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**Physical Activity and Public Health:  
2007 Updated Recommendation for Adults Part I  
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Your Life Your Health  
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In 1995, the American College of Sports Medicine and the Centers for Disease Control and Prevention published national guidelines on Physical Activity and Public Health. The Committee on Exercise and Cardiac Rehabilitation of the American Heart Association endorsed and supported these recommendations. The purpose of the present report is to update and clarify the 1995 recommendations on the types and amounts of physical activity needed by healthy adults to improve and maintain health.

## **Moderate-intensity aerobic physical Activity – 30 minutes five days a week**

To promote and maintain health, all healthy adults aged 18 to 65 yr need moderate-intensity aerobic (endurance) physical activity for a minimum of 30 min on five days each week or vigorous-intensity aerobic physical activity for a minimum of 20 min on three days each week. Combinations of moderate- and vigorous-intensity activity can be performed to meet this recommendation. For example, a person can meet the recommendation by walking briskly for 30 min twice during the week and then jogging for 20 min on two other days.

Moderate-intensity aerobic activity, which is generally equivalent to a brisk walk and noticeably accelerates the heart rate, can be accumulated toward the 30-min minimum by performing bouts each lasting 10 or more minutes. Vigorous-intensity activity is exemplified by jogging, and causes rapid breathing and a substantial increase in heart rate. In addition, every adult should perform activities that maintain or increase muscular strength and endurance a minimum of two days each week.

## **Determining Moderate-intensity Exercise**

You can determine a moderate-intensity aerobic level for yourself by using the following exercise zones which are based on your heart beat. The numbers included here are for a 64 year old person:

<u>Zone</u>	<u>Name</u>	<u>Perceived Exertion Difficulty</u>	<u>Heart Rate Range</u>
Zone 1	Healthy Heart	Perceived Exertion is 10-11	78 to 94 - Health Zone
Zone 2	Temperate	Perceived Exertion is 12-13	95 to 109
Zone 3	Aerobic	Perceived Exertion is 14-15	110 to 125 - Fitness Zone
Zone 4	Threshold	Perceived Exercise is 16-17	126 to 141
Zone 5	Redline	Perceived Exertion is 18-20	142 to 157 – Performance Zone

(Zone 1 and 2 are considered zones of exercise to achieve and maintain health; Zones 3 and 4 are considered zones of exercise to achieve fitness and zone five is considered to be a zone which increases athletic performance.)

To determine your personal heart rate ranges for the five zones above do the following: First, determine your predicted maximum heart rate by subtracting your age from 220. If you are 40 years of age, your maximum predicted heart rate will be 180. You can have this measured with specialized testing but for our purposes this calculation will work well. Each of the five heart zones are a percentage of your maximum predicted heart rate according to the following:

- Zone 1 is 50-60% of your maximum predicted heart rate (for a 40 year old this would be 90-108)
- Zone 2 is 60-70% of your maximum predicted heart rate (for a 40 year old this would be 108-126)
- Zone 3 is 70-80% of your maximum predicted heart rate (for a 40 year old this would be 126-144)
- Zone 4 is 80-90% of your maximum predicted heart rate (for a 40 year old this would be 144-162)
- Zone 5 is 90-100% of your maximum predicted heart rate (for a 40 year old this would be 162-180)

### **Age Differences**

As is obvious, achieving the recommended amount of exercise will require different heart rates depending upon your age. What would be a Zone 5, Redline effort with a Perceived Exertion of 18-20, Performance Zone effort for a 64 year old whose heart rate would be between 142 to 157, would only be a Zone 3, Aerobic effort with a Perceived Exertion of 14-15 in the Fitness Zone for a forty year old. Obviously, within the same age group there will be dramatic differences in the perception of exertion at the same heart rate and equally obviously as your physical condition improves your perception of exertion will go down at each heart rate zone. The best way to measure the improvement in your health is to see how your heart rate responds to the same exercise. When your rate is 90 for an exercise level for which it once was 120, you have achieved significant improvement in your health.

### **Rating your Exercise**

During exercise you should rate your perception of exertion. For this the Borg Scale of Perceived Exertion can be used. On the Borg Scale 6 means no exertion at all and 20 means a totally maximum effort. The 13 on the scale is a somewhat heavy exercise but

capable of being performed at steady state (i.e., anaerobic threshold). When at a level of 17, the effort level requires you to push yourself hard even though it is possible to continue for some time.

Try to appraise the feeling of exertion as honestly as possible. Do not underestimate nor overestimate it. It is of no value to underestimate the level to produce an impression of being "brave" or "tough". Your own feeling of effort and exertion is all that is of interest. Look at the scale and wordings and decide on the word that best describes your effort level and the number alternative associated with that description.

### **Borg's Ratings of Perceived Exertion (RPE)**

6	No exertion at all
7-8	Extremely light (very, very light)
9-10	Very light (warm-up/recovery)
11	Light
12-13	Moderate
14-15	Hard (400 m swimming pace)
16-17	Very hard (200 m swimming pace]
18-19	Extremely hard (very, very hard, 25-50 m pace)
20	Maximum all-out effort with absolutely nothing being held in reserve

The Borg's 12-13 is the moderate-intensive exercise level which is recommended by the American Heart Association. Because of the dose-response relation between physical activity and health, persons who wish to further improve their personal fitness, reduce their risk for chronic diseases and disabilities or prevent unhealthy weight gain may benefit by exceeding the minimum recommended amounts of physical activity.

### **Improvements in the new recommendations**

More than 10 years have passed since the first recommendation was issued. New science has added to our understanding of the biological mechanisms by which physical activity provides health benefits and the physical activity profile (type, intensity, amount) that is associated with enhanced health and quality of life. The intent of the original recommendation, however, has not been fully realized. Physical inactivity remains a pressing public health issue. Technology and economic incentives tend to discourage activity, technology by reducing the energy needed for activities of daily living, and economics by paying more for sedentary than active work.

In addition, there are people who have not accepted, and others who have misinterpreted the original recommendation. Some people continue to believe that only vigorous-intensity activity will improve health while others believe that the light activities of their daily lives are sufficient to promote health. Compounding these challenges, physical activity recommendations have been published in the interim that could be interpreted to be in conflict with the 1995 recommendation.

Disease outcomes which are improved or eliminated in response to regular physical activity in prospective observational studies include:

- cardiovascular disease,
- thromboembolic stroke,
- hypertension,
- type 2 diabetes mellitus,
- osteoporosis,
- obesity,
- colon cancer,
- breast cancer,
- anxiety and
- depression.

Scientific evidence continues to accumulate, with more recent efforts focused on the nature of the relation between physical activity and health, rather than trying to determine if such a relation exists. This additional evidence includes compelling new data on women, and more conclusive evidence on stroke, some cancers, and cognitive function.

### **Updated Recommendation Statement**

This recommendation applies to healthy adults between 18 and 65 yr of age, and to persons in this age range with chronic conditions not related to physical activity (e.g., hearing impairment). During pregnancy and the post-partum period additional precautions may be needed: these issues have been considered by other expert committees. The present preventive recommendation specifies how adults, by engaging in regular physical activity, can promote and maintain health, and reduce risk of chronic disease and premature mortality. A companion recommendation builds on the information in this paper but specifically applies to adults aged 65 and over, and adults aged 50-64 with chronic conditions or physical functional limitations (e.g., arthritis), that affect movement ability or physical fitness.

### **Aerobic Activity**

To promote and maintain health, all healthy adults aged 18-65 yr 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. [I (A)] Also,

combinations of moderate- and vigorous-intensity activity can be performed to meet this recommendation.

### **Muscle-Strengthening Activity**

To promote and maintain good health and physical independence, 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 each week using the major muscle groups. To maximize strength development, a resistance (weight) should be used that allows 8-12 repetitions of each exercise resulting in volitional fatigue. Muscle-strengthening activities include a progressive weight-training program, weight bearing calisthenics, stair climbing, and similar resistance exercises that use the major muscle groups.

### **Benefits of Greater Amounts of Activity**

Participation in aerobic and muscle-strengthening physical activities above minimum recommended amounts provides additional health benefits and results in higher levels of physical fitness. Many adults, including those who wish to improve their personal fitness or further reduce their risk for premature chronic health conditions and mortality related to physical inactivity, should exceed the minimum recommended amounts of physical activity. In addition, to further promote and maintain skeletal health, adults will benefit by engaging in extra weight-bearing activity and higher-impact activity such as stair-climbing or jogging, as tolerated. To help prevent unhealthy weight gain, some adults will need to exceed minimum recommended amounts of physical activity to a point that is individually effective in achieving energy balance, while considering their food intake and other factors that affect body weight.

### **Clarifications to the 1995 Recommendation**

Although fundamentally unchanged from the 1995 recommendation, the updated recommendation is improved in several ways. First, the recommended frequency for moderate-intensity physical activity has been clarified. The 1995 document simply specified "most, preferably all days per week" as the recommended frequency while the new recommendation identifies five days per week as the recommended minimum.

Second, vigorous-intensity physical activity has been explicitly incorporated into the recommendation. To acknowledge both the preferences of some adults for vigorous-intensity physical activity and the substantial science base related to participation in such activity, the recommendation has been clarified to encourage participation in either moderate- and/or vigorous-intensity physical activity. Vigorous-intensity physical activity was implicit in the 1995 recommendation. It is now explicitly an integral part of the physical activity recommendation.

Third, the updated recommendation now specifies that moderate- and vigorous-intensity activities are complementary in the production of health benefits and that a variety of activities can be combined to meet the recommendation. This combining of activities is

based on the amount (intensity × duration) of activity performed during the week and uses the concept of METs (metabolic equivalents) to assign an intensity value to a specific activity.

Fourth, the updated recommendation now clearly states that the recommended amount of aerobic activity (whether of moderate- or vigorous-intensity) is in addition to routine activities of daily living which are of light intensity, such as self care, casual walking or grocery shopping, or less than 10 min of duration such as walking to the parking lot or taking out the trash. Few activities in contemporary life are conducted routinely at a moderate intensity for at least 10 min in duration. However, moderate- or vigorous-intensity activities performed as a part of daily life (e.g., brisk walking to work, gardening with shovel, carpentry) performed in bouts of 10 min or more can be counted towards the recommendation. Although implied, this concept was not effectively communicated in the original recommendation.

Fifth, the new recommendation emphasizes the important fact that physical activity above the recommended minimum amount provides even greater health benefits. The point of maximum benefit for most health benefits has not been established but likely varies with genetic endowment, age, sex, health status, body composition and other factors. Exceeding the minimum recommendation further reduces the risk of inactivity-related chronic disease. Although the dose-response relation was acknowledged in the 1995 recommendation, this fact is now explicit.

Sixth, although the original recommendation introduced the concept of accumulating short bouts of physical activity toward the 30-min goal, there was confusion regarding how short these episodes could be. For consistency and clarity, the minimum length of these short bouts is clarified as being 10 min.

Seventh, muscle-strengthening activities have now been incorporated into the physical activity recommendation. Although the 1995 recommendation mentioned the importance of muscular strength and endurance, it stopped short of making specific declarations in this area. Available evidence now allows the integration of muscle strengthening activities into the core recommendation.

Finally, minor wording changes in the recommendation have been made to enhance clarity in communications. For example, the term "aerobic" or endurance has been added to clarify the type of physical activity being recommended and to differentiate it from muscle-strengthening exercises, which are now part of the core recommendation.