Slow Stream Rehabilitation for Older Adults: A Scoping Review*

Melody Maximos, Sirirat Seng-iad, Ada Tang, Paul Stratford, and Vanina Dal Bello-Haas
School of Rehabilitation Science, McMaster University

RÉSUMÉ

Au Canada, les personnes âgées présentant des problèmes de santé complexes sont souvent considérées comme inadmissibles aux programmes de réadaptation traditionnels, mais peuvent toutefois bénéficier de soins en réadaptation lente (SRL). Cet examen de la portée apporte une vue d'ensemble sur les publications traitant des SRL offerts aux personnes âgées dans les systèmes de soins de santé à payeur unique. Méthodes : Les articles publiés sur les personnes âgées en SRL par des revues avec comités de pairs et dans la littérature grise ont été analysés de manière systématique. Résultats : Un total de 1 445 documents ont été examinés de manière indépendante par deux évaluateurs [valeur Kappa de Cohen de 0,78 (IC = 0,73, 0,83)], et 18 documents ont été retenus. Les programmes de RSS pouvaient être caractérisés comme multidisciplinaires et leur durée moyenne variait de 30 à 141,2 jours. Les participants ayant reçu des SRL étaient majoritairement de sexe féminin, et leurs moyennes d'âge variaient entre 72 et 82 ans. Ils présentaient de multiples comorbidités et des troubles cognitifs légers ou modérés. Leurs mesures physiques et fonctionnelles se sont améliorées après les SRL. Discussion : Les programmes de SRL présentent un potentiel intéressant et leur intégration au continuum de soins devrait être considérée pour les personnes âgées ayant des antécédents médicaux complexes.

ABSTRACT

Canadian older adults with complex health problems are often considered ineligible for traditional rehabilitation programs but may benefit from slow stream rehabilitation (SSR). This scoping review summarizes the literature related to SSR for older adults, within single-payer health care systems. **Methods**: Peer-reviewed and grey-literature documents relevant to older adults in SSR were systematically reviewed. **Results:** 1,445 documents were screened independently by two reviewers [Cohen Kappa value of 0.78 (CI = 0.73, 0.83)], and included 18 documents. SSR programs were found to be multidisciplinary with a mean duration ranging from 30 to 141.2 days. SSR participants were more likely to be female, with a mean age range of 72–82 years, multiple co-morbidities and mild-to-moderate cognitive impairments. SSR participants demonstrated improvements in physical and functional measures. **Discussion:** SSR programs have the potential to be an integral part of the continuum of care for older adults with complex medical histories.

* We acknowledge and Thank Zhe Tang and Mira Maximos for their assistance with this research.

Manuscript received: / manuscrit reçu : 03/01/18

Manuscript accepted: / manuscrit accepté : 05/10/18

Mots-clés : vieillissement, examen de la portée, réadaptation lente, payeur unique, soins de santé, multimorbidité

Keywords: aging, scoping review, slow stream rehabilitation, single payer, health care, multi-morbidity

La correspondance et les demandes de tirés-à-part doivent être adressées à : / Correspondence and requests for offprints should be sent to:

Melody Maximos, Bsc
PhD Student
School of Rehabilitation Science
McMaster University
1400 Main Street West, 308
Hamilton, ON L8S 1C7
(maximom@mcmaster.ca)

Background

Canada has met a critical milestone: As of July 2016, there were a greater number of older adults than there were children under the age of 15 (Canadian Medical Association, 2016). With the increasing number of older adults comes a growing population that presents to the health care system with multiple health challenges. For example, 85 per cent of older adults are living with at least one or more chronic conditions (Patrick et al., 2001), and 25 per cent are living with frailty

(Koné Pefoyo et al., 2015). Older adults make up 40 per cent of acute hospital stays and stay in hospital 1.5 times longer than those younger than 65 years of age (Canadian Institute for Health Information Board of Directors, 2011; Canadian Medical Association, 2013). Thirty-five per cent of older adults admitted to the hospital every year experience a decline in activities of daily living (ADL) during their hospital stay, which, in turn, leads to difficulty returning and staying at home post-hospital discharge (Covinsky et al., 2003; Kortebein, 2009). Furthermore, 8.5 per cent of older adults discharged from the hospital return to the hospital within the first 30 days post-discharge (Pathipvanich et al., 2013). Those with a greater number of co-morbidities, frailty, cognitive decline, and dementia have the highest rates of readmission (Covinsky et al., 2003; Kortebein, 2009).

Canada's Medicare system was developed to address acute, episodic care for a fairly independent and healthy population (Canadian Medical Association, 2016). Older adults are often unprepared for transitions home from hospital and are not always physically or emotionally able to live independently, leading to increased caregiver stress, health care expenditures, and pressure on health care providers (Bauer, Fitzgerald, Haesler, & Manfrin, 2009). Despite the discussions and debates regarding the use of and need for transitional rehabilitation programs and continuity of care for older adults living in the community, there continues to be a gap in providing an effective and efficient continuum of health care services for older adults that will keep older adults at home and out of hospitals. This gap has occurred in part due to the lack of availability of post-acute services, such as services to address chronic illness, medication management, disability adjustment, and transitional and community care needs (Koné Pefoyo et al., 2015).

Rehabilitation for Older Adults Post-hospitalization

There are a variety of rehabilitation program models intended to assist older adults to return to pre-illness function post-hospitalization, and programs vary in practice across the provinces. For example, in Ontario an older adult needing rehabilitation, but deemed not eligible for rehabilitation in the community, may enter a complex continuing care (CCC) unit or be considered for an alternate level of care (ALC), a level of care geared for patients who are medically stable but not ready to be discharged home due to loss of ability to perform ADL (Nord, 2009). Older adults undergoing rehabilitation in CCC or ALC tend to be frail, live alone, have multiple co-morbidities, and to be deemed to have low to no rehabilitative capacity, which is not always the case (Sutherland & Trafford Crump, 2013; Walker, Morris, & Frood, 2009).

Generally, rehabilitation programs for older adults have similar goals: to maximize functional recovery and independence post-hospitalization in a safe and cost-effective manner, and to decrease re-hospitalization (Kortebein, 2009). Traditional rehabilitation programs are considered to be shorter in duration and higher in intensity (Stott & Quinn, 2013). In Ontario, the typical length of traditional rehabilitation programs for older adults is two to eight weeks and with rehabilitation sessions taking place five to seven days a week for 120 minutes a day. These programs are offered in the hospital (in-patient rehabilitation) or are delivered on an outpatient basis (GTA Rehab Network, 2008). Previous research has shown that traditional rehabilitation programs are beneficial for older adults transitioning from hospital to home and have a positive impact on physical function (gait speed, balance), ADL, and psychological health as well as disease management (Hirvensalo, Rantanen, & Heikkinen, 2000). A 2015 randomized control trial assessing physical function and hospital readmission rates in older adults with deconditioning undergoing hospital-based rehabilitation found a decrease in readmission rates 30 days post-hospital discharge (Kim et al., 2015). However, these older adults did not demonstrate significant improvements in ADL as measured by the Katz ADL Index, which may be due to the short duration of rehabilitation (Kim et al., 2015).

Kortebein (2009) conducted a literature review that examined the benefits of a multidisciplinary, traditional rehabilitation program model (subacute and acute rehabilitation wards) for older adults with *hospital-acquired deconditioning* (HAD) resulting from a prolonged stay. Improvements in function were found, and these older adults were able to successfully transition home. Kortebein suggested that patients should be assigned to their rehabilitation program depending on the amount of rehabilitation the older adult patient is able to withstand per session. An evaluation study by Ottenbacher et al. (2004) found that while 71 per cent of older adults participating in a traditional rehabilitation program returned to living in the community, 29 per cent were either admitted into institutionalized care or re-admitted to the hospital post-rehabilitation. Thus, it seems that not all older adults are able to benefit from the shorter duration and higher intensity traditional rehabilitation program model to the same extent and may require a different model of care.

Slow Stream Rehabilitation

Older adults with a greater number of co-morbidities and more serious health conditions tend to make smaller functional gains and require longer lengths of hospital stays (Patrick et al., 2001). It is thought that older adults with complex health problems such as multiple co-morbidities, severe stroke, dementia, and frailty may

https://doi.org/10.1017/S0714980818000740 Published online by Cambridge University Press

not be able to withstand the typical shorter duration and higher intensity of traditional rehabilitation programs, and may struggle to rehabilitate back to independent living (GTA Rehab Network, 2008). A review assessing the prognosis for functional recovery of older adults in Canadian hospitals found that older adults who are discharged from hospital with new or additional disability in ADL require a longer duration of rehabilitation than current traditional rehabilitation programs (Kortebein, 2009).

Due to decreased therapeutic gains, the rising number of older adults with complex health problems, and the need to address the problems of traditional rehabilitation for a complex older adult population, some countries have introduced slow stream rehabilitation (SSR) programs into CCC units, stroke rehabilitation units, in-patient rehabilitation units, and nursing homes (South West LHIN, 2009; Sutherland & Trafford Crump, 2013). SSR programs were first introduced in Australia in nursing homes in 1987 as a way of maintaining function for severely deconditioned older adults who resided in nursing homes (O'Neill, McCarthy, & Newton, 1987). SSR programs tend to be lower intensity and of longer duration, and to target older adults who have multiple complex health problems and who may not tolerate or benefit from traditional rehabilitation (GTA Rehab Network, 2008). The only literature review completed to date on the topic of SSR is a grey literature scoping review exploring SSR for people with acquired brain injury (ABI) (Piccenna, Knox, & Jacinta, 2016). The authors, who found SSR to be beneficial for adults and older adults with ABI, described SSR as being multidisciplinary (based on personally relevant goals and the needs of the individual), outcome driven, and bridging an integrated model of functioning disability and health.

Despite the growing body of research on the benefits of rehabilitation for older adults, we found a large variation in rehabilitation programs that are offered and no clear parameters of who may benefit the most from different models of care. No literature to date has attempted to explore the characteristics of older adults attending SSR programs, SSR program characteristics (e.g., duration [total number of days spent in SSR]; SSR intensity [frequency and amount of time spent in an individual rehabilitation session]; or health professionals involved in SSR), and the benefits of SSR for older adults.

The primary purpose of the scoping review we conducted was to summarize the current body of literature related to SSR for older adults in single-payer health care systems, where "single payer" or "single payer–like" refers to health care funded by the government either through government or quasi-government organizations (World Health Organization, 2018).

Methods

The Canadian Institute of Health Research defines a scoping review as a methodology that aims to explore the breadth of literature on a topic of interest; systematically map the findings; and identify key concepts, theories, gaps, and future direction (Hidalgo Landa, Szabo, Le Brun, Owen, & Fletcher, 2011). We used the framework proposed by Arksey and O'Malley, and the suggestions proposed by Levac et al. (2010), to guide the current scoping review steps and processes (Levac et al., 2010). This framework entails five methodological steps: (a) identify the research question, (b) identify relevant studies, (c) select the studies, (d) chart the data, and (e) collate, summarise, and report the results (Levac et al., 2010).

Step 1: Identify the Research Question

We developed the following research questions with a focus on SSR programs that are available for older adults in single-payer or single payer–like health care systems: What are the characteristics of the older adult patient population (aged 60 years and older) participating in SSR programs? What are the characteristics of SSR programs for older adults with regards to program duration, intensity, setting/location, and clinical practitioners involved? What are the functional, physical, and other outcomes of SSR programs for older adults? To reduce the confounders related to privatized health care systems and to ensure that the results had direct application to the Canadian health care system, we chose to focus on countries with single-payer or single payer–like health care systems.

Step 2: Identify Relevant Studies

The search terms we identified were based upon review of relevant literature and consensus between two authors (MM, SS) (Table 1). We subsequently conducted a three-step search strategy to identify all relevant journal articles and grey literature documents. The first search involved two databases, CINAHL and OVID, in order to identify terms that were synonymous with SSR. Phrases from titles, abstracts, and search terms were then included in the search strategy. Prior to a second search, we consulted with an expert health science librarian for finalization of search terms and search strategy. The second search using all identified search terms and combinations (Table 1) occurred in five primary literature databases (CINAHL, Cochrane, Web of Science, OVID Medline, and OVID Embase), and three grey literature databases (Canadian Public Policy Collection and Global Health, Global Health, and Public Affairs Information Services [PAIS]), in order to cast a wide net and to encompass a variety of settings in which rehabilitation takes place – for example, community,

https://doi.org/10.1017/S0714980818000740 Published online by Cambridge University Press

Table 1: Example of search strategy used across all databases

#	Searches	Results
1	exp Rehabilitation/	274288
2	Rehabilitation Centers/	7790
3	rehab*.mp.	292699
4	1 or 2 or 3	477912
5	exp Aged/	2821516
6	elder*.mp.	240159
7	senior*.mp.	35232
8	geriatric*.mp.	93232
9	5 or 6 or 7 or 8	2934858
10	4 and 9	121080
11	slow* stream.mp.	73
12	((long or extend*) adj2 (duration or "lengths of stay")).mp.	16520
13	*low intensity*.mp.	13221
14	((slow* or extend*) adj3 (pace* or recover*)).mp.	7598
15	Long Term Care/	24426
16	11 or 12 or 13 or 14 or 15	61598
17	10 and 16	2346
18	11 or 12 or 13 or 14	37227
19	10 and 18	598

Note. ***used in search databases as a wildcard to broaden the search by finding all derivations of the word "age".**

hospital, and nursing homes. The third search we conducted involved reference lists of selected articles that we searched to identify any missing resources. For purposes of searching the databases, all sources of information were potentially eligible in order to capture a broad breadth of primary and grey literature, including policy papers. No date restrictions were applied in order to understand the manifestation and history of SSR (Table 2). Literature sources had to be written in English or published with English translation.

Step 3: Select the Studies

Because the intent of the scoping review was to capture a wide breadth of literature, we used the following inclusion criteria:

(1) Population included were older adult participants aged 60 years and older (World Health Organization [WHO], 2002). We used the WHO definition of *older adult*, anticipating that literature and documents would originate from different countries.
(2) Any health condition or diagnosis, except ABI or end-stage degenerative disease.
(3) Rehabilitation had to be described as one or more of the following: slow stream, low intensity, long duration, low tolerance, slow to recover. These terms were chosen based upon a review of the literature and the Toronto Rehabilitation Framework (GTA Rehab Network, 2008). Intensity was considered in the context of the amount of rehabilitation time for sessions – for example, amount of time for an individual session and frequency per week, whereas duration was considered as the total number of days within the SSR program. No cut-off values for either were considered due to the current lack of available operational definitions or empirical values;
(4) All types of rehabilitation settings.
(5) Health care systems similar to that of Canada – for example, single payer or single payer–like. We did not have an a priori list of countries with single-payer health care systems, rather countries as identified in articles and documents were deemed eligible for inclusion through further research of the health care system;
(6) All publication dates to June 2018.
(7) Peer-reviewed papers (quantitative and qualitative methodologies), case studies, conference abstracts, dissertations, hospital reports, policy papers.

To keep the patient population consistent (Mlinac & Feng, 2016), we did not include papers or documents that described SSR (a) years after initial onset of health condition or diagnosis; (b) for end-stage degenerative conditions, as the focus would be palliative care; (c) as programs whose primary purpose was caregiver relief. We did not include ABI, as Piccenna et al. (2016) conducted a scoping review related to this diagnosis. Last, we also did not include textbooks or book chapters. Table 2 shows the complete list of document inclusion and exclusion criteria.

Titles and abstracts were imported into Mendeley Version 1.19.2 (2008–2018 Mendeley Ltd.), and duplicates were automatically removed by the Mendeley program. Titles and abstracts were then independently reviewed by two author reviewers (MM, SS) based upon the inclusion and exclusion criteria. Disagreements were resolved via discussion with a third author reviewer (VBDH). Full-text data extraction was independently undertaken. A Kappa value was calculated using SPSS version 24. We did not determine the Kappa value a priori, but we were looking for substantial agreement. It is suggested that Kappa results be interpreted as following: values ≤ 0 as no agreement, 0.01–0.20 as slight agreement, 0.21–0.40 as fair, 0.41–0.60 as moderate, 0.61–0.80 as substantial, and 0.81–1.00 as almost perfect agreement (McHugh, 2012), thus anything above 0.61 would have been deemed acceptable.

Steps 4 and 5: Chart, Collate, Summarise, and Report the Results

To document information from the included published articles and grey literature, an Excel spreadsheet was created and securely hosted online, so that all research team members had access. We extracted details regarding publication year, country of publication, methodology, objective(s), sample size, participant characteristics (e.g., age, sex, number of co-morbidities), program description, length of stay, outcome measures used (e.g., physical outcomes, ADL measures) and discharge destination.

https://doi.org/10.1017/S0714980818000740 Published online by Cambridge University Press

Table 2: Document inclusion and exclusion criteria for screening and full-text phases

Criteria	Included	Excluded
Year of publication	All available years to June 2018	No years excluded
Age	60 years of age or older	Less than 60 years of age
Program description	• Slow stream • Low intensity • Long duration • Low tolerance • Slow to recover	Programs described as rehabilitation not being the focus of the program – e.g., caregiver burden relief program
Setting	• Hospital • Community • Day hospital • Long-term care • Complex continuing care • Nursing home	No settings excluded
Literature type	• Peer reviewed articles • Case studies • Hospital reports • Dissertations • Conference abstracts • Policy papers or reports	•Textbooks •Book chapters
Health condition or diagnosis	All conditions other than excluded	Acquired brain injury Late-stage degenerative condition – e.g., end-stage dementia
Health care system funding	Single payer Single payer–like	Private health insurance Employment-based insurance Out of pocket

According to Levac et al. (2010), part of collating, summarizing, and reporting of the results is to map the findings and produce a numerical analysis of the extent and nature of studies using tables and charts. Accordingly, we included tables and reported the range of means. To answer the first research question, we reported the range of means for the following across the literature documents: age, number of co-morbidities, sex percentage, diagnosis, or reason for rehabilitation. To answer the second research question, we reported the range of means across the literature documents for total SSR program duration (length of stay, or LOS), intensity – frequency (number of individual sessions per week), and amount of time spent in an individual session. In addition, we extracted the composition of the SSR team. To address the benefits of SSR programs for older adults, we also extracted (e.g., means reported) the outcome measures used and results.

Results

A total of 1,445 literature documents were screened by two reviewers (MM, SS) with a Cohen Kappa value of 0.78, (CI = 0.73, 0.83), which is indicative of substantial agreement. Sixty-four articles and documents remained after assessment for eligibility. Reasons for exclusion at this point were as follows: the program was not an SSR program (n = 32); government did not fund the program – the older adult individuals had to pay out of pocket for rehabilitation; all four programs were conducted in the United States whose health care system is not single payer (n = 4); and age, health condition, or diagnosis did not meet the inclusion criteria (n = 7; for example, ABI in young adults; diagnosis of stroke 10 years ago; Down syndrome) (Figure 1).

After initial and full text review, we included 21 primary articles and grey literature documents: 11 peer-reviewed articles, five conference abstracts, and five report documents. Three documents (Englund, 1987; Raymond, Winter, & Holland, 2015; Wilson & Ballentyne, 2017) did not describe the SSR program or outcomes of the program, and therefore we later excluded them in the data extraction phase: (a) one of the three excluded documents was a measurement study aimed at validating an activity monitor in a hospital-based SSR setting (Raymond, Winter, & Holland, 2015; peer-reviewed); (b) one of three excluded was a critique of the methodology used in O'Neill et al.'s 1987 article and a response to the critique in 1987 (Englund, 1987; peer-reviewed); and (c) the last excluded document was a description of the role of occupational therapists in SSR (Wilson & Ballentyne, 2017;

https://doi.org/10.1017/S0714980818000740 Published online by Cambridge University Press

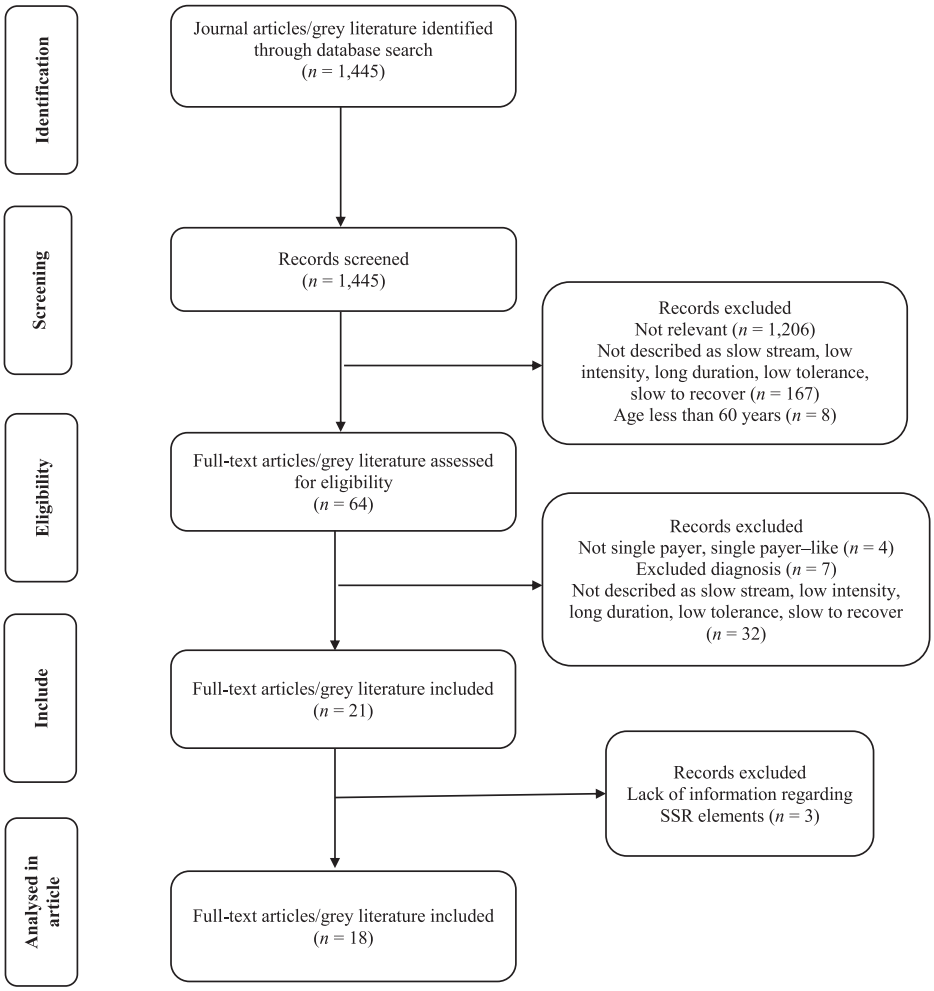

Figure 1: Flow diagram of process of identification and selection of relevant studies and documents, including the number of studies screened and excluded at each stage

conference abstract). Ultimately, 18 included literature documents remained – nine peer-reviewed articles, four conference abstracts, and five report documents.

The final 18 literature documents were published in four different countries: Australia (O'Neill et al., 1987; Parker, Hill, Cobden, Davidson, & McBurney, 2015; Salgado et al., 1995); Canada (ALC Expert Panel, 2006; Berall, Naglie, Katz, Chang, & Leung, 2013; GTA Rehab Network, 2008; Katz et al., 2013; Kubilius, Rose, Pettit, & St. Amant, 2016; Leung et al., 2014; Leung et al., 2016; Ontario Hospital Association, 2006; Ontario Stroke Network, 2013; South West LHIN, 2009; Teasell, Foley, Bhogal, Chakravertty, & Bluvol, 2005; Tourangeau et al., 2011); Singapore (Chong, Empensando, Ding, & Tan, 2012; Zhang, Ang, & Kwek, 2015); and the Netherlands (Spruit-van Eijk, Zuidema, Buijck, Koopmans, & Geurts, 2012) (Table 3).

SSR research originated in Australia in 1987 and publications continued until 1995. From 1995 to 2005, there were no SSR-related publications. In 2005, the first Canadian SSR paper was published, describing SSR in the hospital setting for older adults with severe stroke who could not withstand traditional hospital rehabilitation (Teasell et al., 2005). Since 2005, there have been 12 Canadian SSR-related documents published (Table 3). Of the 13 peer-reviewed articles and conference abstract included, 10 (76.9%) were cohort studies – three retrospective cohort studies (Chong et al., 2012; Kubilius et al., 2016; Teasell et al., 2005) and seven prospective cohort studies (Berall et al., 2013; Katz et al., 2013; Leung et al., 2014; Leung et al., 2016; O'Neill et al., 1987; Spruit-van Eijk et al., 2012; Tourangeau et al., 2011). There were three randomized control trials (RCT) conducted to compare SSR to different models of care (Parker et al., 2015; Salgado et al., 1995; Zhang et al., 2015). Refer to Table 3 for the list of literature documented and their methodology.

Within the five report documents, there was one report describing a hospital framework (GTA Rehab Network, 2008), three hospital evaluation reports (ALC Expert Panel, 2006; Ontario Hospital Association, 2006; South West LHIN, 2009), and one stroke rehabilitation

https://doi.org/10.1017/S0714980818000740 Published online by Cambridge University Press

Table 3: Characteristics of literature documents included in scoping review

Literature Document	Country	Methodology	Sample Size (*n* = participants, unless otherwise specified)
Published Peer-Reviewed Articles			
Leung et al., 2016	Canada	Prospective cohort study	104
Zhang et al., 2015	Singapore	Quasi-randomized control trial	Total = 133 Home = 18 Intensive = 39 SSR = 76
Parker et al., 2015	Australia	Randomized control trial	Total = 60 SSR = 32 FIT and SSR = 28
Spruit-van Eijk et al., 2012	Netherlands	Prospective cohort study	186
Chong et al., 2012	Singapore	Retrospective cohort study	183
Tourangeau et al., 2011	Canada	Prospective cohort study	81
Teasell et al., 2005	Canada	Retrospective cohort study	196
Salgado et al., 1995	Australia	Randomized control trial	SSR = 33 Control = 22
O'Neill et al., 1987	Australia	Prospective cohort study	52
Peer-Reviewed Conference Abstracts			
Kubilius et al., 2016	Canada	Retrospective cohort study	81
Leung et al., 2014	Canada	Prospective cohort study	104
Katz et al., 2013	Canada	Prospective cohort study	95
Berall et al., 2013	Canada	Prospective cohort study	105
Hospital and Government Reports			
GTA REHAB Network, 2008	Canada	Framework	N/R
Ontario Hospital Association, 2006	Canada	Evaluation report	N/R
ALC Expert Panel, 2006	Canada	Evaluation report	N/R
Ontario Stroke Network, 2013	Canada	Recommendations report	11 regional stroke networks 14 hospitals
South West LHIN, 2009	Canada	Evaluation report	N/R

Note. **FIT = functional individual training; N/R = not reported; SSR = slow stream rehabilitation.**

recommendation report (Ontario Stroke Network, 2013). The geriatric rehabilitation framework report published by the Greater Toronto Area (GTA) Rehab Network discussed the differing types of geriatric in-patient rehabilitation units available to older adult patients and gave guidelines as to when an SSR program should be used and what an SSR program should entail (GTA Rehab Network, 2008). Two of the three hospital evaluation reports assessed hospital-based rehabilitation in CCC units in Ontario (South West LHIN, 2009; Ontario Hospital Association, 2006) and reported lack of clarity, lack of information, and lack of resources available for health care practitioners when making rehabilitation decisions regarding CCC rehabilitation for older adult patients. The report by the LHIN concluded that many CCC programs and rehabilitation programs were not appropriately utilized and that transition and referral processes need to be enhanced (South West LHIN, 2009). The last hospital report, written by an expert panel, was ALC focused with the aim of assessing levels of care and flow of care into in-patient SSR units (ALC Expert Panel, 2006). The ALC panel reported that patient flow to SSR occurred following specialized rehabilitation when an older adult was considered stable but unable to return to community living (ALC Expert Panel, 2006).

Finally, the report conducted by the Ontario Stroke Network compared the use of SSR in CCC hospital units to an active stroke rehabilitation unit for patients with stroke. The Ontario Stroke Network found that older adult individuals with severe stroke who were admitted to an active stroke rehabilitation program had a shorter length of stay and similar functional outcomes. The Ontario Stroke Network (2013) recommended that older adult patients, who could potentially withstand active stroke rehabilitation, would be better served by admission to active stroke in-patient rehabilitation than by an SSR program in CCC.

Characteristics of SSR Program for Older Adults

Of all 18 reported literature documents, 15 described staff available in SSR programs (ALC Expert Panel, 2006;

https://doi.org/10.1017/S0714980818000740 Published online by Cambridge University Press

Berall et al., 2013; GTA Rehab Network, 2008; Katz et al., 2013; Leung et al., 2014; Leung et al., 2016; O'Neill et al., 1987; Ontario Stroke Network, 2013; Ontario Hospital Association, 2006; Parker et al., 2015; Salgado et al., 1995; South West LHIN, 2009; Spruit-van Eijk et al., 2012; Teasell et al., 2005; Zhang et al., 2015) (Table 4). All 15 described SSR programs as multidisciplinary, and included a physiotherapist, occupational therapist, and nurse practitioner or physician as part of the rehabilitation team. Other health care professionals included on SSR teams were as follows: physiotherapy assistant in six of the 15 programs, an occupational therapy assistant in four of the 15 programs, social worker in five of the 15 programs, speech language pathologist in eight of the 15 programs, dietician in seven of the 15 programs, and recreational therapist in three of the 15 programs.

Total SSR program duration (LOS) was recorded for 15 of the 18 (83%) literature documents, with a range across literature documents of 30 days to 141.2 days (Berall et al., 2013; Chong et al., 2012; Katz et al., 2013; Kubilius et al., 2016; Leung et al., 2014; Leung et al., 2016; O'Neill et al., 1987; Ontario Stroke Network, 2013; Salgado et al., 1995; South West LHIN, 2009; Spruit-van Eijk et al., 2012; Teasell et al., 2005; Tourangeau et al., 2011; Zhang et al., 2015). Only 10 of 18 (55%) included documents described the SSR session intensity (Berall et al., 2013; GTA Rehab Network, 2008; Katz et al., 2013; Leung et al., 2014; Leung et al., 2016; Parker et al., 2015; Salgado et al.,1995; Spruit-van Eijk et al., 2012; Teasell et al., 2005; Tourangeau et al., 2011). The number of rehabilitation sessions attended by participants per week varied from once a week (Salgado et al.,1995) to five times per week (Berall et al., 2013; GTA Rehab Network, 2008; Katz et al., 2013; Leung et al., 2014; Leung et al., 2016; Teasell et al., 2005; Tourangeau et al., 2011).

The amount of time of each rehabilitation session ranged from 20 minutes (GTA Rehab Network, 2008) to 60 minutes (Tourangeau et al., 2011). For all 18 included documents, SSR programs were offered as in-patient programs, meaning the older adult stayed overnight at the rehabilitation location. Nine (50%) of the 18 SSR programs took place in in-patient hospital rehabilitation wards (Berall et al., 2013; GTA Rehab Network, 2008; Katz et al., 2013; Leung et al., 2014; Leung et al., 2016; Parker et al., 2015; Teasell et al., 2005; Zhang et al., 2015; Ontario Stroke Network, 2013); five (27.8%) in CCC units (ALC Expert Panel, 2006; Ontario Hospital Association, 2006; South West LHIN, 2009; Tourangeau et al., 2011); three (16.7%) in nursing homes (O'Neill et al., 1987; Salgado et al., 1995; Spruit-van Eijk et al., 2012); and one (5.5%) in a subacute rehabilitation (Chong et al., 2012). Table 4 lists characteristics of SSR programs.

Characteristics of Older Adults Participating in SSR Programs

Age was reported in 16 of the 18 literature documents, with youngest reported mean age being 72 years (Teasell et al., 2005) and oldest reported mean age being 82 years (Berall et al., 2013; Katz et al., 2013; Leung et al., 2014; Salgado et al., 1995). Eleven (61.1%) of 18 included documents provided information regarding sex distribution of SSR participants (Berall et al., 2013; Chong et al., 2012; Katz et al., 2013; Leung et al., 2014; Leung et al., 2016; O'Neill et al., 1987; Parker et al., 2015; Spruit-van Eijk et al., 2012; Teasell et al., 2005; Tourangeau et al., 2011; Zhang et al., 2015). The percentage of female participants ranged from 47 per cent (Teasell et al., 2005) to 81 per cent (Zhang et al., 2015). Across all 18 included literature documents, six (Chong et al., 2012; Leung et al., 2016; O'Neill et al., 1987; Parker et al., 2015; South West LHIN, 2009; Zhang et al., 2015) reported patients' co-morbidities, with the lowest mean number of co-morbidities being 1.7 (Chong et al., 2012) and the highest mean being 7.3 (Parker et al., 2015). Primary diagnosis was reported in all 18 literature documents. Multiple primary diagnoses were reported with the most common primary diagnoses of older adult SSR participants being stroke, deconditioning, orthopaedic conditions, chronic complex health conditions, surgery, cognitive impairments, frailty, and falls. Secondary diagnosis was reported in nine of the 18 literature documents and included multiple chronic complex conditions, cognitive impairment, and frailty. See Table 5 for demographics and health history of older adults attending SSR programs.

Cognitive Ability

Four literature documents used a measure of cognitive ability at baseline, and these documents reported that most of the older adult participants had some level of cognitive impairment or delirium (Berall et al., 2013; Katz et al., 2013; Leung et al., 2016; Spruit-van Eijk et al., 2012). Leung et al. (2016) reported that 72 per cent of participants had some cognitive impairment, and 83 per cent had some level of delirium (Leung et al., 2016). Similarly, Berall et al. reported that 85 per cent of participants had mild to moderate cognitive impairment on admission (Berall et al., 2013). Spruit-van Eijk et al. (2012) reported a mean Mini-Mental State Exam (MMSE) score of 23, indicative of mild cognitive impairment.

Outcome Measures Used in Slow Stream Rehabilitation for Older Adult Participants

For a summary of included documents, outcome measures used, and reported findings, see Tables 6a and 6b. The majority of documents (13 of the 18, 72.2%) used outcome measures to describe or assess the SSR program (Berall et al., 2013; Chong et al., 2012; Katz et al., 2013;

https://doi.org/10.1017/S0714980818000740 Published online by Cambridge University Press

Table 4: Characteristics of slow stream rehabilitation programs

Literature Documents	Description of Rehabilitation Program	Intensity of Physical Rehabilitation	Frequency (time/wk)	Intensity (minutes)	Mean LOS (days) *Range	Rehabilitation Team Members (if number provided indicate FTE)	Location
Published Peer-Reviewed Articles							
Leung et al., 2016	N/R	N/R	3-5 times/wk	30	120	2 OT, 1 OTA, 2 PT, 2 PTA, 0.5 Dietician, 0.5 SLP, 0.5 RT, 1 SW	Hospital, in-patient rehabilitation
Zhang et al., 2015	N/R	N/R	N/R	N/R	60	OT, PT, PTA	Hospital, in-patient rehabilitation
Parker et al., 2015	N/R for SSR FIT: activities of daily living done daily on own	N/R	SSR = 2 times/wk SSR+FIT = 2 times/wk SSR and 4 times daily FIT	SSR = 30min SSR + FIT = 4 times/day+ 30 min SSR	SSR = 63.7 SSR + FIT = 65.7	PT, OT, PTA, Nurse	Hospital, in-patient rehabilitation
Spruit-van Eijk et al., 2012	N/R	N/R	3-5 times/week	60	85	PT, OT, Nurse	Nursing home
Chong et al., 2012	N/R	N/R	N/R	N/R	30	N/R	Subacute rehabilitation
Tourangeau et al., 2011	N/R	N/R	5 times/wk	60	113	N/R	Stroke, complex continuing care units
Teasell et al., 2005	Physical, behavioral, and functional exercise–details not specified	N/R	5 times/wk	As needed	80	1 PT, 1 OT, 1 SLP, 1 SW, 1 RT, 0.5 Dietician	Hospital, in-patient rehabilitation
Salgado et al., 1995	Increase independence and avoid institutionalized care–details not specified	N/R	1 time/wk	N/R	Range = 72 to 210	PT, Nurses, Physicians, OT, SW	Nursing home
O'Neil et al., 1987	Increase independence–details not specified	N/R	N/R	N/R	81	1 Nurse, 2 PT, 2 OT, 1 SW; Psychiatrist, SLP Dietician as needed	Nursing home
Peer-Reviewed Conference Abstracts							
Kubilius et al., 2016	N/R	N/R	N/R	N/R	Range = 95.9 to 141.2	N/R	Hospital, complex continuing care
Leung et al., 2014	Individual and group exercise–details not specified	N/R	5 times/wk	30	82.5	OT, PT, OTA, PTA, Nurse	Hospital, in-patient rehabilitation
Katz et al., 2013	Individual and group exercise–details not specified	N/R	5 times/wk	30	72	OT, PT, OTA, PTA, Nurse	Hospital, in-patient rehabilitation
Berall et al., 2013	Individual and group exercise–details not specified	N/R	5 times/wk	30	88	OT, PT, OTA, PTA, Nurse	Hospital, in-patient rehabilitation

Continued

https://doi.org/10.1017/S0714980818000740 Published online by Cambridge University Press

Table 4: Continued

Literature Documents	Description of Rehabilitation Program	Intensity of Physical Rehabilitation	Frequency (time/wk)	Intensity (minutes)	Mean LOS (days) *Range	Rehabilitation Team Members (if number provided indicate FTE)	Location
Hospital and Government Reports							
GTA REHAB Network, 2008	Increase independence and avoid institutionalized care–details not specified	N/R	5 times/wk	20	N/R	Physician, Nurse, PT, OT, SW, SLP, Dietician, RT	Hospital, in-patient rehabilitation
Ontario Hospital Association, 2006	Reactivation and transitional care–details not specified	N/R	N/R	N/R	N/R	Physicians, Physiatrists, OT, PT, SLP	Hospitals, complex continuing care
ALC Expert Panel, 2006	Reactivation and transitional care–details not specified	N/R	N/R	N/R	N/R	Physicians, Physiatrists, OT, PT, SLP, Dietician	Hospitals, complex continuing care and alternate level of care
Ontario Stroke Network, 2013	Provide transitional care–details not specified	N/R	N/R	N/R	95	Physicians, Physiatrists, OT, PT, SLP, Dietician	Hospital, in-patient rehabilitation units
South West LHIN, 2009	Reactivation and transitional care–details not specified	N/R	N/R	N/R	Range = 12.9 to 38.4	Physicians, Physiatrists, OT, PT, SLP, Dietician	Hospitals, complex continuing care and in-patient rehabilitation units

Note. **ALC = alternate level of care; FIT = functional individual training; FTE = full time equivalent; LIHN = Local Health Integrated Network; LOS = length of stay; N/R = not reported; OT = occupational therapist; OTA = occupational therapist assistant; PT = physiotherapist; PTA = physiotherapist assistant; RT = recreational therapist; SLP = speech language pathologist; SW = social workers; SSR = slow stream rehabilitation; wk = week.**

Kubilius et al., 2016; Leung et al., 2014; Leung et al., 2016; O'Neill et al., 1987; Parker et al., 2015; Salgado et al.,1995; Spruit-van Eijk et al., 2012; Teasell et al., 2005; Tourangeau et al., 2011; Zhang et al., 2015). Over three quarters (76.9%, 10 of 13) of the literature documents that used outcome measures used a measure of ADL or function to assess change from baseline to discharge (Berall et al., 2013; Katz et al., 2013; Kubilius et al., 2016; Leung et al., 2014; Leung et al., 2016; O'Neill et al., 1987; Parker et al., 2015; Spruit-van Eijk et al., 2012; Teasell et al., 2005; Tourangeau et al., 2011). The most commonly used measure was the Functional Independence Measure (60%, 6 of 10) (Berall et al., 2013; Katz et al., 2013; Kubilius et al., 2016; Leung et al., 2014; Leung et al., 2016; Teasell et al., 2005), but others included the ADL hierarchy (Tourangeau et al., 2011), de Morton Mobility Index (DEMMI) (Parker et al., 2015), Barthel Index (BI) (Spruit-van Eijk et al., 2012), and one tool created by the authors to measure dependency level for completion of ADL (O'Neill et al., 1987).

Researchers used physical outcome measures to assess change from SSR admission to discharge in seven of 13 (53.8%) literature documents (Berall et al., 2013; Katz et al., 2013; Leung et al., 2016; O'Neill et al., 1987; Parker et al., 2015; Spruit-van Eijk et al., 2012; Zhang et al., 2015). The most often-used measure was the Berg Balance Scale (71.4%), accounting for five of the seven literature documents examining physical outcomes (Berall et al., 2013; Katz et al., 2013; Leung et al., 2016; Parker et al., 2015; Spruit-van Eijk et al., 2012). Other physical outcome measures applied included the Parker Mobility Score (Zhang et al., 2015), Modified Harris Hip Score (Zhang et al., 2015), five times sit-to-stand test (Parker et al., 2015), ambulation ability or speed (Berall et al., 2013; Katz et al., 2013; Leung et al., 2016), grip strength (Leung et al., 2016), and a researcher-designed mobility score (O'Neill et al., 1987).

Only three of the 13 (23.1%) included literature documents included psychological or other outcome measures including (a) the patient Health Questionnaire (Leung et al., 2016), which includes questions about mental and emotional status, such as feelings of depression; (b) Geriatric Depression Scale (GDS) (Tourangeau et al., 2011; Spruit-van Eijk et al., 2012), and (c) a measure of social engagement (Leung et al., 2016)

https://doi.org/10.1017/S0714980818000740 Published online by Cambridge University Press

Table 5: Demographics and health history of older adult population attending slow stream rehabilitation programs according to demographics provided in included literature documents

Literature Documents	Primary Diagnosis	Secondary Diagnosis	No. of Co-morbidities (SD) or Other Description	MOCA Mean Scores, or % with Cognitive Impairment, or CAM % Delirium, or MMSE	Mean Age, Years (*SD*) or Minimum Maximum	Sex, Mean Female Percentage (%) or Minimum % Maximum %
Published Peer-Reviewed Articles						
Leung et al., 2016	Deconditioning	N/R	6.8 (2.5)	83% having some level of delirium (CAM) 72% had a MOCA score less than 23 showing mild to moderate cognitive impairment.	81.6 (8.4)	68.3
Zhang et al., 2015	Femoral hip surgery	Cardiovascular diseases	5.4 (1.6)	N/R	79.9 (7.9)	81.9
Parker et al., 2015	Orthopedics (40%) Medical (28%) Frail (18%)	N/R	7.3 (3.2)	N/R	78.2 (11.7)	60
Raymond et al., 2015	Falls Post-surgery General medicine	N/R	N/R	N/R	79.8 (7.3)	N/R
Spruit-van Eijk et al., 2012	Stroke	Diabetes, multi-morbidity	N/R	23 (MMSE)	79 (10)	54
Chong et al., 2012	Sepsis (32.6%) Fall (19.6%) Impaired cognition (2.2%) Fracture (2.8%) Medical reasons (34.4%)	Frail	1.7 (1.7)	N/R	80 (8.5)	52.2
Tourangeau et al., 2011	Stroke	Vascular disease Cognitive impairment	N/R	N/R	74 (10.5)	59.3
Teasell et al., 2005	Stroke	Aphasia MCI due to stroke	N/R	N/R	72 (11)	47
Salgado et al., 1995	Deconditioning	N/R	N/R	N/R	82	N/R
O'Neil, 1987	Neurological (71%) Orthopedic (14%) Amputations (9%) Other (6%) Dementia (26%)	Multiple diagnosis General deconditioning	25% of discharge population had multiple diagnoses	N/R	78 (7)	68
Peer-Reviewed Conference Abstracts						
Kubilius et al., 2016	Stroke	N/R	N/R	N/R	N/R	N/R
Leung et al., 2014	Deconditioning	N/R	N/R	N/R	82 (8.4)	68.3
Katz et al., 2013	Stroke Orthopedic surgery	Frail MCI	N/R	17 (MOCA)	82 (7.9)	68.4

Continued

https://doi.org/10.1017/S0714980818000740 Published online by Cambridge University Press

Table 5: Continued

Literature Documents	Primary Diagnosis	Secondary Diagnosis	No. of Co-morbidities (SD) or Other Description	MOCA Mean Scores, or % with Cognitive Impairment, or CAM % Delirium, or MMSE	Mean Age, Years (*SD*) or Minimum Maximum	Sex, Mean Female Percentage (%) or Minimum % Maximum %
Berall et al., 2013	Deconditioning	CI (85%) Frail (78.5%)	N/R	85% had mild/moderate to severe cognitive impairment	82	N/R
Hospital and Government Reports						
GTA REHAB Network, 2008	Chronic/complex condition	N/R	N/R	N/R	Minimum = 65	N/R
Ontario Hospital Association, 2006	Orthopedic conditions Stroke	Medically complex MCI deconditioning	N/R	N/R	N/R	N/R
ALC Expert Panel, 2006	Frailty Co-morbidity MCI	N/R	N/R	N/R	Minimum = 65	N/R
Ontario Stroke Network, 2013	Stroke	Multiple co-morbidities	N/R	N/R	Minimum = 65	N/R
South West LHIN, 2009	Chronic/complex conditions	N/R	67% clinically complex	N/R	Minimum = 68 Maximum = 81	Minimum = 48 Maximum = 71

Note. **ALC = alternate level of care; CAM = confusion assessment method; CI = cognitive impairment; LIHN = Local Health Integrated Network; MC = mild cognitive impairment; MMSE = Mini Mental State Exam; MOCA = Montreal Cognitive Assessment; N/R = not reported in the literature document; *SD* = standard deviation; SSR = slow stream rehabilitation.**

Outcomes of Slow Stream Rehabilitation for Older Adults

Changes in Function and Activities of Daily Living

Baseline mean total FIM scores across the six literature documents (Berall et al., 2013; Katz et al., 2013; Kubilius et al., 2016; Leung et al., 2014; Leung et al., 2016; Teasell et al., 2005) ranged from 46 (Teasell et al., 2005) to 55.8 (Leung et al., 2016). Discharge mean FIM scores across the six literature documents (Berall et al., 2013; Katz et al., 2013; Leung et al., 2014; Leung et al., 2016; Teasell et al., 2005) ranged from 70 (Teasell et al., 2005) to 78 (Leung et al., 2016), with all the changes from baseline to discharge being reported as both clinically and statistically significant. Other ADL measures used such as the Barthel Index (Spruit-van Eijk et al., 2012), the ADL hierarchy scale (Tourangeau et al., 2011), the de Morton Mobility Index (Parker et al., 2015), and dependency rating (O'Neill et al., 1987) all showed improvements from baseline to discharge.

Changes in Physical Outcomes

The five literature documents (Berall et al., 2013; Katz et al., 2013; Spruit-Van Eijk et al., 2012; Leung et al., 2016; Parker et al., 2015) that used the Berg Balance Score (BBS) as a physical outcome measure reported an increase in the BBS from baseline to post-SSR. The mean change in BBS score from baseline to discharge ranged, in points, from three (Parker et al., 2015) to 10 (Leung et al., 2016). Older adult participants with the greatest increase in BBS score completed SSR in an in-patient hospital rehabilitation unit and had the lowest mean BBS baseline scores: 9.2 (Leung et al., 2016). Older adult participants showing the smallest mean change in BBS had a higher baseline mean score (44), greater functional ability, and were participating in an RCT study wherein SSR as standard care was compared to SSR plus additional functional exercises (Parker et al. 2015) – SSR-only participants scored a 3-point mean increase in BBS whereas those in the SSR plus additional functional exercise had a 7-point mean increase. All other literature documents that applied physical outcome measures (walking speed, grip strength, or mobility measures) found statistically significant increases in scores from baseline to discharge of SSR, but none reported whether a clinically significant change was achieved (Leung et al., 2014; Leung et al., 2016; Zhang et al., 2015).

Of all included literature documents assessing SSR programs, only one literature document examined the long-term benefits. Zhang et al. (2015) conducted a quasi-RCT comparing home rehabilitation, intensive rehabilitation, and SSR for older adults at 3, 6, and 12 months post-femoral fracture. Zhang et al. (2015) found that there were no differences in walking ability (Parker Mobility scores) between home care and SSR at

https://doi.org/10.1017/S0714980818000740 Published online by Cambridge University Press

Table 6a: Summary of published peer-reviewed articles and conference abstracts included in the scoping review

Literature Document	Stated Aim	Outcome Measures Used	Stated Results
		Published Peer-Reviewed Articles	
Leung et al., 2016	To provide a detailed description of patients admitted to an SSR program after acute hospitalization	**Function:** Functional Independence Measure (FIM) **Physical:** Grip strength, gait speed, Berg Balance Scale (BBS) **Psychological:** The Patient Health Questionnaire (PHQ-9) **Other:** Discharge destination (%)	**Function:** Baseline mean motor FIM score was 33.0 (*SD* = 13.4) with a mean increase of 21 points at discharge.** Baseline mean total FIM score was 55.8(*SD* = 18.8) with a mean increase of 22.6 points at discharge.** **Physical:** Grip strength mean baseline score was 12.5 kg (*SD* = 6.8) with a mean increased of 0.8 kg at discharge; walking speed mean baseline was 0.081m/s (*SD* = 0.2) with a mean increase of 0.3 m/s;* BBS mean baseline score was 9.2 (*SD* = 8.8) with a mean increase of 10.4.* **Psychological:** Baseline mean PHQ-9 score was 6.2 (*SD* = 5.7) with a mean decreased of 1.5 at discharge.* **Other, Discharge Status:** 61.5% returned to preadmission living; 8.6% went to live with family caregivers; 16.3% transferred to long-term nursing home, 13.4% transferred to acute hospital care
Zhang et al., 2015	To assess the effect of three different rehabilitation approaches (high intensity, SSR, and home-based) on mobility outcomes of elderly patients after hip surgery	**Physical:** Parker Mobility Score (PMS), Modified Harris Hip Score (MHHS)	**Physical:** According to PMS home rehabilitation, intensive rehabilitation and SSR were all below mortality at 3 month and means differed across the groups (home = 4[*SD* = 1], intensive = 4.5[*SD* = 2], SSR = 4[*SD* = 2]),* at 6 month (home = 5 [*SD* = 2], intensive = 6[*SD* = 1], SSR = 4[*SD* = 2]),* and 12 month (home = 5[*SD* = 1], intensive = 6[*SD* = 1], SSR = 5 [*SD* = 3]).* MHHS mean scores also differed across groups at 3 month (home = 70[*SD* = 12], intensive = 72.5[*SD* = 17], SSR = 67 [*SD* = 19]),* 6 month (home = 78[*SD* = 12], intensive = 77.5[*SD* = 14.5], SSR = 69[*SD* = 9])* and 12 month (home = 77 [*SD* = 12], intensive = 80[*SD* = 17.5], SSR = 70[*SD* = 19]).*
Parker et al., 2015	To examine whether adding FIT (functional individual training) to the standard SSR would increase number of people returning home	**Function:** de Morton Mobility Index (DEMMI) **Physical:** BBS, 5 times sit-to-stand test (FTSTS). **Other:** Discharge destination (%)	**Function:** Mean DEMMI baseline score for SSR+FIT program was 51.4 (*SD* = 17.3) with a mean increase of 10.5 points at discharge,** for SSR mean DEMMI baseline score was 64.3 (*SD* = 17.2) with a mean increase of 5 point at discharge.* There was no statistical difference between SSR+FIT and SSR only. **Physical:** Mean BBS baseline score for SSR+FIT program was 34 with a mean increase of 7 points at discharge,* for SSR mean BBS baseline score was 44 with a mean increase of 3 point at discharge.* There was no statistical difference between SSR+FIT and SSR only. Mean FTSTS baseline time (seconds) for SSR+FIT program was 22 with a mean decrease of 0.16 at discharge,* for SSR mean FTSTS baseline time (seconds) was 24.1 with a mean decrease 1.8 at discharge. There was no statistical difference between SSR+FIT and SSR only. **Other:** 63% of SSR was discharged home, 43% of SSR+FIT was discharged home. There was no statistical difference between SSR+FIT and SSR only.
Spruit-van Eijk et al., 2012	To identify demographics and functional characteristics of older adults successfully discharged to independent living post being admitted to skilled nursing facilities after stroke	**Function:** Barthel Index (BI) **Physical:** BBS **Psychological:** Geriatric Depression Scale **Other:** Discharge destination (%)	**Function:** The median BI for the entire group of 175 patients was 12 (range 1–20) on admission and 17 (range 1–20) at discharge. The patients who were successfully discharged showed an increase in BI from 14 on admission to 18 at discharge, whereas those who were "unsuccessful" showed a stable BI score of 6. **Physical:** Of those who were able to be discharged home post rehabilitation, mean BBS score was 38; for those who were not discharged home the mean BBS score was 4. **Psychological:** Of those who were able to be discharged home post rehabilitation, 22% had signs of depression according to the GDS; of those not discharged home, 40% had signs of depression according to the GDS score. **Other:** 70% were successfully discharged home.

Continued

https://doi.org/10.1017/S0714980818000740 Published online by Cambridge University Press

Table 6a: Continued

Literature Document	Stated Aim	Outcome Measures Used	Stated Results
Chong et al., 2012	To examine the number of older adults discharged to different rehabilitation settings post hospitalization	**Other:** % discharged to SSR from acute care	**Other:** 23.5% of subacute unit were discharged to slow stream rehabilitation (SSR) facility.
Tourangeau et al., 2011	To describe health-related outcomes of patients participating in SSR in CCC units across Ontario post-acute stroke	**Function:** Activities of daily living (ADL) hierarchy **Psychological:** Social engagement measure, depression rating scale **Other:** Discharge status, patient satisfaction, pain scale (RAI-MDS)	***Note*:** There were 6 different CCC units with SSR that were included in analysis and the following is the means of each outcome measure across all 6 sites. **Function:** Mean ADL hierarchy score 3.3 (*SD* = 1.4), with statistically different means across the 6 sites. **Psychological:** Mean depression score 0.9 (*SD* = 1.1), with no statistical difference across the 6 sites. Mean social engagement 3.6 (*SD* = 1.9) with statistically significant different means across the 6 sites. **Other:** Mean discharge status percentage: 48% were discharged to independent or semi-independent. 35% went to long-term care and 17% went to a higher level of care, with statistically significant difference in mean percentage for discharge status across the 6 sites. Mean patient satisfaction with care 71(*SD* = 31), with statistically significant different means across the 6 sites. Mean Pain scale 1.1 (*SD* = 0.8), with no statistical difference across the 6 sites.
Teasell et al., 2005	To describe rehabilitation progress and develop a logistic regression model to predict patients that are more likely to be discharged home	**Function:** FIM	**Function:** The mean baseline total FIM score was 46, with a mean discharge score of 70, and mean change of 22 points.** Baseline FIM measures were statistically significant in developing a model predicting who will be discharged home, with higher baseline being more likely to be discharged home.
Salgado et al., 1995	To implement a mobile rehabilitation team (SSR program) in nursing homes	**Other:** Discharge home (%)	**Other:** 64% of the non-control/SSR group were discharged home and 9% of the control group were discharged home.*
O'Neil et al., 1987	To evaluate the efficacy of slow stream rehabilitation	**Function:** Dependency rating 1 = independent: requires no assistance 2 = light assistance: requires supervision 3 = moderate assistance: requires considerable help 4 = full assistance; requires total care **Physical:** Mobility rating 1 = independently mobile 2 = not independently mobile **Other:** Discharge destination (%)	**Function:** Mean dependency rating at baseline was 3.2 and 2.1 at discharge. **Physical**: Mean mobility rating at baseline was 1.8 and 1.2 at discharge. **Other**: 14% of patients discharged home, living independently; 30% of patients discharged to community living with caregiver.
		Peer-Reviewed Conference Abstracts	
Kubilius et al., 2016	To understand discharge barriers of a low tolerance long duration hospital stroke rehabilitation unit	**Function:** FIM **Other:** Discharge destination (%)	**Function:** Mean change of total FIM score ranged from 19 to 23 points. **Other:** 66.6–85% is of older adults are discharged back into the community.

Continued

https://doi.org/10.1017/S0714980818000740 Published online by Cambridge University Press

Table 6a: Continued

Literature Document	Stated Aim	Outcome Measures Used	Stated Results
Leung et al., 2014	To identify predictors of rehabilitation outcomes in a hospital SSR unit	**Function:** FIM **Other:** Discharge destination (%)	**Function:** The mean change in motor FIM was 21.03 (*SD* = 12.2).** **Other:** 64% of the patients discharged home, 17% discharged to long-term care.
Katz et al., 2013	To describe patient characteristics at baseline of patients attending SSR	**Functional:** FIM **Physical:** BBS **Other:** Independence level	**Function:** Mean baseline total FIM score was 58. **Physical:** Mean baseline BBS score was 8.7. **Other**: 20% required assistance and 6% dependent with feeding; 73% required assistance and 25 % dependent with bathing; 69% required assistance and 22% dependent with dressing; 47% required assistance and 28% dependent with toileting.
Berall et al., 2013	To examine the change in function and discharge destination of patients admitted to SSR	**Function:** FIM **Physical:** BBS, ambulation ability **Other:** Discharge destination (%)	**Function:** Mean baseline total FIM score was 51, mean discharge total FIM score was 74.* **Physical:** Mean BBS baseline score was 10, mean discharge was 19.7;* at baseline, 51% could ambulate >10 steps with a device, at discharge 80.4% could ambulate >10 steps.* **Other:** 68% were discharged home or to other community residences; 24% to long-term care and 9% to acute care.

***Note.* * statistically significant result according to study; ** clinically significant result according to study. BBS = Berg Balance Scale; FIM = Functional Independence Measure; *SD* = standard deviation; SSR = slow stream rehabilitation.**

any time point, but intensive rehabilitation was effective in improving walking ability (Parker Mobility scores) and function (Mod Harris Hip score) at all-time points.

Changes in Psychological Measures

Of the three literature documents that assessed changes in emotional or psychological states, two found a decrease in depression scores from baseline to discharge using a Depression Rating Scale (Tourangeau et al., 2011) and the Patient Health Questionnaire (Leung et al., 2016). Spruit-van Eijk (2012) found that those discharged home were less likely to have depression (23% with depression as measured by the Geriatric Depression Scale, GDS) in comparison to those discharged to long-term care (40% with depression as measured by the GDS).

Discharge Destination

Ten (55.6%) of the 18 literature documents included discharge destination (Berall et al., 2013; Chong et al., 2012; Kubilius et al., 2016; Leung et al., 2014; Leung et al., 2016; O'Neill et al., 1987; Parker et al., 2015; Salgado et al.,1995; Spruit-van Eijk et al., 2012; Tourangeau et al., 2011). The reported range across literature documents of mean percentage of older adult participants who were discharged back into the community after SSR were 44 per cent to 70 per cent. The literature documents with the highest discharge rates to home described SSR programs based in in-patient units with an average LOS of 85–88 days (Berall et al., 2013; Spruit-van Eijk et al., 2012). Older adult participants had an average age range of 79–82 years and also had cognitive impairment. The lowest discharge rates to home were from nursing home–based SSR programs, with an average LOS of 81 days. Older adults had an average age of 78 years, and 81 per cent were considered to have neurological deficits and an average dependency rate of 2.1 out of 4, meaning that they required light assistance with ADL (O'Neill et al., 1987).

Discussion

The aim of this scoping review was to develop a greater understanding of the available literature on SSR programs, within single-payer or single payer–like health care systems. Through report documents, empirical literature, and research abstracts, this scoping review illustrates the similarities between SSR programs, highlights the differences and areas for improvement, discusses the benefits for older adults participating in SSR, identifies the role of SSR programs in Canadian health care, and proposes a need for continued research.

Slow Stream Rehabilitation Programs

Similarities across Current SSR Programs

We can surmise from the included literature documents that SSR programs are typically not disease- or health condition-specific, but instead target community-living older adult patients who may be struggling with independent living, have HAD, complex health problems, or cannot be discharged home even after participating in a condition-specific rehabilitation program. SSR programs are offered as in-patient rehabilitation programs or are integrated into hospitals (ALC, CCC, hospital

https://doi.org/10.1017/S0714980818000740 Published online by Cambridge University Press

Table 6b: Summary of report documents included in the scoping review

Report Author	Stated Aim of Report	Findings and Recommendations
GTA REHAB Network, 2008	To provide a framework for different rehabilitation programs available in Toronto hospitals with the aim of increasing clarity and consistency of rehabilitation definitions across a continuum of care	**Recommendation for SSR:** To be utilized for a geriatric population in need of an interdisciplinary rehab team/service who may also have a chronic/complex condition requiring 24-hour hospital care over an extended period of time and who are expected to benefit from low-intensity, long-duration rehab. Aimed to increase functional ability and reactivation of older adult patients who have the capacity to return home.
Ontario Hospital Association, 2006	To summarize the changes that have taken place in both rehabilitation and complex continuing care over the past decade and recommend better integration and health policy planning	**Findings:** There is an increase in acceptance of the importance of rehabilitation in contributing to functional improvement. Yet there is a lack of information with respect to definitions of CCC and rehabilitation, and issues with transitioning between care that are arising from the introduction of new types of programs without proper education for staff. There are also variations in the use of CCC and rehabilitation beds across the province. The lack of policy direction in the CCC and rehabilitation sectors have contributed to the lack of recognition of the role these sectors play in enhancing access to appropriate care and improving outcomes for specific population groups. **Recommendation**: Increase in education, development of standard definition across continuum of care and enhancement of slow stream rehabilitation (SSR), and reactivation services in rehabilitation and complex continuing care is needed for patients with complex health needs in order to ensure better outcomes for these patients.
ALC Expert Panel, 2006	To examine continuum of care and the use of ALC beds and make recommendations	**Findings Regarding SSR:** This report states that SSR is on a secondary level in hospital and residential services. SSR is defined as a service to meet specialized needs of post-acute patients when continued specialized rehabilitation is needed. **Recommendations:** Define and expand the role and capacity of health systems in the community to provide care or rehabilitation services. Increase the balance and availability of supportive services for older adults returning home. Develop awareness and education of rehabilitation programs and future care needs of patient to caregiver and health care teams.
Ontario Stroke Network, 2013	To compare discharge and LOS for patients in an SSR program compared to those in an active stroke rehabilitation program post severe stroke	**Findings:** Individuals with severe stroke who were admitted to an active stroke rehabilitation program had a shorter length of stay (by almost 50 days) and similar (or slightly better) functional outcomes as compared to a similar population who were admitted to a slow stream stroke rehabilitation program. **Recommendations**: Patients currently admitted to CCC or SSR would be better served by admission to an active stroke in-patient rehabilitation.
South West LHIN, 2009	To summarize CCC and rehabilitation resources in the South West LHIN, describe how they are used, and make recommendation	**Recommendation:** Clear definition of CCC and rehabilitation, including admission and discharge criteria, that reflects patient need and available human resources.

Note. **ALC = alternate level of care; CCC = complex continuing care; LHIN = Local Health Integrated Network; LOS = length of stay; SSR = slow stream rehabilitation.**

in-patient rehabilitation) and nursing homes, with the goal of discharging the older adult back into the community and avoiding institutionalized care. SSR programs are multidisciplinary, encompassing a physiotherapist (PT), occupational therapist (OT), and physician or nursing staff, and in some cases include other health professionals for some SSR models – for instance, PT or OT assistants, dieticians, speech language pathologists (SLP), and recreational therapists. The most common rehabilitation set-up for SSR programs is five times a week for 30 minutes a day with a two- to three-month length of stay (Berall et al., 2013; GTA Rehab Network, 2008; Leung et al., 2014; Leung et al., 2016; Teasell et al., 2005; Tourangeau et al., 2011). SSR programs that focused on functional exercises and had dieticians, SLP, and recreational therapists in addition to PT, OT, and a physician or nurse on the team tended to show the greatest benefits.

https://doi.org/10.1017/S0714980818000740 Published online by Cambridge University Press

Differences and Shortcomings of Current SSR Programs

The major differences we found in the SSR programs that were included in this scoping review relate to (a) the frequency and duration of the individual sessions, (b) the total length of the program, and (c) the various SSR program locations: for example, in-patient acute ward, CCC units, and nursing homes. The available resources and demands of particular SSR programs included may play a role in how the program is structured in terms of length of stay, extent of daily rehabilitation received, and the composition of the rehabilitation team. SSR programs that took place in nursing home or stroke units tended to have the longest LOS, as the patients presented with greater disability according to baseline scores and could not as readily be discharged home (Salgado et al.,1995; Spruit-van Eijk et al., 2012; Tourangeau et al., 2011). In comparison, programs that took place in subacute care units had the shortest LOS (Chong et al., 2012). The duration of SSR should be dependent upon the older adults' progression and meeting of goals. Thus, location for SSR programs should be one that can offer longer durations and fewer pressures for health care providers to discharge the patient as quickly as possible.

The major limitation of the included documents was the lack of specific information regarding the SSR program as to whether it comprised (for example) specific exercises (type or intensity); specific interventions such as PT, OT, SLP, nursing or recreation therapy interventions; the referral process; goals specific to the older adult patient and knowledge regarding SSR programs offered for older adults; the discharge process; and so on. None of the 18 included literature documents included specific information regarding the details of a rehabilitation program, which poses barriers for (a) implementing it in community programs or hospitals that wish to introduce SSR programs into their organizations; (b) ensuring fidelity of the interventions; and (c) comparing the benefits of SSR programs to other programs, such as home rehabilitation or traditional rehabilitation. The lack of information regarding the referral process may lead to suboptimal patient flow and health care provider confusion. The ALC Expert Panel (2006), Ontario Stroke Network (2013), and South West LHIN (2009) documents all indicated that hospitals need to increase education about available rehabilitation programs and their use, develop a standard definition for the various components within the continuum of care, and identify where different rehabilitation programs fit within the continuum of health care.

In the absence of these strategies, issues related to improper program implementation and lack of appropriate pathways for the older adult patient could lead to older adults with complex health needs being more likely to be discharged into institutionalized care (ALC Expert Panel, 2006; Ontario Stroke Network, 2013; South West LHIN, 2009), rather than benefitting from a longer-duration, low-intensity program. Last, none of the 18 articles or documents reported the older adult patients' personal goals. This could be an issue because older adults may meet the program goals or goals set by the health care professional but may be discharged home without having their own goals met. For example, if an older adult's specific goal is to return to attending a weekly community-based social gathering, she may experience isolation, depression, and decreased quality of life if she did not achieve her personal goal even though her scores on functional measures improved prior to discharge home. Furthermore, research has shown that when patients are involved with setting their own goals and set goals they perceive as important, they are more likely to be more independent (Reuben & Tinetti, 2012; Schulman-Green, Naik, Bradley, McCorkle, & Bogardus, 2006).

SSR Programs and Older Adults

Similarities of Older Adults Participating in SSR Programs

According to our findings, SSR programs most often serve older adults who are in their 70s and 80s, have the lower baseline physical function scores compared to age-normative values (Heinemann, Linacre, Wright, Hamilton, & Granger, 1993; Long et al., 1994), have multiple co-morbidities, some level of cognitive impairment, and have HAD (Berall et al., 2013; Chong et al., 2012; Katz et al., 2013; Leung et al., 2014; Leung et al., 2016; O'Neill et al., 1987; Parker et al., 2015; Salgado et al.,1995). Essentially, SSR programs have demonstrated benefits for older adults who would typically be considered as having low rehabilitative potential by health care professionals (Burton, Horne, Woodward-Nutt, Bowen, & Tyrrell, 2015; GTA Rehab Network, 2008; Kortebein, 2009; Patrick et al., 2001).

We found that 44 per cent to 70 per cent of older adult patients attending SSR programs returned back to independent living in the community. Approximately 75 per cent of older adults' experience HAD, with HAD being more common in older adults with multi-morbidity, cognitive decline, and low physical function (Covinsky et al., 2003). Rehabilitation programs that target older adults with HAD have been shown to improve long-term survival and function, with most programs being offered in a sub-acute in-patient rehabilitation (low intensity, long duration) setting where the goal is to maximize functional recovery (Kortebein, 2009).

In SSR programs that reported on a specialized rehabilitation population (stroke and post-femoral surgery), the subpopulation that benefited the most from SSR involved older adults with multiple co-morbidities and low physical function (Tourangeau et al., 2011; Zhang et al., 2015). The findings of this scoping review align with the findings of systematic reviews of rehabilitation

https://doi.org/10.1017/S0714980818000740 Published online by Cambridge University Press

post-femoral surgery (Beaupre et al., 2013; McGilton et al., 2012), wherein older adults with complex health problems, low discharge probability, and cognitive impairment were found to benefit from longer duration, low intensity rehabilitation. Similar trends were found in the stroke literature. Tourangeau et al. (2011) found that older adults with severe stroke admitted to CCC were more likely to have mild cognitive impairment, depression, require assistance with ADL, and were considered to have low rehabilitative potential; however, they were also more likely to make significant physical gains during SSR. What remains unknown is the longer-term benefits of SSR in terms of physical improvements and the ability to remain at home.

Differences in Benefits of Older Adults Participating in SSR Programs

Our scoping review found that not all older adults benefit from SSR over traditional rehabilitation (GTA Rehab Network, 2008; Ontario Stroke Network, 2013; Zhang et al., 2015). Older adults who are considered healthier, have a low number of co-morbidities, little cognitive decline, are fairly independent in ADL, and require only specialized rehabilitation may benefit more from more traditional rehabilitation programs. A quasi-randomized trial comparing SSR to intensive specialized rehabilitation for older adults post-hemiarthroplasty found that the short, intensive rehabilitation program was more beneficial than SSR when the older adult participant had fewer co-morbidities, lower mortality scores, and were younger (Zhang et al., 2015). Consequently, not all older adults may benefit equally from SSR and there may be a sub-group of older adults who can withstand and can benefit more from traditional rehabilitation programs.

Similar conclusions can be made regarding SSR for older adults' post-stroke. Older adults who attended a specialized stroke rehabilitation program were more likely to be readmitted to rehabilitation if they were older, female, unable to complete ADL, and had other complex health issues (Canadian Institute for Health Information, 2009). One of the reports included in this scoping review, an evaluation and recommendations report by the Ontario Stroke Network, indicated that patients with severe stroke who were originally thought to benefit more from rehabilitation in an SSR program actually had better outcomes in more intensive rehabilitation programs, but arguably this meant only those individuals who have the ability to readily be discharged home (Ontario Stroke Network, 2013).

Integrating SSR Programs into Canada's Current Health Care System

As previously mentioned, all SSR programs included were offered within in-patient settings, yet that may not be Canada's best option. Housing SSR programs within hospitals places a burden on the health care system and decreases hospital resources. Housing these programs in nursing homes and assisted living facilities may result in increased wait times for patients unable to live independently, or who are waiting for assisted living or long-term care. A more economical model may be to house SSR programs in the community. Bean, Vora, and Frontera, (2004) and Tuntland, Aaslund, Espehaug, Førland, and Kjeken (2015) found that community programs were effective in decreasing mortality, enhancing physiological capacity, increasing overall function, increasing overall health-related quality of life, and preserving the older adult's ability to live independently. Two reviews conducted a cost-effective analysis of community programs across Australia and the United States and found that programs housed in the community are 20 per cent more cost-effective than in-patient rehabilitation programs (Brown et al., 2015; Kjerstad & Tuntland, 2016).

With the growing number of older adults with multiple co-morbidities and complex health problems living in the community (Canadian Medical Association, 2016), the demand for effective rehabilitation models, including SSR models, will only increase. In order to address the burden this will place on hospitals and nursing homes, Canada's health care system should develop more initiatives focused on community-based rehabilitation that includes physical activity, chronic disease management, and support for older adults to remain in the community post-hospital discharge. Implementation of these programs has great potential to support healthy aging and "aging-in-place" post-hospitalization, as well as the potential to decrease the need for the number of long-term care beds and assisted-living wait times, in addition to the use of ALC and hospital re-admissions.

Future Direction

From this scoping review, we have begun to understand which older adults benefit from SSR programs, where SSR programs are currently housed and, in broad terms, what they encompass. However, there still remain many unanswered questions. More studies and focused program evaluations need to be conducted in order to further understand, better define, and optimize SSR program design. Future studies should assess specifics of program design – for example, the optimal amount of rehabilitation time, optimal length of stay for rehabilitation-related gains, details regarding individual rehabilitation sessions, and specific interventions in order to produce best-practice guidelines for SSR programs. Very few studies to date have compared SSR to other rehabilitation models. In our current search, only one of the three randomized control trials assessed the

https://doi.org/10.1017/S0714980818000740 Published online by Cambridge University Press

benefits of adding additional non-supervised exercises to their current SSR programs (Parker et al., 2015). Parker et al. (2015) did find some improvement in physical function, but the improvements were not statistically significant; this finding may be a result of not having a method to measure adherence in the intervention group. More RCTs need to be conducted in order to assess whether SSR programs have an equivalent or greater effect on increasing functional independence for older adults with complex needs following prolonged hospital compared to more intensive rehabilitation, standard hospital rehabilitation, or home care.

Furthermore, no research has assessed patient-specific goals for SSR programs and how those program goals may compare to the types of patient specific goals being set in traditional rehabilitation programs. There is also no research related to the long-term benefits of SSR programs. Most studies and grey literature documents examined whether older adults were discharged home, or to long-term care or assisted-living facilities post-rehabilitation; however, there was no longer-term follow-up with these older adults. Future research should assess the benefits of SSR programs via long-term follow up – for instance, three months, six months, and one-year post discharge.

Finally, in order to effectively implement SSR programs into the community and to support healthy aging and "aging in place" post-hospitalization, evidence is needed to guide future SSR program model development and implementation. As well, evidence related to which older-adult profiles would most benefit from SSR programs is also required to guide the referral process. Researchers, health professionals, and government need to come together to develop a common understanding of – and language related to – SSR and expectations of SSR models of care.

Limitations

A common limitation of scoping reviews, including ours, is that although efforts were made to conduct a thorough scan of both empirical and grey literature, it is possible that not all relevant literature documents were identified in our search process. In order to define and assess SSR programs, we narrowed the search terms to literature documents that explicitly defined their rehabilitation as slow stream or long duration and low intensity. Older adult day programs, and day hospital programs that could have potentially been identified or classified as low intensity, long duration rehabilitation, but that did not define themselves as slow stream, were excluded. Thus, there is a possibility that this scoping review did not capture community-based programs or day hospitals that are using a similar model to programs but do not define themselves as SSR.

Furthermore, since we wanted to capture SSR programs in health care systems that were similar to those of Canada so that findings could be more readily integrated into our health care system, many countries with differing health care systems were excluded, such as the United States. Because the purpose of this scoping review was to obtain a broad understanding of the availability and research on SSR programs, we did not consider the quality of the literature and studies and did not assess it as part of the methodology.

Conclusion

Older adult patients, who are medically complex, cognitively impaired, and are considered to be of low rehabilitation potential, can make significant gains in both physical and ADL-related outcome measures through participating in a lower-intensity, longer-duration rehabilitation program. With further research, standardization of programs, standardization of referral processes, and integration of SSR programs into the community, SSR has the potential to be an integral part of Canada's health care system. Although yet to be determined, community-based SSR may be economically beneficial and would provide opportunities to allow older adults with HAD and complex health and other needs to adjust to community living. Participating in lower intensity and longer duration rehabilitation (slow stream) upon returning to the community may also result in decreased hospital re-admission rates and decrease institutionalization.

References

ALC Expert Panel. (2006). Appropriate level of care: A patient flow, system integration and capacity solution (Report by the expert panel on alternate level of care). Retrieved from https://www.advantageontario.ca/oanhssdocs/Issue_Positions/External_Resources/ALC_Report_December_2006.pdf

Bauer, M., Fitzgerald, L., Haesler, E., & Manfrin, M. (2009). Hospital discharge planning for frail older people and their family. Are we delivering best practice? A review of the evidence. *Journal of Clinical Nursing*, *18*(18), 2539–2546. https://doi.org/10.1111/j.1365-2702.2008.02685.x

Bean, J. F., Vora, A., & Frontera, W. R. (2004). Benefits of exercise for community-dwelling older adults. *Archives of Physical Medicine and Rehabilitation*, *85*(Supp 3), S31–S41. https://doi.org/10.1016/j.apmr.2004.03.010

Beaupre, L. A., Binder, E. F., Cameron, I. D., Jones, C. A., Orwig, D., Sherrington, C., & Magaziner, J. (2013). Maximising functional recovery following hip fracture in frail seniors. *Best Practice & Research Clinical Rheumatology*, *27*(6), 771–788. https://doi.org/10.1016/j.berh.2014.01.001

Berall, G., Naglie, P., Katz, A., Chang, G., & Leung, J. (2013, November). Functional gains and discharge destination of patients admitted to a geriatric slow stream rehabilitation unit. *The Gerontological Society of America 66th Annual Scientific Meeting*, *53*(1), 314–314.

Brown, L., Forster, A., Young, J., Crocker, T., Benham, A., & Langhorne, P. (2015). Medical day hospital care for older people versus alternative forms of care. *Cochrane Database of Systematic Reviews*, (6), Article CD001730. https://doi.org/10.1002/14651858.CD001730.pub3

Burton, C. R., Horne, M., Woodward-Nutt, K., Bowen, A., & Tyrrell, P. (2015). What is rehabilitation potential? Development of a theoretical model through the accounts of healthcare professionals working in stroke rehabilitation services. *Disability and Rehabilitation*, *37*(21), 1955–1960. https://doi.org/10.3109/09638288.2014.991454

Canadian Institute for Health Information. (2009). Factors predicting discharge home from inpatient rehabilitation after stroke. *Stroke*, 1–18. Retrieved from https://secure.cihi.ca/free_products/aib_nrs_stroke_e.pdf)

Canadian Institute for Health Information Board of Directors. (2011). Health Care in Canada, 2011 – A Focus on Seniors and Aging. Ottawa, ON: Author. Retrieved from https://secure.cihi.ca/free_products/HCIC_2011_seniors_report_en.pdf

Canadian Medical Association. (2013). Health and health care for an aging population. *Policy Summary of The Canadian Medical Association*, *316*(May), 1–10. https://cma.ca/sites/default/files/2018-11/CMA_Policy_Health_and_Health_Care_for_an_Aging-Population_PD14-03-e_0.pdf

Canadian Medical Association. (2016). The State of Seniors Health Care in Canada. Retrieved from http://sagelink.ca/the_state_of_seniors_healthcare_in_canada

Chong, M. S., Empensando, E. F., Ding, Y. Y., & Tan, T. L. (2012). A subacute model of geriatric care for frail older persons: The Tan Tock Seng Hospital experience. *Annals of the Academy of Medicine, Singapore*, *41*(8), 354–361.

Covinsky, K. E., Palmer, R. M., Fortinsky, R. H., Counsell, S. R., Stewart, A. L., Kresevic, D., Landefeld, C. S. (2003). Loss of independence in activities of daily living in older adults hospitalized with medical illnesses: Increased vulnerability with age. *Journal of the American Geriatrics Society*, *51*(4), 451–458. https://doi.org/10.1046/j.1532-5415.2003.51152.x

Englund, R. (1987). Slow stream rehabilitation: Is it effective? *The Medical Journal of Australia*, *147*(8), 418. Retrieved from http://europepmc.org/abstract/MED/3657685

GTA Rehab Network. (2008). *Geriatric rehab definitions framework*. Retrieved from http://www.gtarehabnetwork.ca/uploads/File/tools/self-assessment-tool-geriatric-community.pdf

Heinemann, A. W., Linacre, J. M., Wright, B., Hamilton, B. B., & Granger, M. (1993). Relationships between impairment and physical disability as measured by the functional independence measure. *Archives of Physical Medicine and Rehabilitation*, *74*(6), 566–573. https://doi.org/10.1016/0003-9993(93)90153-2

Hidalgo Landa, A, Szabo, I., Le Brun, L., Owen, I., & Fletcher, G. (2011). Evidence based scoping reviews. *The Electronic Journal Information Systems Evaluation*, *14*(1), 46–52. Retrieved from http://www.martinhill.me.uk/pubs/EvidenceBasedApproachToLitReview.pdf

Hirvensalo, M., Rantanen, T., & Heikkinen, E. (2000). Mobility difficulties and physical activity as predictors of mortality and loss of independence in the community-living older population. *Journal of the American Geriatrics Society*, *48*(5), 493–498. https://doi.org/10.1111/j.1532-5415.2000.tb04994.x

Katz, P. R., Naglie, G., Berall, A., Karuza, J., Chan, A., & Leung, G. (2013). Characteristics and preliminary outcomes of patients admitted to a slow stream rehabilitation unit. c162. *Journal of the American Geriatrics Society*, *61*(1), 182.

Kim, S. J., Lee, J. H., Han, B., Lam, J., Bukowy, E., Rao, A., … Yoo, J. W. (2015). Effects of hospital-based physical therapy on hospital discharge outcomes among hospitalized older adults with community-acquired pneumonia and declining physical function. *Aging and Disease*, *6*(3), 174–179. https://doi.org/10.14336/AD.2014.0801

Kjerstad, E., & Tuntland, H. K. (2016). Reablement in community-dwelling older adults: A cost-effectiveness analysis alongside a randomized controlled trial. *Health Economics Review*, *6*(1), 15. https://doi.org/10.1186/s13561-016-0092-8

Koné Pefoyo, A. J., Bronskill, S. E., Gruneir, A., Calzavara, A., Thavorn, K., Petrosyan, Y., … Wodchis, W. P. (2015). The increasing burden and complexity of multimorbidity. *BMC Public Health*, *15*(1), 415. https://doi.org/10.1186/s12889-015-1733-2

Kortebein, P. (2009). Rehabilitation for hospital-associated deconditioning. *American Journal of Physical Medicine & Rehabilitation*, *88*(1), 66–77. https://doi.org/10.1097/PHM.0b013e3181838f70

Kubilius, B., Rose, S., Pettit, S., & St. Amant, B. (2016). Complex care to home: Rehabilitation for the complex stroke patient: rhb.143. *International Journal of Stroke*, *10*(1), 86. http://dx.doi.org.libaccess.lib.mcmaster.ca/10.1111/ijs.12

Leung, G., Katz, G., Karuza, J., Chan, A., Berall, A., Fallah, S., & Naglie, G. (2014). Predictors of outcomes in low intensity, long duration rehabilitation: c168. *Journal of the American Geriatrics Society*, *62*(1) S226. Retrieved from http://ovidsp.ovid.com/ovidweb.cgi?T=JS&PAGE=reference&D=emed12&NEWS=N&AN=71470773

Leung, G., Katz, P., Karuza, J., Arling, G., Chan, A., Berall, A., … Naglie, G. (2016). Slow stream rehabilitation: A new model of post-acute care. *Journal of the American Medical Directors Association*, *17*(3), 238–243. https://doi.org/10.1016/j.jamda.2015.10.016

Levac, D., Colquhoun, H., & O'Brien, K. K. (2010). Scoping studies: Advancing the methodology. *Implementation Science*, *5*(1), 69. https://doi.org/10.1186/1748-5908-5-69

Long, W., Sacco, W., Coombes, S., Copes, W., Bullock, A., & Melville, J. (1994). Determining normative standards for functional independence measure transitions in rehabilitation. *Archives of Physical Medicine and Rehabilitation*, *75*(2), 144–148. Retrieved from https://www.archivespmr.org/article/0003-9993(94)90386-7/pdf

McGilton, K. S., Davis, A., Mahomed, N., Flannery, J., Jaglal, S., Cott, C., … Rochon, E. (2012). An inpatient rehabilitation model of care targeting patients with cognitive impairment. *BMC Geriatrics*, *12*, 21. https://doi.org/10.1186/1471-2318-12-21

McHugh, M. L. (2012). Interrater reliability: The kappa statistic. *Biochemia Medica*, *22*(3), 276–282. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/23092060

Mlinac, M. E., & Feng, M. C. (2016). Assessment of activities of daily living, self-care, and independence. *Archives of Clinical Neuropsychology*, *31*(6), 506–516. https://doi.org/10.1093/arclin/acw049

Nord, P. (2009). Alternate level of care. *Canadian Family Physician*, *55*(8), 786 LP–786. Retrieved from http://www.cfp.ca/content/55/8/786.1.abstract

O'Neill, T. J., McCarthy, K., & Newton, B. M. (1987). Slow-stream rehabilitation: Is it effective? *The Medical Journal of Australia*, *147*(4), 172–175.

Ontario Hospital Association. (2006). *Optimizing the role of complex continuing care and rehabilitation in the transformation of the health care delivery system*. Toronto, ON: Author.

Ontario Stroke Network. (2013). Backgrounder. Equitable access for appropriate patients from acute facilities to rehabilitation: Access to specialized inpatient stroke rehabilitation for severe stroke. https://www.strokenetworkseo.ca/sites/strokenetworkseo.ca/files/osn_backgrounder_rehab_of_severe_stroke_nov_2013_seo_final.pdf

Ottenbacher, K. J., Smith, P. M., Illig, S. B., Linn, R. T., Ostir, G. V., & Granger, C. V. (2004). Trends in length of stay, living setting, functional outcome, and mortality following medical rehabilitation. *JAMA*, *292*(14), 1687. https://doi.org/10.1001/jama.292.14.1687

Parker, C., Hill, K., Cobden, J., Davidson, M., & McBurney, H. (2015). Randomized controlled trial of the effect of additional functional exercise during slow-stream rehabilitation in a regional center. *Archives of Physical Medicine and Rehabilitation*, *96*(5), 831–836. https://doi.org/10.1016/j.apmr.2014.12.012

Pathipvanich, P., Tsuchiya, N., Rojanawiwat, A., Schmidt, W.-P., Auwanit, W., Sawanpanyalert, P., & Ariyoshi, K. (2013). Changing burden of HIV/AIDS to clinical settings in Northern Thailand over 15 years. *Japanese Journal of Infectious Diseases*, *66*(5), 375–378.

Patrick, L., Psych, C., Knoefel, F., Coe, C., Gaskowski, P., & Rexroth, D. (2001). Medical comorbidity and rehabilitation efficiency in geriatric inpatients. *American Geriatrics Society*, *49*, 1471–1477.

Piccenna, L., Knox, L., & Jacinta, D. (2016). *Slow stream rehabilitation: An overview* (Briefing paper). Melbourne, AUS: School of Allied Health, La Trobe University. https://summerfoundation.org.au/wp-content/uploads/ssr-briefing-paper-7-june-2016-final.pdf

Raymond, M., Winter, A., & Holland, A. E. (2015). Validation of an activity monitor in older inpatients undergoing slow stream rehabilitation. *Journal of Physical Activity & Health*, *12*(9), 1298–1303. https://doi.org/10.1123/jpah.2014-0347

Reuben, D. B., & Tinetti, M. E. (2012). Goal-oriented patient care – An alternative health outcomes paradigm. *New England Journal of Medicine*, *366*(9), 777–779. https://doi.org/10.1056/NEJMp1113631

Salgado, R., Ehrlich, F., Banks, C., Browne, E., Buckman, S., & Burraston, B. (1995). A mobile rehabilitation team program to assist patients in nursing homes rehabilitate and return to their homes. *Archives of Gerontology and Geriatrics*, *20*(3), 255–261. https://www.sciencedirect.com/science/article/abs/pii/016749439500621Q

Schulman-Green, D. J., Naik, A. D., Bradley, E. H., McCorkle, R., & Bogardus, S. T. (2006). Goal setting as a shared decision making strategy among clinicians and their older patients. *Patient Education and Counseling*, *63*(1), 145–151. https://doi.org/10.1016/j.pec.2005.09.010

South West LHIN. (2009). *South West LHIN Complex Continuing Care (CCC) and Rehabilitation Strategic Resources* (Final report). Toronto, ON: Author.

Spruit-van Eijk, M., Zuidema, S. U., Buijck, B. I., Koopmans, R. T. C. M., & Geurts, A. C. H. (2012). Determinants of rehabilitation outcome in geriatric patients admitted to skilled nursing facilities after stroke: A Dutch multicentre cohort study. *Age and Ageing*, *41*(6), 746–752. https://doi.org/10.1093/ageing/afs105

Stott, D. J., & Quinn, T. J. (2013). Principles of rehabilitation of older people. *Medicine (United Kingdom)*, *41*(1), 1–4. https://doi.org/10.1016/j.mpmed.2012.10.014

Sutherland, J. M., & Trafford Crump, R. (2013). Alternative level of care: Canada's hospital beds, the evidence and options. *Healthcare Policy*, *9*(1), 26–34. https://doi.org/10.12927/hcpol.2013.23480

Teasell, R. W., Foley, N. C., Bhogal, S. K., Chakravertty, R., & Bluvol, A. (2005). A rehabilitation program for patients recovering from severe stroke. *The Canadian Journal of Neurological Sciences. Le Journal Canadien des Sciences Neurologiques*, *32*(4), 512–517.

Tourangeau, A. E., Squires, M. E., Wodchis, W., McGilton, K., Teare, G., & Widger, K. A. (2011). Post-acute stroke patient outcomes in Ontario, Canada complex

continuing care settings. *Disability and Rehabilitation*, *33*(2), 98–104. https://doi.org/10.3109/09638288.2010.486466

Tuntland, H., Aaslund, M. K., Espehaug, B., Førland, O., & Kjeken, I. (2015). Reablement in community-dwelling older adults: A randomised controlled trial. *BMC Geriatrics*, *15*, 145. https://doi.org/10.1186/s12877-015-0142-9

Walker, J., Morris, K., & Frood, J. (2009). Alternative level of care in Canada: A summary. *Healthcare Quarterly*, *12*(2), 21–23.

Wilson, R., & Ballentyne, S. (2017). Introducing occupational therapy to Ward 36 – A new role for patients in NHS palliative care and slow stream rehab. *British Journal of Occupational Therapy*, *80*(1),77-78. Retrieved from https://scholar.google.ca/scholar?hl=en&as_sdt=0%2C5&as_ylo=2017&q=Introducing+occupational+therapy+to+Ward+36-a+new+role+for+patients+in+NHS+palliative+care+and+slow+stream+rehab&btnG=

World Health Organization. (2002). Health statistics and information systems: Definition of an older or elderly person. Proposed Working Definition of an Older Person in Africa for the MDS Project. Geneva, CHE: Author. https://www.who.int/healthinfo/survey/ageingdefnolder/en/

World Health Organization. (2018). *Health financing for universal coverage*. Geneva, CHE: Author. https://www.who.int/health_financing/en/

Zhang, J., Ang, M. L., & Kwek, E. B. K. (2015). Who will walk again? Effects of rehabilitation on the ambulatory status in elderly patients undergoing hemiarthroplasty for femoral neck fracture. *Geriatric Orthopaedic Surgery & Rehabilitation*, *6*(3), 168–172. https://doi.org/10.1177/2151458515583111