

Guidelines for Community Based Exercise Programs for People with Stroke



*Developed by the Guidelines for Community Based
Exercise Programs for People with Stroke Working Group &
Endorsed by the Ontario Stroke Network
October 2010*

TABLE OF CONTENTS

Background	3
About Guidelines	4
Guideline #1 – Medical Clearance	5
Guideline #2 – Screening by Exercise Program Provider	7
Guideline #3 – Class Structure/Class Supervision	11
Guideline #4 – Exercise Program Principles	13
Guideline #5 – Program Evaluation	20
Guideline #6 – Exercise Provider	21
Guideline #7 – Facility	23
Guideline #8 – Emergency Plan & Equipment	24
Appendix A – Glossary	25
Appendix B – Regional & District Stroke Centres	26
Appendix C – Contributing Authors	32
Appendix D – References	33

Guidelines for Community Based Exercise Programs for People with Stroke

Developed by the Guidelines for Community Based Exercise Programs for People with Stroke Working Group (Appendix C) & Endorsed by the Ontario Stroke System (October 2010).

This document is intended to help exercise providers deliver safe and effective exercise programs to stroke survivors in a variety of community settings. Recent pilot projects suggest that collaboration between exercise program providers and registered rehabilitation professionals can enhance the safety and design of the exercise program and build fitness instructor skills and competencies (Howe et al 2010, French et al 2008). These guidelines are congruent with current best practice recommendations and research findings at the time of printing and will be reviewed every three years to reflect evolving practice changes. The document is housed in electronic form on the Ontario Stroke Network web site and should be accessed in this format to ensure that the user is in receipt of the most current version.

It is recognized that evidence and experience continue to inform best practice care. The information in this resource is meant to support knowledge translation of best practices for stroke care. Therefore, to ensure this resource remains current, the Ontario Stroke Network will include the review of this document in its established professional development resource review process every three years.

BACKGROUND

Stroke is the third leading cause of death and long term disability in Canada – each year more than 50,000 Canadians experience a stroke and over 14,000 Canadians die as a result. What is particularly relevant to the context of this document is that there are about 300,000 Canadians living with the effects of stroke. Of those, 25% recover with a minor impairment and 40% are left with a moderate to severe disability (Heart and Stroke Foundation of Ontario 2010). These survivors often struggle to access conventional community fitness programs because of their ongoing physical or cognitive deficits. Yet there is strong evidence that they could benefit from regular exercise programming (Dean et al 2000, Eng et al 2003, 2006, Marigold et al 2005, Pang et al 2005, Stuart et al 2009).

Even moderate levels of physical activity such as walking can reduce the likelihood as well as the severity of recurrent stroke among stroke survivors (EBRSR 2010). There is also mounting evidence that increased physical activity among stroke survivors is associated with improved cardiovascular health, decreased risk of cardiac events, improved physical fitness, balance and mobility, improved bone density as well as reduced depression and social isolation (Stuart et al 2009).

Furthermore, The Canadian Stroke System's (CSS) Canadian Best Practice Recommendations for Stroke Care (Lindsay et al 2008) promote moderate levels of exercise (accumulation of 30-60 minutes) 4 to 7 days each week in addition to performing routine activities of daily living as a part of a healthy lifestyle and risk management approach to prevent stroke. They also state that people with ongoing difficulties in mobility be offered an exercise program and monitored throughout the program in order to support their ongoing recovery.

Despite these recommendations and research, there is limited capacity among community based exercise providers to offer programs that adequately respond to the specific needs of stroke survivors. This particularly impacts those living in the community with **mild to moderate** deficits who may benefit most from such programs. These guidelines may help translate research and best practice recommendations into sustainable community programs.

ABOUT GUIDELINES

For the purposes of this document, a 'guideline' is a statement of advice or instruction pertaining to practice. It originates in an organization with acknowledged professional standing. Practice guidelines are not intended as standards or absolute requirements, and their use cannot guarantee any specific outcome. Practice guidelines are subject to revision as warranted by the evolution of medical knowledge, technology, and practice. They provide basic recommendations that are supported by a synthesis and analysis of the current literature, expert opinion, open forum commentary, and clinical feasibility data (American Society for Anesthesiologists 2009).

These guidelines were developed by a panel of experts in the fields of stroke rehabilitation and community exercise programming. They underwent external review by a panel of academic experts, stroke researchers and community fitness instructors and are supported by Ontario Stroke System. They are intended as a framework to help people living with stroke and their healthcare providers to evaluate and identify appropriate exercise opportunities in their communities. They can also guide community exercise providers such as fitness clubs, municipal recreation departments, community centres or retirement homes, design and deliver safe and effective exercise programs that meet the needs of stroke survivors with **mild** to **moderate** disabilities.

This document contains detailed rationale for each guideline as well as resources, tools and references that will be useful to exercise program providers and health care professionals. A companion document entitled "*Choosing a Community Exercise Program: A Guide for Stroke Survivors*" provides an overview of the guidelines and is intended for stroke survivors and their families.

If followed, these guidelines will have the greatest impact on the person with stroke while recognizing and respecting safe community exercise programming. Although they identify considerations specific to the needs of stroke survivors, they are intentionally flexible enough to accommodate participants with a range of abilities or health conditions. As such, they could be applied to programs that are exclusive to stroke survivors as well as other more mainstream programs that are adjusted to meet the needs of participants living with stroke. Dependent on the capabilities of the participants, a variety of class formats could exist - seated, standing, walking and pool. When applying the following guidelines to an exercise program, it is imperative that each exercise provider considers the type of program that can be safely provided to best meet the needs of the participants.

Guidelines for Community Based Exercise Programs for People with Stroke

GUIDELINE #1: MEDICAL CLEARANCE

People with stroke should consult with a physician or nurse practitioner before participating in any exercise program to undergo medical screening to ensure that there are no conditions that would be contraindicative to the exercise program (Gordon et al, 2004).

Rationale

Exercise is a normal human function that can be undertaken with a high level of safety by most people, including people with stroke (Gordon et al, 2004). However it is wise to recognize that exercise is not without risks and that people with stroke as a general group fall into a higher risk category. Therefore, it is recommended that potential participants be given a standard letter for their physician, which briefly describes the program, including the level of exertion and supervision. This letter should ask for information about medical conditions and precautions or contraindications that would impact on the participant's entry into the program. This letter needs to be returned to the instructor prior to an intake interview and participation in the program.

Resources and Tools

- It is helpful if standardized screening forms are included in the letter to physician. Some examples of these forms are:
 - Par Med – X <http://www.csep.ca/english/view.asp?x=698>
 - Medical Information Form (FAME Manual October 2006 J.Eng) http://www.rehab.ubc.ca/_shared/assets/FAME11486.pdf
 - Physician Consent Form (French et al 2008) http://www.tbrhsc.net/clinical_partners/regional_stroke_program/video_resources/community_based_exercise.asp
 - Participant Screening Form TIME howe.jo-anne@torontorehab.on.ca (Howe et al 2010)
- A written consent will need to be obtained from the participant if the instructor needs to have further direct communication with the physician.
- Medical information that is particularly important to obtain and review is:
 1. Blood pressure status
 2. Presence of diabetes - type of treatment (e.g. oral medications or insulin)
 3. Presence of chronic obstructive pulmonary disease - type of medication used (e.g. Asthma inhaler, supplemental oxygen)
 4. Cardiac status - use of nitroglycerin
 5. Peripheral vascular disease/poor circulation
 6. Musculo-skeletal disease e.g. osteoporosis, osteoarthritis – pain in specific joints
 7. Specific restrictions and/or precautions (e.g. total hip replacement)
 8. Medications - which medications need to be accessed during the class (e.g. nitroglycerin, glucose, inhaler)
 9. Depression

Ideally, a stress test, to assess tolerance and provide guidelines for physical activity, would be administered if cardiovascular exercise is emphasized in the program (Eng et al 2006). However since it is likely that most participants will come to community programs without a stress test, light to moderate rather than vigorous exercise could be prescribed with greater training frequency, duration or both to compensate for the reduced intensity (see also Guideline 4: Exercise Program Principles - Intensity).

GUIDELINE # 2: SCREENING BY EXERCISE PROGRAM PROVIDER

A formal screening process should be conducted to ensure a match between the program and the participant. The screening process should include individual participant intake interviews, a review of health information from the physician/other referring health care providers and an assessment of functional ability.

Rationale

A formal intake process should be considered and built into the administration time, facility space and staffing allocation for the exercise program. It is recommended that exercise program providers should have a standardized process and documentation for health and functional screening of people with stroke. People with stroke may present with a wide variety of impairments extending from minimal to severe. Program providers should be aware of these impairments and attempt to make appropriate accommodations. Some people with stroke may have needs that are beyond the provider's capacity to accommodate in a particular program. For this reason, clear inclusion/exclusion criteria and linkages with more specialized or appropriate programs and/or health care providers should be in place.

Resources and Tools

In order to determine:

- a) The match between participant and program
- b) The degree of support the participant requires and
- c) The program's ability to accommodate the participant's requirements;

The intake assessment should include questions as outlined in the following table:

TABLE 1 – INTAKE ASSESSMENT QUESTIONS

Domain	Probing Question	Relevance
Mobility	Is the participant able to walk? Is a cane or walker required or a lower extremity brace or orthosis? Is assistance required? How far can they walk? Do they need help to get out of a chair or wheelchair? Will it be necessary for the participant to climb stairs to access the program?	Knowing the participant’s mobility level will help determine if additional assistance or adaptations are required to ensure safe access and participation. The ability to do stairs may be important to probe if the person with stroke will be enrolling in an exercise program where there is no ramp or lift and stairs are required to access the exercise space.
Balance	Has there been a fall or near fall within the last three months? What was the cause? Would the participant consent to a referral to fall prevention resources?	Adaptations may be required to minimize risk of falls within the class. Is this feasible?
Self Care	Can the participant dress, undress and toilet independently?	This will impact the degree of support needed.
Continence	Does the participant have bowel and /or bladder control?	Incontinence is not an absolute contraindication. Protective clothing is required if participating in a pool program.
Cognitive Status	Is the participant able to follow instructions? Are they able to monitor themselves for level of exertion, pain, fatigue and personal safety?	Attention, memory, body awareness and impulsive behavior issues may require accommodations.
Swallowing	Does the participant have any difficulties with swallowing or choking? Are there safety precautions that need to be in place?	Certain foods, textures and liquid consistencies may need to be avoided.
Endurance	Can the participant be active for a 1 to 2 hour period without undue fatigue?	A participant should have the tolerance for the class as well as getting ready for and traveling to/from class.

Domain	Probing Question	Relevance
Pain	Does the participant have pain anywhere (common examples would be shoulder, neck, back, knees) and what worsens their pain?	Adaptations would need to be made to the exercises to prevent worsening their pain.
Movement Restrictions	Does the participant have any movement limitations due to stiffness, abnormally “tight” muscles or weakness? Does the participant have a weaker side? Are they able to use that side? Which side is it?	Adaptations would need to be made to the exercises to accommodate any movement restrictions.
Sensation	Can the participant feel on their more affected side? Do they know where that limb is in space? Does the participant forget about the more affected side? Can they feel equipment in their affected hand?	Sensation deficits can impact on the participant’s ability to safely perform exercise. Adaptations may need to be made.
Supports	Does the participant have a family member, caregiver or volunteer to help them participate in the program, if needed?	Support personnel will need some training or orientation to assist the participant in the program.
Transportation	How will the participant be getting to and from the program?	Lack of access to reliable transportation may impact the participant’s ability to regularly attend classes.
Communication	Is the participant able to express their basic needs or do they require assistance?	Adaptation may be required to enable effective communication as some stroke survivors will have difficulty speaking and understanding.

The development of inclusion/exclusion criteria is recommended to ensure participants are appropriate for the exercise class. The following are some **examples of general criteria** which may be applied when screening participants. The inclusion and exclusion criteria need to be specifically developed according to the type of program offered. Some criteria may be able to be waived at the discretion of the exercise provider if the participant is accompanied by a trained caregiver or volunteer.

Examples of Inclusion Criteria:

- The ability to walk short distances (e.g. 3 meters) with or without an assistive device (e.g. cane, walker, ankle brace) with minimal supervision (important if standing and/or walking activities are included in the exercise program).
- The ability to perform standing exercises while holding on to a support (important if standing and/or walking activities are included in the exercise program)
- The ability to follow instructions or mimic exercises
- The ability to self-monitor and understand the concepts of “perceived exertion” and/or “target heart rate”
- The ability to communicate adverse effects such as pain or fatigue or the need for assistance

Examples of Exclusion Criteria:

- Failed medical clearance
- Impulsivity requiring supervision to ensure the safety of the person with stroke and/or the other participants
- Incontinence (unless appropriate undergarments are worn preventing accidents)
- Open wound, contagious conditions

GUIDELINE #3: CLASS STRUCTURE/ CLASS SUPERVISION

Class structure should reflect the ability of the exercise provider to work with people with impairments due to stroke. Consideration should be given to staffing ratios, volunteer availability, the level of disability and each participant's need for assistance. The Exercise Class/Program should be structured to meet the needs of the targeted population. The participants may be fully able to walk, able to walk with assistance, walk with assistive devices or may be unable to walk. The targeted population should also be reflected in the inclusion/exclusion criteria used in the Intake Process.

Rationale

People with stroke present with a range of physical, cognitive & perceptual impairments and therefore require a higher level of support to enable safe participation. In group-based programs, the ratio of staff to participant should be adjusted in order to accommodate specific participant needs.

Resources and Tools

- In programs that include standing and walking exercises, the suggested staff to participant ratios range from 1:3 to 1:5 (Eng et al 2006, French et al 2008. ; Marigold et al 2005, Pang et al 2005, Howe et al 2010)
- When volunteers are used to supplement staffing complements, their role, responsibilities and training requirements should be clearly determined and addressed
- Where appropriate and with consent of the person with stroke, caregivers could be involved. Caregivers should receive proper training regarding their role and responsibilities.
- The total duration of sessions has varied and has been reported to run between four and sixteen weeks (Pang et al 2005, Salbach et al 2004 & 2005, Dean et al 2000, Eng et al 2003, French et al 2008, Marigold et al 2005). It is acknowledged that regular, ongoing exercise is recommended beyond the group exercise session.
- Canadian Fitness Safety Standards 2008 (Fitness Environment Standard #3) recommends that the “number of participants in an exercise class is based on the square footage that allows each participant unrestricted and safe movement in various types of exercises. Participant numbers may also be defined by building code restrictions and/or fire code regulations” (<http://archive.safety-council.org/info/sport/standards.html>).

Implementation Tips

General considerations for **any exercise class**:

Prior to the start of the session, participants should be advised of the following (MacKay-Lyons et al 2006):

- to take medications according to their usual schedule
- to empty the bowel and bladder prior to the class
- to wear comfortable clothing and supportive footwear (MacKay-Lyons et al 2006)
- to bring medications they might need during class (e.g. inhalers, nitroglycerine tablets), to bring an individual water bottle, and for individuals with diabetes, a source of glucose such as fruit juice)

Benefits achieved through exercise are only maintained if participation in exercise is ongoing (MacKay-Lyons et al 2006). The following strategies should be employed to maximize adherence and participation in regular exercise:

- Exercise intensity should be gradually progressed as opposed to rapid increments
- Regular exercise sessions should be established
- Risk of muscular soreness should be minimized
- enjoyment in the program should be emphasized
- Ongoing positive reinforcement should be provided
- Activity logs and charts to record participation and progress should be used. For some participants maintenance of their status is a worthwhile and more realistic objective as their deficits may preclude ongoing progression.
- Sessions should be scheduled at a convenient time and in an accessible location (See Guideline #7: Facility)
- Assistance with transportation or other identified barriers to participation should be offered if possible

GUIDELINE #4: EXERCISE PROGRAM PRINCIPLES

The exercise program should incorporate established training principles and include specific components to address the needs of people living with stroke.

Rationale

Following standard principles supports a comprehensive and safe exercise program suitable for the participants. Research supports the concept that people with stroke achieve the greatest benefit from an ongoing exercise program that incorporates several exercise components (i.e. aerobic, strengthening, stretching, coordination and balance activities) which complement each other and support the person with stroke to achieve maximal independence and mobility (Gordon et al 2004).

Resources and Tools

The following exercise program principles have been shown to provide an effective framework:

Specificity

Specificity means that practice of an exercise or activity tends to produce improvement in that activity or a closely related activity. Also, the more an exercise is related to the individual's interest, the more likely it is to produce change. For example, if the person wants to be able to get up from a chair more easily, their leg muscles are exercised through sit to stand activities in order to enhance their strength.

Progressive Overload

This principle is important when planning for improvement in any component of functional mobility. As the body adapts to activity, the exercise prescription can be modified by adding increased challenge to result in a progressively greater effect. For example, increasing distance or time walked during class.

F.I.T.T. Principles

Frequency

Fitness has been shown to improve with twice weekly exercise sessions however three to five sessions per week are required for optimal training. Participants who are very deconditioned may benefit from exercise sessions that are brief and carried out multiple times per day (MacKay-Lyons et al 2006).

Intensity

The programs should start out at a conservative intensity and be slowly progressed depending on how the individuals report they are feeling and how they physically appear to be responding to the exercises. Intensities must be determined on an individual basis depending on the individual's initial fitness level and their physical limitations post-stroke.

Simple tools can be used to measure intensity such as the Borg Rating of Perceived Exertion scale (Borg 1998) or the Talk Test (Persinger et al 2004).

Time

The average duration of many classes reported in the literature is sixty minutes (Marigold et al 2005, Salbach et al 2004, Dean et al 2000); however it is recommended that a program for more frail individuals last between 20-30 minutes (Harris et al 2008).

Type

Exercise classes should include aerobic, strengthening, stretching, coordination and balance activities (See Table 1). Selected activities should focus on the use of large muscle groups and should be specific to the desired goals of the participant (Harris et al 2008). The practice of

functional activities (e.g. walking, stepping, sit to stand) should be included for those programs which are targeted at individuals who are fully or partially ambulatory (Pang et al 2005, Salbach et al 2004, Dean et al 2000).

TABLE 2 EXERCISE PROGRAM PRINCIPLES

It is important to recognize that every person with stroke is unique. Adaptations to specific components may be required throughout the program depending upon the individual's health status, presence of co-morbidities, post-stroke impairments, joint soreness or extreme fatigue. Type of activity selected must be based on abilities of participants and safety considerations.

Participants should be closely monitored throughout the exercise session. The instructor should be positioned to ensure they can see the entire group. If participants require one-on-one supervision, the assistant should stand no more than one arm's length away, stand on the participant's weak side and slightly behind.

Be aware of balance difficulties throughout the class & ensure adequate supervision or support to decrease risk for falls. Assistive devices (canes or walkers) may be used by some participants for their safety & efficiency; be sure to encourage their use in the class.

Functional exercise will combine several components into one activity. For example, step ups will address strength, balance and aerobic activity all within the context of a function that is important for participants to be able to master.

Signs & symptoms which require participant to IMMEDIATELY STOP exercising:

- **Chest pain, tightness, heaviness &/or radiation of discomfort towards jaw or arm**
- **Cold or clammy skin**
- **Excessive or unusual shortness of breath**
- **Dizziness or light-headedness**
- **Nausea, vomiting or severe headache**

Signs & symptoms of stroke:

- **Weakness - Sudden weakness, numbness or tingling in the face, arm or leg**
- **Trouble speaking - Sudden temporary loss of speech or trouble understanding**
- **Vision problems - Sudden loss of vision, particularly in one eye, or double vision**
- **Headache - Sudden, severe & unusual headache**
- **Dizziness - Sudden loss of balance, especially with any of the above signs**

IF A PARTICIPANT IS EXPERIENCING THESE SYMPTOMS CALL 911 AND/OR FOLLOW LOCAL EMERGENCY PROCEDURES.

EXERCISE CLASS COMPONENTS

Component	Specific Recommendations	Stroke Specific Considerations
Aerobic	<p>Warm-up and cool-down: 3-5 minutes at a lower intensity (MacKay-Lyons et al 2006)</p> <p><u>Frequency</u></p> <ul style="list-style-type: none"> • 3-7 days per week (Gordon et al 2004) • very deconditioned participants may benefit from multiple, brief daily exercise sessions (MacKay-Lyons et al 2006) <p><u>Intensity</u></p> <ul style="list-style-type: none"> • initiated conservatively and progressed slowly • using the Borg 10 point scale: exercising at a level corresponding to an intensity of 3-4 (moderate to somewhat hard) on a scale of 0 (nothing at all) to 10 (maximal) (Borg 1998, APTA 2006) • using the Talk Test: exercising at a level where you can carry on a conversation without becoming breathless (Persinger et al 2004) • where a graded exercise test is not available light to moderate rather than vigorous exercise should be prescribed with greater frequency or time to compensate for reduced intensity (Gordon et al 2004) <p><u>Time</u></p> <ul style="list-style-type: none"> • 20-60 minutes per session, or multiple 10 minute sessions (Gordon et al 2004) 	<p>Participants will also require instruction on how to self-monitor and should be encouraged to rest and inform the instructor if they are fatigued or experience pain with activity.</p> <p>Signs of fatigue:</p> <ul style="list-style-type: none"> • loss of balance • leaning heavily on cane or walker • shortness of breath • decreased quality of movement, task may not look as smooth or coordinated (for example – on attempting to sit participant flops down into chair) <p>Ensure appropriate supervision if participants require assistance getting on and off aerobic equipment.</p> <p>For individuals with low fitness levels begin with 3 to 5 minute sets with rest periods.</p>

Component	Specific Recommendations	Stroke Specific Considerations
Aerobic cont'd	<p><u>Type</u></p> <ul style="list-style-type: none"> • Depends on availability, practicality and safety • using large muscle groups • Examples: <ul style="list-style-type: none"> ○ walking (overland or treadmill) ○ stationary bicycle ○ arm or arm/leg ergometer ○ recumbent stepping machine <p>(StrokEngine 2010)</p>	Type of activity selected must be based on abilities of participants and safety considerations.
Strengthening	<p><u>Frequency</u></p> <ul style="list-style-type: none"> • 2-3 days per week • 1-3 sets of 10-15 repetitions. <p><u>Intensity</u></p> <ul style="list-style-type: none"> • Begin with light weights (e.g. 1-2 pounds, or using light resistance bands) <p><u>Time</u></p> <ul style="list-style-type: none"> • 15 minutes (Gordon et al 2004) <p><u>Type</u></p> <ul style="list-style-type: none"> • Focus on major muscle groups such as hip and knee flexors and extensors, hip abductors, ankle dorsiflexors and plantarflexors, as well as the upper extremities and core. • Examples: <ul style="list-style-type: none"> ○ circuit training ○ free weights ○ functional strengthening (e.g. sit to stand practice, step-ups) <p>(StrokEngine 2010)</p>	<p>Arm movements should be kept at or below shoulder level if the arm that is most affected by the stroke is weak and has decreased range of motion.</p> <p>The use of overhead pulleys is not advisable (Kumar et al 1990).</p> <p>Strength improvements in the major muscle groups are important for maximizing mobility, balance and posture.</p>

Component	Specific Recommendations	Stroke Specific Considerations
Stretching	<p><u>Frequency</u></p> <ul style="list-style-type: none"> • 2-3 days per week (Gordon) <p><u>Intensity</u></p> <ul style="list-style-type: none"> • Should feel a stretch but not pain <p><u>Time</u></p> <ul style="list-style-type: none"> • hold each stretch for 10-30 seconds (Gordon et al 2004), rest and repeat 3 times <p><u>Type</u></p> <ul style="list-style-type: none"> ▪ Stretching should address major muscle groups such as hip and knee flexors and extensors, hip abductors, ankle dorsiflexors and plantar- flexors, as well as the upper body and trunk. 	<p>Arm movements should be kept at or below shoulder level if the arm that is most affected by the stroke is weak and has decreased range of motion.</p> <p>The use of overhead pulleys is not advisable (Kumar et al1990).</p> <p>Stretching should be slow, gradual and sustained. Rapid, forceful stretching should not be undertaken. Participants with stroke may have permanent contractures or joint limitations. They may also have issues with altered muscle tone (spasticity or flaccidity) which are a result of changes in the brain.</p>
Coordination & Balance	<p><u>Frequency</u></p> <ul style="list-style-type: none"> • 2-3 days per week <p><u>Type</u></p> <ul style="list-style-type: none"> • For those exercising in standing, examples include: catching, kicking, standing on one foot, weight shifting, side stepping, standing with feet close together, standing with eyes closed, obstacle course • For those exercising seated, examples include range of motion exercise for arms and legs, weight shifting in all directions including reaching to floor and the use of props to make exercise fun. (StrokEngine 2010) 	<p>Ensure appropriate supervision is provided. If participants require one-on-one supervision, the assistant should stand no more than one arms length away, stand on the participant's weak side and slightly behind.</p> <p>Chairs, railings, participant's gait aids (walkers) or other environmental aids can be used to ensure safety and minimize risk for falls during balance and coordination activities.</p> <p>Type of activity selected must be based on abilities of participants and safety considerations.</p>

Component	Specific Recommendations	Stroke Specific Considerations
<p>Established community-based programs for people with stroke are available for your reference. Fitness and Mobility Exercise (FAME) program (Eng et al 2006), Together In Movement and Exercise (TIME) (Howe et al 2010), Keep Moving with Stroke (French et al 2008), Canadian Centre for Activity and Aging-Post Rehabilitation Exercise for Stroke (2008).</p>		

GUIDELINE # 5: PROGRAM EVALUATION

Program evaluation processes should be in place in order to monitor program safety and effectiveness, to enhance participant satisfaction, and to help ensure the program's ongoing sustainability. In addition, the program should promote sustained change in physical activity levels. Strategies to address this may be considered (e.g. continuing program at home when not attending classes, self-reported changes in physical activity levels).

Rationale

Evaluation of the exercise program supports the provision of a safe and effective exercise program through the identification of successes and risks.

Tools and Resources

Program evaluation plans may include:

Process indicators such as:

- Number of new participants
- Number of returning participants
- Attendance
- Number of adverse events/near misses (e.g. falls, increased pain, angina) measured through incident reports
- Number on wait list
- Use of pedometer or accelerometers

Outcome indicators such as:

- Participant satisfaction measured through questionnaires, participant testimonials and/or re-registration rates
- Number of participants moving on to mainstream exercise or recreation activities. For some participants this transition may not be possible and success is continuing participation in adapted exercise programs as well as integrating exercise into daily life.
- Number of participants engaged in regular exercise and recreation activities outside of the program
- Reduced reliance of individual participants on caregivers or volunteers for support/supervision during program activities
- Participant self reported functional gains (e.g. improved energy level, improved participation in self care or household management activities, resuming community outings or social activities). As an option, participants may be encouraged to set personal goals.

GUIDELINE #6: EXERCISE PROVIDERS

The exercise program provider should ensure that fitness instructors are trained to deliver programs meeting the needs of people with stroke.

Rationale

People with stroke may present with residual functional impairments requiring an advanced skill set to mitigate exercise risk factors. In order to provide safe and effective programs, instructors who provide exercise programs to people with stroke need to be aware of the multi-factorial nature of stroke – people with stroke may have weakness or paralysis and may experience changes to their muscle tone, sensation, perception and vision. These physical issues may impact movement, walking, joint stability, balance and activities of daily living. People with stroke may also have issues with communication, understanding and mood. (Heart and Stroke Foundation of Ontario 2010).

Tools and Resources

The program provider should follow the Canadian Fitness Safety Standards (CFSS) as outlined below: (<http://archive.safety-council.org/info/sport/standards.html>)

Your local District or Regional Stroke Centre can be a valuable resource for stroke care information as well as information on local resources. Please see Appendix B for a listing of Regional/ District Stroke Centres. The 211 system (www.211ontario.ca) where it is available also provides a listing of local community resources. Additionally www.310ccac.ca may be accessed where applicable.

Canadian Fitness Safety Standards – Fitness Related Personnel

Standard #1

All fitness facility personnel and other fitness service providers shall be qualified in first aid and CPR.

Standard #2

Fitness personnel shall be certified in the area with which they are providing program services. (e.g. fitness appraisal, personal training, aerobic classes, aqua fitness classes etc.).

Recommended Guideline #1

Where certification is not available, fitness personnel working with special exercising populations should participate in training programs specific to that population. (e.g. pregnant women, seniors, people with disabilities)

Recommended Guideline #2

Training programs for fitness personnel should include information on participant screening, participant education and the risk of injury during physical activity.

Recommended Guideline #3

Training programs for fitness personnel should emphasize the important safety role of fitness personnel, in instruction, supervision and monitoring high risk/injury activities or areas.

Training programs available to fitness instructors leading programs that include people with stroke should cover the following competencies:

- Understanding of issues specific to stroke: pathology and presentation of stroke, co-morbidities, physical and cognitive impairments, transfers, spasticity, assistive devices, effect of medication on exercise response.
- Ability to make judgments as to whether a participant should be excluded from the program or should be referred to their physician before resuming participation.
- Ability to progress exercises safely to avoid falls, excessive muscle soreness or fatigue and cardiovascular stress.
- Ability to train and direct assistants, volunteers, caregivers (Eng et al 2006, French et al 2008).

Currently known examples of fitness instructor training courses specific to the needs of people with stroke include:

- Post Rehab Exercise for Stroke (PRES)
http://www.ccaaoutreach.com/show_course.php?coursetypeid=20
- Fitness Instructor Training Programme: Community-Based Exercise for People Living With Stroke - A self-study DVD (French, MacLeod, Reinikka, 2008)
http://www.tbrhsc.net/clinical_partners/regional_stroke_program/video_resources/community_based_exercise.asp
- Fitness and Mobility Exercise (FAME)- www.swostroke.ca/content/files/FAME.pdf
- Together in Movement and Exercise (TIME) - Toolkit
Contact : howe.jo-anne@torontorehab.on.ca or brunton.karen@torontorehab.on.ca (Howe et al 2010)

GUIDELINE # 7: FACILITY

The program provider should offer the participant a general orientation, an appropriate training environment and accessible facilities that meet the needs of the participants including barrier free access to equipment and to the facility in general

Rationale

Providing a facility that is barrier-free encourages safe participation by people with stroke who are experiencing varying degrees of limitations. This includes ensuring that the training environment is wheelchair accessible with adequate space to permit transfer to/from exercise equipment. The program provider, in collaboration with the participant and their supports, should also identify any ongoing transportation needs the person with stroke may have in order to attend the program. Additionally, consideration should be given to the temperature of the exercise room to safeguard against overheating or dehydration.

Tools and Resources

(Ontario) Built Environment Standards are expected to be released in 2011 and will provide barrier-free design standards.

Facilities should consider recommendations with respect to barrier free design from the following resources:

- **"Barrier Free Design Guide"** is available on the web site www.safetycodes.ab.ca in a PDF format.
- <http://www.safetycodes.ab.ca/upload/docs/SCC-BFDG-FINAL-protected.pdf>
- Accessible facilities guide:
http://www.ofl.ca/uploads/library/disability_issues/OFL_ACCESSIBILITY.pdf
- Checklist for Accessibility and Universal Design in Architecture
http://www.canparaplegic.org/en/Barrier_Free_Checklist_166/items/Checklist_for_Accessibility_and_Universal_Design_in_Architecture_1.html
- The Advisory Board on Services for Persons with Disabilities (ABSPD) has developed a resource, in conjunction with Barrier Free Design Guidelines, for those who are retrofitting or building a new structure to ensure accessibility for everyone in Edmonton. This checklist outlines the principles of Universal Design and should assist you in creating a space that is accessible by all. Go to www.edmonton.ca/disability and scroll down the page to access the printable version of this checklist.
- Canadian Fitness Safety Standards (<http://archive.safety-council.org/info/sport/standards.html>)
- Exercise providers should ensure they are in compliance with their site facility standards. Reference: American College of Sports Medicine at <http://www.acsm.org/AM/Template.cfm?Section=Search&template=/CM/HTMLDisplay.cfm&ContentID=4476>

The temperature of the room should be kept constant and participants should be encouraged to bring water bottles.

GUIDELINE #8: EMERGENCY PLAN & EQUIPMENT

The program provider should have an emergency plan that is documented and known to all exercise leaders and that includes requirements for current CPR and first aid certification, phone access to Emergency Medical Services and a source of glucose (e.g. juice box). The presence of an Automatic External Defibrillator is highly recommended.

Rationale

The exercise provider should be prepared to respond to an emergency situation in support of a safe environment.

Tools and Resources

Canadian Fitness Safety Standards (<http://archive.safety-council.org/info/sport/standards.html>)

Emergency Procedures

Standard #1: Facilities and other environments in which fitness-related activities are offered shall have in place an Emergency Action Plan which shall be practiced twice per year and reviewed with all NEW staff at the commencement of their employment. (S)

Standard #2: All accidents or emergencies in fitness facilities and other fitness related environments shall be documented in writing and retained. (S)

Standard #3: A designated complement of First Aid equipment shall be readily available in fitness facilities and other fitness-related environments. (S)

Standard #4: Immediate access must be available to in-house first aid services from qualified personnel. Contact information for external medical services (e.g. ambulance/hospital emergency phone numbers) must also be posted and phones readily accessible in all high risk/injury area. (e.g. pools and fitness testing areas) (S)

APPENDIX A

Glossary of Terms

Ankle dorsiflexors: The muscles that cross the ankle that act to move the foot/toes upward, towards the shin.

Ankle plantarflexors: The muscles that cross the ankle that act to move the foot/toes downward, away from the shin.

Cognitive: A term referring to mental processes involved in gaining knowledge and comprehension, including thinking, knowing, remembering, judging and problem-solving. These are higher-level functions of the brain and encompass language, imagination, perception and planning.

Co-morbidities: Two or more coexisting medical conditions or disease processes that are additional to an initial diagnosis.

Contractures: An abnormal, often permanent shortening, as of muscle or scar tissue, that results in distortion or deformity, especially of a joint of the body.

Exclusion Criteria: Condition(s) that if present; prohibit a person from participating in a program.

Extensors: The muscles that act to straighten a flexed (bent) limb.

Flaccidity: A clinical sign characterized by weakness or paralysis and reduced muscle tone. The limb may appear “floppy” or limp.

Flexors: The muscles that act to bend a joint or limb.

Inclusion Criteria: Condition(s) that must be met in order to participate in a program.

Perception: A term referring to the ability to organize, understand & interpret information from different senses such as sight, hearing & touch.

Perceptual Impairment: Difficulty with the ability to organize, understand & interpret information from different senses such as sight, hearing & touch.

Spasticity: A constant and unwanted contraction of one or more muscle groups as a result of a stroke or other insults to the brain or spinal cord.

Synthesis: The process of putting together information.

APPENDIX B

REGIONAL & DISTRICT STROKE CENTRES

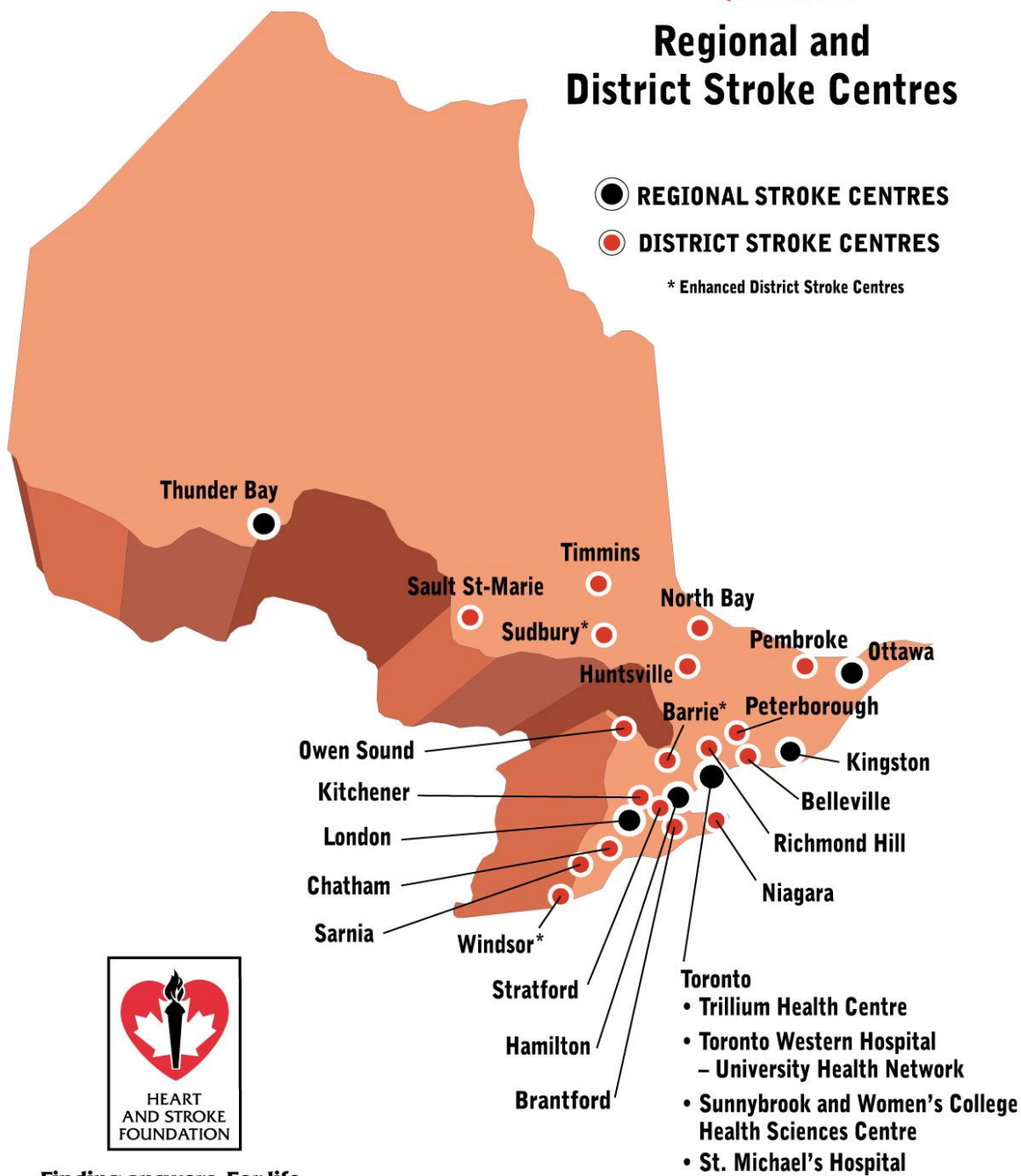


Regional and District Stroke Centres

● REGIONAL STROKE CENTRES

● DISTRICT STROKE CENTRES

* Enhanced District Stroke Centres



Finding answers. For life.

REGIONAL STROKE CENTRES

Region	Address	Phone	Website
Central East	Royal Victoria Hospital 201 Georgian Drive Barrie, ON L4M 6M2	(705)728-9090 Ext. 46320	http://www.cesnstroke.ca/index.php
Central South	Hamilton Health Sciences Centre 237 Barton Street East Hamilton, ON L8L 2X2	(905)527-4322 Ext. 46049	http://www.hamiltonhealthsciences.ca
Champlain District	The Ottawa Hospital Room 33, Parkdale Clinic, Civic Campus 1053 Carling Avenue, Box 608 Ottawa, ON K1Y 4E9	(613)798-5555 Ext. 16153	http://www.champlainstrokecentre.org/
Northeastern Ontario	Sudbury Regional Hospital 41 Ramsey Lake Road Sudbury, ON P3E 5J1	(705) 523-7100 Ext. 1586	http://www.neostrokenetwork.com
North & East GTA	Sunnybrook Health Sciences Centre 2075 Bayview Avenue Toronto, ON M4N 3M5	(416) 480-6100 Ext. 3157	
Northwestern Ontario	Thunder Bay Regional Health Services Centre 201-984 Oliver Road Thunder Bay, ON P7B 7C7	(807)684-6703	www.nwestroke.ca

Region	Address	Phone	Website
Southeastern Ontario	Kingston General Hospital 76 Stuart St. Kingston, ON K7L 2V7	(613) 549-6666 Ext. 3853	http://www.strokestrategyseo.ca/
Southwestern Ontario	London Health Sciences Centre 339 Windermere Road London, ON N6A 5A5	(519)685-8500 Ext. 32462	http://www.swostroke.ca
Southeast Toronto	St. Michael's Hospital 70 Bond St. Basement Toronto, ON M5B 1X3	(416) 864-6060 Ext. 2815	strokenetwork@smh.ca Note: This is a general email as website not currently in place.
West GTA	Trillium Health Centre Mississauga Site 100 Queensway West Mississauga, ON L5B 1B8	905-848-7580 Ext. 5475	http://www.trilliumhealthcentre.org
Toronto West	University Health Network 399 Bathurst Street Toronto, ON M5T 2S8	(416)603-6721	http://www.tostroke.com/

DISTRICT STROKE CENTRES

District	Address	Phone
Belleville	Quinte Health Centre 245 Dundas Street East Belleville, ON K8N 5K5	(613) 969-7400 Ext. 2874
Brantford	Brantford General Hospital 200 Terrace Hill Street Brantford, ON N3R 1G9	(519) 751-5544 Ext. 4451
Chatham	Chatham Kent Health Alliance 80 Grand Avenue West Chatham, ON N7M 5L9	(519) 352-6401 Ext. 6900
Huntsville	Muskoka Algonquin Health Care Huntsville District Memorial Hospital 100 Frank Miller Drive Huntsville, ON P1H 1H7	(705) 789-0022 Ext. 503
Kitchener	Grand River Regional Hospital 835 King Street West Kitchener, ON N2G 1G3	(519) 749-4300 Ext.2605
Niagara Falls	Niagara Health Health System 205-5673 North Street Niagara Falls, ON L2G 1J4	(905) 378-4647 Ext. 55557
North Bay	North Bay General Hospital 720 McLaren Street North Bay, ON P1B 5A4	(705) 474-8600 Ext. 2357
Oshawa	Lakeridge Health Corporation 1 Hospital Court Oshawa, ON L1G 2B9	(905) 576-8711 Ext. 2553

District	Address	Phone
Owen Sound	Grey Bruce Health Services 1800 8th Street East Owen Sound, ON N4K 6M9	(519) 376-2121 Ext. 2920
Pembroke	Pembroke Regional Hospital 705 Mackay Street Pembroke, ON K8A 1G8	(613) 732-3675 Ext. 7310
Peterborough	Peterborough Regional Hospital 1 Hospital Drive Peterborough, ON K9J 7C6	(705) 743-2121 Ext. 3946
Richmond Hill	York Central Hospital 10 Trench Street Richmond Hill, ON L4C 4Z3	(905)883-1212 Ext. 3882
Sarnia	Bluewater Health 89 Norman Street Sarnia, ON N7T 6S3	(519) 464-4400 Ext. 4465
Sault Ste. Marie	Sault Area Hospital 969 Queen Street East Sault Ste. Marie, ON P6A 2C4	(705)759-3434 Ext. 5288
Stratford	Huron Perth Healthcare Alliance Stratford General 46 General Hospital Drive Stratford, ON N5A 2Y6	(519) 272-8210 Ext. 2298
Timmins	Timmins and District Hospital 700 Ross Avenue East Timmins, ON P4N 8P2	(705)267-2131 Ext. 3202

District	Address	Phone
Windsor	Windsor Hotel Dieu Grace 1030 Ouellette Avenue Windsor, ON N9E 1A1	(519) 973-4411 Ext. 3082

APPENDIX C

CONTRIBUTING AUTHORS

Name	Organization	Position
Gwen Brown	SEO Stroke Strategy	Regional Community & LTC Coordinator
Karen Brunton	Toronto Rehabilitation Institute	Clinical Educator - Physiotherapy
Clara Fitzgerald	Canadian Centre for Activity and Aging	Program Director
Esmé French	Northwestern Ontario Regional Stroke Network	Regional Rehabilitation Coordinator
Paula Gilmore	SWO Stroke Region	Regional Community & LTC Coordinator
Genevieve Hladysch	YMCA- Hamilton/Burlington/Brantford	General Manager Community Health Program Development
Jo-Anne Howe	Toronto Rehabilitation Institute	Clinical Educator - Physiotherapy
Patrick Hurteau	Champlain Stroke District	Regional Community & LTC Coordinator
Nancy Jones	SEO Stroke Strategy	Regional Rehabilitation Coordinator
Jacque Levy	Action Potential Rehabilitation	Physiotherapist
Carolyn McCullough	Interaction Rehabilitation Inc.	Consultant Physiotherapist
Cathy McNorgan	Health Fit Services	Physiotherapist
Amanda Middleton	Cardiac Rehabilitation Program – LHSC	Kinesiologist
Darda Sales	Thames Valley - Community Stroke Rehabilitation Team – Parkwood Hospital	Therapeutic Recreational Specialist
Donna Scott	SWO Stroke Region	Interim Regional Community & LTC Coordinator
Alda Tee	Central East Stroke Network	Regional Community & LTC Specialist
Kim Young	Central South Stroke Region	Regional Community & LTC Coordinator

APPENDIX D

REFERENCES

- American Society for Anesthesiologists (2009)
<http://www.asahq.org/publicationsAndServices/sgstoc.htm>
- American Physical Therapy Association (APTA). (2006). Physical Fitness for Survivors of Stroke Based on Best Available Evidence. Supplement to PT Magazine.
- Borg, G. (1998) The Borg CR10 Scale.
<http://ahsmail.uwaterloo.ca/kin356/rpe/rpe/The%20Borg%20CR10%20Scale.html>
- Canadian Centre for Activity and Aging, Post Rehab for Stroke (PRES) 2008,
http://www.ccaa-outreach.com/show_course.php?coursetypeid=20
- Canada Safety Council, Canadian Fitness and Safety Standards, 2008)
<http://archive.safety-council.org/info/sport/standards.html>
- Dean CM, Richards CL, Malouin F. Task-Related Circuit Training Improves Performance of Locomotor Tasks in Chronic Stroke: A Randomized Controlled Pilot Trial. Arch Phys Med Rehabil 2000; 81:409-417.
- EBRSR: Evidence-Based Review of Stroke Rehabilitation (2010)
<http://www.ebrsr.com/>
- Eng JJ, Chu KS, Kim CM, Dawson AS, Carswell A, Hepburn KE. A Community-Based Group Exercise Program for Persons with Chronic Stroke. Med Sci Sports Exerc 2003; 35:1271-1278.
- Eng JJ, Dawson AS, Marigold D, Pang M. Fitness and Mobility Exercise Program: A community-based Group Exercise Program for People Living with Stroke. Guidelines and Manual. October 2006.
http://www.rehab.ubc.ca/_shared/assets/FAME11486.pdf
- French, E., Reinikka, K., & MacLeod, A. (2008). Fitness Instructor Training Programme: Community-Based Exercise for People Living with Stroke. Northwestern Ontario Regional Stroke Network.
http://www.tbrhsc.net/clinical_partners/regional_stroke_program/video_resources/community_based_exercise.asp
- Gordon, N. et al., Physical Activity and Exercise Recommendations for People with Stroke. Circulation 2004; 109:2031-2041.
- Harris, M., Fitzgerald, C., Belfry, S., Kirkpatrick, T., Moore, K. & Lusk, E. (2008). Outcome-Focused Physical Activity Programming in Long-Term Care Homes: Recommended Practice Guidelines, Activity and Aging Community of Practice, Seniors Health Research Transfer Network (SHRTN).
- Heart and Stroke Foundation of Ontario (2010)
<http://www.heartandstroke.on.ca>
- Howe, JA, Brunton, K. (2010). Implementing a community-based exercise program for people with neurological conditions: A step-by-step toolkit. Toronto Rehabilitation Institute: Toronto.
howe.jo-anne@torontorehab.on.ca or brunton.karen@torontorehab.on.ca

Kumar R, Metter EJ, Mehta AJ. Shoulder pain in hemiplegia: the role of exercise. *Am J Phys Med Rehabil* 1990; 69:205–8.

Lindsay P, Bayley M, Hellings C, Hill M, Woodbury E, Phillips S. (2008) Canadian Best Practice Recommendations for Stroke Care. *CMAJ* 2008; 179(12 SUPPL):E1-E93.

MacKay-Lyons MJ, Macko R, Howlett J. Cardiovascular Fitness and Adaptations to Aerobic Training after Stroke. *Physiotherapy Canada* 2006; 58:103-113.

Marigold DS, Eng JJ, Dawson AS, Inglis JT, Harris JE, Gylfadottir S. Exercise Leads to Faster Postural Reflexes, Improved Balance and Mobility, and Fewer Falls in Older Persons with Chronic Stroke. *JAGS* 2005;53:416-423.

Pang MYC, Eng JJ, Dawson AS, McKay HA, Harris JE. A Community-Based Fitness and Mobility Exercise Program for Older Adults with Chronic Stroke: A Randomized, Controlled Trial. *JAGS* 2005;53:1667-1674.

Persinger R, Foster C, Gibson M, Fater DCW, Porcari JP. Consistency of the Talk Test for Exercise Prescription. *Med. Sci. Sports Exerc* 2004;36:9:1632-1636.

Salbach NM, Mayo NE, Robichaud-Ekstrand S, Hanley JA, Richards CL, Wood-Dauphinee S. The Effect of a Task-Oriented Walking Intervention on Improving Balance Self-Efficacy Poststroke: A Randomized, Controlled Trial. *JAGS* 2005; 53:576-582.

Salbach, NM, Mayo NE, Wood-Dauphinee S, Hanley JA, Richards CL, Cote R. A task-oriented intervention enhances walking distance and speed in the first year post stroke: a randomized controlled trial. *Clinical Rehabilitation* 2004; 18: 509-519.

StrokEngine Website Modules; Aerobic Exercise Late after Stroke, Balance, Lower extremity Strength Training. . <http://www.strokengine.ca/>

Stuart M. et al. Community-Based Adaptive Physical Activity Program for Chronic Stroke: Feasibility, Safety, and Efficacy of the Empoli Model. *Neurorehabil Neural Repair* 2009; 23: 726-734.