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Physical Activity and Public Health in Older Adults:
Recommendation from the American College of Sports Medicine
And the American Heart Association
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These recommendations are for men and women age ≥ 65 yr and adults age 50 to 64 yr with clinically significant chronic conditions and/or functional limitations. The recommendation for older adults has several important differences from that for adults including:

1. The recommended intensity of aerobic activity takes into account the older adult's aerobic fitness;

2. Activities that maintain or increase flexibility are recommended; and

3. Balance exercises are recommended for older adults at risk of falls.

4. In addition, older adults should have an activity plan for achieving recommended physical activity that integrates preventive and therapeutic recommendations.

5. The promotion of physical activity in older adults should emphasize moderate-intensity aerobic activity, muscle-strengthening activity, reducing sedentary behavior, and risk management.

Recommendation	Aerobic Activity			Muscle-Strengthening Activity			Flexibility/Balance
	Frequency	Intensity	Duration	Frequency	Number of Exercises	Sets and Repetitions	
Healthy adults, 2007, ACSM/AHA (25) (companion recommendation to 2007 older adult recommendation)	A minimum of 5 d·wk^{-1} for moderate intensity, or a minimum of 3 d·wk^{-1} for vigorous intensity	Moderate intensity between 3.0 and 6.0 METS; vigorous intensity above 6.0 METS	Accumulate at least 30 min·d^{-1} of moderate-intensity activity, in bouts of at least 10 min each; continuous vigorous activity for at least 20 min·d^{-1}	At least 2 d·wk^{-1}	8–10 exercises involving the major muscle groups	8–12 repetitions	
Older adults, 2007, ACSM/AHA Recommendation (described in present paper)	A minimum of 5 d·wk^{-1} for moderate intensity, or a minimum of 3 d·wk^{-1} for vigorous intensity	Moderate intensity at 5 to 6 on a 10-point scale; vigorous intensity at 7 to 8 on 10-point scale	Accumulate at least 30 min·d^{-1} of moderate-intensity activity, in bouts of at least 10 min each; continuous vigorous activity for at least 20 min·d^{-1}	At least 2 d·wk^{-1}	8–10 exercises involving the major muscle groups	10–15 repetitions	At least 2 d·wk^{-1} flexibility; for those at risk for falls, include exercises to maintain or improve balance
Bone Health and Osteoporosis: A Report of the Surgeon General, 2004 (64)	A minimum of 3 d·wk^{-1}	Begin slowly and work up to 60 to 85% of maximal heart rate	Accumulate at least 30 min·d^{-1} of moderate-intensity physical activity on most, preferably all, days of the week; those who have been inactive should start with 5–10 min of activity per day	2–3 d·wk^{-1} for strength training	A progressive program of weight training that uses all muscle groups	Sufficient intensity to improve muscle strength; increase amount of weight lifted gradually over time	Include balance training in overall exercise program
Older adults, 1999, Health Canada (26)	4–7 d·wk^{-1}	Moderate intensity, but may progress to vigorous	Accumulate 30 to 60 min of moderate-intensity activity in bouts of at least 10 min each	2–4 d·wk^{-1}		Weights that a person can lift 10 times "before they become too heavy"	Daily flexibility; and balance activities
Coronary artery disease, 2001, American Heart Association (aerobic recommendation) (19)	At least 3 d·wk^{-1}	Moderate intensity at 40–60% of HR reserve; vigorous intensity as tolerated at 60–85% of HR reserve	At least 30 min				
Cardiovascular disease, 2000, American Heart Association (flexibility and resistance training recommendation) (49)				2–3 d·wk^{-1}	8–10 exercises involving the major muscle groups	1 set of 8–15 reps (may progress to >1 set)	2–3 d·wk^{-1} flexibility
Hypertension, 2004, ACSM (6)	Most, preferably all days per week	Moderate intensity at 40–<60% of $\dot{V}O_{2max}$ reserve (vigorous intensity acceptable for selected adults)	Accumulate 30–60 min·d^{-1} of moderate-intensity activity in bouts of at least 10 minutes each	2–3 d·wk^{-1} (resistance training an adjunct to aerobic activity)	8–10 exercises involving the major muscle groups	1 set of 8–15 reps (more than one set acceptable for selected adults)	
Type 2 diabetes, 2004, American Diabetes Association (64)	At least 3 d·wk^{-1} with no more than 2 consecutive days without activity	Moderate intensity at 50–70% of HR_{max}; vigorous intensity at >70% of HR_{max}	At least 150 min·wk^{-1} of moderate-intensity and/or at least 90 min·wk^{-1} of vigorous intensity	3 d·wk^{-1}	All major muscle groups	Progress to 3 sets of 8–10 reps; use a weight that cannot be lifted >8–10 times	
Cholesterol, 2001, National Cholesterol Education Program (66) recommended physical activity as in 2000 Dietary Guidelines (65)	Most days of the week, preferably daily	Moderate intensity	At least 30 min·d^{-1}	Muscle-strengthening activities recommended as beneficial			Flexibility regarded as beneficial
Stroke, 2004, American Heart Association (23)	3–7 d·wk^{-1}	50–80% of HR_{max}	20–60 min/session (or multiple 10 min sessions)	2–3 d·wk^{-1}	8–10 exercises involving the major muscle groups	1–3 sets of 10–15 reps	2–3 d·wk^{-1} flexibility
Osteoarthritis, 2001, American Geriatrics Society (8)	3–5 d·wk^{-1}	50–60% of HR_{max}	Begin with 20–30 min·d^{-1} (if possible) and progress as appropriate	2–3 d·wk^{-1} for isotonic resistance exercises (isometric exercises also recommended)	8–10 isotonic exercises involving the major muscle groups (isometric exercises also recommended)	6–15 reps of isotonic exercises, depending upon intensity; begin with one set and progress as appropriate	3–5 d·wk^{-1} flexibility

Abbreviations: ACSM, American College of Sports Medicine; HR_{max}, maximal heart rate; HR reserve, heart rate reserve; $\dot{V}O_{2max}$, maximal aerobic capacity; Reps, repetitions.
Note: Only one indicator of aerobic intensity is provided in the table, even if the recommendation provided several (comparable) indicators. Some recommendations were for strength-training activity rather than exercise per se. For comparability, when sufficient information was provided in the recommendation, recommendations for muscle-strengthening activity were all summarized in the form of an exercise program that specifies number of sets and number of repetitions per set of the movement performed against resistance.

Recommendation Statement

Regular physical activity, including aerobic activity and muscle-strengthening activity, is essential for healthy aging. This preventive recommendation specifies how older adults, by engaging in each recommended type of physical activity, can reduce the risk of chronic disease, premature mortality, functional limitations, and disability.

Aerobic Activity

To promote and maintain health, older adults need moderate-intensity aerobic physical activity for a minimum of 30 min on five days each week or vigorous-intensity aerobic activity for a minimum of 20 min on three days each week.

Moderate-intensity aerobic activity involves a moderate level of effort relative to an individual's aerobic fitness. On a 10-point scale, where sitting is 0 and all-out effort is 10, moderate-intensity activity is a 5 or 6 and produces noticeable increases in heart rate and breathing. On the same scale, vigorous-intensity activity is a 7 or 8 and produces large increases in heart rate and breathing.

For example, given the wide range of fitness levels in older adults, for some older adults a moderate- intensity walk is a slow walk, and for others it is a brisk walk.

This recommended amount of aerobic activity is in addition to routine activities of daily living of light- intensity (e.g., self care, cooking, casual walking or shopping) or moderate-intensity activities lasting less than 10 min in duration (e.g., walking around home or office, walking from the parking lot).

Muscle-strengthening Activity

To promote and maintain health and physical independence, older adults will benefit from performing activities that maintain or increase muscular strength and endurance for a minimum of two days each week.

It is recommended that 8-10 exercises be performed on two or more nonconsecutive days per week using the major muscle groups. *To maximize strength development, a resistance (weight) should be used that allows 10-15 repetitions for each exercise. The level of effort for muscle-strengthening activities should be moderate to high. On a 10-point scale, where no movement is 0, and maximal effort of a muscle group is 10, moderate-intensity effort is a 5 or 6 and high-intensity effort is a 7 or 8.* Muscle-strengthening activities include a progressive-weight training program, weight bearing calisthenics, and similar resistance exercises that use the major muscle groups.

Benefits of Greater Amounts of Activity

Participation in aerobic and muscle-strengthening activities above minimum recommended amounts provides additional health benefits and results in higher levels of physical fitness. *Older adults should exceed the minimum recommended amounts of physical activity if they have no conditions that preclude higher amounts of physical activity, and they wish to do one or more of the following*;

a) improve their personal fitness,

b) *improve management of an existing disease where it is known that higher levels of physical activity have greater therapeutic benefits for the disease,* and/or

c) Further reduce their risk for premature chronic health conditions and mortality related to physical inactivity.

In addition, to further promote and maintain skeletal health, older adults should engage in extra muscle strengthening activity and higher-impact weight-bearing activities, as tolerated. To help prevent unhealthy weight gain, some older adults may need to exceed minimum recommended amounts of physical activity to a point that is individually effective in achieving energy balance, while considering diet and other factors that affect body weight.

Flexibility Activity

To maintain the flexibility necessary for regular physical activity and daily life, older adults should perform activities that maintain or increase flexibility on at least two days each week for at least 10 min each day.

Balance Exercise

To reduce risk of injury from falls, community-dwelling older adults with substantial risk of falls (e.g., with frequent falls or mobility problems) should perform exercises that maintain or improve balance.

Integration of Preventive and Therapeutic Recommendations

Older adults with one or more medical conditions for which physical activity is therapeutic should perform physical activity in the manner that effectively and safely treats the condition(s) So as to prevent other conditions from developing, older adults should also perform physical activity in the manner recommended for prevention as described herein. When chronic conditions preclude activity at minimum recommended levels for prevention, older adults should engage in regular physical activity according to their abilities and conditions so as to avoid sedentary behavior.

Activity Plan

Older adults should have a plan for obtaining sufficient physical activity that addresses each recommended type of activity. In addition, to specifying each type of activity, care should be taken to identify, how, when, and where each activity will be performed. Those with chronic conditions for which activity is therapeutic should have a single plan that integrates prevention and treatment. For older adults who are not active at recommended levels, plans should include a gradual (or stepwise) approach to increase physical activity over time using multiple bouts of physical activity (≥10 min) as opposed to continuous bouts when appropriate. Many months of activity at less than recommended levels is appropriate for some older adults (e.g., those with low fitness) as they increase activity in a stepwise manner. Older adults should also be encouraged to self-monitor their physical activity on a regular basis and to re-evaluate plans as their abilities improve or as their health status changes.

Benefits of Regular Physical Activity in Older Adults

Regular physical activity:

- reduces risk of cardiovascular disease
- thromboembolic stroke (CVA)
- hypertension
- type 2 diabetes mellitus
- osteoporosis
- obesity
- colon cancer
- breast cancer
- anxiety
- depression.

Of particular importance to older adults, there is substantial evidence that physical activity:

- reduces risk of falls and injuries from falls
- prevents or mitigates functional limitations
- is effective therapy for many chronic diseases.

Clinical practice guidelines identify a substantial therapeutic role for physical activity in:

- coronary heart disease
- hypertension
- peripheral vascular disease
- type 2 diabetes
- obesity
- elevated cholesterol
- osteoporosis
- osteoarthritis

- claudication

chronic obstructive pulmonary disease (asthma, emphysema and chronic

bronchitis) Clinical practice guidelines identify a role for physical activity in

the management of:

- depression and anxiety disorders
- dementia
- pain
- congestive heart failure
- syncope
- stroke
- prophylaxis of venous thromboembolism (blood clots)
- back pain
- constipation

There is some evidence that physical activity prevents or delays

- cognitive impairment
- disability
- improves sleep

Areas of Emphasis in Promoting Physical Activity in Older Adults

With sufficient skill, experience, fitness, and training, older adults can achieve high levels of physical activity. The promotion of physical activity in older adults should avoid ageism that discourages older adults from reaching their potential. At the same time, it is difficult or impossible for some older adults to attain high levels of activity. Several areas should be emphasized in promoting physical activity in older adults as described below.

Reducing Sedentary Behavior

There is substantial evidence that older adults who do less activity than recommended still achieve some health benefits. Such evidence is consistent with the scientific consensus for a continuous dose-response relationship between physical activity and health benefits. For example, lower risks of cardiovascular disease have been observed with just 45-75 min of

walking per week.

Increasing Moderate Activity and Giving Less Emphasis to Attaining High Levels of Activity

Realistic goals for aerobic activity will commonly be in the range of 30-60 min of moderate-intensity activity a day, as illustrated by the Health Canada recommendation for older adults. Vigorous activity has higher risk of injury and lower adherence. Age-related loss of fitness, chronic diseases, and functional limitations act as barriers to attaining high levels of activity. Vigorous activity and/or high levels of activity are appropriate for selected older adults with sufficient fitness, experience, and motivation.

Taking a Gradual or Stepwise Approach

The standard advice to increase physical activity gradually over time is highly appropriate and particularly important for older adults. This advice minimizes risk of overuse injury, makes increasing activity more pleasant, and allows positive reinforcement for small steps that lead to attainment of intermediate goals. It can be appropriate for older adults to spend a long time at one step (e.g., attending exercise classes two or three days a week) so as to gain experience, fitness, and self-confidence. Very deconditioned older adults may need to exercise initially at less effort than a "5" on a 10-point scale and may need to perform activity in multiple bouts (≥10 min) rather than in a single continuous bout. In addition, activity plans need to be reevaluated when there are changes in health status.

Performing Muscle-strengthening Activity and Engaging in All Recommended Types of Activity

Muscle-strengthening activity is particularly important in older adults, given its role in preventing age- related loss of muscle mass, bone, and its beneficial effects on functional limitations. Currently, only about 12% of older adults perform muscle-strengthening activities at least twice a week.

Sustaining Emphasis on Individual-level and Community-level Approaches

As with younger adults, promotion of physical activity in older adults relies upon both individual and community approaches that are evidence-based and reflect theory and research on behavior change. For example, the Task Force on Community Preventive Services has recommended or strongly recommended several community-level interventions as effective in promoting physical activity, such as interventions to increase access to places of physical activity combined with informational outreach.

Using Risk Management Strategies to Prevent Injury

Chronic conditions increase risk of activity-related adverse events, e.g., heart disease increases risk of sudden death and osteoporosis increases risk of activity-related fractures. Activity-related musculoskeletal injuries act as a major barrier to regular physical activity. While these considerations lead to more emphasis on risk management, there is insufficient research on effective strategies to prevent injuries. Risk management strategies mainly reflect clinical experience, expert opinion, and legal liability concerns. Evidence that risk management strategies can be effective comes from the observation that published exercise studies routinely implement risk management and serious adverse events in these studies are rare. However, research studies presumably exclude adults at high risk of injury.

Conclusion

Virtually all older adults should be physically active. An older adult with a medical condition for which activity is therapeutic should perform physical activity in a manner that treats the condition. In addition, an older adult with medical conditions should engage in physical activity in the manner that reduces risk of developing other chronic diseases as described above. Given the breadth and strength of the evidence, physical activity should be one of the highest priorities for preventing and treating disease and disablement in older adults. Effective interventions to promote physical activity in older adults deserve wide implementation.