ontario stroke network
Advancing the Ontario Stroke System

Post Stroke Community Based Exercise Guidelines

A Resource for Community Based Exercise Providers

TIME™ Program at Abilities Centre in Whitby, ON

Developed by the Post Stroke Community Based Exercise Guidelines Working Group of the Ontario Stroke Network

Revised December 2015

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EXECUTIVE SUMMARY

In 2010, an interdisciplinary, cross-sectoral provincial working group supported by the Ontario Stroke Network produced the first edition of *Guidelines for Community Based Exercise Programs for People with Stroke.* This document provided a framework for the safe and effective provision of exercise programs (stand alone or integrated) for people living with the effects of a mild to moderate stroke in community and other settings. A review of the *Guidelines* was initiated in August of 2014 to ensure continued alignment with best practices, emerging research and expert opinion. Similar to the initial document, this revised edition (entitled *Post Stroke Community Based Exercise Guidelines, 2015*) was developed by an interdisciplinary cross-sectoral working group representing expertise in the fields of stroke care and community exercise programming for people living with the effects of stroke. Included in this process was a review of the draft document by an expert panel. The working group also reviewed and revised the companion brochure (*A Guide to Choosing a Community Exercise Program for People Living with the Effects of Stroke, 2010*) which is intended to assist people living with the effects of a mild to moderate stroke select an exercise program that is safe and meets their needs. The revised *Guidelines* and draft brochure (revised title *A Guide to Choosing a Community Exercise Program for People Living with the Effects of Stroke)* were reviewed by people living with the effects of stroke.

The *Post Stroke Community Based Exercise Guidelines (2015)* includes eight topics each of which include a rationale and recommendations to assist exercise providers in delivering safe and effective exercise programs in a variety of community and other settings. Table 1 provides a summary of the recommendations of the eight guidelines and recommendations.

Both resources can be accessed on the Ontario Stroke Network website at http://ontariostrokenetwork.ca/stroke-qbp-resource-centre/stroke-rehabilitation-resource-centre/clinical-tools-and-resources-for-implementation/clinical-tools-resources-implementation-community-re-engagement/

Table 1 – Guideline Summary

GUIDELINE	STATEMENT/RECOMMENDATIONS
1. Medical Clearance	Persons living with the effects of stroke should consult a health care professional (e.g., physician or nurse practitioner) and undergo medical screening before participating in any exercise program to ensure that there are no conditions that would be contraindicative to participating in the exercise program.
2. Screening by Exercise Provider	A formal screening process should be conducted by the exercise provider to ensure a match between the program and the participant and to ensure that the participant meets program eligibility. Screening processes should include a range of procedures including individual participant intake interviews, a review of health information from the physician/other referring health care providers as well as a review of functional ability and the need for other considerations.
3. Class Structure & Supervision	The exercise class/program (e.g., seated class, exercise in water) 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. Consideration should be given to staffing ratios, volunteer availability, the degree of impairment and each participant's need for assistance.

RECOMMENDATION	STATEMENT
4. Exercise Program Principles	The exercise program should incorporate established training principles and include specific components to address the needs of people living with the effects of stroke. Functional activities should be emphasized. It is also recommended that exercise providers integrate health promotion information into the classes.
5. Program Evaluation	Program evaluation processes should be in place in order to monitor program successes and challenges and to track service delivery, staffing levels and participant satisfaction.
6. Exercise Providers	Exercise providers should ensure that fitness instructors are trained (and provided with updated information as needed/requested) to deliver programs meeting the needs of people living with the effects of stroke. Exercise providers may receive certification from a variety of organizations. It is critical that all exercise providers work within their scope of practice as defined by the relevant certification program and insurance coverage parameters. It is recommended that exercise providers establish linkages with health care providers who can offer ongoing support and stroke-specific expertise as required.
7. Facility	The exercise provider should offer participants 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.
8. Emergency Plan and Equipment	The exercise provider should have an emergency plan that is documented and known to all exercise providers which 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 (AED) is highly recommended.

ABOUT THE GUIDELINES

According to the College of Physicians and Surgeons of Ontario (CPSO), Clinical Practice Guidelines (CPGs) are "systematically developed and updated, evidence-based or consensus-based statements whose purpose is to help improve the quality and consistency of care in specified clinical situations [and] incorporate the most current evidence-based or consensus-based clinical information into a framework that promotes the best patient outcomes." (http://www.cpso.on.ca/policies-publications/positions-initiatives/about-clinical-practice-guidelines) The CPSO goes on to state that CPGs are not intended to be inflexible applications nor are they intended to be applied in the absence of an evaluation of context and individual patients. The working group has adopted, in principle, this definition of Guidelines for the purposes of this document.

This document contains rationale for each guideline as well as additional considerations and resources (including tools and references) that will be useful to exercise providers and health care professionals. A companion brochure entitled "*A Guide to Choosing a Community Exercise Program for People Living with the Effects of Stroke*" is intended to assist persons who are living with the effects of a mild to moderate stroke and their families with selection of an exercise program appropriate to their needs. Both resources can be accessed on the Ontario Stroke Network website at

http://ontariostrokenetwork.ca/stroke-qbp-resource-centre/stroke-rehabilitation-resource-centre/clinical-tools-and-resources-for-implementation/clinical-tools-resources-implementation-community-re-engagement/

Live links to tools and resources have been included throughout the document. If you have difficulty locating any referenced site, please cut and paste the link into "Google Chrome" browser.

ACKNOWLEDGEMENTS

We wish to extend our gratitude to the expert review panel which included health professionals and researchers, but more importantly, also included persons living with the effects of stroke. The perspective of persons living with the effects of stroke provided a level of knowledge and life experience that was critical to the development of this resource. We would also like to acknowledge the students and researchers who were instrumental in the provision of an extensive literature review to inform the amendments and additions to the *Post Stroke Community Based Exercise Guidelines* (the *Guidelines*). Finally, we gratefully acknowledge the dedication of the working group members who demonstrated a continued commitment to this project and a collaborative sharing of expertise. See Appendix A for listing of contributors.

INTRODUCTION

There is evolving discussion with respect to the most appropriate phrasing to be used when referring to individuals who are living with the effects of stroke (e.g., stroke survivors, persons with stroke, persons with lived experience of stroke). The working group agreed to use the phrase "people living with the effects of stroke" throughout this document to support consistency and to reflect the ongoing recovery journey of individuals who have experienced a stroke event.

This document is intended to assist exercise providers in delivering safe and effective exercise programs in a variety of community and other settings (e.g., Long Term Care, Retirement Homes, centres for seniors, fitness clubs, municipal recreation departments, and community centres) for

persons living with the effects of stroke. For the purposes of this document, 'exercise provider' refers to a range of individuals who have completed training/certification in the provision of fitness/exercise programs. This may include but is not limited to fitness instructors and recreation programmers as well as kinesiologists and other health care professionals. Note that the *Guidelines* include recommendations appropriate for the organizational/administrative level as well as for those individuals actually delivering the program. These guidelines are congruent with current best practice recommendations including the Canadian Stroke Best Practice Recommendations (2013) (CSBPR) and research findings as of January 2015. The document is housed in electronic format on the Ontario Stroke Network (OSN) web site and can be accessed using the following link:

http://ontariostrokenetwork.ca/health-programs-resources/resources/prevention/community-reintegration-ltc/

Users should refer to the electronic format housed on the OSN site rather than hard copy versions to ensure they are in receipt of the most current edition. Accessing this document electronically supports the use of the embedded links.

The 2013 Canadian Stroke Best Practice Recommendations (CSBPR) state that patients "be provided with a list of community-based resources for engaging in aerobic and leisure activities in the community prior to discharge from the hospital; they should be referred to relevant agencies as appropriate to provide support in re-engaging in leisure activities." (CSBPR, 2013) The CSBPR also recognizes the critical role that exercise can play in reducing risk for subsequent strokes, "A healthy lifestyle reduces the risk of an initial stroke and the risk of a subsequent stroke for patients with a prior stroke... Regular exercise also reduces the risk of stroke and other vascular diseases." (Coutts, 2014). Exercise also contributes to community reintegration and a reduction in social isolation. It is important that, where possible, safe and effective community exercise programs be available and accessible to people living with the effects of stroke in order to support continued recovery.

This resource is intended to provide a guide to best practices for stroke care, specifically to the community exercise setting. At the same time, the working group also recognizes that evidence and experience continue to evolve and inform changes to best practice stroke care. Therefore, to ensure that this resource remains current, the Ontario Stroke Network will coordinate a review of this document every three years.

BACKGROUND

The 2015 Quality-Based Procedures: Clinical Handbook for Stroke (Acute and Post acute) (QBP Handbook) cites stroke as the leading cause of adult neurological disability in Canada and the third leading cause of death. In fact, of all deaths in Canada each year, six (6) percent are the result of a stroke which equates to about 14,000 Canadians every year. At any given time, there are about 315,000 Canadians living with the effects of stroke (Heart & Stroke Foundation, 2014). Given that there are over 50,000 strokes each year in Canada (or about 1 stroke every 10 minutes), the burden on health and social support systems is significant and it is expected to rise due to Canada's aging population and the growing prevalence of risk factors. (Health Quality Ontario, 2015) For every 100 persons who experience a stroke:

- 15 die
- 10 recover completely
- 25 recover with a minor impairment or disability
- 40 are left with a moderate to severe impairment
- 10 are so severely disabled they require long-term care (Health Quality Ontario, 2015)

Individuals returning to their home setting often struggle to access conventional community fitness programs because of ongoing physical or cognitive deficits. Yet there is evidence that they could benefit from regular exercise programming (Dean et al., 2000; Eng et al., 2003; Eng et al., 2006; Marigold et al., 2005: Pang et al., 2005: Stuart et al., 2009: Salbach et al., 2004: Harrington et al., 2010: Salbach et al., 2014: Saunders et al., 2013: Stoller, 2012 and Pang et al.,2006).

Even moderate levels of physical activity such as walking can reduce the likelihood as well as the severity of recurrent stroke among persons who have experienced a stroke (Evidence-Based Review of Stroke Rehabilitation, 2010). There is also mounting evidence that increased physical activity among persons who have experienced a stroke is associated with improved cardiovascular health, decreased risk of cardiac events, improved physical fitness, balance and mobility and improved bone density as well as reduced depression and social isolation (Dean et al., 2000:Eng et al., 2003; Eng et al., 2006; Marigold et al., 2005; Pang et al., 2005; Stuart et al., 2009; Salbach et al., 2004; Harrington et al., 2010; Salbach et al., 2014; Saunders et al., 2013; Stoller et al. 2012, and Pang et al., 2006). In a study of the Fitness and Mobility Exercise (FAME) Program, results demonstrated that for those participants most at risk for a fall (i.e. had fallen prior to the trial) only 53% of the FAME Program participants fell in the 12 month trial period, compared to 87% of the control group (Eng, 2010).

People living with the effects of stroke who participate in community based exercise programs have reported benefits that extend beyond their physical and psychological health. For example, Norris et al., (2013) examined a peer led community based exercise program for stroke and identified broader benefits such as the promotion of active citizenship and encouragement of self-management.

The *AEROBICS: Aerobic Exercise Recommendations to Optimize Best Practices in Care After Stroke,* recommends that, “All patients following a cerebrovascular event (stroke or TIA) should be considered for potential participation in aerobic exercise interventions” (McKay-Lyons et al., 2013). The Canadian Stroke Best Practice Recommendations (CSBPR,2013) state that persons at risk of stroke and persons who have had a stroke participate in “moderate dynamic exercise such as walking (ideally brisk walking), jogging, cycling, swimming or other dynamic exercise four to seven days each week in addition to routine activities of daily living (Evidence Level A)”(Coutts, 2014).” Specifically, “patients should be counseled to achieve an accumulation of at least 150 minutes of moderate to vigorous intensity per week, in episodes of 10 minutes or more. Most stroke patients should be encouraged to start a regular exercise program” (Coutts, 2014).

The QBP Handbook also supports the essential role of exercise in successful recovery following a stroke stating “physical activity should be promoted consistently by all health care providers involved in the care of a patient and that patients should be physically active or engage in regular exercise that does not produce uncomfortable symptoms” (Health Quality Ontario,2015 pp 123). Consistent with the CSBPR, the QBP Handbook also recommends that “after appropriate medical evaluation, patients should regularly participate in an aerobic exercise program that accounts for the patient’s comorbidities and functional limitations to improve gait speed, endurance, stroke risk factor profile, mood, and cognitive abilities” (Health Quality Ontario, 2015 pp 123).

Despite these recommendations and research, there is limited capacity among community based exercise providers to offer adapted programs that adequately respond to the specific needs of people living with the effects of stroke. This particularly affects those living in the community with **mild to moderate** deficits who may benefit most from such programs. These *Guidelines* are intended to support the translation of research and best practice recommendations into sustainable community exercise programs for people living with the effects of stroke.

METHOD FOR REVIEW & UPDATING OF 2010 GUIDELINES

A working group was established to review the 2010 *Guidelines for Community Based Exercise Programs for People with Stroke* to ensure they continued to reflect current best practice, research and expert opinion. The review ensured alignment with the following documents and standards:

- Canadian Stroke Best Practice Recommendations (2013) (CSBPR)
- Quality-Based Procedures: Clinical Handbook for Stroke (Acute and Post acute) (December 2015)
- *AEROBICS: Aerobic Exercise Recommendations to Optimize Best Practices in Care After Stroke* (MacKay-Lyons et al 2013)
- *Canadian Society for Exercise Physiology (CSEP) Guidelines*
- *Canadian Cardiovascular Harmonized National Guidelines Endeavour (C-CHANGE)*
- *Cardiac Care Network* (CCN) *Guidelines*
- *Canadian Fitness Safety Standards*

The working group included educators, exercise providers, rehabilitation professionals and representatives from the Ontario Stroke Network. As an initial step, a literature review was conducted to ensure continued alignment of the updated *Post Stroke Community Based Exercise Guidelines (Guidelines)* with recent and evolving research findings. Additionally, the *Guidelines* were informed by the experience of the working group members including individuals experienced in the provision of community-based exercise programs for people living with the effects of stroke. The experience of these contributors ensured that the *Guidelines* reflected the reality of human and fiscal resource limitations in many community settings while continuing to support safe and therapeutic exercise environments.

The updated draft document was reviewed by an expert panel consisting of researchers, exercise practitioners and persons living with the effects of stroke. The diversity of the review panel provided a comprehensive review. The findings of the panel review were reviewed by the working group for consideration and a final document produced.

APPLICATION OF THE GUIDELINES

While the working group acknowledges the benefits of exercise across the spectrum of impairments, these *Guidelines* are specifically intended to act as a guide for exercise providers in designing and delivering safe and effective exercise programs across multiple settings that meet the needs of people who are living with the effects of a **mild to moderate** stroke. For individuals who have experienced a severe stroke, exercise can also produce physical and psychosocial benefits when programs include appropriate adaptations and adjusted staff ratios and integrate support from relevant health care professionals. For individuals who have experienced a transient ischemic attack (TIA) or do not have residual deficits from the stroke event, participation in a regular (non-adapted) community exercise program may be appropriate.

While the *Guidelines* identify considerations specific to the needs of people living with the effects of stroke, they can also be used to develop programs which accommodate other participants who are experiencing impaired mobility, balance and other challenges. For example, the *Guidelines* may be applied to programs that are exclusive to people living with the effects of stroke or to general exercise programs that will be adapted to include persons living with the effects of stroke. In general exercise programs participants may have diverse needs and abilities (e.g. classes may include people living with the effects of stroke, individuals with other medical conditions and individuals who may not have any impacting health conditions). For these programs, the

Guidelines will support the provision of a safe, effective and inclusive program for all participants). Condition-specific issues must be considered during the screening process. Dependent on the facility resources and capabilities of the participants, classes may encompass exercises performed while sitting, standing, and walking on land or in the pool. When applying the *Guidelines* to an exercise program, it is imperative that each exercise provider consider the type of program that can be safely provided to best meet the needs of the participants. Exercise providers are also encouraged to connect with Regional or District Stroke Centres (Appendix B) for support with the implementation of exercise programs for people living with the effects of stroke. The Centres may assist by linking exercise providers to regional educational and neuro-expertise supports as well as the dissemination of program information to persons living with the effects of stroke in the community.

Post Stroke Community Based Exercise Guidelines

GUIDELINE #1: MEDICAL CLEARANCE

Persons living with the effects of stroke should consult with a health care professional (e.g., physician or nurse practitioner) to undergo medical screening before participating in any exercise program to ensure that there are no conditions that would be contraindicative to participating in the exercise program (Gordon et al., 2004;Billinger et al., 2014).

Rationale

Exercise is a normal human function that can be undertaken with a high level of safety by most people, including people living with the effects of stroke (Gordon et al. 2004). However it should be recognized that exercise is not without risks and that people living with the effects of stroke as a general group fall into a higher risk category with, for example, an increased prevalence of coronary artery disease (CAD) and diabetes. This recommendation is consistent with the AEROBICS guidelines which indicate that that "pre-participation evaluation for aerobic training after stroke or TIA should be provided by appropriately qualified health care professionals, consistent with their scope of practice and practice setting." (MacKay-Lyons et al. 2013) Therefore, it is recommended that potential participants be given a standard medical clearance letter/form for their primary care provider (e.g. physician or nurse practitioner) to complete, which briefly describes the exercise program, including the level of exertion and supervision. This letter/form should ask for information about medical conditions and precautions/contraindications that would impact on the participant's entry into or participation in the program. This letter/form needs to be returned to the exercise provider prior to an intake interview and participation in the program.

Resources and Additional Considerations

A written consent will need to be obtained from the participant if the exercise provider requires direct communication with the primary care provider.

The following medical information is particularly important to obtain and review. The exercise provider should consider these points when selecting an appropriate screening tool and medical clearance letter/form.

1. Blood pressure status and medications used, particularly those that may inhibit a response to exercise (e.g. beta blocker).

2. Presence of diabetes including type of treatment (e.g. oral medications or insulin) as well as risk of hypoglycemia and any requirement to track blood glucose levels during exercise.
3. Presence of chronic obstructive pulmonary disease including type of medication used (e.g. asthma inhaler, supplemental oxygen).
4. Cardiac status including use of nitroglycerin. Ideally, a stress test to assess tolerance and provide guidelines for physical activity should be administered if cardiovascular exercise is emphasized in the program (Eng et al., 2006, MacKay-Lyons et al., 2013). 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 and/or duration to compensate for the reduced intensity (see also Guideline 4: Exercise Program Principles - Intensity) (MacKay-Lyons et al 2013, Billinger et al., 2014).
5. Information related to any need for fluid restriction or other fluid considerations (e.g., congestive heart failure, dialysis, requirement for thickened fluids).
6. Peripheral vascular disease/poor circulation.
7. Musculoskeletal disease such as osteoporosis and osteoarthritis. Also, identify any specific joint pain.
8. Specific restrictions and/or precautions related to any other existing medical condition or surgical procedure (e.g., total hip replacement or injury).
9. Medications that may cause excessive bleeding during injury (e.g. anticoagulants).
10. Signs and symptoms of depression.
11. Cognitive and behaviour status as it pertains to the individual's ability to participate in group exercise.
12. Communication impairments as they pertain to the individual's ability to participate in group exercise.
13. Pregnancy. Note that The Canadian Society of Exercise Physiology (CSEP) has guidelines for exercise and pregnancy that may be accessed through the following link: http://www.csep.ca/cmfiles/publications/parq/parmed-xpreg.pdf.

It is helpful if standardized screening forms are included in the medical clearance letter to the primary care provider. Some examples of these tools are:

- PAR Q and/or PAR Q+
  www.csep.ca/publications
- ePARmedX
  http://eparmedx.com/wp-content/uploads/2013/03/PARQPlusJan2014.pdf
- Medical Information Form (FAME Manual October 2015 J. Eng)
  http://neurorehab.med.ubc.ca/fame/

Examples of a standardized medical clearance letter/form include:

- Canadian Society of Exercise Physiology (CSEP) Physician Physical Activity Readiness Clearance - Appendix C (also accessed through www.csep.ca/publications)
- ePARmed-X Physician Clearance Follow-Up – Appendix D
- Sample Referral Form (Howe et al 2015) - Appendix E
- Sample Physician Consent Form (French et al 2008) – Appendix F

GUIDELINE # 2: SCREENING BY EXERCISE PROVIDER

A formal screening process should be conducted by the exercise provider to ensure a match between the program and participant and to ensure that the participant meets program eligibility. Screening processes should include a range of procedures including individual participant intake interviews, a review of health information from the physician/other referring health care providers as well as a review of functional ability and the need for other considerations.

Rationale

Consideration must be given to time, space and staff resources required to provide a formal intake process. It is recommended that exercise providers have a standardized intake process and documentation procedure for health and functional screening of people living with the effects of stroke. These individuals may present with a wide variety of impairments. Exercise providers should be aware of these impairments and make appropriate accommodations. Some people living with the effects of 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 (e.g. falls prevention) and/or health care providers should be in place. As well, participants would benefit from repeated screening in response to changes in health status and capabilities to ensure that the current program is continuing to meet their needs (Billinger et al., 2014). A collaborative, communicative approach between the participant, the exercise provider and the health care provider will support an optimal experience for the participant with the maximum benefit.

Resources and Additional Considerations

A. Intake Assessment

The intake assessment should occur after receiving the medical clearance form and should include questions to determine:

- match between participant and program
- degree of support the participant requires and
- program's ability to accommodate the participant's requirements.

See Table 2 for a list of suggested intake questions.

Table 2 – Intake Assessment Questions		
MOVEMENT		
Domain	**Probing Question**	**Relevance**
Mobility	Is the participant able to walk? Is a cane or walker required? Is assistance required? How far can they walk? Do they use a lower extremity brace or orthosis? 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 participation and access to the class. 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	Does the participant feel unsteady when moving about their home or community? Has the participant fallen or experienced a near fall within the last three months? What was the cause of the fall? Does the participant use mobility aids and were they using these devices when the fall occurred? Would the participant like to be informed of or obtain a referral to fall prevention resources?	Adaptations may be required to minimize risk of falls within the class.
Fatigue/ Endurance	Can the participant be active for a 1 to 2 hour period without excessive fatigue (i.e. fatigue that limits their ability to participate in the rest of their daily activities)? Will there need to be an additional break/rest period for the individual?	A participant should have the tolerance for the class as well as getting ready for and traveling to/from class.
Range of Motion	Does the participant have any movement limitations? Does the participant experience any stiffness in a joint or abnormally "tight" muscles?	Adaptations would need to be made to the exercises to accommodate any movement restrictions. Particular attention may need to be paid to the shoulder on the affected side.
Strength/ Coordination	Does the participant experience any weakness? Does the participant have a weaker side? Are they able to use that side? Which side is it? Does the participant experience uncoordinated movement?	Adaptations would need to be made to the exercises to accommodate any restrictions with strength and coordination.
Musculoskeletal	Has the participant had a hip/knee replacement or do they have severe osteoporosis? Have they had a recent injury? What movements need to be avoided?	Adaptations would need to be made to the exercises to accommodate any movement restrictions.

PERCEPTION		
Domain	**Probing Question**	**Relevance**
Pain	Does the participant have pain anywhere (common examples would be shoulder, neck, back, knees)? What makes the pain worse?	Adaptations would need to be made to the exercises to prevent worsening their pain.
Sensation	Can the participant feel on the side(s) affected by the stroke? Do they know where the affected limb is in space? Does the participant forget about the side affected by the stroke? 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.
Vision Loss	Does the participant have any vision loss? Do they have adequate peripheral (side) vision? Are they experiencing blurred or double vision or other visual concerns? Is special eyewear required?	Adaptation may be required to support the participant's safety if their visual field is restricted and/or if their balance is impacted by blurred or double vision.
Hearing Loss	Does the participant have any hearing loss? Is a hearing aid or other adaptive equipment needed? Does the participant lip read or communicate using sign language?	Adaptation may be required to support the participant's safety and participation.
THINKING/BEHAVIOUR		
Behaviour	Does the participant experience episodes of anger or crying? Are they impulsive? How is this managed? Can the participant express emotion appropriate to the situation (will it be evident if they are stressed or unhappy)?	Adaptation may be needed to ensure an understanding of the participant's emotional status and a response plan in place for outbursts. A family member/friend may need to be present for ongoing support.
Cognitive Status	Is the participant able to pay attention to and follow instructions? Are they able to monitor themselves for level of exertion, pain, fatigue and personal safety?	Attention, memory, body awareness and impulsive behaviour issues may require accommodations.
Self Care	Can the participant dress, undress and use the bathroom independently?	Difficulty in these areas will impact on the degree of support needed (e.g. a family member or caregiver may also need to attend the class).

COMMUNICATION & SWALLOWING		
Domain	**Probing Question**	**Relevance**
Communication (Aphasia)	Is the participant able to express their basic needs or do they require assistance? Is the participant able to understand and follow instructions?	It is important to be aware of the specific communication strategies that are used by the participant. Adaptation may be required to enable effective communication as some persons who have experienced a stroke will have difficulty speaking and/or understanding. See Appendix G.
Swallowing (Dysphagia)	Does the participant have any difficulties with swallowing or choking? Are there safety precautions that need to be in place? Will they bring their own refreshments to the class?	Certain foods, textures and liquid consistencies may need to be avoided. See Appendix G.
CONTINENCE		
Continence	Does the participant have bowel and bladder control? If the participant is incontinent, is it contained?	Incontinence is not an absolute contraindication to participation in an exercise program. Protective clothing is required if participating in a pool program.
SUPPORTS		
Supports	Does the participant have a family member, caregiver or volunteer to help them participate in the program, if needed?	Support personnel will require training or orientation to safely 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.

B. Inclusion/Exclusion Criteria

The development of inclusion/exclusion criteria is recommended to ensure that the exercise program is appropriate for the participant. The following are 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 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/support. This is 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. This is important if standing and/or walking activities are included in the exercise program.
- The ability to follow instructions or mimic exercises (with or without support).
- 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)
- Open wound, contagious conditions
- Behavioural issues that will negatively impact on others in a group setting

Consideration should be given to those participants who may have a higher level of function than is appropriate for the adapted program being provided. In these situations, a program targeted at the general population may be more appropriate.

If a person is ineligible for the exercise program due to a low level of function, it is recommended that the exercise provider suggest alternate strategies/exercise opportunities such as referral to a seated exercise program, fall prevention program, personal trainer or other community resources. Consideration should also be given to referring the individual back to their primary care provider for re-evaluation at a later date.

GUIDELINE #3: CLASS STRUCTURE/ CLASS SUPERVISION

The exercise class/program (e.g. seated class, exercise in water) 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 be reflected in the inclusion/exclusion criteria used in the intake process. Consideration should be given to staffing ratios, volunteer availability, degree of impairment and each participant's need for assistance.

Rationale

There must be purposeful decision-making with respect to program design and participants' abilities. The following domains should be included in the design process:

- program frequency
- duration of classes
- setting/venue
- inclusion/exclusion criteria.

People living with the effects of 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:

- meet the goals of the program
- accommodate specific participant needs and
- offer a safe and effective program.

Generally speaking, as the level of participant disability or impairment increases the ratio of staff to participant should also change accordingly.

Resources and Additional Considerations

A. Program Considerations

- In programs that include standing and walking exercises, the suggested staff to participant ratios range from 1:3 to 1:6 (Norris et al., 2013; Cramp et al., 2010; Howe et al., 2015; French et al., 2008; Eng et al., 2006; Marigold et al., 2005; Pang et al., 2005).
- When volunteers are used to supplement staffing, their role, responsibilities and training requirements should be clearly determined and addressed.
- Where appropriate and with consent of the person living with the effects of stroke, caregivers could be involved. Caregivers should receive proper training regarding their role and responsibilities.
- The total duration of sessions may vary and has been reported to run between four and sixteen weeks (Pang et al., 2005; Salbach et al., 2004; Salbach et al., 2005; Dean et al., 2000; Eng et al., 2003; French et al., 2008; Marigold et al., 2005; MacKay-Lyons et al., 2013). It is acknowledged that regular, ongoing exercise is recommended beyond the exercise session.
- Canadian Fitness Safety Standards (2008) (Fitness Environment Standard #3) recommends:
  "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."

- Exercise providers may find it beneficial to use a checklist before, during and after each session to support the safety, efficiency and effectiveness of the program. See Appendix H.

B. Participant Preparation

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

- take medications according to their usual schedule
- empty bowel and bladder prior to the class
- wear comfortable clothing and supportive footwear
- bring medications they might need during class (e.g. inhalers, nitroglycerine)
- bring an individual water bottle or other appropriate hydration
- individuals with diabetes should also bring a source of glucose such as fruit juice. The participant's glucometer may also need to be brought to the class.

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 the effects of stroke. Functional activities should be emphasized. It is also recommended that exercise providers integrate health promotion information into classes.

Rationale

Following standard principles will support a comprehensive and safe exercise program suitable for participants. Research supports the concept that people living with the effects of stroke achieve the greatest benefit from an ongoing exercise program that incorporates several exercise components (i.e. aerobic, strengthening, stretching, coordination and balance activities through the practice of functional tasks) which complement each other and support the person living with the effects of stroke to achieve maximal fitness, independence and mobility (Gordon et al., 2004; Billinger et al., 2014).

Resources and Additional Considerations

The following exercise program principles should be incorporated into program design.

Posture & Alignment

In order to optimize function and minimize the possibility of injury during exercise, attention should be paid to the starting and ending position of an exercise and to posture and alignment throughout the motion. It is particularly important that the participant is directed to begin each exercise from a position of best possible posture and alignment and to try to maintain this throughout each exercise. The instructor may need to help achieve this by decreasing the difficulty of the exercise, demonstrating correct posture and alignment and/or providing verbal correction so that participant can experience the best possible movement pattern.

Task Related Training

Task related training (also referred to as task specific or task oriented training) requires the participant to perform exercises that replicate functional activities used in everyday life. Examples are repetitive sit to stand, step ups or walking. These activities have been shown to be effective in improving function particularly in the lower limb in persons living with the effects of stroke. These activities can be adapted to gradually increase difficulty and complexity by lowering the height of a sitting surface or increasing the height of a step. Task related training recognizes that exercises are more effective if they are meaningful to a person and link to a tangible real life goal (StrokEngine, 2015; Winstein et al., 2009).

Specificity

Specificity means 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 interests, 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, 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(s) resulting in a progressively greater effect. For example, increasing

distance or time walked during class or increasing the number of repetitions or weight load lifted during resistance training.

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 aerobic 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; MacKay-Lyons et al., 2013). Resistance training should be carried out 2 to 3 times per week, with a rest day between workouts.

Intensity

The programs should begin 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/strength level and their physical limitations post-stroke. Simple tools can be used to measure aerobic intensity such as the Borg Rating of Perceived Exertion Scale (Borg, 1998) or the Talk Test (Persinger, et al., 2004). For resistance training, an intensity that can be repeated 10 times comfortably with good technique, without requiring breath holding may be appropriate. Typically, patients should feel as if they could lift 2 to 3 more repetitions but not 10 or more after completing a set. See Appendix I for intensity level chart.

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 3). 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 that are targeted at individuals who are fully or partially ambulatory (Pang et al., 2005; Salbach et al., 2004; Dean et al., 2000). Task-oriented circuit training is recommended to improve transfer skills, mobility, and activities of daily living (ADLs)/functional tasks (Health Quality Ontario, 2015). A consideration when developing the exercise program sequence would be to avoid having the most challenging or complex activities/exercises at the end of the class when participants may be tired. This could increase the risk of falls, injury and/or undue fatigue.

Adapting Equipment

While exercise equipment is not required to implement a safe and effective exercise program for people living with the effects of stroke, some exercise providers may elect to use equipment during the class. In these situations, the exercise provider must confirm that all such equipment has been safely adapted to meet the needs of the individual participants. Note that not all standard exercise equipment can be adapted for use with people living with the effects of stroke. Additionally, when adapting exercise equipment, it may be beneficial to consult with a physiotherapist, occupational therapist or other health professional.

Health Promotion

Health promotion information related to stroke may be accessed through the Heart & Stroke website at http://www.heartandstroke.com/site/c.ikIQLcMWJtE/b.3483949/k.967D/Healthy_Living.htm

The following table (Table 3) outlines the exercise components which should be incorporated into a class

Table 3 – Exercise Class Components

Component	Specific Recommendations	Stroke Specific Considerations
Aerobic	Warm-up and cool-down: 3-5 minutes at a lower intensity (MacKay-Lyons et al.,2006; MacKay-Lyons et al., 2013) <u>Frequency</u> • 3-7 days per week (Gordon et al., 2004, Billinger et al., 2013) • Very deconditioned participants may benefit from multiple, brief daily exercise sessions (MacKay-Lyons et al., 2006; MacKay-Lyons et al., 2013). <u>Intensity</u> • Exercises should be initiated conservatively and progressed slowly • If using a 10-point scale to measure intensity: - exercising at a level corresponding to an intensity of 1 or 2 would be considered light, - an intensity from 3 to 4 as moderate and; - an intensity of 5 to 7 as vigorous (MacKay-Lyons et al., 2013). See Appendix I for full chart including use of a 6 to 20 point rating scale. • If using the Talk Test, exercising should be at a level where you can carry on a conversation without becoming breathless (Persinger et al.,2004). • If a participant wishes to progress to an intensity level higher than light it is recommended that a stress test be conducted (MacKay-Lyons et al., 2013). <u>Time</u> • 20-60 minutes per session, or multiple 10 minute sessions (Gordon et al., 2004;Billinger et al., 2014)	Participants will also require instruction on how to self-monitor and should be encouraged to: • rest when necessary • inform the exercise provider if they are fatigued or experience pain with an activity. Signs of fatigue: • 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, the participant flops down onto chair. Ensure appropriate supervision if participants require assistance getting on and off aerobic equipment. For individuals with low fitness levels begin with 3 to 5 minute sets with rest periods. *Potential Negative Outcome: Increased risk of falls when participants get fatigued or when level is too advanced for their mobility.*

Component	Specific Recommendations	Stroke Specific Considerations

Aerobic cont'd	<u>Type</u>
	• Depends on availability of equipment as well as practicality and safety of the exercise
	• Use large muscle groups
	• Examples:
	  ○ walking (overland or treadmill)
	  ○ stationary bicycle
	  ○ arm or arm/leg ergometer
	  ○ recumbent stepping machine
	(StrokEngine, 2015)
	
	Inclusion of task related activities such as walking, sit to stand or step-ups.
		The type of activity selected must be based on abilities of participants and safety considerations.

Strengthening	<u>Frequency</u> • 2-3 days per week • 1-3 sets of 10-15 repetitions. <u>Intensity</u> • Begin with light weights (e.g. 1-2 pounds, or using light resistance bands) • Progressive Resistance Training is advisable to elicit strength gains that are likely to improve participants' functional health status (Sims et al., 2009) • Light to moderate resistance should be used where the individual can comfortably perform 8 to 10 reps with good technique <u>Time</u> • 15 – 30 minutes (Gordon et al., 2004) <u>Type</u> • Focus on major muscle groups such as hip and knee flexors and extensors, hip abductors, ankle dorsiflexors and plantar flexors, as well as the upper extremities and core.	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. The use of overhead pulleys is not advisable (Kumar et al., 1990). Move through the available range; exercise should be pain-free. *Potential Negative Outcome: Arm movements above shoulder height can cause shoulder impingement and other injuries.* Strength improvements in the major muscle groups are important for maximizing mobility, balance and posture.

Component	Specific Recommendations	Stroke Specific Considerations

Strengthening cont'd	• Examples:
	  ○ circuit training
	  ○ free weights/handheld dumbbells
	  ○ functional strengthening
	(StrokEngine, 2015)
	
	Incorporate task related activities such as sit to stand, heel raises, step-ups, squats and lunging.	

Stretching	Stretching may be done throughout the class but is emphasized in the cool-down component <u>Frequency</u> • 2-3 days per week (Gordon et al., 2004) <u>Intensity</u> • Should feel a stretch but not pain <u>Time</u> • Hold each stretch for 10-30 seconds (Gordon et al., 2004), rest and repeat 3 times <u>Type</u> • Stretching should address major muscle groups such as hip and knee flexors and extensors, hip adductors, ankle dorsiflexors and plantar flexors, as well as the upper body and trunk.	Refer to strengthening section for specific considerations related to the arm. 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/rigidity or flaccidity) that are a result of changes in the brain. If increased muscle tone, (for example, increased flexion of the elbow or fingers), occurs while exercising, encourage participants to take a moment to stretch that specific area to restore the available range. If clonus (a series of involuntary, rhythmic, muscular contractions and relaxations) occurs, ask the participant to perform a very slow, prolonged, gentle stretch or position the part experiencing clonus into a weight-bearing position.

Component	Specific Recommendations	Stroke Specific Considerations

Coordination
&
Balance
	<u>Frequency</u>
	• 2-3 days per week
	<u>Type</u>
	• For **seated exercises**, examples include range of motion exercises for arms and legs:
	  • coordinated, simultaneous arm and leg movement
	  • weight shifting in all directions including reaching to floor
	  • use of props to make exercise fun. (StrokEngine, 2015)
	• For **standing exercises**, examples of static balance exercises include:
	  • standing on one foot
	  • standing with feet close together
	  • standing with eyes closed.
	• Examples of **dynamic standing** balance exercises include:
	  • catching
	  • kicking
	  • obstacle courses
	• Many of task related exercises previously mentioned are also examples of dynamic balance activities. Examples include:
	  • sit to stands
	  • tap ups and step ups
	  • weight shifting, modified lunges and reaches in all directions including to the floor
	  • stepping in all directions
	• If and when appropriate, more challenging agility tasks can be introduced such as walking sideways and backwards, walking on or near a line, or high knee walking.
	• Using the dynamic balance exercises listed above can also provide the dual benefits of incorporating an aerobic component and fall prevention.
		Ensure appropriate supervision is provided. 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.
		
		Chairs, railings, participant's gait aids (e.g. walkers) or other environmental aids can be used to ensure safety and minimize risk for falls during balance and coordination activities.
		
		The type of activity selected must be based on participants' abilities and safety considerations.

Social benefits derived from participation in a group exercise program may continue beyond the exercise period further supporting the value of incorporating exercise into daily routines. It should also be recognized that the benefits achieved through exercise are only maintained if participation in exercise is ongoing (MacKay-Lyons et al., 2006). Therefore, it is important to encourage and foster ongoing participation in a regular fitness routine following completion of the formal program. Independent exercising by participants helps to support an ongoing fitness routine.

The following strategies can be employed to maximize adherence and participation in regular exercise:

- gradually progress intensity
- establish an exercise schedule
- minimize the risk of muscle soreness
- emphasize enjoyment in the program/activity
- provide ongoing positive reinforcement
- use activity logs and charts to record participation and progress. For some participants, maintenance of their current status is a worthwhile and more realistic objective, as their deficits may preclude ongoing progression.
- schedule sessions at a convenient time and at an accessible location (see Guideline #7: Facility)
- integrate task-related activities into exercise classes
- encourage participants to incorporate additional exercise opportunities into their weekly routines (e.g. daily walks, attending other recreational activities, home exercise, finding an exercise 'buddy').

Table 4 provides examples of exercise programs specific to stroke.

Table 4 Examples of Exercise Programs Specific to Stroke

Program	Access	Details
Fitness and Mobility Exercise Program (Eng et al., 2006)	University of British Columbia - Neurorehabilitation Research Program http://neurorehab.med.ubc.ca/fame/	• A community-based exercise program developed for people with stroke • Program available via download from the website. • Terms and Conditions apply.
Together in Movement and Exercise (TIME™) (Howe et al., 2015)	University Health Network – Toronto Rehab www.uhn.ca/TorontoRehab/PatientsFamilies/Clinics_Tests/TIME	• The TIME™ exercise program was designed by physiotherapists at Toronto Rehab and is led by trained fitness instructors in community centres • A toolkit is available which supports the implementation of the TIME™ exercise program (*Implementing a Community-Based Exercise Program for People with Balance and Mobility Challenges: A Step-by-Step Toolkit*) • Terms and Conditions apply
Fit for Function	A program of the LiveWell partnership between the YMCA of Hamilton/Burlington/Brantford, Hamilton Health Sciences and McMaster University http://ymcahbb.ca/Programs/LiveWell/Fit-For-Funtion-LiveWell	• A 12 week community-based exercise and educational program for stroke survivors.

Program	Access	Details
MOST: Moving On After Stroke (Huijbregts et al., 2009)	Offered throughout the Northwestern Ontario Stroke Region http://ontariostrokenetwork.ca/stroke-rehabilitation-resource-centre/wp-content/uploads/sites/2/2014/03/04a-Moving-On-After-Stroke-program-Brochure.pdf	• A group exercise and self- management education program for people with stroke.
Movement Therapy Stroke Recovery group: The Getting on After Stroke group	Offered through Baycrest Health Sciences in Toronto http://www.baycrest.org/care/care-programs/community-programs/wagman-centre/stroke-recovery/	• A two-hour program offered two times per week which includes one hour of exercise using a specifically designed exercise circuit and on hour of facilitated group interaction and activity

GUIDELINE # 5: PROGRAM EVALUATION

Program evaluation processes should be in place in order to monitor program successes and challenges and to track services delivery, staffing levels and participant satisfaction.

Rationale

Program evaluation supports the delivery of a safe, effective exercise program, improved service provision, improved access to exercise and enhanced participant satisfaction. One of the overall goals of the program is to promote sustained change in physical activity levels. Strategies to measure this may be considered (e.g. self-reported changes in physical activity levels outside of the program). Program evaluation reports can inform community recreation planning, public relations efforts and support sustainability.

Potential Evaluation Indicators include:

Process indicators reported by session or annually such as:

- Number of participants
  - Number of new participants
  - Number of returning participants (re-registration rate)
- Number on wait list
- Adherence rates (e.g. percent attendance in past session, proportion of dropouts)
- Outcome indicators such as:
- Participant satisfaction measured through questionnaires (see Howe et al., 2015 for sample satisfaction questionnaire) participant testimonials and/or re-registration rates
- Number of participants transitioning to non-adapted exercise programs within the facility
- Number of participants engaged in regular exercise and recreation activities outside of the program (e.g. reported in diary or verbally)
- Reduced reliance of individual participants on caregivers or volunteers for support/supervision during program activities (e.g. anecdotal report/observation)
- Participant self-reported change (e.g. in energy levels, confidence in mobility/balance, use of walking aids, quality of life, function [rising from chairs, distance walked], participation in community outings and/or social activities)
- Goal attainment (e.g. participants may be encouraged to set and monitor personal goals)
- Participant performance measures for consideration are listed in Resources and Considerations below.

Resources and Additional Considerations

Depending on program resources, the evaluation strategy used can vary and should be adapted to reflect the individual program considering the above potential indicators. There are many additional standardized measures available for use in the stroke population. These may be used for pre- and post-session testing, if resources allow. The use of the following tools is not mandatory but may provide additional valuable information.

- Two or Six Minute Walk Test (Kosak & Smith, 2005; American Thoracic Society, 2002)
- Walking speed (10 meter walk test) (retrieved from : http://www.rehabmeasures.org/PDF%20Library/10%20Meter%20Walk%20Test%20Instructions.pdf)
- Timed Sit to Stand Test (Mong, Teo & Ng, 2010)
- Timed Up and Go (Podsiadlo & Richardson, 1991)

- Stroke Specific Quality of Life (Williams et al, 1999)
- Stroke Impact Scale (Duncan et al, 1999)

For programs that wish to include standardized measures, additional information can be obtained from your local Stroke Network/District Stroke Centre (See Appendix B). For some participants a change in the standardized outcome measures listed above may not be observed. Success can then be measured through ongoing participation in the adapted exercise program and integrating exercise into daily life. Attendance at recurring sessions allows participants to continue to experience the many benefits of exercise. The participant voice is often one of the most powerful and meaningful ways to learn about the impact of your program. Consider obtaining permission for use of quotes/participant feedback to endorse or improve your program.

GUIDELINE #6: EXERCISE PROVIDERS

The exercise provider should ensure that fitness instructors are trained (and provided with updated information as needed/requested) to deliver programs meeting the needs of people living with the effects of stroke. Exercise providers may receive certification from a variety of organizations. It is critical that all exercise providers work within their scope as defined by the relevant certification program and insurance coverage parameters. It is recommended that exercise providers establish linkages with health care providers who can offer ongoing support and stroke-specific expertise as required.

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, exercise providers who provide programs to people living with the effects of stroke need to be aware of the multi-factorial nature of stroke; they may have weakness or paralysis and may experience changes to their muscle tone, sensation, perception and vision. These issues may impact movement, walking, joint stability, balance and activities of daily living. People living with the effects of stroke may also have issues with communication, fatigue, remembering or understanding instructions and mood/depression. Participants with cardiovascular disease may experience evolving challenges with co-morbid conditions such as such as diabetes and hypertension (high blood pressure). Additionally, these individuals will be at a higher risk for recurrent stroke (e.g., 25% risk of recurrence within 5 years, 39% risk or recurrence within 10 years (Mohan,2011) Information on such issues can be obtained by accessing the Heart & Stroke Foundation's website at: http://www.heartandstroke.on.ca/site/c.pvI3IeNWJwE/b.3581685/k.CE49/Stroke.htm

Additionally, instructors leading these exercise programs should provide motivational support and modeling. (Stuart, 2009; Spencer-Cavaliere, 2014)

Resources and Additional Considerations

The Regional or District Stroke Centre is a valuable resource for stroke care information and linkages as well as information on local resources. Please see Appendix B for a listing of Regional/ District Stroke Centres. Where available, the 211 system (www.211ontario.ca) and the Healthline (www.thehealthline.ca) provide a listing of local community resources.

The program provider should follow the Canadian Fitness Safety Standards (CFSS) .

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.).

Canadian Fitness Safety Standards – Fitness Related Personnel

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 exercise providers leading programs that include people living with the effects of stroke should cover the following competencies:

- Demonstrating knowledge 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, communication issues (Blonski et al., 2014), depression and fatigue.
- Judging whether a participant should be excluded from the program, when exercise should be stopped, and/or when the participant should be referred to an appropriate health care provider before resuming participation.
- Developing exercise progression safely to avoid falls, excessive muscle soreness or fatigue and cardiovascular stress.
- Training and directing assistants, volunteers and caregivers (Eng et al., 2006, French et al., 2008)
- Liaising with appropriate health care providers (e.g., physiotherapy) for initial training and ongoing support/updates as needed. (Stuart et al., 2009, Harrington et al., 2009, Wiles et al., 2008, Salbach et al., 2014, Billinger et al., 2014, French et al., 2008).

See Table 5 for a listing of Stroke Specific Fitness Instructor Education Resources.

Previous training or experience in working with the exercise program's specific population (e.g. stroke) provides enhanced competencies. (Poliakoffa et al., 2013, Stuart et al., 2009).

Studies have suggested that collaboration between exercise providers and health care professionals can enhance the safety and design of the exercise program (Howe et al., 2015; French et al., 2008; Stuart et al., 2009; Salbach et al., 2014). It should also be noted that the Canadian Stroke Best Practice Recommendations suggest that,

> "Supervision by a health-care professional (such as physiotherapist) at exercise initiation should be considered in individuals with stroke at risk of falls or injury, or in individuals with other co-morbid disease (such as cardiac disease), which may place them at higher risk of medical complications."Canadian Stroke Best Practice Recommendations, Prevention of Stroke, Section 2.3 ii).

Table 5 Stroke Specific Fitness Instructor Education Resources

Resource	Access	Details
Post Rehab Exercise for Stroke (PRES)	Western University – Centre for Activity and Aging http://www.uwo.ca/ccaa/training/workshops/pres.html	• 6 hour workshop for senior fitness instructors • Provides the tools required to develop and instruct community physical activity programs for people with stroke following rehabilitation • Prerequisites required • Cost: $150 + applicable taxes
Fitness Instructor Training Programme: Community-Based Exercise for People Living With Stroke - A self-study DVD (French, MacLeod, Reinikka, 2008)	Northwestern Ontario Regional Stroke Network http://www.tbrhsc.net/regional-partners/northwestern-ontario-regional-stroke-network/stroke-resources/	• Self-Study DVD training package • Enables non-health care professionals to deliver an exercise programme based on best practice to people living with stroke • Cost: $20
VON Healthy Lifestyles Education Initiative Webinars: • Stroke and Exercise	VON Canada http://ontariostrokenetwork.ca/patientsfamiles/useful-links-for-patients-and-families/	• 2 part webinar series developed for VON SMART exercise program instructors and volunteers. Also relevant to fitness instructors. • Part A: Stroke - Impairments and Risk Factors • Part B: Stroke and Exercise • Each webinar is approximately 30 minutes
Together in Movement and Exercise™ (TIME™)	University Health Network – Toronto Rehabilitation Institute http://www.uhn.ca/TorontoRehab/PatientsFamilies/Clinics_Tests/TIME	• A task related community based exercise program developed by Toronto Rehabilitation Institute originally in partnership with City of Toronto Parks Forestry and Recreation • Website provides an overview of the program including information for clinicians and participants, listing of current sites, toolkit of resources to support the implementation of a program • Toolkit fee (cost $60 for electronic version & $85 for hard copy) and licensing requirements apply

Additional resources providing general information on stroke for exercise providers, people living with the effects of stroke and caregivers may be found in Appendix J.

GUIDELINE # 7: FACILITY

The exercise provider should offer participants 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 living with the effects of 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 any exercise equipment that may be used. The exercise provider, in collaboration with the participant and their support persons, should also identify any ongoing transportation needs the person living with the effects of stroke may have in order to attend the program. Additionally, for an appropriate training environment consideration should be given to the temperature of the exercise room as well as access to water* to safeguard against overheating or dehydration.

*Exercise providers should be aware of participants who have swallowing impairments and should recommend that these participants bring their own refreshments if water is not appropriate (e.g. they require thickened fluids).

Resources and Additional Considerations

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

Accessibility for Ontarians with Disabilities Act (AODA)

The act includes the Integrated Accessibility Standards Regulation (IASR) that provides standards which assist organizations in their determination of where they need to remove barriers to information and communication, employment, transportation and the design of public space (http://www.aoda.ca and http://accessontario.com).

Beginning in 2015, all organizations (public, private, and nonprofit) have to meet accessibility requirements when constructing and maintaining new or redeveloped elements of public spaces including:

- Recreational trails and beach access routes
- Outdoor eating areas for public use
- Outdoor play spaces (such as playgrounds)
- Exterior paths of travel (such as walkways across parks or between buildings)
- Accessible on and off street parking
- Service counters and waiting areas

Integrated Accessibility Standards Regulation Guidelines

http://www.mcss.gov.on.ca/documents/en/mcss/accessibility/DOPS%20Guidelines%20(short)%20FINAL%20April%202014%20EN-s.pdf

For information on barrier-free designs, perform a Google search to access local and regional resources.

GUIDELINE #8: EMERGENCY PLAN & EQUIPMENT

The exercise provider should have an emergency plan that is documented and known to all exercise providers which 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 (AED) is highly recommended.

Rationale

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

Resources and Additional Considerations

See Table 6 Symptom Response

Canadian Fitness Safety Standards http://ontariostrokenetwork.ca/stroke-rehabilitation-resource-centre/wp-content/uploads/sites/2/2014/03/Canadian-Fitness-Safety-Standards.pdf

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.

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

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

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).

Accessibility for Ontarians with Disabilities Act (AODA) requires emergency plans to be in place.

http://www.aoda.ca search ‘emergency plan’

http://www.aoda.ca/emergency-preparedness-new-aoda-rules-for-persons-with-disabilities/

An additional document of interest can be accessed by performing a search for *“AHA/ACSM Joint Position Statement: Recommendations for Cardiovascular Screening, Staffing, and Emergency Policies at Health/Fitness Facilities.”*

Table 6 Symptom Response

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

Participants should be closely monitored throughout the exercise session. The exercise provider 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, on the participant's weak side and slightly behind.

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

<u>Signs & symptoms which require participant to IMMEDIATELY STOP exercising:</u>

- **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**
- **Seizures**
- **Excessive thirst**
- **Trembling**
- **Palpitations**
- **Irritability, nervousness, confusion**
- **Numbness or tingling in tongue or lips**
- **Denial of symptoms**

IF A PARTICIPANT IS EXPERIENCING ANY OF THESE SIGNS OF A STROKE, CALL 911 IMMEDIATELY AND/OR FOLLOW EMERGENCY PROCEDURES.

APPENDIX A

CONTRIBUTING AUTHORS

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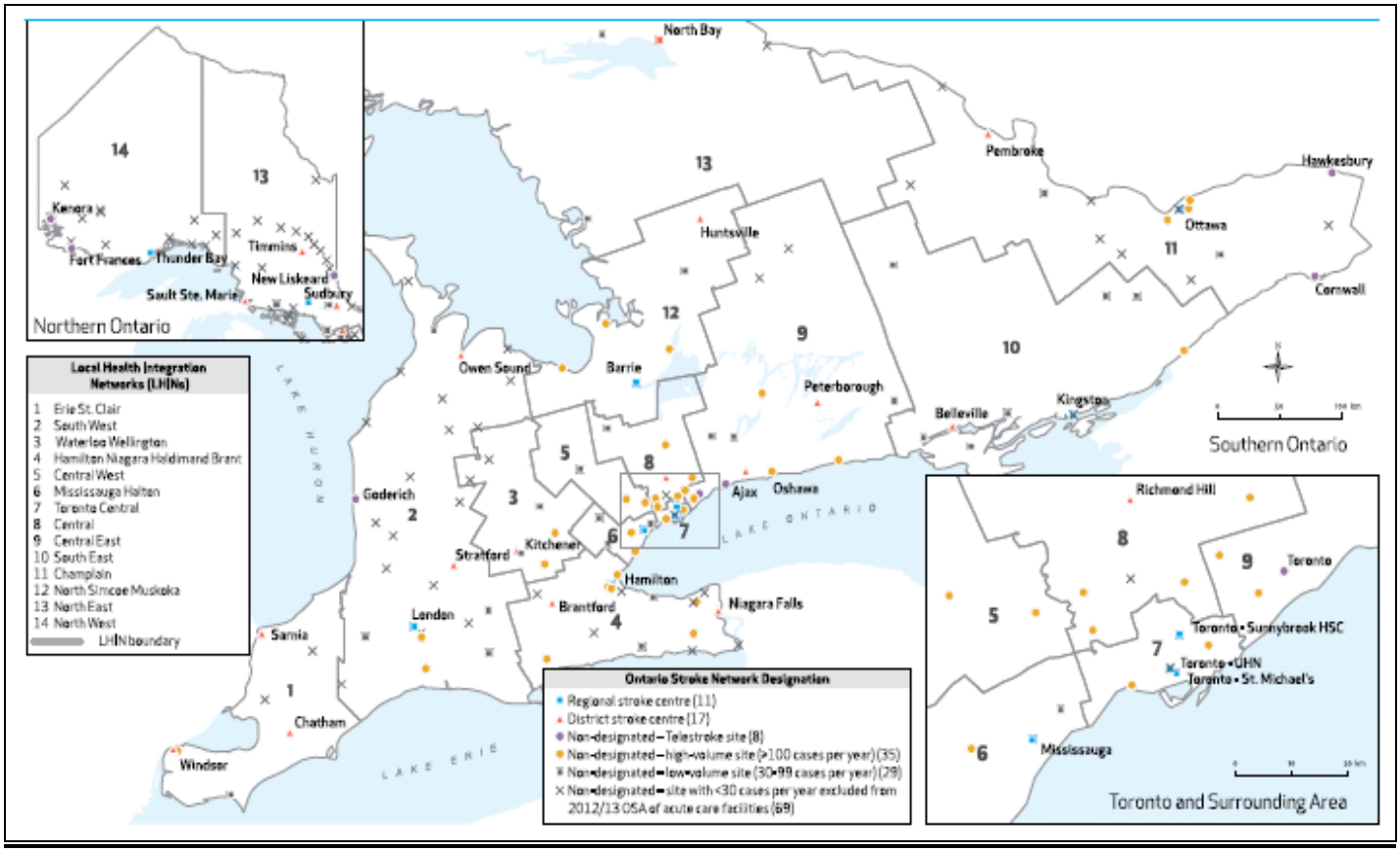
APPENDIX B
REGIONAL & DISTRICT STROKE CENTRES



REGIONAL STROKE CENTRES

Region	Address	Phone	Website
Central East	Royal Victoria Hospital Regional Health Centre 201 Georgian Drive Barrie, ON L4M 6M2	(705)728-9090 Ext. 46320	http://www.cesnstroke.ca
Central South	Hamilton Health Sciences Centre 237 Barton Street East Hamilton, ON L8L 2X2	(905)527-4322 Ext. 46049	http://www.hamiltonhealthsciences.ca
Champlain	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	Health Sciences North 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	http://www.tostroke.com/
Northwestern Ontario	Thunder Bay Regional Health Sciences Centre Medical Centre, 201-984 Oliver Road Thunder Bay, ON P7B 7C7	(807) 684-6703	http://www.nwostroke.ca
Southeastern Ontario	Kingston General Hospital Regional Stroke Program Stroke Network of Southeastern Ontario Watkins 3, Rm 4-3-409-0 76 Stuart St Kingston, ON K7L 2V7	(613) 549-6666 Ext. 3853	http://www.strokenetworkseo.ca/

Region	Address	Phone	Website
Southwestern Ontario	London Health Sciences Centre 339 Windermere Road London, ON N6A 5A5	(519) 685-8500 Ext. 32462	http://www.swostroke.ca
South East Toronto	St. Michael's Hospital 70 Bond St. Basement Toronto, ON M5B 1X3	(416) 864-6060 Ext. 2815	http://www.tostroke.com/
West GTA	Trillium Health Partners Mississauga Site 100 Queensway West Mississauga, ON L5B 1B8	(905) 848-7580 Ext. 5475	http://trilliumhealthpartners.ca
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 Care Belleville General Hospital, District Stroke Program 265 Dundas Street East, Belleville, ON K8N 5A9	(613) 969-7400 Ext. 2235
Brantford	Brantford General Hospital 200 Terrace Hill Street Brantford, ON N3R 1G9	(519) 751-5544 Ext. 4451
Chatham-Kent	Chatham Kent Health Alliance 80 Grand Avenue West Chatham, ON N7M 5L9	(519) 352-6401 Ext. 6900
Durham	Lakeridge Health Corporation 1 Hospital Court Oshawa, ON L1G 2B9	(905) 576-8711 Ext. 2553
Haliburton Kawartha Pine Ridge	Peterborough Regional Hospital 1 Hospital Drive Peterborough, ON K9J 7C6	(705) 743-2121 Ext. 3946
Muskoka	Muskoka Algonquin Health Care Huntsville District Memorial Hospital 100 Frank Miller Drive Huntsville, ON P1H 1H7	(705) 789-0022 Ext. 503
Niagara Falls	Greater Niagara General 5546 Portage Road Niagara Falls, ON L2E 6X2	(905) 378-4647 Ext. 55557
North Bay	North Bay Regional Health Centre 50 College Drive North Bay, ON P1B 5A4	(705) 474-8600 Ext. 3283

District	Address	Phone
Grey Bruce	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
Sarnia-Lambton	Bluewater Health 89 Norman Street Sarnia, ON N7T 6S3	(519) 464-4400 Ext. 4465
Sault Ste. Marie	Sault Area Hospital 750 Great Northern Road Sault Ste. Marie, ON P6B 0A8	(705)759-3434 Ext. 5288
Huron -Perth	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
Waterloo-Wellington	Grand River Hospital 835 King St W, Kitchener, ON N2G 1G3	(519) 749-4300 Ext. 2870
Windsor-Essex	Windsor Regional Hospital Ouellette Site 1030 Ouellette Avenue Windsor, ON N9E 1A1	(519) 973-4411 Ext. 3082
York	Mackenzie Health 10 Trench Street Richmond Hill, ON L4C 4Z3	(905)883-1212 Ext. 3882

APPENDIX C
Physical Activity Readiness Clearance Form

CSEP | SCPE
THE GOLD STANDARD IN EXERCISE SCIENCE AND PERSONAL TRAINING

CSEP-PATH: PHYSICIAN PHYSICAL ACTIVITY READINESS CLEARANCE

Dear Physician, _____

Patient Name: _____

Date: _____

Your patient has consulted a Canadian Society for Exercise Physiology - Certified Personal Trainer® (CSEP-CPT) for a physical activity, fitness and lifestyle assessment and/or personal training services.

Although evidence demonstrates that becoming more active is very safe for most people and yields many health benefits, it is important to identify clients who may need a more thorough evaluation before doing a fitness assessment or becoming much more physically active.

During our standardized screening procedures we became aware that your patient:

☐ Answered "Yes" to one or more questions on the Physical Activity Readiness Questionnaire (PAR-Q+) – see copy attached. Specific concern:

_____

☐ Had a Resting Heart Rate of ____ (above the safety cut-off of 99 bpm)

☐ Had a Resting Blood Pressure of ____/____ (above the safety cut-off of 144/94 mmHg)

To ensure that your patient proceeds in the safest way possible, they were advised to consult with you about becoming more physically active. Please complete and sign this form, indicating any necessary physical activity restrictions, and have your patient return the form to their CSEP-CPT.

Based upon my review of the health status of _____ , I recommend:

☐ Unrestricted physical activity based on the *Canadian Physical Activity Guidelines* - start slowly and build up gradually

☐ Progressive physical activity:

- ☐ With avoidance of: _____
- ☐ With inclusion of: _____

☐ Only a medically-supervised exercise program until further medical clearance

☐ No physical activity

CANADIAN SOCIETY FOR EXERCISE PHYSIOLOGY CSEP.CA

Physician Name (please print):

Signed: _____

Date: _____

Physician/Clinic Stamp:

If you have any questions regarding the physical activity, fitness and lifestyle assessment, the PAR-Q+, or the services provided by the CSEP-CPT, please contact:

CSEP-CPT: _____

Email and Phone: _____

NOTE: This Physician Physical Activity Readiness Clearance is valid for a maximum of one year from the date it is completed, and becomes invalid if your patient's medical condition worsens.

APPENDIX D

ePARmed-X+ Physician Clearance Follow-Up

This form is separated into three main sections:

A) Background information regarding the PAR-Q+ and ePARmed-X+ clearance process,
B) A brief history and demographic information regarding the participant, and
C) The physician's recommendations regarding the participant becoming more physically active.

At the end of this process, the participant is recommended to take this signed clearance form to a qualified exercise professional or other healthcare professional (as recommended in the ePARmed-X+) before becoming more physically active or engaging in a fitness appraisal.

A BACKGROUND INFORMATION REGARDING THE PAR-Q+ AND ePARMed-X+ CLEARANCE PROCESS

The ePARmed-X+ is an easy to follow interactive program (www.eparmedx.com) that can be used to determine an individual's readiness for increased physical activity participation or a fitness appraisal. The ePARmed-X+ supplements the paper and online versions of the new Physical Activity Readiness Questionnaire for Everyone (PAR-Q+).

Individuals who use the ePARmed-X+ have had a positive response to the PAR-Q+, or have been directed to the online program by a qualified exercise professional or another healthcare professional, owing to his/her current medical condition. At the end of the ePARmed-X+, it is possible that the participant is advised to consult a physician to discuss the various options regarding becoming more physically active. In this instance, the participant will be required to receive medical clearance for physical activity from a physician. Until this medical clearance is received, the participant is restricted to low intensity physical activity participation.

This document serves to assist both the participant and physician in the physical activity clearance process.

B PERSONAL INFORMATION

NAME: _____ SEX: ☐ M or ☐ F

ADDRESS: _____ BIRTHDATE (mm/dd/yy): _____

_____

_____

TELEPHONE: _____ HEALTH/MEDICAL NUMBER: _____

REASON FOR REFERRAL (SELECT ALL THAT APPLY):

- ☐ QUALIFIED EXERCISE PROFESSIONAL REFERRAL
- ☐ HEALTH CARE PROFESSIONAL REFERRAL
- ☐ ePARmed-X+ RECOMMENDATION

C ePARmed-X+ PHYSICAL ACTIVITY READINESS PHYSICIAN REFERRAL FORM

Based on the current review of the health status of _____(name)
I recommend the following course of action:

- ☐ The participant should avoid engaging in physical activity at this time.
- ☐ The participant should engage in only a medically supervised physical activity/exercise program involving the supervision of a qualified exercise professional (or other appropriately trained health care professional) and overseen by a physician.
- ☐ The participant is cleared for intensity and mode appropriate physical activity/exercise training under the supervision of a qualified exercise professional.
- ☐ The participant is cleared for intensity and mode appropriate physical activity/exercise training with limited supervision (i.e., unrestricted physical activity).

The following precautions should be taken when prescribing exercise for the aforementioned participant:

- With the avoidance of: _____
  _____
  _____
  _____
- With the inclusion of: _____
  _____
  _____
  _____

NAME OF PHYSICIAN: _____

ADDRESS: _____

TELEPHONE: _____

Date of Medical Clearance (mm/dd/yy): _____

PHYSICIAN/CLINIC STAMP AND SIGNATURE

NOTE: This physical activity/exercise clearance is valid for a period of six months from the date it is completed and becomes invalid if the medical condition of the above named participant changes/worsens.

APPENDIX E
SAMPLE REFERRAL FORM (Howe et al, 2015)

(To be completed and signed by Physician, PT, or RN/NP)

_____ [name] is interested in participating in a group exercise program for people who have challenges with balance and mobility. Fitness instructors lead the exercise program. Eligible persons are those who can walk a minimum of 10 metres with or without a walking aid.

This program provides exercise for health and wellness, not physiotherapy. It offers exercises to address strength, balance and endurance. Classes include:

- The practice of everyday activities such as standing up from a chair, walking, reaching and bending, and stepping on and off steps. Supports are provided for balance as needed.
- Light to moderate aerobic exercise; 1-hour of exercise, once or twice per week for about 12 weeks per session and up to 3 sessions per year.
- A supportive environment with a safe staff (fitness instructor and volunteer) to participant ratio.

If your patient has either of the following, he/she would not be suitable for this program. Please indicate if either of the following apply: □ Uncontrolled angina □ Uncontrolled hypertension

Is a support person needed to assist with personal care needs (i.e., washroom)? □ YES □ NO

Is your patient presently medically stable and safe to participate in exercise? □ YES □ NO

Can your patient walk by him/herself 10m, with or without a walking aid? □ YES □ NO

Does your patient have a history of, or currently have the following (check all that apply):

□ Stroke
□ MS
□ Acquired brain injury
□ Cognitive and/or behavioural issues that may impede group participation
□ Diabetes
□ Peripheral vascular disease
□ Seizures: Date of last one: _____ Frequency: _____
□ Other medical conditions: _____
□ Osteoporosis
□ Severe joint pain preventing exercise

The following are precautions for which a graded exercise test/stress test is recommended. Does your patient have a history of (check all that apply):

□ Cardiac arrest □ Congestive heart failure □ Asthma/COPD that worsens with activity

Do "Hip Precautions" apply? □ YES □ NO In effect until: _____

☐ **Please attach a printed list of your patient's current medications.**

Considering all aspects of my patient's medical history, I agree that _____ does not have any health issues that would prevent him/her from participating in the exercise program as described.

Referring Professional's Name (please print): _____ Phone #: (___) _____

Signature: _____ Date: _____

Send completed form to:

[add your contact information here]

APPENDIX F
SAMPLE PHYSICIAN CONSENT FORM

Community Exercise Programme for Stroke Physician Consent Form

Dear Doctor:

Your patient _____wishes to participate in a Community-based Exercise Programme for People Living with Stroke. This programme will occur twice weekly for 8 weeks. Each session will be 60 minutes in total, and will include a 10 minute warm-up and stretching component, 20 minute strengthening and aerobic fitness component, 10 minute balance and mobility component, and a 5 minute cool-down. The intensity will be gradually increased to a moderate to somewhat strong intensity (i.e. able to still converse comfortably with little effort).

By completing this form, you are not assuming any responsibility for the exercise. However, this information will help us to determine whether your patient is safe to participate in the programme.

I consent to and authorize _____ to release to_____ relevant health information concerning my stroke and my ability to participate in the exercise programme. Authorization is not valid beyond 6 months from the date of signature. Further disclosure of release of my health information is prohibited without specific written consent of person to whom it pertains.

Participant signature :	Date:
Health Care Link signature:	Date:

Fitness Instructor Training Programme: Stroke French MacLeod Reinikka 2008

Community Exercise Programme for Stroke Physician Consent Form

Please complete the following information:

Date of Stroke (dd/mm/yyyy)		
Type of Stroke (please check)	Ischemic ☐	Hemorrhagic ☐
Location of Stroke		
Please check if the client has any of the following contraindications to our programme:		
☐ Presence of an unstable medical condition		
☐ Presence of a disorder (other than stroke) that may affect balance (i.e. head injury, vestibular dysfunction or severe peripheral neuropathy)		
☐ Musculoskeletal contraindications to exercise		☐ Presence of dementia

Physician Recommendations (please check 1 box)

	I am not aware of any contraindications toward participation in this programme.
	I believe the applicant can participate, but urge caution because:
	The applicant should not engage in the following activities:
	I recommend the applicant **NOT** participate in the above exercise programme.
Physician signature:	Date:
Physician name (print):	
Address:	

APPENDIX G

STRATEGIES TO ENHANCE PARTICIPATION FOR ADULTS WITH COMMUNICATION (APHASIA) & SWALLOWING (DYSPHAGIA) DIFFICULTIES

Person's living with aphasia and/or dysphagia can participate in "aphasia/dysphagia friendly" community exercise programs designed for people living with the effects of stroke with a high degree of success. In fact, participation in leisure activities can reduce the social isolation often experienced by people with aphasia and can provide a safe environment where they may be able to enhance their communication capacity through practice.

Aphasia is an impairment of language, affecting the production or comprehension of speech and the ability to read or write. Aphasia is always due to injury to the brain, most commonly from a stroke. During the intake assessment it is important to establish the preferred method of communication with the participant. This may include nonverbal cues such as demonstrations, pictures, key wording on a clip board or having a "communication partner".

Dysphagia describes the difficulty with swallowing that some clients experience after a stroke. This difficulty can cause choking on foods and/or liquids. During the intake assessment it is important to ascertain if there are any restrictions on what fluids the participant is able to safely swallow and if they have any special needs in this regard (e.g. thickened fluids, nectars, jello). If so, arrange with the participant that they bring in the appropriate fluids for hydration.

Strategies to ensure classes are accessible to persons living with **aphasia** include:

- Supporting a participant's request to bring a communication partner to the exercise sessions
- Providing the time needed for the participant to communicate, allow extra time for the participant to understand the message, speak slowly and clearly while facing the participant and remember that aphasia does not equal lack of intelligence.
- Consider keeping verbal instructions to a minimum
- Using supported conversation strategies such as pictures, key wording, written choice communication and written transcripts
- Using facial expressions to relay messages
- Using non-verbal communication such as exercise demonstrations and gestures
- Adapting materials to be aphasia friendly by including pictures and words
- Providing assistance as needed with scheduling transportation, understanding program information, and filling out registration forms
- Having consistent staff who are able to build a relationship with the person living with aphasia and learn the communication strategies that work best
- The participant may need guidance during the exercise program including one-on-one attention and modification of exercises as needed
- Keeping routines as consistent as possible including scheduled exercise program times and class format

Strategies to ensure classes are accessible to persons living with **dysphagia** include:

- Developing a plan to ensure that appropriate foods/fluids are available (participant may need to bring their own refreshments)

Resources and References

Aphasia Institute www.aphasia.ca

Aphasia Centre of Ottawa www.aphasiaottawa.org

Heart and Stroke Foundation
http://www.heartandstroke.com/site/c.ikIQLcMWJtE/b.8485305/k.6AAA/Living_With_Stroke_Tips.htm#communication-tab

Blonski, Dianne C. et al. (2014). Barriers to and Facilitators of Access and Participation in Community-Bases Exercise Programmes from the Perspectives of Adults with Post Stroke Aphasia. *Physiotherapy Canada*. 66:4

APPENDIX H
SESSION CHECKLIST – Example

Use this checklist before, during and after each session to support the safety, efficiency and effectiveness of the program.

ITEM	POTENTIAL COMPONENTS	√ or X
BEFORE SESSION		
Emergency procedures	AED available, working telephone available, entrances and exits clear, fire extinguisher available, emergency communication system in place.	
Facility	Check temperature, lighting, cleanliness, washrooms.	
Equipment	Clean, correct number, not damaged.	
Program Files (e.g., handouts, participant information)	Handouts, participant information, attendance sheet.	
Readiness for Class	Prior to class, reminder to participants to use washroom facilities, take required medications as prescribed, have required medications readily available, wear appropriate footwear and clothing.	
Health Status	Ask each participant if they have experienced any change in health status since the last exercise class.	
DURING SESSION		
Hydration	Remind participants to stay hydrated, remember accommodations for participants who have dysphagia.	
Capacity/Fatigue	Remind participants to exercise at their own pace and to self-monitor their exertion during the class.	
Updates	Provide any updates (e.g., change to class time, change in instructor, number of sessions remaining).	
Wrap Up	Remind participants to continue to self-monitor and to continue with a range of exercises/activities on a daily basis.	
AFTER SESSION		
Updating	Update participant files as needed (e.g., any special considerations for next session).	
Planning	Ensure class plan is in place for next session.	

APPENDIX I
EXERCISE INTENSITY CHART

Table 2.9b Approximate relationships among indicators of exercise intensity based on data from studies involving non-disabled individuals. Adapted from American College of Sports Medicine. ACSM's Guidelines for Exercise Testing and Prescription. 9th ed. Philadelphia, PA: Lippincott Williams and Wilkins; 2014.

Exercise Intensity			Clinical Indicators of Exercise Intensity				
			RPE Scales				Talk Test
Description	**%HRR**	**%HR max**	**6-20**	**Description**	**0-10**	**Description**	**Description**
Very Light	<30	<57	6 7 8	Very, very light	0 .5	Nothing at all Extremely light	Can sing and converse with no effort
Light	30 - <40	57-63	9 10 11	Very light Fairly light	1 2	Very Light Light	Can converse with almost no effort
Moderate	40 - <60	64-75	12 13	Somewhat hard	3 4	Moderate Somewhat hard	Can converse comfortably with little effort
Vigorous	60 - 89	76-95	14 15 16 17	Hard Very hard	5 6 7	Hard Very hard	Can converse with some effort ➔ Converses with quite a bit of effort
Near maximal or maximal	≥90	≥96	18 19 20	Very, very hard	8 9 10	Extremely hard	Can conserve with quite a bit of effort and must stop talking to catch breath Converses with maximum effort ➔ Unable to converse

MacKay-Lyons, M., Macko R., Eng, J., Billinger, S., Hafer-Macko, C. Suskin, N. and Che, M. (2013). *AEROBICS: Aerobic Exercise Recommendations to Optimize Best Practices in Care After Stroke*. Nova Scotia Health Research Foundation, Canadian Institutes of Health Research, Heart and Stroke Foundation of Canada and Faculty of Health Professions, Dalhousie University.

APPENDIX J

ADDITIONAL EDUCATIONAL RESOURCES – FITNESS INSTRUCTORS & PARTICIPANTS

Resource	Access	Description
Heart and Stroke Foundation	Heart and Stroke Foundation http://www.heartandstroke.on.ca/site/c.pvI3IeNWJwE/b.3581685/k.CE49/Stroke.htm	Website for persons living with the effects of stroke and their caregivers providing information on stroke prevention, recognition, care and treatment.
StrokEngine	StrokEngine http://strokengine.ca/	Website for professionals and persons living with the effects of stroke and their caregivers.
March of Dimes - Stroke Recovery Canada	March of Dimes http://www.marchofdimes.ca/EN/programs/src/Pages/src.aspx	Resources for persons living with the effects of stroke and their significant others. Includes information and toll free number for the Warmline (phone connections to persons living with the effects of stroke and caregivers). Local support groups for persons living with the effects of stroke and their caregivers.
Taking Action for Optimal Community and Long Term Stroke Care available January 2016.	Heart and Stroke Foundation http://www.heartandstroke.on.ca/site/c.pvI3IeNWJwE/b.6194819/k.9B09/Tips_and_Tools.htm	Resource designed to provide the practical knowledge and skills needed by those who provide care to persons living with the effects of stroke.
Your Stroke Journey: A Guide for People Living with Stroke	Heart and Stroke Foundation http://www.heartandstroke.com/atf/cf/%7B99452d8b-e7f1-4bd6-a57d-b136ce6c95bf%7D/YOURSTROKEJOURNEY_FINAL_ENGLISH.PDF	A guide for persons living with the effects of stroke and families to help understand stroke and its effects. Includes tips and strategies for living life fully and information about the support services, healthcare providers and networks of persons living with the effects of stroke that can help

		during the stroke recovery journey.
Resource	**Access**	**Description**
Thehealthline: Stroke Resources	www.thehealthline.ca	Listing of health care and community services with specific links to stroke-relevant resources.
Stroke in Young Adults	Heart and Stroke Foundation http://www.canadianstroke.ca/wp-content/uploads/2014/12/Stroke_Young_FINAL.pdf	Resource designed for young adults who are living with the effects of stroke.
Taking Charge of Your Stroke Recovery	Heart and Stroke Foundation http://www.strokebestpractices.ca/wp-content/uploads/2014/08/HSF_SBP_PatientsGuide_F14_EN_July2014-FINAL.pdf	Guide to the Canadian Stroke Best Practice Recommendations for persons living with the effects of stroke and their caregivers.

APPENDIX K

GLOSSARY OF TERMS

Aphasia: Aphasia makes it hard to express and understand language, both spoken and written. The amount of disability depends on where the stroke took place in the brain and how much damage there was. Aphasia often happens to people who have had a stroke in the brain's left hemisphere. Expressive aphasia means having trouble getting the message out. The individual will know what they want to say but the words do not come out right. Receptive aphasia means having trouble taking the message in. The individual may not understand what people are saying to them. (Heart & Stroke Foundation, 2014)

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

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

Clonus: A series of involuntary, rhythmic, muscular contractions and relaxations which may occur with spasticity (also, see spasticity).

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 of muscle and/or soft tissue resulting in decreased range of motion of a joint.

Dysphagia: A problem with swallowing food and drink is called dysphagia. This happens when the individual has trouble using the muscles in their throat or mouth to move food and drink around. Or, the individual may have lost feeling in their mouth. Dysphagia can put the individual at risk of choking or inhaling food (aspiration). (Your Stroke Journey, *Heart and Stroke Foundation*)

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) joint.

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.

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: Involuntary movements or muscle contractions which may be intermittent or sustained as a result of a stroke or other insults to the brain or spinal cord (also, see clonus).

APPENDIX L

REFERENCES

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Canadian Centre for Activity and Aging, Post Rehab for Stroke (PRES) (2008). Retrieved from http://www.uwo.ca/ccaa/training/workshops/pres.html

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