

# Research Update



Practical, leading edge research results applied to physical activity for older adults, in plain language for health practitioners and leaders.  
 Sponsored by the Active Living Coalition for Older Adults (ALCOA).

## Aerobic Fitness for Older Adults

By Gareth R. Jones Ph.D, Director, Canadian Centre of Activity and Aging; Assistant Professor, Faculty of Health Sciences, University of Western Ontario; and Associate Scientist, Lawson Health Research Institute, St. Joseph's Health Care London.

### Active Living Coalition for Older Adults

33 Laird Dr., Toronto  
ON, M4G 3S9

Toll-free: 800 549-9799

Tel: 416-423-2163

Fax: 416 423-2112

E-mail: [alcoa3@ca.inter.net](mailto:alcoa3@ca.inter.net)

[www.alcoa.ca](http://www.alcoa.ca)

Additional copies of ALCOA Research Update issues and research references for this article are available in print and electronic formats from the ALCOA office, or can be downloaded from [www.ALCOA.ca](http://www.ALCOA.ca)

Reproduction of this document, in part or in total, is permitted and encouraged on the condition that credit is given to the ALCOA Research update and the authors listed in this publication.

The financial support of Health Canada is gratefully acknowledged.

Older adults can remain healthy and live independently longer by maintaining and improving their aerobic fitness.

Aerobic fitness is a person's ability to do a physical activity for two minutes or longer. Research has shown that adults who are less active lose 16% of their existing level of aerobic fitness every 10 years. Research has also clearly indicated that adults who exercise for 30 minutes or more on most days of the week can slow down or reverse an age associated functional decline.

The link between regular exercise and improved aerobic fitness was shown in a landmark study by researchers from the Canadian Centre for Activity and Aging almost 25 years ago. This study was conducted over a one-year period on 220 men who were close to retiring. Half of the men exercised three times a week and the other half did not. At the end of the year, the men who exercised had improved their aerobic fitness level by 12% and increased their muscle strength and flexibility by 10%. These men had the aerobic fitness, strength and flexibility of men who were ten years younger. On the other hand, the men who did not exercise continued to decline in aerobic fitness, strength and flexibility.



Research has also demonstrated that older adults with a low level of aerobic fitness increase their risk of untimely death. In addition to reducing life expectancy, low aerobic fitness can also seriously affect the quality of life of older adults in their later years. Older adults generally need help with everyday activities for the last two to nine years of their lives. By age 75, activities like housework and gardening can become tiring for less active adults who are more likely to stop doing these activities due to the strain and exhaustion they may feel. This pattern can start a cycle of decline, with these older adults becoming less active, and consequently less fit and more dependent on others to carry out these activities for them.

**Acknowledgements**

**Author:**

**Gareth R. Jones, PhD**  
University of  
Western  
London, ON

**ALCOA Research  
Co-Chairs**

**Philippe Markon PhD**  
University of Québec  
in Chicoutimi, PQ

**Mike Sharratt PhD**  
University of  
Waterloo  
Waterloo, ON

**Research  
Committee Members:**

**Nancy Ecclestone**  
Canadian Centre for  
Activity and Aging  
London, ON

**Don Wackley**  
Ontario Coalition of  
Senior Citizens  
Organizations  
Toronto, ON

**Reviewed by:  
Robert Petrella**  
MD, PhD  
University of Western  
Ontario  
Canadian Centre for  
Activity and Aging  
London, ON

**ALCOA Staff:**

**Imran Syed,**

**Photos:**

**Health Canada**

**Table 1.**

***Benefits of aerobic exercise.***

**Health**

- Less risk of heart disease and stroke
- Control of diabetes
- Protection from osteoporosis
- Lower blood pressure and cholesterol
- Improved gastrointestinal function

**Fitness**

- Increased amount of daily activity
- Improved lower leg strength, flexibility and balance
- Better sense of well-being
- Greater ability to do vigorous activities
- Delayed fatigue for moderate activities

Health promotion messages recommend physical activity as a way of preventing disease and often neglect to highlight the contribution physical activity makes in supporting independent living in older adults. Surveys show that older adults, when listing the main benefit of exercise, will state that exercise allows them to remain functionally independent. Aerobic fitness is an important factor in determining functional independence and it may be improved or maintained through regular participation in aerobic exercise activities.

Aerobic exercise includes activities that work large muscle groups (legs, trunk, shoulders), have functional importance (preferably weight bearing), and can be done for 10-30 minutes at a level that is challenging but still enjoyable.

**Table 2.**

***Suitable aerobic exercise choices for older adults***

- Brisk walking • Jogging/running
- Cycling (mobile or stationary)
- Rowing (mobile or stationary)
- Dance (continuous) • Calisthenics/ aerobics
- Swimming • Aquarobics
- Cross-country skiing • Snowshoeing

**Getting started**

Older adults have different levels of fitness. Therefore, it is important to choose a level of intensity and type of activity that is suitable for the individual older adult. Generally, exercise is more effective if started from a

lower intensity and then gradually progressed to a more challenging level.

**Medical advice**

Older adults who have not done much exercise, or those who want to try more challenging activities, should speak with a family doctor before they start. A doctor may order an exercise test to investigate if there are any reasons to advise against exercising. It is important for older adults to realize that, in most circumstances where normal aerobic exercise (such as walking) is restricted, there may still remain many options for continuing to exercise and these options should be explored further with the appropriate medical advice.

Recent research suggests that, in certain situations, not exercising may do more harm than good, regardless of cardiovascular risk. Even those with chronic degenerative diseases such as arthritis can choose a suitable form of exercise. Those with joint and balance problems may find water-based activities like swimming and aquarobics suitable.

**Are You Ready to Exercise?**

Health practitioners can use the physical activity readiness questionnaire (PAR-Q) to determine if an older adult should consult with their family doctor before starting exercise for the first time. An answer of “yes” to any question on the PAR-Q requires the older adult to meet with their doctor, who can complete a physical activity readiness medical examination (PARmed-X). This will determine their patient’s readiness to exercise safely.

**PAR-Q and PARmed-X** can be found at <http://www.csep.ca/forms.asp>

**Aerobic exercise prescription for healthy and independent older adults**

Many older adults know that there is a link between physical activity and health. However, few know what type of exercise to do, how often to do it and what level of difficulty to choose. The five essential components to consider when exercising are:

## Frequency, Intensity, Time, Type and Progression.

**Frequency** can be defined as the number of exercise sessions per week. Research has shown that older adults will benefit by improving their aerobic fitness level and other functional measures if they exercise three days a week. Choosing different activities will help make exercise more interesting and fun.

Subjective measures of intensity can also be effective at determining appropriate exercise intensity. The Rating of Perceived Exertion (RPE) scale is a good indicator of how hard the body is working during exercise. A rating between 4 and 7, or “somewhat strong” to “very strong,” defines the target heart zone needed to improve aerobic fitness.

Component	Frequency	Intensity	Time	Type	Progression
Aerobic Fitness	4-7 days per week most days of the week	Within age associated target heart rate limits  Between 4-7 on the rating of perceived exertion scale  Threshold of just audible breathing	10-30 minutes of continuous activity.  Try to accumulate 45-60 minutes over the entire day.	Activities that use large muscle groups, continuous and rhythmical	To safely boost aerobic fitness, first gradually increase the duration then increase the intensity of the activity.

**Intensity** is the level of effort needed to challenge the individual without being too difficult. New research shows that people naturally select a moderate pace and intensity when they walk for exercise. However, when they are asked to walk briskly, they speed up to a strong walking speed. Walking briskly will help obtain greater aerobic fitness benefits. Heart rate monitoring, perceived exertion scales and the “talk test” can be used to measure aerobic fitness. Exercise Target Heart Rates (THR) are used to determine a range (moderate–vigorous) inside of which healthy, older adults can exercise effectively. However, each person’s heart rate may be different because of age, health or medication. These factors can limit the effectiveness of the THR technique.

A simple “talk” or Just Audible Breathing (JAB) test is also an effective tool for measuring exercise intensity. In this case, the older adult increases their exercise intensity to the point at which they first hear themselves breathing and conversation becomes difficult. At this point, the person is getting the benefits of aerobic exercise.



### Calculate Age Specific Target Heart Rate\* Based on a 10 second pulse check

Age	Lower Limit 65%		Upper Limit 80%	
	Men	Women	Men	Women
55	18	18	22	23
60	18	18	22	22
65	17	17	22	21
70	17	17	21	20
75	16	16	21	20
80	16	15	20	19
85	16	15	20	18
90	15	14	19	17
100	15	13	19	16

### Rating of Perceived Exertion (RPE) adapted from Borg 1982

0	Nothing at all
0.5	Very, very weak
1	Very weak
2	Weak
3	Moderate
4	Somewhat Strong
5	Strong
6	
7	Very strong
8	
9	
10	Very, Very Strong
•	Maximal

\*Adapted from the Canadian Centre for Activity and Aging

**Time** is the number of minutes of exercise needed to get the maximum fitness benefits. Older adults should generally set a goal of 45-60 minutes of exercise. This time includes a warm-up, 30 minutes of continuous aerobic exercise, and a cool-down period. The warm-up will allow the body to adjust to the exercise intensity and the cool-down period helps the body return safely to its pre-exercise state.

**Type** of aerobic exercise performed includes activities that are enjoyable, require dynamic movement of all the major muscle groups (legs, arms, trunk) and can be performed continuously and painlessly. Older adult should also consider activities that are easy to perform for continuous periods, such as walking.

Individuals who are overweight or who have arthritic joint problems may find non-weight bearing activities, like swimming, aquarobics and cycling, more appropriate. Fitness clubs have training machines (treadmills, steppers, elliptical trainers) for aerobic exercise. Fitness clubs can also provide a comfortable environment with exercise professionals to help tailor individual exercise programs. Mall-walking programs can provide a welcome relief from extreme weather conditions.

**Progression** of exercise is necessary for both improving and maintaining fitness. As the body adapts to increased physical activity, the frequency, intensity, duration and type of exercise can be changed to maintain the level of physical challenge. Healthy older adults can improve their aerobic fitness and muscle strength at the same rate as younger individuals. Thus, the progression should keep track of the rate of improvement being made by the older adult.

## Aerobic exercise for older adults with restricted mobility

Older adults who cannot attend an aerobic exercise class can still exercise by marching in-place, walking from room-to-room in their home or by walking back-and-forth in the hallway of their apartment building. An exercise session can start with five minutes of non-stop activity. The number of times per week the exercise is conducted can be increased, and so can the intensity (low to challenging) and

duration of the exercise. This kind of exercising will allow a person to maintain their present functional abilities and may also delay the need to receive additional care or having to go to a nursing home.

Research has shown that exercising at home can reduce functional decline in older adults. Bed rest due to injury or illness can make recovery and rehabilitation a long and slow process. Fortunately, those with stable health conditions can take part in aerobic activities throughout the recovery period by using special exercises and exercise equipment (such as arm ergometers or resistive pulleys to exercise.) There are many myths, fears and misunderstandings about aerobic exercise for older adults. However, research in the last 25 years has clearly shown that taking part in aerobic activities reduces disease, increases fitness and contributes to preserving function and independence. Improved aerobic fitness makes daily activities easier to do, allowing older adults to adopt an active lifestyle with improved vigour and enjoy a better quality of life.

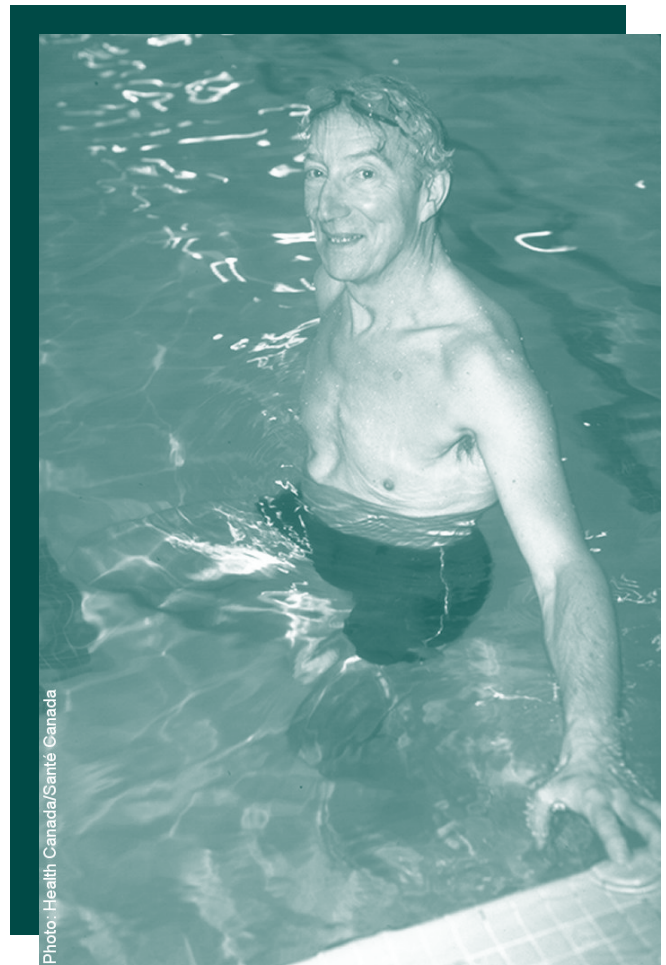


Photo: Health Canada/Santé Canada

# Research Update Reader Survey

Please take a few moments to complete this survey. Your comments and feedback will help ALCOA improve the research Update. Please be assured that your responses will remain confidential.

If you are interested in being entered into a draw for prizes, please submit your details in the space provided at the end of this survey.

## YOUR THOUGHTS ON THE AEROBIC FITNESS ISSUE

1. Please circle the response that best describes how much new information you learned about each of the following topics.

	Learned a great deal	Learned some new things	Did not learn anything new
a. The benefits of aerobic exercise	1	2	3
b. Generally appropriate frequency of aerobic exercise	1	2	3
c. Methods for measuring intensity of aerobic exercise	1	2	3

2. Please rate the Aerobic Fitness Issue on the following components (circle your response).

	Excellent	Good	Fair	Poor	Not Sure
a. Selection of topics	1	2	3	4	NS
b. Quality of information	1	2	3	4	NS
c. Usefulness of information	1	2	3	4	NS
d. Use of visuals (e.g., pictures, layout)	1	2	3	4	NS
e. Overall rating of the Issue	1	2	3	4	NS

3. Is there anything that you intend to do based on what you have read?  Yes  No  
If Yes, what do you intend to do?

---

## YOUR THOUGHTS ON THE ALCOA RESEARCH UPDATE NEWSLETTER

4. Please rate the EFFECTIVENESS of the Research Update in meeting the following objectives.

	Not at All Effective	Somewhat Effective	Very Effective
a. Keeping you informed on up-to-date information	1	2	3
b. Communicating in clear and plain language	1	2	3
c. Providing you with practical tips	1	2	3

5. Do you have any suggestions for future newsletter topics?  Yes  No  
If Yes, what topics would you like to see covered?

---

6. Do you have any suggestions to improve the Research Update?  Yes  No  
If Yes, how so?

---

## DISTRIBUTION OF THE NEWSLETTER

### 7. How do you receive the Research Update newsletter? (check all that apply)

- Through the mail  As part of Joe Taylor's Active Living Newsletter  
 At my work or organization  Other. Please specify.  
 Download from ALCOA web site \_\_\_\_\_

### 8a. Do you distribute or share any of the information included in the Research Update? Yes No

b. If Yes, with how many others (approx.) do you share the newsletter? \_\_\_\_\_

c. If Yes, with whom are you sharing the newsletter? (check all that apply)

- older adults  practitioners/leaders  other \_\_\_\_\_

### 9. Do you know of anywhere else that you can get the type of information contained in the Research Update?

Yes  No

## DEMOGRAPHIC INFORMATION

10. Age:  54 years of age or less  55 –74 years  75 – 90 years  Over 90 years

11. In which province / territory do you reside? \_\_\_\_\_

### 12. What type of organization do you work for or represent? Check all that apply.

- I do not work for or represent an organization  Non-governmental/Volunteer organization  Public Health Department/Unit/Board  
 Senior's Organization  Government  Other (please specify)  
 Coalition  Education system \_\_\_\_\_  
 Healthcare System  Corporate or Private Sector

13. Is your organization ...  Local  Provincial?  Federal?  Not Sure

### 14. Please describe your role within your organization. Check all that apply.

- Health Practitioner  Consultant  Residence Staff  
 Leader Active Living Programs  University Staff  Volunteer  
 Fitness Professional  University Faculty/Researcher  Other (please specify)  
 Recreation Leader  Student \_\_\_\_\_

ALCOA thanks you for taking the time to fill out this questionnaire.

Please mail your response to ALCOA, 33 Laird Drive, Toronto, ON M4G 3S9 or fax us at 416-423-2112

If you would like to be entered into a draw for a prize, please provide your name, email address, or phone number.

Name \_\_\_\_\_ Email \_\_\_\_\_ Telephone number \_\_\_\_\_