td>
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</table>
Table 5.4: Tests and estimates of fixed effects for TREATMENT questions

Tests of Fixed Effects

<table>
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<tr>
<th>Effect</th>
<th>DF</th>
<th>F value</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (&lt;30 years; 31-35 years; 36-40 years; 41-50 years; &gt;50 years*)</td>
<td>4</td>
<td>1.41</td>
<td>0.2273</td>
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<tr>
<td>Discipline (PT; OT*)</td>
<td>1</td>
<td>3.80</td>
<td>0.0516</td>
</tr>
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<td>Degree of professional training in PT/OT (Certificate; BSc; Prof. MSc.; MSc/PhD*)</td>
<td>3</td>
<td>0.35</td>
<td>0.7926</td>
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<td>Academic affiliation (yes; no*)</td>
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<td>0.20</td>
<td>0.6556</td>
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<td>Clinical experience with stroke clientele (0-3 years; 4-10 years; &gt;10 years*)</td>
<td>2</td>
<td>0.18</td>
<td>0.8318</td>
</tr>
<tr>
<td>Number of stroke clients on typical daily caseload (&lt;2, 2-5, &gt;6*)</td>
<td>2</td>
<td>0.94</td>
<td>0.3917</td>
</tr>
<tr>
<td>Departmental funds for continuing education (yes; no*)</td>
<td>1</td>
<td>0.23</td>
<td>0.6304</td>
</tr>
<tr>
<td>Computer/internet access at work (yes; no*)</td>
<td>3</td>
<td>1.89</td>
<td>0.1302</td>
</tr>
<tr>
<td>Specialty certification re: stroke rehabilitation (yes; no*)</td>
<td>1</td>
<td>0.13</td>
<td>0.7231</td>
</tr>
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<td>Location of workplace (urban; suburban; rural*)</td>
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<td>Stroke rehabilitation research conducted on site (yes; no*)</td>
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<td>0.02</td>
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<tr>
<td>Presence of stroke unit/team on site (yes; no*)</td>
<td>1</td>
<td>0.00</td>
<td>0.9551</td>
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<td>Protected work time for continuing education (yes; no*)</td>
<td>1</td>
<td>0.01</td>
<td>0.9321</td>
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<td>Total time spent on Stroke Engine</td>
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<tr>
<td>Total time spent on usual continuing education</td>
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<td>0.0432</td>
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<td>Intervention effect (Baseline 1 &amp; 2; Month 1, 2, 3*)</td>
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<td>9.31</td>
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</table>

*designated as the reference category

Estimates of Fixed Effects

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<th>Estimate</th>
<th>SE</th>
<th>DF</th>
<th>T value</th>
<th>Significance</th>
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<td>0.0505</td>
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<td>1.79</td>
<td>0.0747</td>
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<td>Discipline</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physical Therapy</td>
<td>0.0135</td>
<td>0.0069</td>
<td>739</td>
<td>1.95</td>
<td>0.0516</td>
</tr>
<tr>
<td>Occupational Therapy</td>
<td>0</td>
<td>0</td>
<td>.</td>
<td>.</td>
<td>.</td>
</tr>
<tr>
<td>Total time spent on usual education (hours)</td>
<td>0.0007</td>
<td>0.0004</td>
<td>2.03</td>
<td>0.0432</td>
<td></td>
</tr>
<tr>
<td>Total time spent on Stroke Engine (hours)</td>
<td>0.0037</td>
<td>9.25E-6</td>
<td>6.68</td>
<td>&lt;.0001</td>
<td></td>
</tr>
<tr>
<td>Intervention effect</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baseline 1 &amp; 2</td>
<td>-0.0181</td>
<td>0.0059</td>
<td>739</td>
<td>-3.05</td>
<td>0.0024</td>
</tr>
<tr>
<td>Intervention (Month 1, 2 &amp; 3)</td>
<td>0</td>
<td>0</td>
<td>.</td>
<td>.</td>
<td>.</td>
</tr>
</tbody>
</table>
Table 5.5 Percentage of OTs and PTs identifying each “evidence-based” critical problem for problem identification questions per time point

<table>
<thead>
<tr>
<th>“EVIDENCE-BASED” CRITICAL PROBLEMS</th>
<th>OCCUPATIONAL THERAPISTS (OTs)</th>
<th>PHYSICAL THERAPISTS (PTs)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Before intervention</td>
<td>During intervention</td>
</tr>
<tr>
<td></td>
<td>Baseline 1 (n=102)</td>
<td>Baseline 2 (n=102)</td>
</tr>
<tr>
<td>PERCEPTUAL DOMAIN- What potential perceptual limitation(s) if any, would you like to investigate with Mrs. P?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unilateral spatial neglect (USN)*</td>
<td>90%</td>
<td>83%</td>
</tr>
<tr>
<td>USN of personal, near/for extrapersonal space*</td>
<td>70%</td>
<td>10%</td>
</tr>
<tr>
<td>Hemianopsia*</td>
<td>24%</td>
<td>15%</td>
</tr>
<tr>
<td>Visual perception*</td>
<td>30%</td>
<td>35%</td>
</tr>
<tr>
<td>Visual function*</td>
<td>27%</td>
<td>6%</td>
</tr>
<tr>
<td>PHYSICAL DOMAIN- What potential physical limitation(s) if any, would you like to investigate with Mrs. P?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Apraxia</td>
<td>16%</td>
<td>4%</td>
</tr>
<tr>
<td>Motor control*</td>
<td>27%</td>
<td>19%</td>
</tr>
<tr>
<td>Manual dexterity*</td>
<td>16%</td>
<td>23%</td>
</tr>
<tr>
<td>Range of motion*</td>
<td>28%</td>
<td>37%</td>
</tr>
<tr>
<td>Strength*</td>
<td>55%</td>
<td>40%</td>
</tr>
<tr>
<td>Coordination*</td>
<td>40%</td>
<td>21%</td>
</tr>
<tr>
<td>Sensation*</td>
<td>38%</td>
<td>14%</td>
</tr>
<tr>
<td>Tone*</td>
<td>8%</td>
<td>14%</td>
</tr>
<tr>
<td>Proprioception*</td>
<td>33%</td>
<td>5%</td>
</tr>
<tr>
<td>Fine motor skills</td>
<td>no cue</td>
<td>no cue</td>
</tr>
<tr>
<td>Foot drop</td>
<td>no cue</td>
<td>11%</td>
</tr>
<tr>
<td>Shoulder subluxation</td>
<td>no cue</td>
<td>42%</td>
</tr>
<tr>
<td>FUNCTIONAL DOMAIN- What potential functional limitation(s) if any, would you like to investigate with Mrs. P?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Endurance</td>
<td>7%</td>
<td>3%</td>
</tr>
<tr>
<td>Fall risk</td>
<td>1%</td>
<td>3%</td>
</tr>
<tr>
<td>Balance</td>
<td>52%</td>
<td>11%</td>
</tr>
<tr>
<td>Safety</td>
<td>27%</td>
<td>16%</td>
</tr>
<tr>
<td>Ambulation*</td>
<td>68%</td>
<td>65%</td>
</tr>
<tr>
<td>Transfers*</td>
<td>18%</td>
<td>8%</td>
</tr>
<tr>
<td>Bilateral tasks/movements</td>
<td>50%</td>
<td>65%</td>
</tr>
<tr>
<td>Activities of daily living</td>
<td>36%</td>
<td>45%</td>
</tr>
<tr>
<td>Instrumental activities of daily living*</td>
<td>68%</td>
<td>33%</td>
</tr>
<tr>
<td>Driving*</td>
<td>45%</td>
<td>no cue</td>
</tr>
<tr>
<td>Stairs</td>
<td>7%</td>
<td>9%</td>
</tr>
<tr>
<td>Home environment/access</td>
<td>8%</td>
<td>17%</td>
</tr>
<tr>
<td>Leisure and participation*</td>
<td>9%</td>
<td>30%</td>
</tr>
<tr>
<td>Occupational performance*</td>
<td>22%</td>
<td>23%</td>
</tr>
<tr>
<td>Community reintegration*</td>
<td>2%</td>
<td>0%</td>
</tr>
<tr>
<td>Swallowing/dysphagia*</td>
<td>no cue</td>
<td>45%</td>
</tr>
<tr>
<td>Incontinence</td>
<td>no cue</td>
<td>55%</td>
</tr>
<tr>
<td>COGNITIVE DOMAIN- What potential cognitive limitation(s) if any, would you like to investigate with Mrs. P?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Communication*</td>
<td>3%</td>
<td>53%</td>
</tr>
<tr>
<td>Insight</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Judgment/impulsiveness*</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td>Attention*</td>
<td>82%</td>
<td>93%</td>
</tr>
<tr>
<td>Confabulation*</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Cognitive status (general)*</td>
<td>63%</td>
<td>55%</td>
</tr>
<tr>
<td>Memory*</td>
<td>98%</td>
<td>47%</td>
</tr>
<tr>
<td>Executive function*</td>
<td>1%</td>
<td>20%</td>
</tr>
<tr>
<td>PSYCHOSOCIAL DOMAIN- What potential psychosocial limitation(s) if any, would you like to investigate with Mrs. P?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Depression</td>
<td>47%</td>
<td>26%</td>
</tr>
<tr>
<td>Emotional status/affect</td>
<td>40%</td>
<td>2%</td>
</tr>
<tr>
<td>Caregiver burden*</td>
<td>23%</td>
<td>15%</td>
</tr>
<tr>
<td>Role change*</td>
<td>30%</td>
<td>14%</td>
</tr>
<tr>
<td>Interpersonal relationships*</td>
<td>9%</td>
<td>35%</td>
</tr>
<tr>
<td>Coping skills (stress/anger)*</td>
<td>45%</td>
<td>11%</td>
</tr>
<tr>
<td>Family support*</td>
<td>20%</td>
<td>23%</td>
</tr>
</tbody>
</table>

*Cues for these critical problems were presented identically in all case vignettes for their respective time points.
†These critical problems were classifiable under two domains (e.g. foot drop: physical & functional domain), thus were considered as “evidence-based” critical problems since a cue was present in the vignette (see Appendix 5.8. for these classifications)

NOTE: "No cue" indicates that the domain area was NOT represented in the problem identification questions for that respective time point.
Table 5.6: Percentage of clinicians indicating each “evidence-based” response to assessment questions per time point (for questions posed identically at baseline and intervention)

<table>
<thead>
<tr>
<th>ASSESSMENT QUESTIONS and EVIDENCE-BASED RESPONSES**</th>
<th>BASELINE</th>
<th>INTERVENTION</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Baseline 1 n=229</td>
<td>Baseline 2 n=229</td>
</tr>
<tr>
<td><strong>APPLIED EVIDENCE-BASED KNOWLEDGE</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. What are the possible advantages of using the Berg Balance Scale with Mrs. P/Mrs. F?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reliable</td>
<td>4%</td>
<td></td>
</tr>
<tr>
<td>Valid</td>
<td>7%</td>
<td></td>
</tr>
<tr>
<td>Responsive to clinical change</td>
<td>55%</td>
<td></td>
</tr>
<tr>
<td>Strong psychometric properties</td>
<td>3%</td>
<td></td>
</tr>
<tr>
<td>Standardized</td>
<td>9%</td>
<td></td>
</tr>
<tr>
<td>Recommended by best practice guidelines</td>
<td>4%</td>
<td></td>
</tr>
<tr>
<td>Stage of stroke recovery</td>
<td>0%</td>
<td></td>
</tr>
<tr>
<td>Floor/ceiling effect</td>
<td>0%</td>
<td></td>
</tr>
<tr>
<td>2. What are the possible advantages of using the Chedoke Arm and Hand Activity Inventory with Mrs. P/ Mr. P?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reliable</td>
<td>3%</td>
<td></td>
</tr>
<tr>
<td>Valid</td>
<td>11%</td>
<td></td>
</tr>
<tr>
<td>Responsive to clinical change</td>
<td>40%</td>
<td></td>
</tr>
<tr>
<td>Strong psychometric properties</td>
<td>2%</td>
<td></td>
</tr>
<tr>
<td>Standardized</td>
<td>8%</td>
<td></td>
</tr>
<tr>
<td>Recommended by best practice guidelines</td>
<td>3%</td>
<td></td>
</tr>
<tr>
<td>Stage of stroke recovery</td>
<td>1%</td>
<td></td>
</tr>
<tr>
<td>3a. Given Mrs. P/ Mr. P's apparent difficulty with scanning the environment on her left side, what would be the best screening tool to use?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clock Drawing Test</td>
<td>43%</td>
<td></td>
</tr>
<tr>
<td>Line Bisection Test†</td>
<td>38%</td>
<td></td>
</tr>
<tr>
<td>Draw-A-Man Test</td>
<td>6%</td>
<td></td>
</tr>
<tr>
<td>None of them</td>
<td>13%</td>
<td></td>
</tr>
<tr>
<td>3b. What are the advantages that guided your decision to use this unilateral spatial neglect screening tool?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reliable</td>
<td>3%</td>
<td></td>
</tr>
<tr>
<td>Valid</td>
<td>4%</td>
<td></td>
</tr>
<tr>
<td>Strong psychometric properties</td>
<td>3%</td>
<td></td>
</tr>
<tr>
<td>Standardized</td>
<td>3%</td>
<td></td>
</tr>
<tr>
<td>Recommended by best practice guidelines</td>
<td>5%</td>
<td></td>
</tr>
<tr>
<td>Stage of stroke recovery</td>
<td>0%</td>
<td></td>
</tr>
<tr>
<td>Not a complex task that measures other constructs</td>
<td>0%</td>
<td></td>
</tr>
<tr>
<td>4a. What would be the best screening tool to use to screen for the presence of post-stroke depression with Mr. J/Mr. T?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hospital Anxiety and Depression Scale† (at Baseline 2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stroke Aphasic Depression Questionnaire† (at Month 2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Montgomery Asberg Depression Rating Scale</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beck Depression Index</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aphasic Depression Rating Scale</td>
<td></td>
<td></td>
</tr>
<tr>
<td>None of the above</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not sure</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### 4b. What are the advantages that guided your decision to use this depression screening tool?

<table>
<thead>
<tr>
<th>Advantage</th>
<th>Baseline 1 n=229</th>
<th>Baseline 2 n=229</th>
<th>Month 1 n=226</th>
<th>Month 2 n=227</th>
<th>Month 3 n=215</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reliable</td>
<td>0%</td>
<td>2%</td>
<td>0%</td>
<td>0%</td>
<td>1%</td>
</tr>
<tr>
<td>Valid</td>
<td>0%</td>
<td>1%</td>
<td>3%</td>
<td>7%</td>
<td>11%</td>
</tr>
<tr>
<td>Responsive to clinical change</td>
<td>1%</td>
<td>0%</td>
<td>3%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Strong psychometric properties</td>
<td>1%</td>
<td>0%</td>
<td>5%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Standardized</td>
<td>0%</td>
<td>2%</td>
<td>3%</td>
<td>2%</td>
<td>4%</td>
</tr>
<tr>
<td>Recommended by best practice guidelines</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>5%</td>
</tr>
<tr>
<td>Stage of stroke recovery</td>
<td>1%</td>
<td>0%</td>
<td>1%</td>
<td>4%</td>
<td>14%</td>
</tr>
</tbody>
</table>

### 5. What are the possible advantages of using the Timed Up and Go/ Five Minute Walk Test with Mr. J/Mrs. F?

<table>
<thead>
<tr>
<th>Advantage</th>
<th>Baseline 1 n=229</th>
<th>Baseline 2 n=229</th>
<th>Month 1 n=226</th>
<th>Month 2 n=227</th>
<th>Month 3 n=215</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reliable</td>
<td>3%</td>
<td>10%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Valid</td>
<td>1%</td>
<td>11%</td>
<td>1%</td>
<td>0%</td>
<td>2%</td>
</tr>
<tr>
<td>Responsive to clinical change</td>
<td>25%</td>
<td>32%</td>
<td>22%</td>
<td>32%</td>
<td>35%</td>
</tr>
<tr>
<td>Strong psychometric properties</td>
<td>3%</td>
<td>10%</td>
<td>2%</td>
<td>2%</td>
<td>4%</td>
</tr>
<tr>
<td>Standardized</td>
<td>2%</td>
<td>4%</td>
<td>2%</td>
<td>2%</td>
<td>4%</td>
</tr>
<tr>
<td>Recommended by best practice guidelines</td>
<td>3%</td>
<td>5%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Stage of stroke recovery</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>High sensitivity</td>
<td>0%</td>
<td>2%</td>
<td>1%</td>
<td>1%</td>
<td>2%</td>
</tr>
</tbody>
</table>

### GENERAL EVIDENCE-BASED KNOWLEDGE

### 6. What is the difference between a screening tool and assessment tool?

<table>
<thead>
<tr>
<th>Feature</th>
<th>Baseline 1</th>
<th>Baseline 2</th>
<th>Month 1</th>
<th>Month 2</th>
<th>Month 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Detect presence versus absence of deficit</td>
<td>43%</td>
<td>75%</td>
<td>0%</td>
<td>75%</td>
<td>75%</td>
</tr>
<tr>
<td>Identify need for assessment</td>
<td>51%</td>
<td>83%</td>
<td>0%</td>
<td>83%</td>
<td>83%</td>
</tr>
<tr>
<td>Detect clinical change</td>
<td>3%</td>
<td>22%</td>
<td>0%</td>
<td>22%</td>
<td>22%</td>
</tr>
<tr>
<td>Classify/stratify severity of deficit</td>
<td>3%</td>
<td>11%</td>
<td>0%</td>
<td>11%</td>
<td>11%</td>
</tr>
<tr>
<td>Provides a detailed assessment</td>
<td>1%</td>
<td>19%</td>
<td>0%</td>
<td>19%</td>
<td>19%</td>
</tr>
</tbody>
</table>

### 7. What do the Canadian Best Practice Guidelines for Stroke suggest about the timing of dysphagia assessment?

<table>
<thead>
<tr>
<th>Assessment</th>
<th>Baseline 1</th>
<th>Baseline 2</th>
<th>Month 1</th>
<th>Month 2</th>
<th>Month 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assess with reliable/valid screening tool</td>
<td>2%</td>
<td>12%</td>
<td>4%</td>
<td>12%</td>
<td>12%</td>
</tr>
<tr>
<td>Referral for OT/SLP</td>
<td>8%</td>
<td>15%</td>
<td>6%</td>
<td>15%</td>
<td>15%</td>
</tr>
<tr>
<td>Referral for dietary assessment</td>
<td>2%</td>
<td>10%</td>
<td>2%</td>
<td>10%</td>
<td>10%</td>
</tr>
<tr>
<td>Assess early</td>
<td>17%</td>
<td>35%</td>
<td>6%</td>
<td>35%</td>
<td>35%</td>
</tr>
<tr>
<td>No oral intake prior to assessment</td>
<td>6%</td>
<td>22%</td>
<td>2%</td>
<td>22%</td>
<td>22%</td>
</tr>
<tr>
<td>Use of Toronto Bedside Swallowing Screening Test</td>
<td>2%</td>
<td>1%</td>
<td>3%</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td>Existing best practice guidelines for assessment</td>
<td>3%</td>
<td>12%</td>
<td>0%</td>
<td>12%</td>
<td>12%</td>
</tr>
</tbody>
</table>

*Hospital Anxiety and Depression Scale is the best "evidence-based" response at Baseline 2, given that the presence of aphasia was not mentioned in the respective case vignette. Stroke Aphasic Depression Questionnaire is the best "evidence-based" response at Month 2, given that the presence of aphasia post-stroke was depicted in the respective case vignette as follows: "You observe that Mr. T has difficulty expressing ideas and is often searching for words, making the conversation difficult. For words that he cannot pronounce, he tries to scribble them on a notepad using his non-dominant left hand. You find yourself using simple language and speaking slightly slower than you usually would."

**Best "evidence-based" response**

NOTE: “Not a response option” indicates that the response option was not available for the question at that respective time point. DARKENED cells indicate that the assessment question was NOT posed for that respective time point.

**Each clinician was counted only once for each "evidence-based" response but they could have provided one or more "evidence-based responses for a given question**
Table 5.7: Percentage of clinicians indicating each “evidence-based” response to treatment questions per time point (for questions posed identically at baseline and intervention)

<table>
<thead>
<tr>
<th>TREATMENT QUESTIONS and EVIDENCE-BASED RESPONSES</th>
<th>BASELINE</th>
<th>INTERVENTION</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Baseline 1 n=229</td>
<td>Baseline 2 n=229</td>
</tr>
<tr>
<td>APPLIED EVIDENCE-BASED KNOWLEDGE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Is functional electrical stimulation effective for improving shoulder pain for Mr. J/Mr. T?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Effectiveness*</td>
<td>10%</td>
<td>49%</td>
</tr>
<tr>
<td>Stage of stroke recovery</td>
<td>1%</td>
<td>13%</td>
</tr>
<tr>
<td>Level of evidence</td>
<td>0%</td>
<td>10%</td>
</tr>
<tr>
<td>Recommended by best practice guidelines</td>
<td>8%</td>
<td>19%</td>
</tr>
<tr>
<td>Appropriate for Mr. J/Mr. T</td>
<td>9%</td>
<td>7%</td>
</tr>
<tr>
<td>2. Is task-oriented training effective for improving upper/lower extremity motor function for Mr. J/Mr. P?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Effectiveness</td>
<td>23%</td>
<td>30%</td>
</tr>
<tr>
<td>Stage of stroke recovery</td>
<td>0%</td>
<td>30%</td>
</tr>
<tr>
<td>Level of evidence</td>
<td>0%</td>
<td>13%</td>
</tr>
<tr>
<td>Recommended by best practice guidelines</td>
<td>5%</td>
<td>8%</td>
</tr>
<tr>
<td>Appropriate for Mr. J/Mrs. P</td>
<td>6%</td>
<td>9%</td>
</tr>
<tr>
<td>3. Is acupuncture effective for improving ambulation for Mrs. P/Mr. P?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Effectiveness</td>
<td>7%</td>
<td></td>
</tr>
<tr>
<td>Stage of stroke recovery</td>
<td>0%</td>
<td></td>
</tr>
<tr>
<td>Level of evidence</td>
<td>0%</td>
<td></td>
</tr>
<tr>
<td>Recommended by best practice guidelines</td>
<td>5%</td>
<td></td>
</tr>
<tr>
<td>Appropriate for Mrs. P/Mr. P</td>
<td>0%</td>
<td></td>
</tr>
<tr>
<td>4. Is constraint-induced movement therapy effective for improving upper extremity function for Mrs. P/Mr. T?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Effectiveness</td>
<td>44%</td>
<td>29%</td>
</tr>
<tr>
<td>Stage of stroke recovery</td>
<td>3%</td>
<td>19%</td>
</tr>
<tr>
<td>Level of evidence</td>
<td>0%</td>
<td>3%</td>
</tr>
<tr>
<td>Recommended by best practice guidelines</td>
<td>10%</td>
<td></td>
</tr>
<tr>
<td>Appropriate for Mrs. P/Mr. T</td>
<td>28%</td>
<td></td>
</tr>
<tr>
<td>5. Is mirror therapy/motor imagery effective for improving lower extremity for Mr. J/Mr. T?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Effectiveness</td>
<td>11%</td>
<td>28%</td>
</tr>
<tr>
<td>Stage of stroke recovery</td>
<td>2%</td>
<td>4%</td>
</tr>
<tr>
<td>Level of evidence</td>
<td>0%</td>
<td>6%</td>
</tr>
<tr>
<td>Recommended by best practice guidelines</td>
<td>4%</td>
<td>16%</td>
</tr>
<tr>
<td>Appropriate for Mr. J/Mr. T</td>
<td>3%</td>
<td>3%</td>
</tr>
<tr>
<td>6. Is body-weight supported treadmill training effective for improving balance for Mrs. P/Mrs. F?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Effectiveness</td>
<td>3%</td>
<td>34%</td>
</tr>
<tr>
<td>Stage of stroke recovery</td>
<td>0%</td>
<td>20%</td>
</tr>
<tr>
<td>Level of evidence</td>
<td>1%</td>
<td>3%</td>
</tr>
<tr>
<td>Recommended by best practice guidelines</td>
<td>4%</td>
<td>19%</td>
</tr>
<tr>
<td>Appropriate for Mrs. P/Mrs. F</td>
<td>5%</td>
<td>18%</td>
</tr>
<tr>
<td>GENERAL EVIDENCE-BASED KNOWLEDGE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7a. Are there any strategies that patients can use to compensate for their physical limitations (i.e. hemiparesis) during sexual activity?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>40%</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>17%</td>
<td></td>
</tr>
<tr>
<td>Not sure</td>
<td>44%</td>
<td></td>
</tr>
</tbody>
</table>
### 7b. What strategies can patients use to compensate for their physical limitations (i.e. hemiparesis) during sexual activity?

<table>
<thead>
<tr>
<th></th>
<th>Baseline 1 n=229</th>
<th>Baseline 2 n=229</th>
<th>Month 1 n=226</th>
<th>Month 2 n=227</th>
<th>Month 3 n=215</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attempt alternate sexual positions</td>
<td>28%</td>
<td></td>
<td></td>
<td></td>
<td>42%</td>
</tr>
<tr>
<td>Communicate with partner</td>
<td>8%</td>
<td></td>
<td></td>
<td></td>
<td>6%</td>
</tr>
<tr>
<td>Energy conservation techniques</td>
<td>0%</td>
<td></td>
<td></td>
<td></td>
<td>5%</td>
</tr>
<tr>
<td>Medications</td>
<td>2%</td>
<td></td>
<td></td>
<td></td>
<td>3%</td>
</tr>
<tr>
<td>Sexual aids/devices</td>
<td>3%</td>
<td></td>
<td></td>
<td></td>
<td>2%</td>
</tr>
<tr>
<td>Sexual education</td>
<td>3%</td>
<td></td>
<td></td>
<td></td>
<td>6%</td>
</tr>
<tr>
<td>Other forms of intimacy</td>
<td>0%</td>
<td></td>
<td></td>
<td></td>
<td>2%</td>
</tr>
</tbody>
</table>

† Each clinician was counted only once for each “evidence-based” response but they could have provided one or more “evidence-based” responses for a given question.

*See Appendix 5.5 for best “evidence-based” response in regards to effectiveness for treatment questions per time point.

NOTE: DARKENED cells indicate that the treatment question was NOT posed for that respective time point.
Figures
Figure 3.1: Flowchart of study selection

Potentially relevant studies identified:
MEDLINE, CINAHL, AMED, EBM Reviews and databases specific to rehabilitation
n = 3104

Duplicate
n = 39

Potentially relevant studies
n = 3065

Studies excluded by titles and abstracts:
Not relevant by population, intervention or outcome
n = 3023

Potentially relevant studies
n = 42

Studies excluded by full text review:
Not relevant by population: n = 8
Not relevant by intervention: n = 12
Not relevant by outcome: n = 7
Not relevant by language: n = 3

RELEVANT STUDIES
n = 12
Figure 4.1: Stroke Engine-Intervention homepage (accessible from www.strokengine.ca)
Figure 4.2: Stroke Engine-Assess homepage (accessible from www.strokengine.ca)
Figure 4.3: *Quick Review* section of Virtual Reality module (upper extremity)

FACILITATOR: Information on each outcome listed (i.e. immersive/non-immersive virtual reality) conveniently appears on one webpage.

![Quick Review section of Virtual Reality module (upper extremity)](image)

Figure 4.4: *In-Depth Review* section of Virtual Reality module (upper extremity)

BARRIER: Information on each outcome listed (i.e. immersive/non-immersive virtual reality)
appears on separate webpages. User needs to click on left menu bar to retrieve information.
Figure 5.1: Flowchart of study participants

1673 contacted
- 117 refused
  - 849 not eligible
    - < 2 patients with stroke on caseload = 381
    - No internet/computer during study = 5
    - < 3 months experience = 462
    - Involved in another research study = 1
  - 80 not traceable
  - 300 reached quota (no longer traced)
  - 327 agreed to participate
    - 60 withdrew after receiving Questionnaire at Baseline 1
    - 10 withdrew after receiving Questionnaire at Baseline 2
    - 9 withdrew after receiving Questionnaire at Month 1
    - 8 withdrew after receiving Questionnaire at Month 2
    - 11 withdrew after receiving Questionnaire at Month 3
    - 229 completed the study
- 300 reached quota (no longer traced)
- 117 refused
- 849 not eligible
- 80 not traceable
- 327 agreed to participate
Figure 5.2: Proportion of "evidence-based" responses for the TOTAL Questionnaire by participants per time point

NOTE: Maximum number of "evidence-based" responses per total Questionnaire varied slightly at each time point: 125 for Baseline 1; 114 for Baseline 2; 121 for Month 1; 140 for Month 2; 117 for Month 3.
Figure 5.3: Proportion of "evidence-based" critical problems* identified for PROBLEM IDENTIFICATION questions by participants per time point

*NOTE: Maximum number of "evidence-based" critical problems varied slightly at each time point: 32 for Baseline 1 (representing 26% of maximum number of "evidence-based responses for the total Questionnaire); 34 for Baseline 2 (30%); 32 for Month 1 (27%); 39 for Month 2 (28%); 30 for Month 3 (26%).

**Problem identification questions were posed on five key domain areas: functional, perception, cognitive, physical and psychosocial (in line with International Classification of Functioning, Disability and Health Care Sets for Stroke**

---

**Proportion of "evidence-based" critical problems identified**

- <20%
- 20-30%
- 31-40%
- >40%

**Time point**

Before intervention | During intervention

Baseline 1 (n=229) | Baseline 2 (n=229) | Month 1 (n=226) | Month 2 (n=227) | Month 3 (n=215)

Proportion of participants

- Baseline 1: mean=27%, SD=10%
- Baseline 2: mean=28%, SD=10%
- Month 1: mean=23%, SD=11%
- Month 2: mean=26%, SD=11%
- Month 3: mean=32%, SD=14%
Figure 5.3a: Proportion of "evidence-based" critical problems* identified related to FUNCTION by participants per time point

*Based on specific cues related to function in each patient case vignette

NOTE: Maximum number of "evidence-based" critical problems specific to function varied slightly at each time point: 16 for Baseline 1 (representing 13% of maximum number of "evidence-based responses for the total Questionnaire); 16 for Baseline 2 (14%); 17 for Month 1 (14%); 16 for Month 2 (11%); 18 for Month 3 (15%).
Figure 5.3b: Proportion of "evidence-based" critical problems* identified related to PERCEPTION by participants per time point

Proportion of participants

Before intervention | During intervention

Baseline 1 (n=229) | Month 1 (n=226) | Month 3 (n=215)

*Based on specific cues related to perception in each patient case vignette

NOTE: Maximum number of "evidence-based" critical problems specific to perception remained the same at each time point: 5 for Baseline 1 (representing 4% of maximum number of "evidence-based responses for the total Questionnaire); 5 for Month 1 (4%); 5 for Month 3 (4%).
Figure 5.3c: Proportion of "evidence-based" critical problems identified related to COGNITION by participants per time point

Proportion of "evidence-based" critical problems identified

- <20%
- 20-30%
- 31-40%
- >40%

Baseline 2 (n=229) Month 3 (n=215)

Before intervention  During intervention

*Based on specific cues related to cognition in each patient case vignette

NOTE: Maximum number of "evidence-based" critical problems specific to cognition varied slightly at each time point 8 for Baseline 2 (representing 7% of maximum number of "evidence-based responses for the total Questionnaire); 7 for Month 3 (6%).
Figure 5.3d: Proportion of "evidence-based" critical problems* identified related to PHYSICAL limitations by participants per timepoint

*Based on specific cues related to physical limitations in each patient case vignette

NOTE: Maximum number of "evidence-based" critical problems specific to physical limitations varied slightly at each time point: 11 for Baseline 1 (representing 9% of maximum number of "evidence-based responses for the total Questionnaire); 13 for Month 2 (9%).
Figure 5.3e: Proportion of "evidence-based" critical problems* identified related to PSYCHOSOCIAL limitations by participants per time point

*Based on specific cues related to psychosocial limitations in each patient case vignette

NOTE: Maximum number of "evidence-based" critical problems specific to psychosocial limitations remained the same at each time point: 10 for Baseline 2 (representing 9% of maximum number of "evidence-based responses for the total Questionnaire); 10 for Month 1 (8%); 10 for Month 2 (7%).
Proportion of "evidence-based" responses for ASSESSMENT questions by participants per time point

Before intervention
Baseline 1 (n=229)
Baseline 2 (n=229)
Month 1 (n=226)
Month 2 (n=227)
Month 3 (n=215)

During intervention

NOTE: Maximum total number of "evidence-based" responses for assessment questions varied slightly at each time point: 67 for Baseline 1 (representing 54% of maximum number of "evidence-based responses for the total Questionnaire); 50 for Baseline 2 (54%); 61 for Month 1 (50%); 69 for Month 2 (49%); 55 for Month 3 (47%).
Figure 5.5: Proportion of "evidence-based" responses for TREATMENT questions by participants per time point

NOTE: Maximum total number of "evidence-based" responses for treatment questions varied slightly at each time point: 26 for Baseline 1 (representing 21% of maximum number of "evidence-based responses for the total Questionnaire); 30 for Baseline 2 (26%); 28 for Month 1 (23%); 32 for Month 2 (23%); 32 for Month 3 (27%).
Figure 5.6: Clinicians’ total time spent on Stroke Engine per month during the intervention

- Mean = 2.05 hours, SD = 2.06
- Mean = 2.71 hours, SD = 2.86
- Mean = 2.12 hours, SD = 2.43
Figure 5.7: Clinicians' total time spent on usual continuing education activities per time point

NOTE: Time spent on usual educational activities excludes Stroke Engine use
Figure 5.8: Interactive learning module for Unilateral Spatial Neglect (USN)
Appendices
Appendix 3.1: Specific search strategies

Ovid MEDLINE(R): 1950 to June Week 1 2008
1) exp Clinical Competence/ or exp Knowledge/ or exp Information Dissemination/ or knowledge translation.mp. or exp "Diffusion of Innovation”/ or exp Health Knowledge, Attitudes, Practice/
2) exp Evidence-Based Medicine/ or evidence-based practice.mp.
3) exp Practice Guidelines as Topic/ or exp Guideline Adherence/ or guidelines adherence.mp.
4) exp Professional Practice/ or exp Physician's Practice Patterns/ or practice patterns.mp.
5) exp Education, Medical/ or exp Education, Continuing/ or exp Competency-Based Education/ or exp Education, Professional/ or exp Education, Distance/ or exp Education, Professional, Retraining/ or exp Education, Medical, Continuing/
6) competency.mp. or exp Competency-Based Education/
7) 1 or 2 or 3 or 4 or 5 or 6
8) exp "Physical Therapy (Specialty)”/ or exp Physical Therapy Modalities/ or physical therapy.mp.
9) occupational therapy.mp. or exp Occupational Therapy/
10) 8 or 9
11) 7 and 10

CINAHL - Cumulative Index to Nursing & Allied Health Literature: 1982 to June Week 2 2008
1) exp "Diffusion of Innovation”/ or exp Professional Knowledge/ or knowledge translation.mp.
2) evidence-based practice.mp. or exp Professional Practice, Evidence-Based/
3) practice patterns.mp. or exp Practice Patterns/
4) exp Professional Compliance/ or exp Practice Guidelines/ or exp Professional Practice/ or guideline adherence.mp.
5) competence.mp. or exp PROFESSIONAL COMPETENCE/ or exp CLINICAL COMPETENCE/
6) exp EDUCATION, MEDICAL, CONTINUING/ or exp EDUCATION, CONTINUING/ or exp EDUCATION, OCCUPATIONAL THERAPY/ or exp EDUCATION, PHYSICAL THERAPY/ or exp EDUCATION, ALLIED HEALTH/ or exp EDUCATION, COMPETENCY-BASED/
7) occupational therapy.mp. or exp Occupational Therapy/
8) physical therapy.mp. or exp Physical Therapy/
9) 1 or 2 or 3 or 4 or 5 or 6
10) 7 or 8
11) 9 and 10

AMED (Allied and Complementary Medicine) 1985 to June 2008
1) knowledge translation.mp.
2) exp Evidence based medicine/ or evidence-based practice.mp.
3) exp Professional competence/
4) exp Education continuing/ or continuing education.mp.
5) guideline adherence.mp. or exp practice guidelines/
6) practice patterns.mp.
7) exp Occupational therapy/ or occupational therapy.mp.
8) exp Physiotherapy/ or physiotherapy.mp.
9) 1 or 2 or 3 or 4 or 5 or 6
10)7 or 8
11)9 and 10

All EBM Reviews (from inception to June 2008)- Cochrane DSR, ACP Journal Club, DARE, and CCTR
1) knowledge translation.mp.
2) evidence-based practice.mp.
3) professional education.mp.
4) continuing education.mp.
5) competency.mp.
6) guideline adherence.mp.
7) occupational therapy.mp.
8) physical therapy.mp.
9) physiotherapy.mp.
10)1 or 2 or 3 or 4 or 5 or 6
11)7 or 8 or 9
12)10 and 11

Databases specific to rehabilitation (from inception to June 2008)- Physiotherapy Evidence Database, Occupational Therapy Seeker, and Research and Development Resource Base
Key terms used: knowledge translation, evidence-based practice, continuing education, competency, guideline adherence, practice patterns, professional practice
Appendix 4.1: Consent form

CONSENT TO PARTICIPATE IN RESEARCH STUDY

Title of study: Usability testing of a stroke rehabilitation e-learning resource

Principal Investigators:
Sharon E. Straus MD MSc FRCPC
St. Michael’s Hospital, Li Ka Shing Knowledge Institute
193 Yonge Street, 6th floor
Toronto ON M5B 1W8
Tel: 416 864 3068
Availability: Monday to Friday 9:00am-5:00pm

Nicol Korner-Bitensky, PhD, OT
School of Physical and Occupational Therapy, McGill University
3630 Promenade Sir-William-Osler,
Montreal QC H3G 1Y5
Tel: 514 398 5457
Availability: Monday to Friday 9:00am-5:00pm

Graduate Student:
Anita Menon, PhD Candidate
St. Michael’s Hospital, Li Ka Shing Knowledge Institute
193 Yonge Street, 6th floor
Toronto ON M5B 1W8
Tel: 514 831 2915
Availability: Monday to Friday 9:00am-5:00pm

Sponsor/Funding: Canadian Institutes of Health Research

Introduction
You are being invited to participate in a research study. Before agreeing to participate, it is important that you read and understand the following explanation of the proposed study procedures. The following information describes the purpose, procedures, benefits and risks associated with the study. It also describes your right to refuse to participate or withdraw from the study at any time. To decide whether you wish to participate in this research study, you should understand enough about its risks and benefits to be able to make an informed decision. This is known as the informed consent process. Please make sure all of your questions have been answered to your satisfaction before signing this document.

Purpose of the research
An interactive e-learning resource was created to provide rehabilitation clinicians with evidence-based
summary statements on the effectiveness of rehabilitation interventions and psychometric properties of assessment tools. As an occupational therapist or physical therapist working in stroke rehabilitation, you are being invited to participate in a research study where you will provide us with your valuable feedback on the usability of this e-learning resource and factors that enhance or impair its use.

**Description of the research**
If you agree to participate, you will be requested to attend one 1.5-hour session at a designated computer lab at St. Michael’s Hospital (193 Yonge Street, Toronto, ON, M5B 1M8). This session can be scheduled at a date and time that is convenient for you, outside of your work hours.

On the day of your session, you will be requested to sit in front of a computer. You will sign the consent form and a copy of this signed form will be provided to you. You will then respond to a questionnaire that has four sections. The first section includes general questions about yourself, such as your age, years of clinical experience, type of work setting, etc. The second section includes one case study describing a typical patient with stroke and five clinical questions. You will be asked to independently search and retrieve information on stroke-related assessments and treatments by using the e-learning resource in order to answer those clinical questions. Here is an example of a question: “Is limb activation therapy effective for treating unilateral spatial neglect post-stroke?” The third and fourth sections include feedback questions about the e-learning resource. We are not interested in the accuracy of your answers but rather the process and effort involved in how you obtained answers by navigating through the resource. For three sections of the questionnaire, you will write down your answers and for one section, you will say your answers out loud as well as provide verbal feedback about the resource. Your answers will be tape recorded. The tape recordings will be used only for study purposes and shall remain confidential; this means that identifying information will never be abstracted from the tape recordings and publications/presentations resulting from this study will be free of unique identifiers.

**Potential harms (injury, discomfort, or inconvenience)**
There are no foreseeable risks to participating in this study. If you decide to decline this invitation or withdraw from the study at any time, you will not experience any negative consequences. The information collected during the study will only be used for research purposes.

**Potential benefits**
You may not benefit personally from participating in this study. However, your valuable input will help refine and ready the e-learning resource to be used in a large-scale implementation study. Your feedback will also help us prepare a continuing educational tool that is functional for stroke rehabilitation clinicians.

**Protecting your personal information and rights as a research participant**
All data will be kept completely confidential. There will be no unique identifiers used (i.e. names, addresses, etc.) that could link your identity to any of the information that you will provide. You will be assigned a study ID number in order to de-identify your data and maintain confidentiality. The information collected will be viewed by only the research team and research assistants. Your name will not be identified in any report or publication. All tape recordings will be deleted five years after study completion (2016). All research on human volunteers is reviewed by a committee that works to protect your rights and welfare.
Compensation for Injury
If you suffer a physical injury from participation in this study, medical care will be provided to you in the same manner as you would ordinarily obtain any other medical treatment. In no way does signing this form waive your legal rights nor release the study doctor(s), sponsors or involved institutions from their legal and professional responsibilities.

Participation and Withdrawal
Participation in any research study is voluntary. If you choose not to participate, you and your family will continue to have access to customary care at St. Michael’s Hospital. If you decide to participate in this study you can change your mind without giving a reason, and you may withdraw from the study at any time without any effect on the care you or your family will receive at St. Michael’s Hospital. Withdrawal from the study includes withdrawal of any of your data compiled up to that point.

Study results
You will be informed of the study results when the research study is completed and its results are disseminated as a publication in a peer-reviewed medical journal.

Potential costs of participation and reimbursement to participant
You will be reimbursed for travel expenses to and from St. Michael’s Hospital (e.g. taxi fares, bus/subway, and parking). Complimentary refreshments will be offered before and after the test session.

Research Ethics Board Contacts
If you have questions or concerns about your rights as a research subject you may contact, anonymously if you wish, Dr. J. Spence, Chair of St. Michael’s Hospital Research Ethics Board at (416) 864-6060 x 2557 during business hours.

The study protocol and consent form have been reviewed by a committee called the Research Ethics Board at St. Michael’s Hospital. The Research Ethics Board is a group of scientists, medical staff, individuals from other backgrounds (including law and ethics), as well as members from the community. The committee is established by the hospital to review studies for their scientific and ethical merit. The Board pays special attention to the potential harms and benefits involved in participation to the research participant, as well as the potential benefit to society.

This committee is also required to do periodic review of ongoing research studies. As part of this review, someone may contact you from the Research Ethics Board to discuss your experience in the research study.
Signature page

Title of study: Usability testing of a stroke rehabilitation e-learning resource

Principal Investigators:
Sharon E. Straus MD MSc FRCPC
St. Michael’s Hospital, Li Ka Shing Knowledge Institute
193 Yonge Street, 6th floor
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School of Physical and Occupational Therapy, McGill University
3630 Promenade Sir-William-Osler,
Montreal QC H3G 1Y5
Tel: 514 398 5457
Availability: Monday to Friday 9:00am-5:00pm

I, ________________________, agree to participate in the study described above. The research study has been explained to me, and my questions have been answered to my satisfaction. I have the right not to participate, as well as the right to withdraw at any time without experiencing negative consequences. The potential harms and benefits of participating in this research study have been explained to me.

I have been told that I have not waived my legal rights nor released the investigators, sponsors, or involved institutions from their legal and professional responsibilities. I know that I may ask now, or in the future, any questions that I have about the study. I give permission to the research team to use information collected during the study for research purposes only. I understand that every effort will be made to protect my privacy as a participant and that the information collected will be only viewed by the research team and research assistants. I understand the procedures of the study and willingly give my consent to participate. I have been told that I will be given a signed copy of this consent form.

________________________________________
Participant’s Printed Name

________________________________________
Participant’s Signature                              Date

I ______________________ hereby certify that I have explained to ______________________ the nature of the study and the benefits and known risks of participating in it, and that they have the option of withdrawing from the study at any time.

________________________________________
Signature of Person Obtaining Consent               Date
Appendix 4.2: Recruitment form

Name ____________________________ ID _____________ Phone ______________

RECRUITMENT FORM

Hello I’m Anita Menon from the University of Toronto. Our group has created a website for occupational therapists and physical therapists working in stroke. So could we just verify that you are…

Currently working as a physiotherapist/occupational therapist?  YES NO
Working with a stroke clientele?

If YES to all of the above questions: In that case, we would like to invite you to provide us with some feedback about our stroke website. The session will last about 1.5 hours. You will be reimbursed $50 to cover any travel expenses. The session will take place at St. Michael’s Hospital. There is nothing to prepare beforehand. I will be interested to hear clinicians’ thoughts on the website on March 10th, 11th, and 12th: would you like to participate and if so, does one of these dates work for you?

If refuses: Would you be willing to explain your reason for refusal? Thank you for your time.

____________________________________________________________________________

If accepts: Excellent! Let’s schedule a good date and time for you. Your session is scheduled for DATE and TIME and will take place at 193 Yonge Street, 6th floor, Toronto ON, M5B 1M8. I will be there to greet you. In terms of parking, the most convenient place is Eaton Centre, located on Yonge Street (entrance from Shuter Street).

Session Date: ___________________________   Session Time:_____________

Before I let you go, there are three questions that I would like to ask:

What is your primary work setting?   Acute Care ☐ In-patient Rehabilitation ☐ Out-patient Rehabilitation ☐

How comfortable are you with using a computer? Very comfortable ☐ Somewhat comfortable ☐ Not very comfortable ☐

How comfortable are you with browsing the Internet? Very comfortable ☐ Somewhat comfortable ☐ Not very comfortable ☐

Do you have an email where I can send you confirmation about the date and time of your session? Is this the phone number I should use to reach you?

Yes ___ Sometimes ___ No ____ If no/sometimes when? _______________

Email address:__________________________   Phone number #2: ________________

Do you have any questions? Great, thanks so much for your time.

NOTE:
• If the individual asks how you got their name: they were randomly sampled from a list of therapists working with a stroke clientele from the Greater Toronto Area who were registered at the College of Occupational Therapists of Ontario and the College of Physiotherapists of Ontario. Their office telephone numbers were also provided.
• This study has been reviewed by the St. Michael’s Hospital Research Ethics Office/University of Toronto.
• Your responses will be kept confidential.
Appendix 4.3: Ethics certificate

August 11, 2009

Dr. Sharon E. Straus,
Department of Medicine,
St Michael’s Hospital

Dear Dr. Straus,

Re: REB# 09-197c - Usability testing of a stroke rehabilitation E-learning resource

<table>
<thead>
<tr>
<th>REB APPROVAL:</th>
<th>Original Approval Date</th>
<th>Annual/Interval Review Date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>August 11, 2009</td>
<td>August 11, 2010</td>
</tr>
</tbody>
</table>

Thank you for your application submitted on July 14, 2009. The above noted study has been reviewed through an expedited/delegated process (not by Full Board review). The views of the St. Michael’s Hospital (SMH) Research Ethics Board (REB) have been documented and resolved.

The REB approves the study as it is found to comply with relevant research ethics guidelines, as well as the Ontario Personal Health Information Protection Act (PHIPA), 2004. The REB hereby issues approval for the above named study for a period of 12 months from the date of this letter. Continuation beyond that date will require further review of REB approval. In addition, the following documents have been reviewed and are hereby approved:

1. Protocol
2. Recruitment Sheet
3. General Information Sheet
4. Clinical Questions
5. Tester Instructions and script

During the course of this investigation, any significant deviations from the approved protocol and/or unanticipated developments or significant adverse events should immediately be brought to the attention of the REB.

This letter serves as approval by the SMH REB for conduct of this study; however, additional approvals are required as outlined on the Office of Research Administration Authorization Check List form. Enclosed is a copy of this check list and REB authorization is in the appropriate space. Also, the Clinical Trial Agreements have to be submitted to the Office of Research Administration for review and approval. The remainder of the approvals must be coordinated through the Office of Research Administration prior to initiation of this research. All drug dispensing must be coordinated through the Research Pharmacy at 416-864-5413.
The St. Michael's Hospital (SMH) Research Ethics Board (REB) operates in compliance with the Tri-Council Policy Statement Ethical Conduct for Research Involving Humans, the Ontario Personal Health Information Protection Act, 2004, and ICH Good Clinical Practice Consolidated Guideline E6, Health Canada Part C Division 5 of the Food and Drug Regulations, Part 4 of the Natural Health Product Regulations, and the Medical Devices regulations. Furthermore, all investigational drug trials at SMH are conducted by Qualified Investigators (as defined in the latter document).

With best wishes,

[Signature]

Dr. Julie Spence
Chair, Research Ethics Board

Dr. Brenda McDowell
Vice Chair, Research Ethics Board
Appendix 4.4: Sociodemographics form

SOCIODEMOGRAPHICS

For each question, please check the appropriate answer.

SD1. Please select your age group
- 21-25
- 26-30
- 31-35
- 36-40
- 41-50
- 51-60
- Over 60

SD2. What is your gender?
- Male
- Female

SD3. What is your professional discipline?
- Physical Therapy
- Occupational Therapy

SD4. In a typical week, how many hours do you work as a clinician? ___ hours

SD5. Is your work site a teaching institution (defined as an institution that hosts student therapists for their clinical rotations/training)?
- Yes
- No
- Don’t Know

SD6. How many years have you been working with a stroke clientele?
- <1
- 1-3
- 4-10
- >10

SD7. On average, how many hours a month do you spend on educational activities related to stroke? ______ hours

SD8. Does your worksite allocate time for educational activities?
- Yes
- No

SD9. Does your worksite provide funds for educational activities?
- Yes
- No

SD10. Do you have access to a computer with Internet at work?
- Yes
- No

SD11. Do you have access to a computer with Internet at home?
- Yes
- No

SD12. How comfortable are you with searching the Internet for information?
- Not at all
- A little
- Somewhat
- Very
- Extremely
Appendix 4.5: Standardized patient vignettes

ACUTE vignette: “Mrs. P is a 68 year-old retired teacher. She was admitted to the acute care hospital where you work with a right hemisphere stroke. On your initial assessment one week post-stroke, Mrs. P is sitting in a regular chair. When the phone rings, Mrs. P has difficulty locating the phone on a table to her left but then manages to clumsily grasp the receiver using her left hand. On your request, she rises to stand, using her right hand to push against the arm of the chair. Mrs. P is able to stand alone, using a wide base and walks with your assistance but has some difficulty bringing her left leg forward.”

IN-PATIENT REHAB vignette: “Mrs. P is a 68 year-old retired teacher. She was transferred to the rehabilitation in-patient centre where you work, 1 month after experiencing a right hemisphere stroke. On your initial assessment, Mrs. P is sitting up in a regular chair with armrests. When the phone rings, Mrs. P has difficulty locating the phone on a table to her left but then manages to clumsily grasp the receiver using her left hand. On your request, she rises to stand, using her right hand to push against the arm of the chair. Mrs. P is able to stand alone, using a wide base and walks with your assistance but has some difficulty bringing her left leg forward.”

OUT-PATIENT REHAB vignette: “Mrs. P is a 60 year-old retired teacher. She was diagnosed with a right hemisphere stroke 6 months ago. Mrs. P was initially admitted to an acute care hospital and then received inpatient rehabilitation. She is now receiving treatment as an out-patient. When you walk into the treatment room, Mrs. P is sitting up in a regular chair with armrests. When you approach Mrs. P from her left, she doesn’t notice your presence at first but as you begin to speak, she turns to look at you. On your request, she rises to stand, using her right hand to push against the arm of the chair. Mrs. P is able to stand alone, using a wide base and walks with your assistance but has some difficulty bringing her left leg forward.”
Appendix 4.6: Clinical questions

CLINICAL QUESTIONS FOR ACUTE PATIENT VIGNETTE

Question 1: Mrs. P asks you about acupuncture and whether it is effective for improving motor function during her acute phase of stroke recovery (i.e. less than a month post-stroke).

Instructions: Find this information using Stroke Engine and answer her question.

Question 2: While screening, you discover that Mrs. P has symptoms of unilateral spatial neglect (USN). A colleague suggests that use of Fresnel prisms is beneficial for treating USN but you know nothing about the administration of this treatment and would like to learn more.

Instructions: Find practical “how-to” information about how to administer Fresnel prisms using Stroke Engine. Describe the administration of this treatment.

Question 3: You want to read journal articles on the benefits of functional electrical stimulation (FES) for improving upper extremity range of motion for acute patients with stroke, before you decide to offer this treatment to Mrs. P.

Instructions: Find article(s) on FES for improving upper extremity range of motion using Stroke Engine. Mention the first author’s name and publication year for each article.

Question 4: You want to know whether the Assessment of Life Habits is a reliable tool to use with Mrs. P.

Instructions: Find information on the reliability of the Assessment of Life Habits using Stroke Engine-Assess and answer your question.

Question 5: You want to know what the Canadian Best Practice Guidelines are for the use of constraint-induced movement therapy post-stroke, before you decide to offer this treatment to Mrs. P.

Instructions: Find Canadian Best Practice Guidelines for constraint-induced movement therapy using Stroke Engine and describe these recommendations and its source.
Appendix 4.7: Tester instructions

Thanks again for taking the time to participate in our usability testing session of our e-learning resource (Stroke Engine and Stroke Engine-Assess). Before we get started I would like to give you some information and explain the flow of the usability session:

1) First we will ask you to read and sign both copies of the consent form. Please let us know if you have any questions as you read the form. You will receive one signed copy of the form and we will keep one for our records. **GIVE PARTICIPANT CONSENT FORM TO READ AND SIGN**

2) Now we will ask you to respond to a questionnaire that has four sections. Section 1 includes general questions about yourself, such as your age, years of clinical experience, type of work setting, etc. Section 2 includes one case study describing a typical patient with stroke and five clinical questions. You will be asked to find information on assessments and treatments using an e-learning resource to answer those clinical questions. Sections 3 and 4 include feedback questions about the e-learning resource.

3) For three sections of the questionnaire, you will write down your answers and for one section, you will say your answers out loud as well as provide us with verbal feedback about the resource. We are interested in what you think about the resource, and would like to encourage you to provide us with both positive and negative comments by “thinking aloud”. We may remind you to let us know what you are thinking at various intervals during the session, just in case you forget to talk!

4) We are not interested in the accuracy of your answers but rather the process and effort involved in how you obtained answers by navigating through the resource. There are no right answers or wrong answers and this is not a test of your knowledge but rather a test of the e-learning resource.

5) We ask your permission to tape record the session. This will allow us to complete the session much faster and I can focus on listening to your comments and observing your actions. The tape recordings will be used only for scientific purposes and will remain confidential. We will not use any identifiers (i.e. names, addresses, etc.) that could link your identity to any of the information that you will provide. The information collected will be viewed by only the research team and research assistants. Your name or your organization will not be identified in any report or publication.

6) At any point during the session, you may feel free to ask questions or request for clarifications. Depending on the question, I may address it immediately or at the end of the session.

7) Do you have any questions before we get started? I’m turning on the recorder and timer so let’s start!

**TURN RECORDER AND SHOW TWO ICONS ON DESKTOP**

**HAND SECTION 1 TO PARTICIPANT TO COMPLETE (SOCIODEMOGRAPHICS FORM)**

**SECTION 2: CLINICAL QUESTIONS TO RETRIEVE WEBSITE INFORMATION**

Hand participant the vignette

**Instructions**: Please read this vignette. Then use the Stroke Engine website to answer four treatment-related questions below and the Stroke Engine-Assess website to answer one assessment-related question below (icons for these websites can be found on desktop). This section does not require any writing; you will answer these questions verbally. While searching for information to answer questions, please provide us with comments out loud regarding things you like or dislike about the organization of information, format used, ease of navigation between web pages etc.

**PLEASE REMEMBER THAT THIS IS A TEST OF STROKE ENGINE, NOT A TEST OF YOUR KNOWLEDGE.**

Hand participant each question (total of 5 questions), one at a time and wait for their response before handing them the next question.
Appendix 4.8: Observation sheet

**Question 1**

START TIME: __________

FINISH TIME: __________

Did you observe any navigational errors made by the participant during their search?

Did you observe any signs of confusion/frustration for the participant during their search?

**Question 2**

START TIME: __________

FINISH TIME: __________

Did you observe any navigational errors made by the participant during their search?

Did you observe any signs of confusion/frustration for the participant during their search?

**Question 3**

START TIME: __________

FINISH TIME: __________

Did you observe any navigational errors made by the participant during their search?

Did you observe any signs of confusion/frustration for the participant during their search?

**Question 4**

START TIME: __________

FINISH TIME: __________

Did you observe any navigational errors made by the participant during their search?

Did you observe any signs of confusion/frustration for the participant during their search?

**Question 5**

START TIME: __________

FINISH TIME: __________

Did you observe any navigational errors made by the participant during their search?

Did you observe any signs of confusion/frustration for the participant during their search?

**OTHER COMMENTS**
Appendix 4.9: Usability Questionnaire

We are going to ask you some questions about your thoughts related to Stroke Engine ONLY – we will ask you about Stroke Engine-Assess after.

1. How satisfied are you with the overall organization (i.e. layout) of information on the homepage?
   Not at all □  A little □  Somewhat □  Very □  Extremely □
   Comments: ________________________________________________________________

2. How easy is it to search for information on a given topic or intervention (e.g. acupuncture)?
   Not at all □  A little □  Somewhat □  Very □  Extremely □
   Comments: ________________________________________________________________

3. How satisfied are you with the overall organization of information within a given topic or intervention?
   Not at all □  A little □  Somewhat □  Very □  Extremely □
   Comments: ________________________________________________________________

4. How easy is it to go back and forth between different buttons (i.e. quick review, in-depth review, clinician how-to, and best practices) within a given topic or intervention?
   Not at all □  A little □  Somewhat □  Very □  Extremely □
   Comments: ________________________________________________________________

OTHER COMMENTS

What do you like about Stroke Engine?
________________________________________________________________________

What do you dislike about Stroke Engine?
________________________________________________________________________

What should we change about Stroke Engine?
________________________________________________________________________

In the future, how likely are you to use Stroke Engine to search for stroke-related info?
Not at all □  A little □  Somewhat □  Very □  Extremely □
Now we are going to ask you some questions about your thoughts related to Stroke Engine-Assess ONLY.

1. How satisfied are you with the overall organization (i.e. layout) of information on the homepage?
   Not at all  ■  A little  ■  Somewhat  ■  Very  ■  Extremely  ■
   Comments: ________________________________________________________________

2. How easy is it to search for information on a given assessment (e.g. Assessment of Life Habits)?
   Not at all  ■  A little  ■  Somewhat  ■  Very  ■  Extremely  ■
   Comments: ________________________________________________________________

3. How satisfied are you with the overall organization of information within a given assessment?
   Not at all  ■  A little  ■  Somewhat  ■  Very  ■  Extremely  ■
   Comments: ________________________________________________________________

4. How easy is it to go back and forth between different buttons (i.e. summary table, in-depth review) within a given assessment?
   Not at all  ■  A little  ■  Somewhat  ■  Very  ■  Extremely  ■
   Comments: ________________________________________________________________

OTHER COMMENTS

What do you like about Stroke Engine-Assess?
____________________________________________________________________________

What do you dislike about Stroke Engine-Assess?
____________________________________________________________________________

What should we change about Stroke Engine-Assess?
____________________________________________________________________________

In the future, how likely are you to use Stroke Engine-Assess to search for stroke-related info?
Not at all  ■  A little  ■  Somewhat  ■  Very  ■  Extremely  ■
Appendix 5.1: Ethics certificate

University of Toronto
Office of the Vice-President, Research
Office of Research Ethics

PROTOCOL REFERENCE #24272

July 16, 2009

Dr. Sharon Straus
Knowledge Translation Program
St. Michael’s Hospital
30 Bond St, Shutter 2-026
Toronto, ON M5B 1W9

Ms. Anita Menon
Knowledge Translation Program
St. Michael’s Hospital
30 Bond St, Shutter 2-026
Toronto, ON M5B 1W9

Dear Dr. Straus and Ms. Menon:

Re: Your research protocol entitled “Benefits of an e-learning resource for implementing stroke rehabilitation best practices”

ETHICS APPROVAL

Original Approval Date: July 16, 2009
Expiry Date: July 15, 2010
Continuing Review Level: 1

We are writing to advise you that a member of the Health Sciences Research Ethics Board has granted approval to the above-named research study, for a period of one year, under the REB’s expedited review process. Ongoing projects must be renewed prior to the expiry date.

The following consent document (received July 8, 2009) has been approved for use in this study: Consent form

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 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 at least 30 days prior to the expiry date of your study.

If your research has funding attached, please contact the relevant Research Funding Officer in Research Services to ensure that your funds are released.

Best wishes for the successful completion of your project.

Yours sincerely,

Daniel Gyewu
Research Ethics Coordinator

McMurtry Building, 12 Queen’s Park Cres. W, 3rd Floor Toronto, ON M5G 1S8
TEL: 416-946-3273 FAX: 416-946-5763 EMAIL: ethics.review@utoronto.ca
Appendix 5.2: Recruitment form

Hello I’m ___________ and I am calling from our rehabilitation research center at the University of Toronto and McGill. We are conducting research on OTs/PTs working with a stroke clientele. So could I just verify that you….

<table>
<thead>
<tr>
<th>Question</th>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Are currently working as an occupational therapist or physical therapist?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do you have at least 3 months experience in stroke care?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do you have at least 2 patients with stroke currently on your caseload?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

If NO to one of the above questions: Unfortunately you don’t meet our eligibility criteria but thanks so much for your time.

If YES to all of the above questions: Great! We would like to invite you to participate in our research study that examines whether an evidence-based stroke website can facilitate learning about stroke rehabilitation. If you agree to participate, you will start by completing 2 short online Questionnaires. Each Questionnaire will have 20 questions about your current management of a typical patient with stroke and will take less than 45 minutes to complete. After that, we will provide you with a knowledge translation package, including an evidence-based website, for your use over a 3-month period. You will be asked to browse the website for at least 1 hour per week. At the end of each month, you will complete an online Questionnaire. Once the study is completed, you will receive an official certificate of participation from the Canadian Association of Occupational Therapists (Canadian Physiotherapy Association), which will be a valuable addition to your professional portfolio. Does this sound interesting to you?

If refuses: Would you be willing to explain your reason for refusal? Thank you for your time.

Too busy ☐ Not interested ☐ Not available ☐ Other ☐
___________________________________________

If accepts: Excellent! I will send you information about the study and key dates. What is the best email address for us to keep in touch? Is this the phone number to use in case I need to reach you?

Email address:_____________________________________________ Alternate phone number: __________________________

Before I let you go, there are four questions that I would like to ask:

Do you foresee yourself being unable to access the Internet for more than 30 consecutive days between October and January? Yes ☐ No ☐

What is your primary work setting?  Acute Care ☐ In-patient Rehabilitation ☐ Out-patient rehabilitation ☐

How comfortable are you with searching the Internet for information? Not at all ☐ A little ☐ Somewhat ☐ Very ☐ Extremely ☐

Are you currently participating in another research project? Yes ☐ if yes, please describe ___________ No ☐

Do you have any questions? Great, thanks so much for your time and your participation is greatly appreciated.
Appendix 5.3: Consent form

CONSENT FORM

Title of Study: BENEFITS OF AN E-LEARNING RESOURCE FOR IMPLEMENTING STROKE REHABILITATION BEST PRACTICES: A collaborative effort by researchers and knowledge users to move evidence into practice

Research Team: Nicol Korner-Bitensky (McGill), Sharon Straus (U of T), Robert Teasell (UWO), Anita Menon (U of T), Ann McKibbon (McMaster), Kevin Thorpe (U of T), Mark Chignell (U of T), Elizabeth Woodbury (CSS), Mary E. Harriman (HSFC), Claudia von Zweck (CAOT), Margaret Mousseau (CPA)

What is the purpose of this study?
We are requesting your participation in a study that examines whether an e-learning resource can facilitate learning about stroke rehabilitation. We would also like to understand the impact of factors such as clinical experience or aspects of the work environment.

How many people will take part in this study?
154 occupational therapists and 154 physical therapists working in Ontario will participate.

What will happen if I take part in the study and how much time will I commit?
First, you will receive a 15-minute online training session to familiarize yourself with the e-learning resource and its use. Also you will be asked to complete a brief socio-demographic information sheet and indicate your consent to participate.

Next, throughout a 3-month period, you will be requested to log on to the e-learning resource for at least 1 hour weekly.

You will be asked to respond to a 20-item online Questionnaire about stroke at five different times: twice before you begin accessing the e-learning resource and once a month during the 3-month period. The Questionnaire should take less than 1 hour to complete each time. It will include questions about your clinical management of a patient who is depicted in a clinical vignette. These questions will relate to: 1) problems you identify that would warrant further investigation; 2) assessments you would administer; and, 3) treatments you would use. Additional information will be collected on your current continuing education activities, and time spent on these activities.

Towards completion of the study, 30 participants will be randomly selected to participate in a 20-minute telephone interview. If you are recruited for this part of the study you will be asked standard questions about your practice, and facilitators and barriers to change in practice.
What are the possible benefits from being in this study?
The Canadian Stroke Network, Heart and Stroke Foundation of Ontario, and REPAR/FRSQ have supported the creation of this e-learning resource and your participation will help us examine its potential value as a continuing education tool for clinicians working in stroke rehabilitation.

What are the possible risks or discomforts involved from being in this study?
There are no foreseeable risks to participating in this study. If you decide to decline this invitation or withdraw from the study at any time, it will not have any impact on your career. The information collected during the study will only be used for research purposes.

Will it cost me anything to be in this study?
There will be no costs for your participation.

How will my privacy be protected?
All data will be kept completely confidential. There will be no unique identifiers used (i.e. names, addresses, etc.) that could link your identity to any of the information that you will provide. The information collected will be viewed by only the research team and research assistants. Your name will not be identified in any report or publication.

What if I have questions about this study?
You have the right to ask, and have answered, any questions you may have about this research. If you would like additional information or have any questions or concerns regarding the study, please contact: Anita Menon, PhD candidate or Dr. Nicol Korner-Bitensky, School of Physical and Occupational Therapy, Faculty of Medicine, McGill University at (514) 398-5457 or Dr. Sharon Straus, Knowledge Translation Program, Faculty of Medicine, University of Toronto/St. Michael’s Hospital at (416) 864-3068.

What if I have questions about my rights as a research participant?
All research on human volunteers is reviewed by a committee that works to protect your rights and welfare. If you have questions or concerns about your rights as a research subject you may contact, anonymously if you wish, Ms. Ilde Lepore of the Faculty of Medicine’s Institutional Review Board at (514) 398-8302 or by email to ilde.lepore@mcgill.ca.

Ethics Approval
Ethics approval from the Institutional Review Board at the McGill University has been obtained. This study has been reviewed in a manner which conforms with guidelines as outlined in the Tri-Council Policy Statement: Ethical conduct for research involving humans- guidelines for CIHR-funded research (http://www.pre.ethics.gc.ca).
Participant’s Agreement

I, ________________________, agree to participate in the study described above. I give permission to the research team to use information collected during the study for research purposes only. I understand that every effort will be made to protect my privacy as a participant and that the information collected will be only viewed by the research team and research assistants. All questions that I had regarding the study have been answered to my satisfaction. I understand the procedures of the study and willingly give my consent to participate.

Participant’s Signature
 ________________________________
Date  ___________________________________

Witness
 ________________________________
Date  ___________________________________

I __________________ hereby certify that I have explained to ____________________ the nature of the study and the benefits and known risks of participating in it, and that they have the option of withdrawing from the study at any time.

Signature
 ________________________________
Date  ___________________________________
Appendix 5.4: Study participation certificate

Continuing Education Certificate of Completion

This certifies that

Jane Doe

Participated and successfully completed study requirements for the CIHR funded project: Benefits of an e-learning resource for implementing stroke rehabilitation best practices (KAL-94487), involving ongoing access of Stroke Engine and Stroke Engine-Assess e-learning resources for a 3-month period.

_______________________________________
Anita Menon (Project Coordinator)

on behalf of the research team: Nicol Korner-Bitensky, Sharon Straus, Ann McKibbon, Robert Teasell, Kevin Thorpe, Mark Chignell, Elizabeth Woodbury, Mary Elizabeth Harriman, Carol Miller, Brenda McGibbon Lammi

This project is supported through funding and in-kind support from the following organizations:

Issued on March 1, 2011
Appendix 5.5: Knowledge Questionnaire versions and Scoring Grid

KNOWLEDGE QUESTIONNAIRE (BASELINE #1)

Case vignette: “Mrs. P is a 68 year-old retired teacher and was an active volunteer with her husband at the local elementary school before her stroke. She also drove her grandchildren home from school daily. She was recently admitted to the acute care hospital where you work and was diagnosed with a right hemisphere stroke. Her medical chart indicates that she has no cognitive impairments as a result of her stroke. The nurse mentions that she is able to comb her hair using her right hand but leaves half of the food on her plate while eating, usually the food on the left. On your initial assessment 1 week post-stroke, Mrs. P is sitting up in a regular chair. When the phone rings, Mrs. P has difficulty locating the phone on a table to her left but then manages to clumsily grasp the receiver with her left hand. On your request, she rises to stand, using her right hand to push against the arm of the chair. Mrs. P is able to stand alone, using a wide base and walks with your assistance but has some difficulty bringing her left leg forward.”

1) PROBLEM IDENTIFICATION

The following series of questions relate to problems experienced by Mrs. P as noted in the case vignette.

P1: Does Mrs. P have any potential perceptual limitations that warrant investigation?
Responses:
-Yes
-No (then skip to P2)
-Not sure (then skip to P2)

P1a: List the potential perceptual limitation(s) that you would like to investigate with Mrs. P based on the case vignette.

P2: Does Mrs. P have any potential physical limitations that warrant investigation?
Responses:
-Yes
-No (then skip to P3)
-Not sure (then skip to P3)

P2a: List the potential physical limitation(s) that you would like to investigate with Mrs. P based on the case vignette.

P3: Does Mrs. P have any potential functional limitations that warrant investigation?
Responses:
-Yes
-No (then skip to A1)
-Not sure (then skip to A1)

P3a: List the potential functional limitation(s) that you would like to investigate with Mrs. P based on the case vignette.
2) **ASSESSMENT/SCREENING**  
The following series of questions relate to assessment.

**A1**: What are the possible advantages of using the Berg Balance Scale with Mrs. P?

**A2**: Given Mrs. P’s apparent difficulty with scanning/attending to the environment on her left side, what would be the **best** screening tool to use?  
Responses:  
- Clock Drawing Test  
- Line Bisection  
- Draw-A-Man Test  
- None of them (*then skip to A3*)

**A2a**: List advantage(s) of this screening tool that guided your decision to use this tool? (*only if they answered any one of the first 3 responses*)

**A2b**: List limitation(s) of the other screening tools that guided your decision to not use these tools? (*only if they answered any one of the first 3 responses*)

**A3**: Which of the following tool(s) (if any) can detect change in Mrs. P’s performance in activities of daily living as she receives stroke rehabilitation?  
Responses: (*NOTE: can select more than one*)  
- Barthel Index  
- Functional Independence Measure (FIM)  
- Assessment of Life Habits (LIFE-H)  
- None of them

**A4**: What are the possible advantages of using the Assessment of Life Habits (LIFE-H) tool with Mrs. P?  
- I am not familiar with the Assessment of Life Habits tool (*NOTE: a possible response option to select*)

**A5**: What are the possible advantages of using the Chedoke Arm and Hand Activity Inventory (CAHAI) with Mrs. P?  
- I am not familiar with the Chedoke Arm and Hand Activity Inventory (*NOTE: a possible response option to select*)

**A6**: Is the Mini Mental State Examination a tool that should be administered repeatedly with Mrs. P?  
Responses:  
- Yes  
- No  
- Not sure

**A6a**: Please explain your reasoning for your response to Question A6.

**A7**: During your initial visit, would you use a screening tool or assessment tool to investigate whether Mrs. P can scan the left side of her environment?  
Responses:
-Screening Tool
-Assessment Tool
-Both a screening and an assessment tool
-Neither a screening nor an assessment tool
-I am not sure of the difference between a screening and assessment tool (then skip to A8)

A7a: Please explain your reasoning for your response to Question A7

A8: In general, why is it important to evaluate for unilateral spatial neglect (USN)?

3) **TREATMENT**
The following series of questions relate to treatment intervention.

T1: During your initial visit, Mrs. P asks you whether acupuncture is effective for improving her ability to walk. What is your response?
Responses:
- Yes it is effective
- No it is not effective
- Not sure if it is effective (then skip to T2)

T1a: Please describe your knowledge about the scientific evidence that supports or refutes the use of acupuncture for improving ability to walk, when considering Mrs. P’s current stage of stroke recovery and functional status.

T2: What do the Canadian stroke rehabilitation best practice guidelines suggest about the use of upper limb constraint-induced movement therapy post-stroke?

T3: Mrs. P has been prescribed prism therapy. Would you have Mrs. P wear the prism glasses during your treatment session?
Responses:
- Yes
- No
- Not sure (then skip to T4)

T3a: Please describe your reasoning for your response to Question T3.

T4: Mrs. P’s husband asks you whether functional electrical stimulation (FES) is effective for improving Mrs. P’s left hand function. What is your response?
Responses:
- Yes it is effective
- No it is not effective
- Not sure if it is effective (then skip to T5)

T4a: Please describe the scientific evidence that supports or refutes the use of functional electrical stimulation for improving hand function, when considering Mrs. P’s current stage of stroke recovery and functional status.
T5: Mrs. P’s daughter asks you whether body weight supported (BWS) treadmill training is effective for improving Mrs. P’s balance. What is your response?

Responses:
- Yes it is effective
- No it is not effective
- Not sure if it is effective

T5a: Please describe the scientific evidence that supports or refutes the use of body-weight supported treadmill training for improving balance, when considering Mrs. P’s current stage of stroke recovery and functional status.

4) EDUCATIONAL RESOURCES

ER1. Which of these educational resources (if any) did you use this month (including today):

☐ Journal club
☐ Web searching (e.g. Google)
☐ Online Resources
☐ Electronic databases (e.g. MEDLINE)
☐ Workshops
☐ Conferences
☐ Reading journal articles
☐ Educational sessions/lectures
☐ Departmental in-services
☐ Informal discussions with colleagues
☐ Librarian on site
☐ Other: ________________________________

For each resource selected in ER1, please answer the following two questions:

ER2: Please describe the educational resource: ________________________________

ER3: How much time did you spend on this educational resource this month (including today)? _______ hours
KNOWLEDGE QUESTIONNAIRE (BASELINE #2)

Case vignette: “Mr. J is a 55-year-old man who was recently admitted to the acute care hospital where you work with a left hemisphere stroke. He lives with his wife in a two-storey house. The couple is supportive of each other and they had an active lifestyle. They have 2 adult daughters: one lives close by and visits frequently. Mr. J works as a car mechanic.

On your initial assessment at 1 week post-stroke, Mr. J provides basic and accurate information about himself, but is easily distracted and repeatedly mentions pain while pointing to his right shoulder. You note that he requires minimum assistance from one person for transfers to and from the wheelchair, bed and toilet. He walks with maximum assistance from one person while using a quad cane, with a tendency for his right knee to buckle and for his right foot to drag. The nurse mentions that while assisting Mr. J to transfer from his wheelchair to the toilet seat, he occasionally has difficulty holding in his urine. The nurse also reports that Mr. J sometimes coughs while eating or drinking.

Mr. J mentions that he is remembering events from his past but is having trouble remembering daily occurrences, such as what he ate for breakfast. You notice that Mr. J speaks quite fluently. He expresses a desire to get back to walking and is anxious to return home, becoming tearful during this part of the discussion.

1) PROBLEM IDENTIFICATION

The following series of questions relate to problems experienced by Mr. J as noted in the case vignette.

P1: Does Mr. J have any potential psychosocial issues that warrant investigation?

Responses:
- Yes
- No (then skip to P2)
- Not sure (then skip to P2)

P1a: List the potential psychosocial issue(s) that you would like to investigate.

P2: Does Mr. J have any potential functional impairments that warrant investigation?

Responses:
- Yes
- No (then skip to P3)
- Not sure (then skip to P3)

P2a: List the potential functional impairment(s) that you would like to investigate.

P3: Does Mr. J have any potential cognitive impairments that warrant investigation?

Responses:
- Yes
P3a: List the potential cognitive impairment(s) that you would like to investigate.

2) ASSESSMENT/SCREENING

The following series of questions relate to assessment.

A1: What are the possible advantages of using the Chedoke-McMaster Stroke Assessment with Mr. J?

- I am not familiar with the Chedoke-McMaster Stroke Assessment (NOTE: a possible response option to select)

A2: Mr. J’s daughter raises a concern that her father appears to be extremely sad for the past few days. Prior to his stroke, he was known to be very friendly and in generally high spirits. What would be the best screening tool to use to screen for the presence of post-stroke depression? SELECT ONE RESPONSE

Responses:
- Hospital Anxiety and Depression Scale (HADS)
- Stroke Aphasic Depression Questionnaire (SADQ)
- Montgomery Asberg Depression Rating Scale (MADRS)
- None of the above (then skip to A3)
- Not sure (then skip to A3)

A2a: List advantage(s) of the screening tool you selected that guided your decision to use this tool? (only if they answered any one of the first 3 responses)

A2b: List limitation(s) of the other screening tools listed that guided your decision to not use these tools? (only if they answered any one of the first 3 responses)

A3: Which of the following tool(s) can detect change in Mr. J’s mobility as he receives gait training? SELECT ALL THOSE THAT APPLY

Responses: (NOTE: can select more than one)
- Timed Up and Go (TUG)
- Fugl-Meyer Assessment of Sensorimotor Recovery (FMA)
- 5 Minute Walk Test (5MWT)
- None of the above
- Not sure

A4: What are the possible advantages of using the 5 Minute Walk Test (5MWT) to assess mobility with Mr. J?

- I am not familiar with the 5MWT (NOTE: a possible response option to select)
A5: What are the possible advantages of using the Montreal Cognitive Assessment (MoCA) to screen for cognitive impairment with Mr. J?

-I am not familiar with the MoCA (NOTE: a possible response option to select)

A6: What do the Canadian Best Practice Recommendations for Stroke Care suggest about the timing of dysphagia (i.e. swallowing ability) assessment?

-I am not familiar with the Canadian Best Practice Recommendations for Stroke Care, specific to the timing of dysphagia (i.e. swallowing ability) assessment (NOTE: a possible response option to select)

3) **TREATMENT**

The following series of questions relate to treatment intervention.

T1: As you prepare Mr. J’s discharge summary, results from your quick screen indicate that Mr. J has a mild post-stroke depression. When you meet with Mr. J to plan for discharge, his wife asks you whether cognitive behavioral therapy is effective for improving post-stroke depression. What is your response?

Responses:
-Yes it is effective
-No it is not effective
-Not sure if it is effective or not (then skip to T2)

T1a: Please describe your knowledge about the scientific evidence that supports or refutes the use of cognitive behavioral therapy for improving depressive symptoms, when considering Mr. J’s current stage of stroke recovery.

T2: Mr. J’s wife read about mirror therapy on the Internet and asks you whether it is effective for improving Mr. J’s lower extremity function. What is your response?

Responses:
-Yes it is effective
-No it is not effective
-Not sure if it is effective or not (skip to T3)

T2a: Please describe the scientific evidence that supports or refutes the use of mirror therapy for improving lower extremity function, when considering Mr. J’s current stage of stroke recovery and functional status.

T3: After examining Mr. J’s right shoulder, you observe that his shoulder is not subluxed but that he has limited pain-free active range of motion. Mr. J’s daughter is anxious about her father’s shoulder pain and asks you whether functional electrical stimulation (FES) is effective for improving his shoulder pain. What is your response?

Responses:
-Yes it is effective
-No it is not effective
-Not sure if it is effective or not (skip to T4)

T3a: Please describe the scientific evidence that supports or refutes the use of FES for improving shoulder pain, when considering Mr. J’s current stage of stroke recovery and the fact that there is no shoulder subluxation present.

T4: As you prepare Mr. J’s discharge summary, Mr. J expresses that he has a personal and private concern. He mentions that he was sexually active prior to his stroke. He asks you whether his physical limitations (i.e. diminished ability to feel or move his weaker side) post-stroke will affect his sexual activity. What is your response?
NOTE: Mr. J’s medical chart indicates that he has no sexually-related dysfunction.

Responses:
-Yes, his physical limitations may affect his sexual function (further investigation necessary)
-No, his physical limitations will not affect his sexual function (then skip to T2)
-Not sure about the issue of sexual functioning post-stroke (then skip to T2)

T4a: Do you have any suggestions for Mr. J regarding how to compensate for his physical limitations during sexual activity?

T5: What do the Canadian Evidence-based Recommendations for the Upper/Lower Extremities (SCORE guidelines for stroke rehabilitation) suggest about the use of task-oriented training for the lower extremity?

-I am not familiar with the Canadian Evidence-based Recommendations for the Upper/Lower Extremities (SCORE guidelines for stroke rehabilitation), specific to the use of task-oriented training for the lower extremity (NOTE: a possible response option to select)

4) EDUCATIONAL RESOURCES

Same as Knowledge Questionnaire (Baseline #1)
KNOWLEDGE QUESTIONNAIRE (MONTH #1)

Case vignette: “Mrs. F is a 75 year-old retired secretary who was recently admitted to the acute care hospital where you work with a right hemisphere stroke. She lives alone in an apartment complex for seniors. She is an active member of a social club and plans weekly group outings with other residents of the apartment complex. She also enjoys baking and doing crossword puzzles during her spare time. Among her four children, only one daughter lives in close proximity and visits regularly.

On your initial assessment at four days post-stroke, Mrs. F is eating her lunch independently while seated in a chair. Her medical chart reports that she ambulates independently while using a quad cane but tends to lose her balance and bump into obstacles on her left side. It also reports that she has mild weakness of her left upper and lower extremities, but is quite functional in her daily activities. Her daughter mentions that when she approaches Mrs. F from her left side, she doesn’t seem to notice her at first. She also mentions that Mrs. F can only spend a few minutes on her crossword puzzles before she gets too tired and switches to another activity. Mrs. F says that she can remember events from her past but is having trouble remembering daily occurrences, such as what she ate for breakfast. On your request, Mrs. F rises to stand, using her right hand to push against the arm of the chair. She attempts to regain her balance by holding onto the side table, however it is too far away and she ends up grabbing your arm at the last minute. The nurse mentions that Mrs. F fell at her bedside last night while getting up to go to the bathroom, even though she was instructed to ring her bell. Although there were no injuries, her daughter is now scared to leave her mother alone. Mrs. F. tells you that she wants to go home today because she doesn’t want to miss her weekly group outings. She plans to drive when she returns home.

1) PROBLEM IDENTIFICATION

The following series of questions relate to problems experienced by Mrs. F as noted in the case vignette.

P1: Does Mrs. F have any potential perceptual issues that warrant investigation?

Responses:
-Yes
-No (then skip to P2)
-Not sure (then skip to P2)

P1a: List the potential perceptual issues(s) that you would like to investigate with Mrs. F based on the case vignette.

P2: Does Mrs. F have any potential functional impairments that warrant investigation?

Responses:
-Yes
-No (then skip to P3)
-Not sure (then skip to P3)
P2a: List the potential functional impairment(s) that you would like to investigate with Mrs. F based on the case vignette.

P3: Does Mrs. F have any potential psychosocial issues that warrant investigation?
Responses:
- Yes
- No (then skip to A1)
- Not sure (then skip to A1)

P3a: List the potential psychosocial issue(s) that you would like to investigate with Mrs. F based on the case vignette.

2) ASSESSMENT/SCREENING

The following series of questions relate to assessment/screening.

A1: What are the possible advantages of using the Berg Balance Scale with Mrs. F?

- I am not familiar with the Berg Balance Scale (NOTE: a possible response option to select)

A2: Given Mrs. F’s apparent difficulty with scanning/attending to the environment on her left side, what would be the best screening tool to use?

Responses:
- Motor Free Visual Perceptual Test (MVPT)
- Bells Test
- Albert’s Test
- Single Letter Cancellation Test
- None of them (then skip to A3)
- Not sure (then skip to A3)

A2a: List advantage(s) of this screening tool that guided your decision to use this tool? (only if they answered any one of the first 3 responses)

A2b: List limitation(s) of the other screening tools that guided your decision to not use these tools? (only if they answered any one of the first 3 responses)

A3: Results from your quick screen with Mrs. F suggest the presence of unilateral spatial neglect. However you would like to further investigate this impairment and assess whether any recovery occurs spontaneously over time or with specific treatment. What would be the best assessment tool to use?

Responses:
- Motor Free Visual Perceptual Test (MVPT)
- Semi-Structured Scale for Functional Evaluation of Extrapersonal Space
Ontario Society of Occupational Therapists (OSOT) Perceptual Evaluation
Behavioral Inattention Test (BIT)

None of them (then skip to A4)
-Not sure (then skip to A4)

A3a: List advantage(s) of this assessment tool that guided your decision to use this tool? (only if they answered any one of the first 3 responses)

A3b: List limitation(s) of the other assessment tools that guided your decision to not use these tools? (only if they answered any one of the first 3 responses)

A4: Which of the following tool(s) (if any) can detect improvements in Mrs. F’s performance in activities of daily living as she receives stroke rehabilitation?

Responses: (NOTE: can select more than one)
- Barthel Index
- Functional Independence Measure (FIM)
- Assessment of Life Habits (LIFE-H)
- Frenchay Activities Index (FAI)
- None of them (then skip to A5)
- Not sure (then skip to A5)

A5: Which of the following tool(s) (if any) can detect improvements in Mrs. F’s mobility as she receives gait training for a two-week period?

Responses: (NOTE: can select more than one)
- Rivermead Mobility Index (RMI)
- Timed Up and Go (TUG)
- 6-Minute Walk Test (6MWT)
- Rivermead Motor Assessment (RMA)
- None of them (then skip to A6)
- Not sure (then skip to A6)

A6: What are the possible advantages of using the Timed Up and Go (TUG) Test with Mrs. F?

-I am not familiar with the TUG (NOTE: a possible response option to select)

A7: What are the possible advantages of using the Cambridge Cognitive Examination (CAMCOG) with Mrs. F?

-I am not familiar with the CAMCOG (NOTE: a possible response option to select)

3) TREATMENT

The following series of questions relate to treatment intervention.
Results from the Berg Balance Scale indicate that Mrs. F has impaired balance. When you meet with Mrs. F to discuss your assessment findings, she asks you whether body weight supported treadmill training is effective for improving balance. What is your response?

Responses:
- Yes it is effective (go to T1a)
- No it is not effective (go to T1a)
- Not sure if it is effective or not (then skip to T1b)

Please describe your knowledge about the scientific evidence that supports or refutes the use of body weight supported treadmill training for improving balance, when considering Mrs. F’s current stage of stroke recovery.

Regardless of the scientific evidence supporting or refuting the use of body weight supported treadmill training, is Mrs. F an appropriate candidate for this treatment based on the case vignette?

Responses:
- Yes (go to T1c)
- No (go to T1c)
- Not sure whether she is an appropriate candidate (then skip to T2)

List the reason(s) why Mrs. F is/is not an appropriate candidate for this treatment based on the case vignette.

Mrs. F’s daughter read about virtual reality for the lower extremity on the Internet and asks you whether it is effective for improving Mrs. F’s mobility upon discharge. What is your response?

Responses:
- Yes it is effective
- No it is not effective
- Not sure if it is effective or not (skip to T3)

Please describe the scientific evidence that supports or refutes the use of virtual reality for the lower extremity for improving mobility upon discharge, when considering Mrs. F’s current stage of stroke recovery and functional status.

Mrs. F is interested in doing crosswords puzzles, which was one of her favorite pastimes prior to her stroke. However after a few minutes of doing puzzles, she gets quite tired and switches to another activity. You ask yourself whether cognitive rehabilitation would be effective intervention for improving her short attention span. What is your response?

Responses:
- Yes it is effective
- No it is not effective
- Not sure if it is effective or not (skip to T4)
T3a: Please describe the scientific evidence that supports or refutes the use of cognitive rehabilitation for improving attention span, when considering Mrs. F’s current stage of stroke recovery and functional status.

T4: Results from the Behavioral Inattention Test with Mrs. F indicate the presence of unilateral spatial neglect (USN). You ask yourself whether eye patching would be effective intervention for improving her USN symptoms. What is your response?

Responses:
- Yes it is effective
- No it is not effective
- Not sure if it is effective or not (skip to T5)

T4a: Please describe the scientific evidence that supports or refutes the use of eye patching for improving USN symptoms, when considering Mrs. F’s current stage of stroke recovery and functional status.

T5: What do the Canadian Evidence-based Recommendations for the Upper/Lower Extremities (SCORE guidelines for stroke rehabilitation) suggest about the use of aerobic exercise?

- I am not familiar with the Canadian Evidence-based Recommendations for the Upper/Lower Extremities (SCORE guidelines for stroke rehabilitation), specific to the use of aerobic exercise. (NOTE: a possible response option to select)

4) EDUCATIONAL RESOURCES

Same as Knowledge Questionnaire (Baseline #1)
KNOWLEDGE QUESTIONNAIRE (MONTH #2)

Case vignette: “Mr. T is a 70-year-old retired construction worker who was recently admitted to the acute care hospital where you work with a left hemisphere stroke. Prior to his stroke, he lived with his son, daughter-in-law, and three grandchildren in a two-storey house. He drove his grandchildren home from school daily. He has had an active social life and is a member of a local bridge club.

On your initial assessment at 1 week post-stroke, you observe that Mr. T has difficulty expressing ideas and is often searching for words, making the conversation difficult. For words that he cannot pronounce, he tries to scribble them on a notepad using his non-dominant left hand. You find yourself using simple language and speaking slightly slower than you usually would. Regardless, Mr. T seems to be oriented and manages to provide you with accurate information. He points to his right shoulder repeatedly and winces in pain when he tries to raise it. His daughter is concerned that Mr. T does not interact as much with family members as he did prior to his stroke. You observe that Mr. T who is right hand dominant as per his medical chart, primarily uses his left hand and arm during daily activities and only uses his right hand as a support. Mr. T is able to wash and dress himself independently but needs help with buttons. The medical chart indicates that he requires moderate assistance from one person for walking and transfers (i.e. to and from the bed, bathtub and toilet). He expresses a desire to get back to walking independently and is anxious to return home, becoming tearful during this part of the discussion. He also wishes to continue driving his grandchildren to school upon discharge.

1) PROBLEM IDENTIFICATION

The following series of questions relate to problems experienced by Mr. T as noted in the case vignette.

P1: Does Mr. T have any potential physical impairments that warrant investigation?

Responses:
-Yes
-No (then skip to P2)
-Not sure (then skip to P2)

P1a: List the potential physical impairment(s) that you would like to investigate.

P2: Does Mr. T have any potential psychosocial issues that warrant investigation?

Responses:
-Yes
-No (then skip to P3)
-Not sure (then skip to P3)

P2a: List the potential psychosocial issue(s) that you would like to investigate.
P3: Does Mr. T have any potential functional impairments that warrant investigation?

Responses:
- Yes
- No (then skip to A1)
- Not sure (then skip to A1)

P3a: List the potential functional impairment(s) that you would like to investigate.

2) **ASSESSMENT/SCREENING**

The following series of questions relate to assessment/screening.

A1: You are concerned about Mr. T’s shoulder pain. Please explain how you would assess the extent of his shoulder pain?

A2: Mr. T’s son raises a concern that his father appears to be extremely sad for the past few days. Prior to his stroke, he was known to be very friendly and in generally high spirits. What would be the best screening tool to use to screen for the presence of post-stroke depression? SELECT ONE RESPONSE

Responses:
- Hospital Anxiety and Depression Scale (HADS)
- Stroke Aphasic Depression Questionnaire (SADQ)
- Beck Depression Inventory
- Aphasic Depression Rating Scale (ADRS)
- None of the above (then skip to A3)
- Not sure (then skip to A3)

A2a: List advantage(s) of the screening tool you selected that guided your decision to use this tool? *(only if they answered any one of the first 3 responses)*

A2b: List limitation(s) of the other screening tools listed that guided your decision to not use these tools? *(only if they answered any one of the first 3 responses)*

A3: Given your limited assessment time with Mr. T, you would like to use one tool to assess for motor function of the upper and lower extremity in order to determine his treatment options. What would be the best assessment tool to use to evaluate his motor function of the upper and lower extremity? SELECT ONE RESPONSE

Responses:
- Rivermead Motor Assessment
- Wolf Motor Function Test
- Chedoke-McMaster Stroke Assessment
- Fugl-Meyer Assessment of Sensorimotor Recovery after Stroke
- None of the above (then skip to A4)
-Not sure *(then skip to A4)*

**A3a:** List advantage(s) of the assessment tool you selected that guided your decision to use this tool? *(only if they answered any one of the first 3 responses)*

**A3b:** List limitation(s) of the other assessment tools listed that guided your decision to not use these tools? *(only if they answered any one of the first 3 responses)*

**A4:** What are the possible advantages of using the Chedoke Arm and Hand Activity Inventory (CAHAI) with Mr. T?

- I am not familiar with the CAHAI *(NOTE: a possible response option to select)*

**A5:** What are the possible advantages of using the Reintegration to Normal Living Index (RNLI) with Mr. T?

- I am not familiar with the RNLI *(NOTE: a possible response option to select)*

**A6:** Which of the following tool(s) (if any) can detect improvements in Mr. T’s performance in instrumental activities of daily living as he receives stroke rehabilitation?

Responses: *(NOTE: can select more than one)*
- Reintegration to Normal Living Index (RNLI)
- Stroke Impact Scale (SIS)
- Assessment of Life Habits (LIFE-H)
- Frenchay Activities Index (FAI)
- None of them *(then skip to A6)*
- Not sure *(then skip to A6)*

**A7:** What is the difference between a screening tool and assessment tool? Please explain your response.

**A8:** As you prepare Mr. T’s discharge summary, he mentions that he wants to continue driving and is aware that he will need to undergo a driving assessment. He wonders what a driving assessment consists of. What is your response?

3) **TREATMENT**

The following series of questions relate to treatment intervention.

**T1:** Results from the Chedoke Arm and Hand Activity Inventory (CAHAI) indicate that Mr. T requires moderate assistance during functional tasks involving his arm/hand and that his affected upper limb performs 50% to 74% of the task. Before you meet with Mr. T to discuss your assessment findings, you ask yourself whether constraint-induced movement therapy is effective for improving his functional independence during tasks involving his arm/hand. What is your response?
Responses:
- Yes it is effective
- No it is not effective
- Not sure if it is effective or not (then skip to T1b)

T1a: Please describe your knowledge about the scientific evidence that supports or refutes the use of constraint-induced movement therapy is effective for improving his functional independence during tasks involving his arm/hand, when considering Mr. T’s current stage of stroke recovery.

T1b: Regardless of the scientific evidence supporting or refuting the use of constraint-induced movement therapy for the upper extremity, is Mr. T an appropriate candidate for this treatment based on the case vignette?

Responses:
- Yes (see T1c)
- No (see T1c)
- Not sure whether he is an appropriate candidate (then skip to T2)

T1c: List the reason(s) why Mr. T is/is not an appropriate candidate for this treatment based on the case vignette.

T2: Results from your quick screen indicate that Mr. T has a mild post-stroke depression. When you meet with Mr. T to discuss your assessment findings, his son asks you whether therapeutic exercise is effective for improving post-stroke depression. What is your response?

Responses:
- Yes it is effective
- No it is not effective
- Not sure if it is effective or not (then skip to T3)

T2a: Please describe your knowledge about the scientific evidence that supports or refutes the use of therapeutic exercise for improving depressive symptoms.

T3: After examining Mr. T’s right shoulder, you observe that his hemiplegic shoulder is subluxed and requires treatment. As you mention this to Mr. T, you ask yourself whether functional electrical stimulation (FES) is effective for improving his shoulder pain. What is your response?

Responses:
- Yes it is effective
- No it is not effective
- Not sure if it is effective or not (skip to T4)

T3a: Please describe the scientific evidence that supports or refutes the use of FES for improving shoulder pain, when considering Mr. T’s current stage of stroke recovery and the fact that his hemiplegic shoulder is subluxed.
T4: Mr. T read about motor imagery on the Internet and was curious about this intervention. He asks you whether motor imagery is effective for improving his lower extremity function. What is your response?

Responses:
- Yes it is effective
- No it is not effective
- Not sure if it is effective or not (skip to T5)

T4a: Please describe the scientific evidence that supports or refutes the use of motor imagery for improving lower extremity function, when considering Mr. T’s current stage of stroke recovery and functional status.

T5: According to the Canadian Best Practice Recommendations for Stroke Care, what topics areas regarding secondary stroke prevention are suggested to be discussed with patients such as Mr. T?

-I am not familiar with the Canadian Best Practice Recommendations for Stroke Care, specific to secondary stroke prevention. (NOTE: a possible response option to select)

4) EDUCATIONAL RESOURCES

Same as Knowledge Questionnaire (Baseline #1)
KNOWLEDGE QUESTIONNAIRE (MONTH #3)

Case vignette: “Mr. P is a 65 year-old retired teacher who was recently admitted to the acute care hospital where you work and was diagnosed with a right hemisphere stroke. Prior to his stroke, he lived with his wife in a two-storey house. The couple is supportive of each other and they had an active lifestyle. Mr. P was an active volunteer with his wife at a local elementary school. He also drove his grandchildren home from school daily. They have 2 adult daughters: one lives close by and visits frequently.

On your visit 2 weeks post-stroke, Mr. P is sitting up in a regular chair. He provides basic and accurate information about himself, but is easily distracted and repeatedly mentions that he wants to return home to drive his grandchildren home from school. You notice that Mr. P speaks fluently. You note that he requires supervision for transfers to and from his chair, bed and toilet. He walks with minimum assistance from one person while using a quad cane. The medical chart mentions that he is able to comb his hair using his right hand but leaves half of the food on his plate while eating, usually the food on the left. The chart also reports that Mr. P occasionally coughs while eating or drinking. Mr. P mentions that he remembers events from his past but is having trouble remembering daily occurrences, such as what he ate for breakfast. He expresses a desire to get back to walking independently and to resume his volunteer activities.

1) PROBLEM IDENTIFICATION

The following series of questions relate to problems experienced by Mr. P as noted in the case vignette.

P1: Does Mr. P have any potential perceptual issues that warrant investigation?

Responses:
- Yes
- No (then skip to P2)
- Not sure (then skip to P2)

P1a: List the potential perceptual issue(s) that you would like to investigate with Mr. P based on the case vignette.

P2: Does Mr. P have any potential cognitive deficits that warrant investigation?

Responses:
- Yes
- No (then skip to P3)
- Not sure (then skip to P3)

P2a: List the potential cognitive deficit(s) that you would like to investigate with Mr. P based on the case vignette.
P3: Does Mr. P have any potential functional limitations that warrant investigation?  
Responses:  
- Yes  
- No (then skip to A1)  
- Not sure (then skip to A1)

P3a: List the potential functional limitation(s) that you would like to investigate with Mr. P based on the case vignette.

2) **ASSESSMENT/SCREENING**

The following series of questions relate to assessment.

A1: Given Mr. P’s apparent difficulty with scanning/attending to the environment on his left side, what would be the **best** screening tool to use?  

Responses:  
- Clock Drawing Test  
- Line Bisection  
- Draw-A-Man Test  
- None of them (then skip to A2)

A1a: List advantage(s) of this screening tool that guided your decision to use this tool? (only if they answered any one of the first 3 responses)

A1b: List limitation(s) of the other screening tools that guided your decision to not use these tools? (only if they answered any one of the first 3 responses)

A2: In general, why is it important to evaluate for unilateral spatial neglect (USN)?

A3: What are the possible advantages of using the Chedoke Arm and Hand Activity Inventory (CAHAI) with Mr. P?  

- I am not familiar with the Chedoke Arm and Hand Activity Inventory (***can you put this at the bottom of the text box as an option to click)

A4: Which of the following tool(s) can detect change in Mr. P’s mobility as he receives gait training? SELECT ALL THOSE THAT APPLY  

Responses: (NOTE: can select more than one)  
- Timed Up and Go (TUG)  
- Fugl-Meyer Assessment of Sensorimotor Recovery (FMA)  
- 6 Minute Walk Test (6MWT)  
- None of the above  
- Not sure
A5: What are the possible advantages of using the Montreal Cognitive Assessment (MoCA) to screen for cognitive impairment with Mr. P?

-I am not familiar with the MoCA (NOTE: a possible response option to select)

A6: What do the Canadian Best Practice Recommendations for Stroke Care suggest about the timing of dysphagia (i.e. swallowing ability) assessment?

-I am not familiar with the Canadian Best Practice Recommendations for Stroke Care, specific to the timing of dysphagia (i.e. swallowing ability) assessment (NOTE: a possible response option to select)

3) **TREATMENT**

The following series of questions relate to treatment intervention.

T1: During your initial visit, Mr. P asks you whether acupuncture is effective for improving his ability to walk. What is your response?

Responses:
- Yes it is effective
- No it is not effective
- Not sure if it is effective (then skip to T2)

T1a: Please describe your knowledge about the scientific evidence that supports or refutes the use of acupuncture for improving ability to walk, when considering Mr. P’s current stage of stroke recovery and functional status.

T2: Mr. P’s daughter asks you whether task-oriented training is effective for improving Mr. P’s upper extremity motor function. What is your response?

Responses:
- Yes it is effective
- No it is not effective
- Not sure if it is effective (then skip to T3)

T2a: Please describe the scientific evidence that supports or refutes the use of task-oriented training for improving upper extremity motor function, when considering Mr. P’s current stage of stroke recovery and functional status.

T3: Mr. P asks you whether strength training is effective for improving Mr. P’s functional mobility (i.e. from sitting to ambulating)? What is your response?

Responses:
- Yes it is effective
-No it is not effective
-Not sure if it is effective (then skip to T4)

T3a: Please describe the scientific evidence that supports or refutes the use of strength training for improving functional mobility (i.e. from sitting to ambulating), when considering Mr. P’s current stage of stroke recovery and functional status.

T4: As you prepare Mr. P’s discharge summary, Mr. P expresses that he has a personal and private concern. He mentions that he was sexually active prior to his stroke. He asks you whether his physical limitations (i.e. diminished ability to move his weaker side) post-stroke will affect his sexual activity. What is your response?
NOTE: Mr. P’s medical chart indicates that he has no sexually-related dysfunction.

Responses:
-Yes, his physical limitations may affect his sexual function (further investigation necessary)
-No, his physical limitations will not affect his sexual function (then skip to T2)
-Not sure about the issue of sexual functioning post-stroke (then skip to T2)

T4a: Do you have any suggestions for Mr. J regarding how to compensate for his physical limitations during sexual activity?

T5: What do the Canadian Best Practice Recommendations for Stroke Care suggest about the use of stroke units for the management of patients post-stroke? Summarize your response in 1-2 sentences.

-I am not familiar with the Canadian Best Practice Recommendations for Stroke Care, specific to the use of stroke units for the management of patients post-stroke (NOTE: a possible response option to select)

4) EDUCATIONAL RESOURCES

Same as Knowledge Questionnaire (Baseline #1)
<table>
<thead>
<tr>
<th>Knowledge Questionnaire Scoring Grid</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BASELINE #1</strong></td>
</tr>
<tr>
<td><strong>PROBLEM IDENTIFICATION (PI)</strong></td>
</tr>
<tr>
<td>Does Mrs. P have any potential perceptual limitations that warrant investigation (Score=5)</td>
</tr>
<tr>
<td>Does Mrs. P have any potential physical limitations that warrant investigation (Score=11)</td>
</tr>
<tr>
<td>Does Mrs. P have any potential functional limitations that warrant investigation (Score=16)</td>
</tr>
<tr>
<td><strong>SUBTOTAL for PI = 32</strong></td>
</tr>
<tr>
<td><strong>ASSESSMENT (AX)</strong></td>
</tr>
<tr>
<td>What are the possible advantages of using the Berg Balance Scale with Mrs. P (Score=8) A1</td>
</tr>
<tr>
<td>- Reliability: 9,10,11,12,13</td>
</tr>
<tr>
<td>- Validity: 14,15,16,17,18,19,20,21</td>
</tr>
<tr>
<td>- Responsiveness: 31,111</td>
</tr>
<tr>
<td>- Psychometric strength: 5,41</td>
</tr>
<tr>
<td>- Standardized: 40</td>
</tr>
<tr>
<td>- Best practice guidelines/evidence: 7,8,33,34,35,38</td>
</tr>
<tr>
<td>- Stage of stroke recovery: 39</td>
</tr>
<tr>
<td>- Floor/ceiling effect: 27,28</td>
</tr>
<tr>
<td>What are the possible advantages of using the Chedoke-McMaster Stroke Assessment with Mr. J (Score=7) A2</td>
</tr>
<tr>
<td>- Reliability: 9,10,11,12,13</td>
</tr>
<tr>
<td>- Validity: 14,15,16,17,18,19,20,21</td>
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<tr>
<td>- Stage of stroke recovery: 39</td>
</tr>
<tr>
<td>You are concerned about Mr. T’s shoulder pain. Please explain how you would assess the extent of his shoulder pain (Score=4) A1</td>
</tr>
<tr>
<td>- CAHAI: 80</td>
</tr>
<tr>
<td>- Chedoke-McMaster Stroke Ax: 81</td>
</tr>
<tr>
<td>- DASH: 82</td>
</tr>
<tr>
<td>- Pain scale/inventory: 83</td>
</tr>
<tr>
<td>- Verbal Rating Scale: 84</td>
</tr>
<tr>
<td>- Faces Rating Scale (CMSA Impairment Inventory): 85</td>
</tr>
<tr>
<td>- Goniometry: 86</td>
</tr>
<tr>
<td>- X-ray/Ultrasound to rule out subluxation: 114</td>
</tr>
<tr>
<td>- VAS: 123</td>
</tr>
</tbody>
</table>

Given Mrs. P’s apparent difficulty with scanning/attending to the environment on her left side, what would be the best screening tool to use (Score=1 for 2) A2 |
- Clock Drawing Test: 1 |
- Line Bisection: 2 |
- Draw-A-Man Test: 3 |
- None of them: 4 |

Given Mrs. F’s apparent difficulty with scanning/attending to the environment on her left side, what would be the best screening tool to use for the presence of post-stroke depression with Mr. J (Score=1 for 1) A2 |
| - HADS: 1 |
| - SADQ: 2 |
| - MADRS: 3 |
| - None of the above: 4 |
| - Not sure: 5 |

What would be the best screening tool to use to screen for the presence of post-stroke depression for Mr. T (Score=1 for 2) A2 |
| - HADS: 1 |
| - SADQ: 2 |
| - BDQ: 3 |
| - MADRS: 4 |
| - None of the above: 5 |
| - Not sure: 6 |

Given Mr. P’s apparent difficulty with scanning/attending to the environment on her left side, what would be the best screening tool to use (Score=1 for 2) A1 |
| - Clock Drawing Test: 1 |
| - Line Bisection: 2 |
| - Draw-A-Man Test: 3 |
| - None of them: 4 |

What are the advantages that guided your decision to use this tool (Score=7) A1a |
<p>| - Reliability: 9,10,11,12,13 |
| - Validity: 14,15,16,17,18,19,20,21 |
| - Responsiveness: 31,111 |
| - Psychometric strength: 5,41,109,106 |
| - Standardized: 40 |
| - Best practice guidelines/evidence: 7,8,33,34,35,38 |
| - Stage of stroke recovery: 39 |
| - Floor/ceiling effect: 27,28 |</p>
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<thead>
<tr>
<th>What are the advantages that guided your decision to use this tool with Mrs. P (Score=7) A2a</th>
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<th>What are the advantages that guided your decision to use this tool (Score=9) A2a</th>
<th>What are the advantages that guided your decision to use this tool (Score=8) A2a</th>
<th>What are the advantages that guided your decision to use this tool (Score=7) A2a</th>
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<tr>
<td>• Complex task that measures other constructs: 107</td>
<td>• Screen vs. assess: 42</td>
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<tr>
<td>What are the limitations of the other screening tools that guided your decision to not use these tools (Score=10) A2b</td>
<td>What are the limitations of the other screening tools that guided your decision to not use these tools (Score=7) A2b</td>
<td>What are the limitations of the other screening tools that guided your decision to not use these tools (Score=8) A2b</td>
<td>What are the limitations of the other screening tools that guided your decision to not use these tools (Score=10) A1b</td>
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<td>• Screen vs. assess: 42</td>
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<tr>
<td>• Does not screen for other hemispaces: 105,108</td>
<td>• Sensitivity/specificity:32</td>
<td>• Assess vs. screen: 42</td>
<td>• Stage of stroke recovery: 39</td>
<td></td>
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<tr>
<td>Which of the following tools can detect change in Mrs. P’s performance in activities of daily living as she receives stroke rehabilitation (Score=1 for 1 or 2; Score 2 for 1 and 2)</td>
<td>A3</td>
<td>Which of the following tool(s) can detect change in Mr. J’s mobility as he receives gait training (Score=1 if 1 or 2 or 3; Score=2 if 1 and 2 and 3)</td>
<td>A3</td>
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<td></td>
<td>Complex task that measures other constructs: 107</td>
<td>Screen vs. assess: 42</td>
<td>Not responsive: 77</td>
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<td></td>
<td>Does not screen for other hemispheres: 105,108</td>
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<td>Assesses other constructs: 73</td>
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<td></td>
<td>Does not accurately measure USN: 119</td>
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<td></td>
<td>Not specific measure for USN: 104</td>
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<td></td>
<td>USN: 104, 105, 108</td>
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<td></td>
<td>None of them: 4</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>What are the possible advantages of using the Assessment of Life Habits tool with Mrs. P (Score=8)</th>
<th>A4</th>
<th>What are the possible advantages of using the Timed Up and Go/5 Minute Walk Test with Mr. J (Score=8)</th>
<th>A4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reliability: 9,10,11,12,13</td>
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<tr>
<td>Best practice</td>
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</table>

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<tr>
<th>What are the possible advantages of using the Timed Up and Go/5 Minute Walk Test</th>
<th>A3a</th>
<th>What are the advantages that guided your decision to use this tool (Score=8)</th>
<th>A3a</th>
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</thead>
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<tr>
<td>Best practice guidelines/evidence:</td>
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<tr>
<th>Which of the following tool(s) can detect change in Mr. J’s mobility as he receives gait training (Score=1 if 1 or 2 or 3; Score=2 if 1 and 2 and 3)</th>
<th>A3</th>
<th>What would be the best assessment tool to use to evaluate Mr. T’s motor function of the upper and lower extremity (Score=1 for 3)</th>
<th>A3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rivermead: 1</td>
<td>MVPT: 1</td>
<td>Wolf MFT: 2</td>
<td>MVPT: 1</td>
</tr>
<tr>
<td>OSOT: 3</td>
<td>Not responsive: 77</td>
<td>None of the above: 5</td>
<td>Not responsive: 77</td>
</tr>
<tr>
<td>BIT: 4</td>
<td>None of them: 5</td>
<td>Not sure: 6</td>
<td>None of them: 5</td>
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<tr>
<td>Not sure: 6</td>
<td>Not sure: 5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>None of the above: 4</td>
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<tr>
<td>Best practice</td>
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<td>Best practice</td>
</tr>
<tr>
<td>What are the possible advantages of using the Chedoke Arm and Hand Activity Inventory with Mrs. P (Score=7) A5</td>
<td>What are the possible advantages of using the Montreal Cognitive Assessment (MoCA) to screen for cognitive impairment with Mr. J (Score=11) A5</td>
<td>What are the possible limitations of the other screening tools that guided your decision to not use these tools (Score=9) A3b</td>
<td>What are the possible limitations of the other screening tools that guided your decision to not use these tools (Score=8) A3b</td>
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</table>
| - Reliability: 9,10,11,12,13  
- Validity: 14,15,16,17,18,19,20,21,22,23,24,25,30,32,26  
- Responsiveness: 31,111  
- Psychometric strength: 5,41  
- Standardized: 40  
- Best practice guidelines/evidence: 7,8,33,34,35,38  
- Stage of stroke recovery: 39  
- Developed in response to poor sensitivity of MMSE: 66  
- Excellent correlation with MMSE: 67  
- Three versions to minimize practice effect: 92,29  
- Ceiling effect: 128,27,28 | - Reliability: 9,10,11,12,13  
- Validity: 14,15,16,17,18,19,20,21,22,23,24,25,30,32,26  
- Responsiveness: 31,111,77  
- Psychometric strength: 5,41  
- Standardized: 40  
- Best practice guidelines/evidence: 7,8,33,34,35,38  
- Stage of stroke recovery: 39  
- Assesses other constructs: 73 | - Reliability: 9,10,11,12,13  
- Validity: 14,15,16,17,18,19,20,21,22,23,24,25,30,32,26  
- Responsiveness: 31,111  
- Psychometric strength: 5,41  
- Standardized: 40  
- Best practice guidelines/evidence: 7,8,33,34,35,38  
- Stage of stroke recovery: 39  
- Assess other constructs: 91  
- Assess UE only: 90 | - Reliability: 9,10,11,12,13  
- Validity: 14,15,16,17,18,19,20,21,22,23,24,25,30,32,26  
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- Standardized: 40  
- Best practice guidelines/evidence: 7,8,33,34,35,38  
- Stage of stroke recovery: 39  
- Assess other constructs: 91  
- Assess UE only: 90 |

Is the Mini Mental State Examination a tool that should be administered repeatedly with Mrs. P (Score=1 for 2) A6
- Yes: 1
- No: 2
- Not sure: 3

What do the Canadian Best Practice Guidelines for Stroke suggest about the timing of dysphagia assessment for Mr. J (Score=7) A6
- Use of reliable/valid screening tool: 68
- Assess by SLP or OT: 70
- Referral to dietitian: 71
- Assess early: 93,94,95

Which of the following tool(s) (if any) can detect improvements in Mrs. F’s performance in activities of daily living as she receives stroke rehabilitation (Score=1 for 1 or 2; Score 2 for 1 and 2) A4
- Barthel Index: 1
- Functional Independence Measure: 2

What are the possible advantages of using the Chedoke Arm and Hand Activity Inventory with Mr. T (Score=7) A4
- Reliability: 9,10,11,12,13
- Validity: 14,15,16,17,18,19,20,21,22,23,24,25,30,32,26
- Responsiveness: 31,111
- Psychometric strength: 5,41

What do the Canadian Best Practice Guidelines for Stroke suggest about the timing of dysphagia assessment for Mr. P (Score=7) A6
- Use of reliable/valid screening tool: 68
- Assess by SLP or OT: 70
- Referral to dietitian: 71
- Assess early: 93,94,95
<table>
<thead>
<tr>
<th>Question</th>
<th>Score</th>
<th>Options</th>
<th>Relevant Tools or Concepts</th>
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<tr>
<td>Please explain your reasoning for your response (Score=6) A6a</td>
<td></td>
<td>• Repeated use with the same client at short intervals reduces validity:</td>
<td>43,46</td>
</tr>
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<td></td>
<td></td>
<td>• Sensitivity: 32,47</td>
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<tr>
<td></td>
<td></td>
<td>• Ineffective to detect cognitive impairments in stroke patients: 48</td>
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<tr>
<td></td>
<td></td>
<td>• Practice effect: 49</td>
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<td></td>
<td></td>
<td>• Not designed for stroke patients: 50,51</td>
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<tr>
<td></td>
<td></td>
<td>• Use MOCA rather than MMSE: 121</td>
<td></td>
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<tr>
<td>Which of the following tool(s) (if any) can detect improvements in Mrs. F’s mobility as she receives gait training for a two-week period (Score=1 for 1 or 2 or 3 or 4; Score=2 for 1 and 2 and 3 and 4) A5</td>
<td>5,41</td>
<td>• Standardized: 40</td>
<td>7,8, 33,34,35,38</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Best practice guidelines/evidence:</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Rivermead Mobility Index: 1</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>• Timed Up &amp; Go: 2</td>
<td></td>
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<td></td>
<td></td>
<td>• 6-Minute Walk Test: 3</td>
<td></td>
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<td></td>
<td></td>
<td>• Rivermead Motor Assessment: 4</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>• None of them: 5</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Not sure: 6</td>
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<tr>
<td>What are the possible advantages of using the Reintegration to Normal Living Index (RNLI) with Mr. T (Score=7) A5</td>
<td></td>
<td>• Reliability: 9,10,11,12,13</td>
<td>7,8, 33,34,35,38</td>
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<tr>
<td></td>
<td></td>
<td>• Validity: 14,15,16,17,18,19,20,21,22,23,24,25,30,32,36,37</td>
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<tr>
<td></td>
<td></td>
<td>• Responsiveness: 31,111</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Psychometric strength: 5,41</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Standardized: 40</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Best practice guidelines/evidence:</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>• Stage of stroke recovery: 39</td>
<td></td>
</tr>
<tr>
<td>During your initial visit, would you use a screening tool or assessment tool to investigate whether Mrs. P can scan the left side of her environment (Score=1 for 1 or 3) A7</td>
<td></td>
<td>• Screening tool: 1</td>
<td>7,8, 33,34,35,38</td>
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<tr>
<td></td>
<td></td>
<td>• Assessment tool: 2</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>• Screening and assessment tool: 3</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>• Neither screening nor assessment tool: 4</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Not sure about difference between screening and assessment: 5</td>
<td></td>
</tr>
<tr>
<td>What are the possible advantages of using the Timed Up and Go/5 Minute Walk Test with Mrs. F (Score=8) A6</td>
<td>5,41</td>
<td>• Standardized: 40</td>
<td>7,8, 33,34,35,38</td>
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<tr>
<td></td>
<td></td>
<td>• Best practice guidelines/evidence:</td>
<td></td>
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<td></td>
<td></td>
<td>• Stage of stroke recovery: 39</td>
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<tr>
<td></td>
<td></td>
<td>• Sensitivity: 32</td>
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<tr>
<td>What is the difference between a screening tool and assessment tool (Score=6) A7a</td>
<td>5,41</td>
<td>• Standardized: 40</td>
<td>7,8, 33,34,35,38</td>
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<tr>
<td></td>
<td></td>
<td>• Best practice guidelines/evidence:</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>• Stage of stroke recovery: 39</td>
<td></td>
</tr>
<tr>
<td>What is the difference between a screening tool and assessment tool (Score=6) A7a</td>
<td>5,41</td>
<td>• Standardized: 40</td>
<td>7,8, 33,34,35,38</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Best practice guidelines/evidence:</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Stage of stroke recovery: 39</td>
<td></td>
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</tbody>
</table>

**What is the difference between a screening tool and assessment tool (Score=6) A7a**

**What are the possible advantages of using the Cambridge Cognitive**

**What is the difference between a screening tool and assessment tool (Score=6) A7a**
- Detecting present vs. absent of deficit: 52, 42
- Identify need for assessment: 53
- Detects change: 54, 31, 111
- Classify/stratify severity of deficit: 55, 26
- Identify type of USN: 56
- Detailed assessment: 110

**Examination with Mrs. F?** (Score=6) A7
- Reliability: 9, 10, 11, 12, 13
- Validity: 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 30, 26
- Psychometric strength: 5, 41
- Standardized: 40
- Best practice guidelines/evidence: 7, 8, 33, 34, 35, 38
- Stage of stroke recovery: 39

- Detecting present vs. absent of deficit: 52, 42
- Identify need for assessment: 53
- Detects change: 54, 31, 111
- Classify/stratify severity of deficit: 55, 26
- Identify type of USN: 56
- Detailed assessment: 110

Why is it important to evaluate for unilateral spatial neglect (USN) (Score=10) A8
- Risk for falls: 57
- Long rehab stays: 58
- Poor functional recovery: 59
- Influence discharge/return home: 60
- Affect their safety: 61
- Treatments to improve their symptoms/function: 62
- Can go misdiagnosed or undetected: 63
- Client awareness: 64
- Early screen/assess: 65
- Alert other professionals: 120

Mr. T mentions that he wants to continue driving and is aware that he will need to undergo a driving assessment. He wonders what a driving assessment consists of. What is your response (Score=8) A8
- OT Referral: 97
- Referral to driving assessment program: 98
- Pre-road driving test: 99
- Physical, cognitive, visual perception, medical history, vision: 100, 103
- On-road driving test: 101
- Assess ability to obey driving rules: 102
- Vehicle adaptations, safe use of driving controls: 115, 125
- Driver retraining/treatment program, trained instructor: 126, 116

<table>
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<tr>
<th>SUBTOTAL for AX = 67</th>
<th>SUBTOTAL for AX = 50</th>
<th>SUBTOTAL for AX = 61</th>
<th>SUBTOTAL for AX = 69</th>
<th>SUBTOTAL for AX = 55</th>
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</table>

**TREATMENT (TX)**

- Is acupuncture effective for improving Mrs. P’s ability to walk
- Is cognitive behavioral therapy effective for improving post-
- Is body-weight supported treadmill training effective for
- Is constraint-induced movement therapy effective for
- Is acupuncture effective for improving Mr. P’s ability to walk
| (Score=1 for 2) T1 | • Effective: 1 |
| Not effective: 2 |
| Not sure: 3 |
| Use of acupuncture for improving ability to walk, when considering Mrs. P’s current stage of stroke recovery and functional status (Score=5) T1a |
| • Effectiveness: 2,6 |
| • Stage of stroke recovery: 4 |
| • Level of evidence: 12 |
| • Best practice guidelines/research evidence: 7,8,11 |
| • Client appropriateness: 13,14,16,17,18,19 |

| Use of cognitive behavioral therapy for improving post-stroke depression, when considering Mr. J’s current stage of stroke recovery and functional status (Score=3) T1a |
| • Effectiveness: 2,6 |
| • Stage of stroke recovery: 4 |
| • Best practice guidelines/research evidence: 7,8,11 |

| Use of body-weight supported treadmill training for improving balance, when considering Mrs. F’s current stage of stroke recovery and functional status (Score=5) T1a |
| • Effectiveness: 2,6 |
| • Stage of stroke recovery: 4 |
| • Level of evidence: 12 |
| • Best practice guidelines/research evidence: 7,8,11 |
| • Client appropriateness: 13,14,16,17,18,19 |

| Use of constraint-induced movement therapy for improving upper extremity function, when considering Mr. T’s current stage of stroke recovery (Score=5) T1a |
| • Effectiveness: 1,6 |
| • Stage of stroke recovery: 4 |
| • Level of evidence: 12 |
| • Best practice guidelines/research evidence: 7,8,11 |
| • Client appropriateness: 13,14,16,17,18,19 |

| Use of constraint-induced movement therapy for improving upper extremity function, when considering Mr. T’s current stage of stroke recovery and functional status (Score=5) T1a |
| • Effectiveness: 2,6 |
| • Stage of stroke recovery: 4 |
| • Level of evidence: 12 |
| • Best practice guidelines/research evidence: 7,8,11 |
| • Client appropriateness: 13,14,16,17,18,19 |

| Is mirror therapy/motor imagery effective for improving Mr. J’s lower extremity function (Score=1 for 1) T2 |
| • Effective: 1 |
| • Not effective: 2 |
| • Not sure: 3 |

| Is virtual reality effective for improving Mrs. F’s mobility upon discharge (Score=1 for 1) T2 |
| • Effective: 1 |
| • Not effective: 2 |
| • Not sure: 3 |

| Is therapeutic exercise effective for improving post-stroke depression for Mr. T (Score=1 for 1) T2 |
| • Effective: 1 |
| • Not effective: 2 |
| • Not sure: 3 |

| Is task-oriented training effective for improving Mr. P’s upper extremity motor function (Score=1 for 2) T2 |
| • Effective: 1 |
| • Not effective: 2 |
| • Not sure: 3 |

| Mrs. P has been prescribed prism therapy. Would you have Mrs. P wear the prism glasses during your treatment session (Score=1 for 1) T3 |
| • Yes: 1 |
| • No: 2 |
| • Not sure: 3 |

| Use of mirror therapy/motor imagery for improving lower extremity function, when considering Mr. J’s current stage of stroke recovery (Score=5) T2a |
| • Effectiveness: 1,6 |
| • Stage of stroke recovery: 4 |
| • Level of evidence: 12 |
| • Best practice |

| Use of virtual reality for the lower extremity for improving mobility upon discharge, when considering Mrs. F’s current stage of stroke recovery and functional status (Score=5) T2a |
| • Effectiveness: 1,6 |
| • Stage of stroke recovery: 4 |
| • Level of evidence: 12 |

| Use of therapeutic exercise for improving depressive symptoms, when considering Mr. T’s current stage of stroke recovery and functional status (Score=5) T2a |
| • Effectiveness: 1,6 |
| • Stage of stroke recovery: 4 |
| • Level of evidence: 12 |
| • Best practice |

<p>| Use of task-oriented training for improving upper extremity motor function, when considering Mr. P’s current stage of stroke recovery and functional status (Score=5) T2a |
| • Effectiveness: 2,6 |
| • Stage of stroke recovery: 4 |
| • Level of evidence: 12 |</p>
<table>
<thead>
<tr>
<th>Question</th>
<th>Options</th>
</tr>
</thead>
</table>
| **Is functional electrical stimulation effective for improving Mrs. P's left hand function (Score=1 for 1) T4** | - Effective: 1  
- Not effective: 2  
- Not sure: 3                                                                                                      |
| **Use of functional electrical stimulation for improving hand function, when considering Mr. J's current stage of stroke recovery and functional status (Score=5) T3a** | - Effectiveness: 2.6  
- Stage of stroke recovery: 4  
- Level of evidence: 12  
- Best practice guidelines/research evidence: 7,8,11  
- Client appropriateness: 13,14,16,17,18,19                                                                 |
| **Use of cognitive rehabilitation for improving attention span, when considering Mrs. F's current stage of stroke recovery and functional status (Score=4) T3a** | - Effectiveness: 2.6  
- Stage of stroke recovery: 4  
- Best practice guidelines/research evidence: 7,8,11  
- Client appropriateness: 13,14,16,17,18,19                                                                 |
| **Use of strength training for improving functional mobility, when considering Mr. P's current stage of stroke recovery and functional status (Score=5) T3a** | - Effectiveness: 1,6  
- Stage of stroke recovery: 4  
- Level of evidence: 12  
- Best practice guidelines/research evidence: 7,8,11  
- Client appropriateness: 13,14,16,17,18,19                                                                 |
| **Are there strategies that patients can use to compensate for their physical limitations (i.e. hemiparesis) during sexual activity (Score=1 for 1) T4** | - Yes: 1  
- No: 2  
- Not sure: 3                                                                                                      |
| **Is eye patching effective for improving Mrs. F's USN symptoms (Score=1 for 1) T4** | - Effective: 1  
- Not effective: 2  
- Not sure: 3                                                                                                      |
| **Is mirror therapy/motor imagery effective for improving Mr. T's lower extremity function (Score=1 for 1) T4** | - Effective: 1  
- Not effective: 2  
- Not sure: 3                                                                                                      |
| **Use of strength training for improving Mr. P's functional mobility (Score=1 for 1) T3** | - Effective: 1  
- Not effective: 2  
- Not sure: 3                                                                                                      |
| **Is body-weight supported treadmill training effective for improving Mrs. P's balance** | **What strategies can patients use to compensate for their physical limitations (i.e. hemiparesis)**  
- Use of eye patching for improving USN symptoms, when considering Mrs. F's current stage of stroke recovery and functional status (Score=5) T3a  
- Use of mirror therapy/motor imagery for improving lower extremity function, when considering Mrs. F's current stage of stroke recovery and functional status (Score=5) T3a  
- Are there strategies that patients can use to compensate for their physical limitations (i.e. hemiparesis) during sexual activity (Score=1 for 1) T4  
- - Yes: 1  
- - No: 2  
- - Not sure: 3                                                                                                      |
### Use of Body-Weight Supported Treadmill Training for Improving Balance, When Considering Mrs. P’s Current Stage of Stroke Recovery and Functional Status (Score=5) T5a
- **Effectiveness**: 2, 6
- **Stage of stroke recovery**: 4
- **Level of evidence**: 12
- **Best practice guidelines/research evidence**: 7, 8, 11
- **Client appropriateness**: 13, 14, 16, 17, 18, 19

### What Do the Canadian Stroke Rehabilitation Best Practice Guidelines Suggest About the Use of Task-Oriented Training for the Lower Extremity Function for Mr. J (Score=5) T5
- **Effectiveness**: 1, 6
- **Stage of stroke recovery**: 4
- **Level of evidence**: 12
- **Best practice guidelines/research evidence**: 7, 8, 11
- **Client appropriateness**: 13, 14, 16, 17, 18, 19

### What Do the Canadian Evidence-Based Recommendations for the Upper/Lower Extremities Suggest About the Use of Aerobic Exercise for Mrs. F (Score=5) T5
- **Effectiveness**: 1, 6
- **Stage of stroke recovery**: 4
- **Level of evidence**: 12
- **Best practice guidelines/research evidence**: 7, 8, 11
- **Client appropriateness**: 13, 14, 16, 17, 18, 19

### According to the Canadian Best Practice Recommendations for Stroke Care, What Topics Areas Regarding Secondary Stroke Prevention Are Suggested to Be Discussed with Patients Post-Stroke (Score=8) T5
- **Diet modification**: 47
- **Patient education**: 48
- **Exercise, physical activity, weight management**: 49, 56
- **Stress management**: 50
- **Smoking cessation**: 51
- **Medical management (lipid, blood pressure, cholesterol, diabetes)**: 53, 54
- **Alcohol management**: 55
- **History of stroke**: 57

### What Do the Canadian Best Practice Recommendations for Stroke Care Suggest About the Use of Stroke Units for the Management of Patients Post-Stroke (Score=5) T5
- **Specific setting: leads to better functional outcomes**: 60
- **Interdisciplinary and organized care**: 61
- **Standardized assessment**: 62
- **Decreased length of stay**: 63
- **Transition to unit should be within 24-48 hrs**: 64

<table>
<thead>
<tr>
<th>(Score=1 for 2) T5</th>
<th>(Score=8) T4a</th>
<th>(Score=5) T4a</th>
<th>(Score=8) T4a</th>
<th>(Score=5) T4a</th>
<th>(Score=8) T4a</th>
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<td><strong>Alternate positions</strong>: 37</td>
<td><strong>Effectiveness</strong>: 1, 6</td>
<td><strong>Alternate positions</strong>: 37</td>
<td><strong>Effectiveness</strong>: 1, 6</td>
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<td><strong>Not effective</strong>: 2</td>
<td><strong>Communication</strong>: 38</td>
<td><strong>Stage of stroke recovery</strong>: 4</td>
<td><strong>Communication</strong>: 38</td>
<td><strong>Stage of stroke recovery</strong>: 4</td>
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<td><strong>Not sure</strong>: 3</td>
<td><strong>Energy conservation</strong>: 39</td>
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<td><strong>Energy conservation</strong>: 39</td>
<td><strong>Level of evidence</strong>: 12</td>
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<td><strong>Medication</strong>: 40</td>
<td><strong>Best practice guidelines/research evidence</strong>: 7, 8, 11</td>
<td><strong>Medication</strong>: 40</td>
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<td><strong>Sexual aids</strong>: 41</td>
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<td><strong>Education</strong>: 42</td>
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<td><strong>Other forms of intimacy</strong>: 43</td>
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<td><strong>Other forms of intimacy</strong>: 43</td>
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</tbody>
</table>

### Notes
- Questions in grey were posed 2 or 3 times across the five time points.
- PI=Problem Identification
- Ax=Assessment
- Tx=Treatment
- TOTAL=Total Questionnaire

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**SUBTOTAL for TX = 26**

**SUBTOTAL for TX = 30**

**SUBTOTAL for TX = 28**

**SUBTOTAL for TX = 32**

**SUBTOTAL for TX = 32**

**TOTAL for BASELINE #1 = 125**

**TOTAL for BASELINE #2 = 114**

**TOTAL for MONTH #1 = 121**

**TOTAL for MONTH #2 = 140**

**TOTAL for MONTH #3 = 117**

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Patient Vignettes- Acute care

VIGNETTE for Knowledge Questionnaire Baseline #1

"Mrs. P is a 68-year-old retired teacher and was an active volunteer with her husband at the local elementary school before her stroke. She also drove her grandchildren home from school daily. She was recently admitted to the acute care hospital where you work and was diagnosed with a right hemisphere stroke. Her medical chart indicates that she has no cognitive impairments as a result of her stroke. The nurse mentions that she is able to comb her hair using her right hand but leaves half of the food on her plate while eating, usually the food on the left. On your initial assessment 1 week post-stroke, Mrs. P is sitting up in a regular chair. When the phone rings, Mrs. P difficulty locating the phone on a table to her left but then manages to clumsily grasp the receiver with her left hand. On your request, she rises to stand, using her right hand to push against the arm of the chair. Mrs. P is able to stand alone, using a wide base and walks with your assistance but has some difficulty bringing her left leg forward."

VIGNETTE for Knowledge Questionnaire Baseline #2

"Mr. J is a 55-year-old man who was recently admitted to the acute care hospital where you work with a left hemisphere stroke. He lives with his wife in a two-storey house. The couple is supportive of each other and they had an active lifestyle. They have 2 adult daughters: one lives close by and visits frequently. Mr. J works as a car mechanic. On your initial assessment at four days post-stroke, Mr. J provides basic and accurate information about himself, but is easily distracted and repeatedly mentions pain when pointing to his right shoulder. You note that he requires minimum assistance from one person for transfers to and from the wheelchair, bed and toilet. He walks with maximum assistance from one person while using a quad cane, with a tendency for his right knee to buckle and for his right foot to drag. The nurse mentions that while assisting Mr. J to transfer from his wheelchair to the toilet seat, he occasionally has difficulty holding in his urine. The nurse also reports that Mr. J sometimes coughs while eating or drinking. Mr. J mentions that he is remembering events from his past but is having trouble remembering daily occurrences, such as what he ate for breakfast. You notice that Mr. J speaks quite fluently. He expresses a desire to get back to walking and is anxious to return home, becoming tearful during this part of the discussion."

VIGNETTE for Knowledge Questionnaire Month #1

"Mrs. F is a 75-year-old retired secretary who was recently admitted to the acute care hospital where you work with a right hemisphere stroke. She lives alone in an apartment complex for seniors. She is an active member of a social club and plans weekly group outings with other residents of the apartment complex. She also enjoys baking and doing crossword puzzles during her spare time. Among her four children, only one daughter lives in close proximity and visits regularly. On your initial assessment at four days post-stroke, Mrs. F is eating her lunch independently while seated in a chair. Her medical chart reports that she ambulates independently while using a quad cane but tends to lose her balance and bump into obstacles on her left side. It also reports that she has mild weakness of her left upper and lower extremities, but is quite functional in her daily activities. Her daughter mentions that when she approaches Mrs. F from her left side, she doesn’t seem to notice her at first. She also mentions that Mrs. F can only spend a few minutes on her crossword puzzles before she gets too tired and switches to another activity. Mrs. F says that she can remember events from her past but is having trouble remembering daily occurrences, such as what she ate for breakfast. On your request, Mrs. F rises to stand, using her right hand to push against the arm of the chair. She attempts to regain her balance by holding onto the side table, however it is too far away and she ends up grabbing your arm at the last minute. The nurse mentions that Mrs. F fell at her bedside last night while getting up to go to the bathroom, even though she was instructed to ring her bell. Although there were no injuries, her daughter is now scared to leave her mother alone. Mrs. F. tells you that she wants to go home today because she doesn’t want to miss her weekly group outings. She plans to drive when she returns home."

VIGNETTE for Knowledge Questionnaire Month #2

"Mr. T is a 70-year-old retired construction worker who was recently admitted to the acute care hospital where you work with a left hemisphere stroke. Prior to his stroke, he lived with his son, daughter-in-law, and three grandchildren in a two-storey house. He drove his grandchildren home from school daily. He has had an active social life and is a member of a local bridge club. On your initial assessment at 1 week post-stroke, you observe that Mr. T has difficulty expressing ideas and is often searching for words, making the conversation difficult. For words that he cannot pronounce, he tries to scribble them on a notepad using his non-dominant left hand. You find yourself using simple language and speaking slightly slower than you usually would. Regardless, Mr. T seems to be oriented and manages to provide you with accurate information. He points to his right shoulder repeatedly and winces in pain when he tries to raise it. His daughter is concerned that Mr. T does not interact as much with family members as he did prior to his stroke. You observe that Mr. T who is right hand dominant as per his medical chart, primarily uses his left hand and arm during daily activities and only uses his right hand as a support. Mr. T is able to wash and dress himself independently but needs help with buttons. The medical chart indicates that he requires moderate assistance from one person for walking and transfers (i.e. to and from the bed, bathtub and toilet). He expresses a desire to get back to walking independently and is anxious to return home, becoming tearful during this part of the discussion. He also wishes to continue driving his grandchildren to school upon discharge."

VIGNETTE for Knowledge Questionnaire Month #3

"Mr. P is a 65-year-old retired teacher who was recently admitted to the acute care hospital where you work and was diagnosed with a right hemisphere stroke. Prior to his stroke, he lived with his wife in a two-storey house. The couple is supportive of each other and they had an active lifestyle. Mr. P was an active volunteer with his wife at a local elementary school. He also drove his grandchildren home from school daily. They have 2 adult daughters: one lives close by and visits frequently. On your visit 2 weeks post-stroke, Mr. P is sitting up in a regular chair. He provides basic and accurate information about himself, but is easily distracted and repeatedly mentions that he wants to return home to drive his grandchildren home from school. You notice that Mr. P speaks fluently. You note that he requires supervision for transfers to and from his chair, bed and toilet. He walks with minimum assistance from one person while using a quad cane. The medical chart mentions that he is able to comb his hair using his right hand but leaves half of the food on his plate while eating, usually the food on the left. The chart also reports that Mr. P occasionally coughs while eating or drinking. Mr. P mentions that he remembers events from his past but is having trouble remembering daily occurrences, such as what he ate for breakfast. He expresses a desire to get back to walking independently and to resume his volunteer activities."
**Patient Vignettes- In-patient Rehabilitation**

**VIGNETTE for Knowledge Questionnaire Baseline #1**

“Mrs. P is a 68 year-old retired teacher and was an active volunteer with her husband at the local elementary school before her stroke. She also drove her grandchildren home from school daily. She was recently admitted to the acute care hospital where you work and was diagnosed with a right hemisphere stroke. Her medical chart indicates that she has no cognitive impairments as a result of her stroke. The nurse mentions that she is able to comb her hair using her right hand but leaves half of the food on her plate while eating, usually the food on the left. On your initial assessment 1 week post-stroke, Mrs. P is sitting up in a regular chair. When the phone rings, Mrs. P has difficulty locating the phone on a table to her left but then manages to clumsily grasp the receiver with her left hand. On your request, she rises to stand, using her right hand to push against the arm of the chair. Mrs. P is able to stand alone, using a wide base and walks with your assistance but has some difficulty bringing her left leg forward.”

**VIGNETTE for Knowledge Questionnaire Baseline #2**

“Mr. J is a 55-year-old man who was recently admitted to the acute care hospital where you work with a left hemisphere stroke. He lives with his wife in a two-storey house. The couple is supportive of each other and they had an active lifestyle. They have 2 adult daughters: one lives close by and visits frequently. Mr. J works as a car mechanic. Prior to his stroke, Mrs. J provides basic and accurate information about herself, but is easily distracted and repeatedly mentions pain while pointing to his right shoulder. You note that he requires minimum assistance from one person for transfers to and from the wheelchair, bed and toilet. He walks with maximum assistance from one person while using a quad cane, with a tendency for his right knee to buckle and for his right foot to drag. The nurse mentions that while assisting Mr. J to transfer from his wheelchair to the toilet seat, he occasionally has difficulty holding in his urine. The nurse also reports that Mr. J sometimes coughs while eating or drinking. Mr. J mentions that he is remembering events from his past but is having trouble remembering daily occurrences, such as what he ate for breakfast. You notice that Mr. J speaks quite fluently. He expresses a desire to get back to walking and is anxious to return home, becoming tearful during this part of the discussion.”

**VIGNETTE for Knowledge Questionnaire Month #1**

“Mrs. F is a 75 year-old retired secretary who was recently admitted to the acute care hospital where you work with a right hemisphere stroke. She lives alone in an apartment complex for seniors. She is an active member of a social club and plans weekly group outings with other residents of the apartment complex. She also enjoys baking and doing crossword puzzles during her spare time. Among her four children, only one daughter lives in close proximity and visits regularly. On your initial assessment at four days post-stroke, Mrs. F is eating her lunch independently while seated in a chair. Her medical chart reports that she ambulates independently while using a quad cane but tends to lose her balance and bump into obstacles on her left side. It also reports that she has mild weakness of her left upper and lower extremities. Her daughter mentions that when she approaches Mrs. F from her left side, she doesn’t seem to notice her at first. She also mentions that Mrs. F only needs one or two minutes on her crossword puzzles before she gets too tired and switches to another activity. Mrs. F says that she can remember events from her past but is having trouble remembering daily occurrences, such as what she ate for breakfast. On your request, Mrs. F rises to stand, using her right hand to push against the arm of the chair. She attempts to regain her balance by holding onto the side table, however it is too far away and she ends up grabbing your arm at the last minute. The nurse mentions that Mrs. F fell at her bedside last night while getting up to go to the bathroom, even though she was instructed to ring her bell. Although there were no injuries, her daughter is now scared to leave her mother alone. Mrs. F tells you that she wants to go home today because she doesn’t want to miss her weekly group outing. She plans to drive when she returns home.”

**VIGNETTE for Knowledge Questionnaire Month #2**

“Mr. T is a 70-year-old retired construction worker who was recently admitted to the acute care hospital where you work with a left hemisphere stroke. Prior to his stroke, he lived with his son, daughter-in-law, and three grandchildren in a two-storey house. He drove his grandchildren home from school daily. He has had an active social life and is a member of a local bridge club. On your initial assessment at 1 week post-stroke, you observe that Mr. T has difficulty expressing ideas and is often searching for words, making the conversation difficult. For words that he cannot pronounce, he tries to scribble them on a notepad using his non-dominant left hand. You find yourself using simple language and speaking slightly slower than you usually would. Regardless, Mr. T seems to be oriented and manages to provide you with accurate information. He points to his right shoulder repeatedly and winces in pain when he tries to raise it. His daughter is concerned that Mr. T does not interact as much with family members as he did prior to his stroke. You observe that Mr. T who is right hand dominant as per his medical chart, primarily uses his left hand and arm during daily activities and only uses his right hand as a support. Mr. T is able to wash and dress himself independently but needs help with buttons. The medical chart indicates that he requires moderate assistance from one person for walking and transfers (i.e. to and from the bed, bathtub and toilet). He expresses a desire to get back to walking independently and is anxious to return home, becoming tearful during this part of the discussion. He also wishes to continue driving his grandchildren to school upon discharge.”

**VIGNETTE for Knowledge Questionnaire Month #3**

“Mr. P is a 65 year-old retired teacher who was recently admitted to the acute care hospital where you work and was diagnosed with a right hemisphere stroke. Prior to his stroke, he lived with his wife in a two-storey house. The couple is supportive of each other and they had an active lifestyle. Mr. P was an active volunteer with his wife at a local elementary school. He also drove his grandchildren home from school daily. They have 2 adult daughters: one lives close by and visits frequently. On your first visit 2 weeks post-stroke, Mr. P is sitting up in a regular chair. He provides basic and accurate information about himself, but is easily distracted and repeatedly mentions that he wants to return home to drive his grandchildren home from school. You notice that Mr. P speaks fluently. You note that he requires supervision for transfers to and from his chair, bed and toilet. He walks with minimum assistance from one person while using a quad cane. The medical chart mentions that he is able to comb his hair using his right hand but leaves half of the food on his plate while eating, usually the food on the left. The chart also reports that Mr. P occasionally coughs while eating or drinking. Mr. P mentions that he remembers events from his past but is having trouble remembering daily occurrences, such as what he ate for breakfast. He expresses a desire to get back to walking independently and to resume his volunteer activities.”

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Patient Vignettes- Out-patient Rehabilitation

VIGNETTE for Knowledge Questionnaire Baseline #1
“Mrs. P is a 68 year-old retired teacher and was an active volunteer with her husband at the local elementary school before her stroke. She also drove her grandchildren home from school daily. She was recently admitted to the acute care hospital where you work and was diagnosed with a right hemisphere stroke. Her medical chart indicates that she has no cognitive impairments as a result of her stroke. The nurse mentions that she is able to comb her hair using her right hand but leaves half of the food on her plate while eating, usually the food on the left. On your initial assessment 1 week post-stroke, Mrs. P is sitting up in a regular chair. When the phone rings, Mrs. P has difficulty locating the phone on a table to her left but then manages to clumsily grasp the receiver with her left hand. On your request, she rises to stand, using her right hand to push against the arm of the chair. Mrs. P is able to stand alone, using a wide base and walks with your assistance but has some difficulty bringing her left leg forward.”

VIGNETTE for Knowledge Questionnaire Baseline #2
“Mr. J is a 55-year-old man who was recently admitted to the acute care hospital where you work with a left hemisphere stroke. He lives with his wife in a two-storey house. He was a calm, active volunteer at a local elementary school. He also drove his grandchildren home from school daily. He has had an active social life and is a member of a local bridge club. On your initial assessment 1 week post-stroke, Mr. J provides basic and accurate information about himself, but is easily distracted and repeatedly mentions pain while pointing to his right shoulder. You note that he requires minimum assistance from one person for transfers to and from the wheelchair, bed and toilet. He walks with maximum assistance from one person while using a quad cane, with a tendency for his right knee to buckle and for his right foot to drag. The nurse mentions that while assisting Mr. J to transfer from his wheelchair to the toilet seat, he occasionally has difficulty holding in his urine. The nurse also reports that Mr. J sometimes coughs while eating or drinking. Mr. J mentions that he is remembering events from his past but is having trouble remembering daily occurrences, such as what he ate for breakfast. You notice that Mr. J speaks quite fluently. He expresses a desire to get back to walking and is anxious to return home, becoming tearful during this part of the discussion.”

VIGNETTE for Knowledge Questionnaire Month #1
“Mrs. F is a 75 year-old retired secretary who was recently admitted to the acute care hospital where you work with a right hemisphere stroke. She lives alone in an apartment complex for seniors. She is an active member of a social club and plans weekly group outings with other residents of the apartment complex. She also enjoys baking and doing crossword puzzles during her spare time. Among her four children, only one daughter lives in close proximity and visits regularly.

On your initial assessment at four days post-stroke, Mrs. F is eating her lunch independently while seated in a chair. Her medical chart reports that she ambulates independently while using a quad cane but tends to lose her balance and bump into obstacles on her left side. It also reports that she has mild weakness of her left upper and lower extremities, but is quite functional in her daily activities. Her daughter mentions that when she approaches Mrs. F from her left side, she doesn’t seem to notice her at first. She also mentions that Mrs. F can only spend a few minutes on her crossword puzzles before she gets too tired and switches to another activity. Mrs. F says that she can remember events from her past but is having trouble remembering daily occurrences, such as what she ate for breakfast. On your request, Mrs. F rises to stand, using her right hand to push against the arm of the chair. She attempts to regain her balance by holding onto the side table, however it is too far away and she ends up grabbing your arm at the last minute. The nurse mentions that Mrs. F fell at her bedside last night while getting up to go to the bathroom, even though she was instructed to ring her bell. Although there were no injuries, her daughter is now scared to leave her mother alone. Mrs. F. tells you that she wants to go home today because she doesn’t want to miss her weekly group outings. She plans to drive when she returns home.”

VIGNETTE for Knowledge Questionnaire Month #2
“Mr. T is a 70-year-old retired construction worker who was recently admitted to the acute care hospital where you work with a left hemisphere stroke. Prior to his stroke, he lived with his son, daughter-in-law, and three grandchildren in a two-storey house. He drove his grandchildren home from school daily. He has had an active social life and is a member of a local bridge club. On your initial assessment at 1 week post-stroke, you observe that Mr. T has difficulty expressing ideas and is often searching for words, making the conversation difficult. For words that he cannot pronounce, he tries to scribble them on a notepad using his non-dominant left hand. You find yourself using simple language and speaking slightly slower than you usually would. Regardless, Mr. T seems to be oriented and manages to provide you with accurate information. He points to his right shoulder repeatedly and winces in pain when he tries to raise it. His daughter is concerned that Mr. T does not interact as much with family members as he did prior to his stroke. You observe that Mr. T who is right hand dominant as per his medical chart, primarily uses his left hand and arm during daily activities and only uses his right hand as a support. Mr. T is able to wash and dress himself independently but needs help with buttons. The medical chart indicates that he requires moderate assistance from one person for walking and transfers (i.e. to and from the bed, bathtub and toilet). He expresses a desire to get back to walking independently and is anxious to return home, becoming tearful during this part of the discussion. He also wishes to continue driving his grandchildren to school upon discharge.”

VIGNETTE for Knowledge Questionnaire Month #3
“Mr. P is a 65 year-old retired teacher who was recently admitted to the acute care hospital where you work and was diagnosed with a right hemisphere stroke. Prior to his stroke, he lived with his wife in a two-storey house. The couple is supportive of each other and they had an active lifestyle. Mr. P was an active volunteer with his wife at a local elementary school. He also drove his grandchildren home from school daily. They have 2 adult daughters: one lives close by and visits frequently.

On your visit 2 weeks post-stroke, Mr. P is sitting up in a regular chair. He provides basic and accurate information about himself, but is easily distracted and repeatedly mentions that he wants to return home to drive his grandchildren home from school. You notice that Mr. P speaks fluently. You note that he requires supervision for transfers to and from his chair, bed and toilet. He walks with minimum assistance from one person while using a quad cane. The medical chart mentions that he is able to comb his hair using his right hand but leaves half of the food on his plate while eating, usually the food on the left. The chart also reports that Mr. P occasionally coughs while eating or drinking. Mr. P mentions that he remembers events from his past but is having trouble remembering daily occurrences, such as what he ate for breakfast. He expresses a desire to get back to walking independently and to resume his volunteer activities.”

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Appendix 5.7: Sociodemographics form

For each question, please check the appropriate answer.

SD1. Please select your age group
   21-25  □  26-30  □  31-35  □  36-40  □  41-50  □  51-60  □  Over 60  □

SD2. What is your gender?  Male  □  Female  □

SD3. What is your professional discipline?  Physical Therapy (PT)  □  Occupational Therapy (OT)  □

SD4. Please specify the degree of your professional training in OT or PT:
   Diploma entry-level  □  Bachelors  □  Masters  □  Doctorate  □

SD5. Please specify the year of graduation of your latest (OT, PT, etc.) degree: ____________

SD6. In a typical week, how many hours do you work as a clinician?  ____ hours

SD7. Is your work site a teaching institution (defined as an institution that hosts student therapists for their clinical rotations/training)?  Yes  □  No  □  Not sure  □

SD8. How many years have you been working with a stroke clientele?
   <1  □  1-3  □  4-10  □  >10  □

SD9. On a typical day, approximately how many clients with stroke do you see?
   <2  □  2-5  □  6-10  □  >10  □

SD10. In your department, approximately how many clients with stroke are currently on the waiting list for assessment/treatment?
   <2  □  2-5  □  6-10  □  >10  □  □ Not sure

SD11. Does your worksite allocate time for educational activities?  Yes  □  No  □

SD12. Does your worksite provide funds for educational activities?  Yes  □  No  □

SD13. Do you have access to a computer with Internet at work?  Yes  □  No  □

SD14. Do you have access to a computer with Internet at home?  Yes  □  No  □

SD15. How comfortable are you with searching the Internet for information?
   Not at all  □  A little  □  Somewhat  □  Very  □  Extremely  □

SD16. Do you have specialty certification related to stroke assessment/treatment?  Yes  □  No  □
   Please specify?  ____________________________________________________________
SD17. Are you active in teaching at the university level? Yes ☐ No ☐
Please specify? ________________________________________________________________

SD18. Is your worksite in an urban (<20 kms from a major city, including Toronto; Ottawa; London; Hamilton), suburban (20-40km from major city) or rural region (>40 kms from major city)?
Urban ☐ Suburban ☐ Rural ☐

SD19. On average, how many new clients with stroke are admitted per month to your setting?
0-10 ☐ 11-20 ☐ 21-30 ☐ 31-40 ☐ >40 ☐

SD20. What is the typical length of stay/rehabilitation for clients with a stroke at your setting?
< 1 day ☐ 1-5 days ☐ 6-9 days ☐ 10-15 days ☐ 16-25 days ☐ >25 days ☐

SD21. Is stroke rehabilitation research conducted in your setting? Yes ☐ No ☐ Not sure ☐

SD22. Is your site an environment where OT or PT students come for fieldwork placements? Yes ☐ No ☐

SD23. Is there a stroke unit in your setting? (i.e. a designated unit that focuses primarily on the assessment and treatment of individuals with stroke) Yes ☐ No ☐
Appendix 5.8: Critical problems embedded as cues per patient vignette

CASE VIGNETTE #1 (for Questionnaire at Baseline 1)

<table>
<thead>
<tr>
<th>CRITICAL PROBLEMS (denominator of cues)</th>
<th>DOMAIN</th>
<th>ICF MODEL CLASSIFICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unilateral spatial neglect (general)</td>
<td>Perception</td>
<td>Body Function/Structure</td>
</tr>
<tr>
<td>USN (3 hemispaces)</td>
<td>Perception</td>
<td>Body Function/Structure</td>
</tr>
<tr>
<td>Hemianopsia</td>
<td>Perception</td>
<td>Body Function/Structure</td>
</tr>
<tr>
<td>Visual perception (figure ground, depth)</td>
<td>Perception</td>
<td>Body Function/Structure</td>
</tr>
<tr>
<td>Visual function (acuity, visual field)</td>
<td>Perception</td>
<td>Body Function/Structure</td>
</tr>
<tr>
<td>Apraxia</td>
<td>Physical</td>
<td>Body Function/Structure</td>
</tr>
<tr>
<td>Manual dexterity</td>
<td>Physical</td>
<td>Body Function/Structure</td>
</tr>
<tr>
<td>Range of motion</td>
<td>Physical</td>
<td>Body Function/Structure</td>
</tr>
<tr>
<td>Strength</td>
<td>Physical</td>
<td>Body Function/Structure</td>
</tr>
<tr>
<td>Coordination</td>
<td>Physical</td>
<td>Body Function/Structure</td>
</tr>
<tr>
<td>Motor control</td>
<td>Physical</td>
<td>Body Function/Structure</td>
</tr>
<tr>
<td>Sensation</td>
<td>Physical</td>
<td>Body Function/Structure</td>
</tr>
<tr>
<td>Endurance</td>
<td>Physical/Functional</td>
<td>Body Function/Structure</td>
</tr>
<tr>
<td>Tone</td>
<td>Physical</td>
<td>Body Function/Structure</td>
</tr>
<tr>
<td>Proprioception</td>
<td>Physical</td>
<td>Body Function/Structure</td>
</tr>
<tr>
<td>Fall risk</td>
<td>Physical/Functional</td>
<td>Body Function/Structure</td>
</tr>
<tr>
<td>Balance</td>
<td>Physical/Functional</td>
<td>Body Function/Structure</td>
</tr>
<tr>
<td>Safety</td>
<td>Functional</td>
<td>Body Function/Structure</td>
</tr>
<tr>
<td>Executive function</td>
<td>Cognition/Functional</td>
<td>Body Function/Structure</td>
</tr>
<tr>
<td>Ambulation</td>
<td>Functional</td>
<td>Activity</td>
</tr>
<tr>
<td>Transfers</td>
<td>Functional</td>
<td>Activity</td>
</tr>
<tr>
<td>Bilateral tasks/movements</td>
<td>Functional</td>
<td>Activity</td>
</tr>
<tr>
<td>ADLs</td>
<td>Functional</td>
<td>Activity</td>
</tr>
<tr>
<td>IADLs</td>
<td>Functional</td>
<td>Activity</td>
</tr>
<tr>
<td>Driving</td>
<td>Functional</td>
<td>Activity</td>
</tr>
<tr>
<td>Home environment (access)</td>
<td>Functional</td>
<td>Activity</td>
</tr>
<tr>
<td>Stairs</td>
<td>Functional</td>
<td>Activity</td>
</tr>
<tr>
<td>Depression (NOTE: weak cue)</td>
<td>Psychosocial/Functional</td>
<td>Participation</td>
</tr>
<tr>
<td>Emotional status (affect)</td>
<td>Psychosocial/Functional</td>
<td>Participation</td>
</tr>
<tr>
<td>Leisure and participation</td>
<td>Psychosocial/Functional</td>
<td>Activity</td>
</tr>
<tr>
<td>Family support</td>
<td>Psychosocial</td>
<td>Environmental</td>
</tr>
<tr>
<td>Caregiver burden</td>
<td>Psychosocial</td>
<td>Environmental</td>
</tr>
<tr>
<td>Role change</td>
<td>Psychosocial</td>
<td>Participation</td>
</tr>
<tr>
<td>Occupational performance</td>
<td>Psychosocial/Functional</td>
<td>Participation</td>
</tr>
<tr>
<td>Community reintegration</td>
<td>Psychosocial/Functional</td>
<td>Participation</td>
</tr>
</tbody>
</table>

TOTAL NUMBER OF CUES PER DOMAIN AREA: Perception 5; Physical 11; Functional 16

TOTAL NUMBER OF CUES in CASE VIGNETTE #1= 32
### CASE VIGNETTE #2 (for Questionnaire at Baseline 2)

<table>
<thead>
<tr>
<th>CRITICAL PROBLEMS (denominator of cues)</th>
<th>DOMAIN</th>
<th>ICF MODEL CLASSIFICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Range of motion</td>
<td>Physical</td>
<td>Body Function/Structure</td>
</tr>
<tr>
<td>Strength</td>
<td>Physical</td>
<td>Body Function/Structure</td>
</tr>
<tr>
<td>Coordination</td>
<td>Physical</td>
<td>Body Function/Structure</td>
</tr>
<tr>
<td>Motor control</td>
<td>Physical</td>
<td>Body Function/Structure</td>
</tr>
<tr>
<td>Sensation</td>
<td>Physical</td>
<td>Body Function/Structure</td>
</tr>
<tr>
<td>Foot drop</td>
<td>Physical/Functional</td>
<td>Body Function/Structure</td>
</tr>
<tr>
<td>Tone</td>
<td>Physical</td>
<td>Body Function/Structure</td>
</tr>
<tr>
<td>Proprioception</td>
<td>Physical</td>
<td>Body Function/Structure</td>
</tr>
<tr>
<td>Fall risk</td>
<td>Physical/Functional</td>
<td>Body Function/Structure</td>
</tr>
<tr>
<td>Swallowing (dysphagia)</td>
<td>Physical/Functional</td>
<td>Body Function/Structure</td>
</tr>
<tr>
<td>Attention</td>
<td>Cognition/Functional</td>
<td>Activity</td>
</tr>
<tr>
<td>Confabulation</td>
<td>Cognition/Functional</td>
<td>Activity</td>
</tr>
<tr>
<td>Balance</td>
<td>Physical/Functional</td>
<td>Body Function/Structure</td>
</tr>
<tr>
<td>Safety</td>
<td>Functional</td>
<td>Body Function/Structure</td>
</tr>
<tr>
<td>Shoulder pain</td>
<td>Physical/Functional</td>
<td>Body Function/Structure</td>
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<tr>
<td>Shoulder subluxation/joint integrity</td>
<td>Physical</td>
<td>Body Function/Structure</td>
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<tr>
<td>Endurance</td>
<td>Physical/Functional</td>
<td>Body Function/Structure</td>
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<td>Incontinence</td>
<td>Physical/Functional</td>
<td>Body Function/Structure</td>
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<tr>
<td>Communication (receptive/expressive)</td>
<td>Cognitive/Functional</td>
<td>Activity</td>
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<tr>
<td>Cognitive status (general)</td>
<td>Cognitive/Functional</td>
<td>Activity</td>
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<td>Memory</td>
<td>Cognitive/Functional</td>
<td>Activity</td>
</tr>
<tr>
<td>Insight</td>
<td>Cognitive/Functional</td>
<td>Activity</td>
</tr>
<tr>
<td>Judgment</td>
<td>Cognitive/Functional</td>
<td>Activity</td>
</tr>
<tr>
<td>Ambulation</td>
<td>Functional</td>
<td>Activity</td>
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<tr>
<td>Emotional status</td>
<td>Psychosocial/Functional</td>
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<td>Depression</td>
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<tr>
<td>Leisure and participation</td>
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<td>Family support</td>
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<tr>
<td>Occupational performance</td>
<td>Psychosocial/Functional</td>
<td>Participation</td>
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<td>Interpersonal relationships</td>
<td>Psychosocial</td>
<td>Participation</td>
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<tr>
<td>Coping skills (stress/anxiety)</td>
<td>Psychosocial</td>
<td>Participation</td>
</tr>
</tbody>
</table>

**TOTAL NUMBER OF CUES PER DOMAIN AREA:**
Psychosocial 10; Cognitive 8; Functional 16

**TOTAL “CRITICAL PROBLEMS” in CASE VIGNETTE #2 = 34**
### CASE VIGNETTE #3 (for Questionnaire at Month 1)

<table>
<thead>
<tr>
<th>CRITICAL PROBLEMS (denominator of cues)</th>
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<td></td>
<td></td>
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<tr>
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<td></td>
</tr>
<tr>
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<td></td>
<td></td>
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<tr>
<td>Strength</td>
<td></td>
<td></td>
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<tr>
<td>Coordination</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Motor control</td>
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<tr>
<td>Sensation</td>
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<tr>
<td>Proprioception</td>
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<tr>
<td>Manual dexterity</td>
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<tr>
<td>Cognitive status (general)</td>
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<tr>
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<td>Fall risk</td>
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<tr>
<td>Insight</td>
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<tr>
<td>Judgment (impulsive)</td>
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<td>Executive function</td>
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<td>IADLs</td>
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<tr>
<td>Driving</td>
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<tr>
<td>Home environment (access)</td>
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<tr>
<td>Bilateral tasks/movements</td>
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<td></td>
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<tr>
<td>Stairs</td>
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<tr>
<td>Leisure and participation</td>
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<td></td>
</tr>
<tr>
<td>Family support</td>
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<td></td>
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<tr>
<td>Caregiver burden</td>
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<td></td>
</tr>
<tr>
<td>Role change</td>
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</tr>
<tr>
<td>Community reintegration</td>
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</tr>
<tr>
<td>Interpersonal relationships</td>
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<td></td>
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<tr>
<td>Occupational performance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coping skills (stress/anxiety)</td>
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</table>

TOTAL NUMBER OF CUES PER DOMAIN AREA: Perception 5; Psychosocial 10; Functional 17

TOTAL “CRITICAL PROBLEMS” IN CASE VIGNETTE #3 = 32
**CASE VIGNETTE #4 (for Questionnaire at Month 2)**

<table>
<thead>
<tr>
<th>CRITICAL PROBLEMS (denominator of cues)</th>
<th>DOMAIN</th>
<th>ICF MODEL CLASSIFICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Range of motion</td>
<td>Physical</td>
<td>Body Function/Structure</td>
</tr>
<tr>
<td>Strength</td>
<td>Physical</td>
<td>Body Function/Structure</td>
</tr>
<tr>
<td>Coordination</td>
<td>Physical</td>
<td>Body Function/Structure</td>
</tr>
<tr>
<td>Motor control</td>
<td>Physical</td>
<td>Body Function/Structure</td>
</tr>
<tr>
<td>Sensation</td>
<td>Physical</td>
<td>Body Function/Structure</td>
</tr>
<tr>
<td>Tone</td>
<td>Physical</td>
<td>Body Function/Structure</td>
</tr>
<tr>
<td>Proprioception</td>
<td>Physical</td>
<td>Body Function/Structure</td>
</tr>
<tr>
<td>Manual dexterity</td>
<td>Physical</td>
<td>Body Function/Structure</td>
</tr>
<tr>
<td>Fine motor skills</td>
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<td>Body Function/Structure</td>
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<td>Apraxia</td>
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<td>Body Function/Structure</td>
</tr>
<tr>
<td>Shoulder pain</td>
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<td>Body Function/Structure</td>
</tr>
<tr>
<td>Shoulder subluxation/joint integrity</td>
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<td>Body Function/Structure</td>
</tr>
<tr>
<td>Memory</td>
<td>Cognition/Functional</td>
<td>Activity</td>
</tr>
<tr>
<td>Executive function</td>
<td>Cognition/Functional</td>
<td>Activity</td>
</tr>
<tr>
<td>Communication (receptive/expressive)</td>
<td>Cognitive/Functional</td>
<td>Activity</td>
</tr>
<tr>
<td>Insight (NOTE: weak cue)</td>
<td>Cognition/Functional</td>
<td>Activity</td>
</tr>
<tr>
<td>Judgment (impulsive) (NOTE: weak cue)</td>
<td>Cognition/Functional</td>
<td>Activity</td>
</tr>
<tr>
<td>Balance</td>
<td>Physical/ Functional</td>
<td>Body Function/Structure</td>
</tr>
<tr>
<td>Safety</td>
<td>Functional</td>
<td>Activity</td>
</tr>
<tr>
<td>Fall risk</td>
<td>Physical/ Functional</td>
<td>Activity</td>
</tr>
<tr>
<td>Ambulation</td>
<td>Functional</td>
<td>Activity</td>
</tr>
<tr>
<td>Transfers</td>
<td>Functional</td>
<td>Activity</td>
</tr>
<tr>
<td>ADLs</td>
<td>Functional</td>
<td>Activity</td>
</tr>
<tr>
<td>IADLs</td>
<td>Functional</td>
<td>Activity</td>
</tr>
<tr>
<td>Emotional status</td>
<td>Psychosocial/Functional</td>
<td>Activity</td>
</tr>
<tr>
<td>Depression</td>
<td>Psychosocial/Functional</td>
<td>Activity</td>
</tr>
<tr>
<td>Endurance</td>
<td>Physical/Functional</td>
<td>Body Function/Structure</td>
</tr>
<tr>
<td>Home environment (access/adapt)</td>
<td>Functional</td>
<td>Activity</td>
</tr>
<tr>
<td>Bilateral tasks/movements</td>
<td>Functional</td>
<td>Activity</td>
</tr>
<tr>
<td>Stairs</td>
<td>Functional</td>
<td>Activity</td>
</tr>
<tr>
<td>Driving</td>
<td>Functional</td>
<td>Activity</td>
</tr>
<tr>
<td>Leisure and participation</td>
<td>Psychosocial/Functional</td>
<td>Activity</td>
</tr>
<tr>
<td>Family support</td>
<td>Psychosocial</td>
<td>Environmental</td>
</tr>
<tr>
<td>Caregiver burden</td>
<td>Psychosocial</td>
<td>Environmental</td>
</tr>
<tr>
<td>Role change</td>
<td>Psychosocial</td>
<td>Participation</td>
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<tr>
<td>Community reintegration</td>
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<td>Participation</td>
</tr>
<tr>
<td>Occupational performance</td>
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<td>Participation</td>
</tr>
<tr>
<td>Interpersonal relationships</td>
<td>Psychosocial</td>
<td>Participation</td>
</tr>
<tr>
<td>Coping skills (stress/anxiety)</td>
<td>Psychosocial</td>
<td>Participation</td>
</tr>
</tbody>
</table>

**TOTAL NUMBER OF CUES PER DOMAIN AREA:** Physical 13; Psychosocial 10; Functional 16

**TOTAL “CRITICAL PROBLEMS” IN CASE VIGNETTE #4 = 39**
### CASE VIGNETTE #5 (for Questionnaire at Month 3)

<table>
<thead>
<tr>
<th>CRITICAL PROBLEMS (denominator of cues)</th>
<th>DOMAIN</th>
<th>ICF MODEL CLASSIFICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unilateral spatial neglect (general)</td>
<td>Perception</td>
<td>Body Function/Structure</td>
</tr>
<tr>
<td>USN (3 hemispaces)</td>
<td>Perception</td>
<td>Body Function/Structure</td>
</tr>
<tr>
<td>Hemianopsia</td>
<td>Perception</td>
<td>Body Function/Structure</td>
</tr>
<tr>
<td>Visual perception (figure ground, depth)</td>
<td>Perception</td>
<td>Body Function/Structure</td>
</tr>
<tr>
<td>Visual function (acuity, visual field)</td>
<td>Perception</td>
<td>Body Function/Structure</td>
</tr>
<tr>
<td>Range of motion</td>
<td>Physical</td>
<td>Body Function/Structure</td>
</tr>
<tr>
<td>Strength</td>
<td>Physical</td>
<td>Body Function/Structure</td>
</tr>
<tr>
<td>Coordination</td>
<td>Physical</td>
<td>Body Function/Structure</td>
</tr>
<tr>
<td>Motor control</td>
<td>Physical</td>
<td>Body Function/Structure</td>
</tr>
<tr>
<td>Sensation</td>
<td>Physical</td>
<td>Body Function/Structure</td>
</tr>
<tr>
<td>Tone</td>
<td>Physical</td>
<td>Body Function/Structure</td>
</tr>
<tr>
<td>Proprioception</td>
<td>Physical</td>
<td>Body Function/Structure</td>
</tr>
<tr>
<td>Cognitive status (general)</td>
<td>Cognition/Functional</td>
<td>Activity</td>
</tr>
<tr>
<td>Memory</td>
<td>Cognition/Functional</td>
<td>Activity</td>
</tr>
<tr>
<td>Attention</td>
<td>Cognition/Functional</td>
<td>Activity</td>
</tr>
<tr>
<td>Confabulation</td>
<td>Cognition/Functional</td>
<td>Activity</td>
</tr>
<tr>
<td>Fall risk</td>
<td>Physical/Functional</td>
<td>Body Function/Structure</td>
</tr>
<tr>
<td>Insight</td>
<td>Cognition/Functional</td>
<td>Activity</td>
</tr>
<tr>
<td>Judgment (impulsive)</td>
<td>Cognition/Functional</td>
<td>Activity</td>
</tr>
<tr>
<td>Swallowing (dysphagia)</td>
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<td>Body Function/Structure</td>
</tr>
<tr>
<td>Balance</td>
<td>Physical/Functional</td>
<td>Body Function/Structure</td>
</tr>
<tr>
<td>Safety</td>
<td>Functional</td>
<td>Body Function/Structure</td>
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<td>Ambulation</td>
<td>Functional</td>
<td>Activity</td>
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<td>Transfers</td>
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<td>Executive function</td>
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<tr>
<td>Endurance</td>
<td>Physical/Functional</td>
<td>Body Function/Structure</td>
</tr>
<tr>
<td>Emotional status</td>
<td>Psychosocial/Functional</td>
<td>Activity</td>
</tr>
<tr>
<td>Depression (NOTE: weak cue)</td>
<td>Psychosocial/Functional</td>
<td>Activity</td>
</tr>
<tr>
<td>Home environment (access/adapt)</td>
<td>Functional</td>
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<tr>
<td>Bilateral tasks/movements</td>
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<td>Driving</td>
<td>Functional</td>
<td>Activity</td>
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<tr>
<td>Leisure and participation</td>
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<td>Family support</td>
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<td>Environmental</td>
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<td>Caregiver burden</td>
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<td>Environmental</td>
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<td>Role change</td>
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<td>Participation</td>
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<tr>
<td>Community reintegration</td>
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<td>Participation</td>
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<tr>
<td>Occupational performance</td>
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<td>Participation</td>
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<tr>
<td>Interpersonal relationships</td>
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<td>Participation</td>
</tr>
<tr>
<td>Coping skills (stress/anxiety)</td>
<td>Psychosocial</td>
<td>Participation</td>
</tr>
</tbody>
</table>

**TOTAL NUMBER OF CUES PER DOMAIN AREA:** Perception 5; Cognitive 7; Functional 18

**TOTAL “CRITICAL PROBLEMS” IN CASE VIGNETTE #5= 30**
Appendix 5.9: Examples of data classification of “evidence-based” responses to questions related to problem identification, assessment and treatment

<table>
<thead>
<tr>
<th>QUESTION</th>
<th>MAXIMUM NUMBER OF “EVIDENCE-BASED” RESPONSES</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PROBLEM IDENTIFICATION</strong></td>
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</tbody>
</table>
| What potential psychosocial limitation(s) if any, would you like to investigate with Mr. J based on the case vignette #2 | 10 “evidence-based” responses  
Possible responses: depression, emotional status, leisure and participation, occupational performance, community reintegration, role change, interpersonal relationships, coping skills, caregiver burden, family support |
| **ASSESSMENT** |  |
| What is the difference between a USN-related screening tool and assessment tool? | 6 “evidence-based” responses  
Possible responses:  
A screening tool: detecting the presence vs absence of deficit, identify need for assessment  
An assessment tool: detects change, classifies or stratifies severity of deficit, identify type of USN, detailed assessment. |
| What are the possible advantages to using the Berg Balance Scale with Mrs. P? | 8 “evidence-based” responses  
Possible responses:  
Describes evidence for the Berg Balance Scale regarding: its reliability, validity and responsiveness to clinical change, its psychometric strength, standardized, recommended by best practice guidelines, stage of stroke recovery, floor/ceiling effect  
NOTE: A clinician’s “evidence-based” response could have been stated in many ways, such as “it can detect change” or “it is responsive”; similar responses were grouped under one global “evidence-based” response (responsiveness in this case) and was counted once |
| **TREATMENT** |  |
| What is the scientific evidence that supports or refutes the use of functional electrical stimulation (FES) for improving Mrs. P’s hand function | 5 “evidence-based” responses  
Possible responses:  
Effectiveness, stage of stroke recovery, level of evidence, best practice guidelines, client appropriateness  
NOTE: A clinician’s “evidence-based” response could have been expressed in many ways, such as FES is effective for improving hand function or FES leads to improved hand function or FES has been recommended for improving hand function: again similar responses were grouped under one global “evidence-based” response (supports use of FES in this case) and counted once |