

# Personalizing Physical Activity Prescription

B. Don Franks  
UNIVERSITY OF ILLINOIS

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## HIGHLIGHT

Coherent individualized recommendations for physical activity can be consistent with the research data and expert judgment by using the individual's current activity status and the health/fitness/performance goals in the following sequence:

<u>Activity Status</u>	<u>Recommended Activities</u>
Everyone	Include activity in everyday life
Sedentary	Accumulate at least 30 min. of daily moderate-intensity activities
Moderately active	Include activities based on Health and Fitness Goals
Vigorously active	Perform activities based on Performance Goals

## INTRODUCTION

An explosion of recent scientific research findings has provided the basis for numerous reports that document the health benefits of regular physical activity. These reports have been issued by varied public and private organizations, including the Office of the Surgeon General, the National Institutes of Health, the Centers for Disease Control and Prevention, the President's Council on Physical Fitness and Sports, the American Medical Association, the National Coalition for Promoting Physical Activity (including the American College of Sports Medicine, the American Alliance for Health, Physical Education, Recreation and Dance, and the American Heart Association), as well as many other organizations in both the public and the private domain (see box at the end of this article for a description of some of these reports). However, there remain several unresolved issues regarding physical activity prescription that require further study. These include intensity, duration, frequency, type of activity, and whether or not activity must be done in one session or can be divided into several shorter sessions throughout the day.

The purpose of this paper is to describe how coherent recommendations for physical activity can be provided to individuals based on, and consistent with, the current research and the expert judgment of professionals in the field. Although “how much activity to recommend?” seems like a simple question, there is confusion about its answer both in the research and the popular literature. *The confusion is the result of the failure to consider two factors: the physical activity status of the individual and the health, fitness, and performance goals that are desired by the individual.*

## A MODEL FOR MAKING PHYSICAL ACTIVITY RECOMMENDATIONS

It is possible to harmonize all the various research studies and position statements by using the model described earlier. There are certain activities that can be universally recommended. Other activities depend on the current activity level of the individual. After a modest level of physical activity is included in a person’s lifestyle, then the recommendations for additional activity depend largely on the specific health, fitness, and/or performance goals of the individual. Figure 3.1 summarizes this model for recommending physical activity.

### 1. Activities for Everyone

**Recommendation: Activities for everyone should be of the type that can be done as part of an individual’s routines at home, work, and during leisure time.** In order to promote general health and well-being and the ability to handle routine tasks, there are common activities recommended for everyone. Each person can increase activity as part of her or his lifestyle.

To increase physical activity as part of daily life, individuals should walk rather than ride when possible; climb stairs rather than taking the elevator or escalator; park farther away from the store or office for a short walk to and from the car; get off the bus or train one stop earlier for a short walk to the office, store, or home. Emphasize weight-bearing activities to use more energy and to enhance bone health. Include a daily routine of stretching aimed at preventing low back problems.

### FIGURE 3.1

#### Model for physical activity recommendations.

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1. Activities recommended for everyone
2. Activities for sedentary individuals
3. Activities for moderately active individuals interested in health
  - Cardiovascular
  - Bone
  - Low Back
  - Psychological
4. Activities for moderately active individuals interested in physical fitness
  - Aerobic fitness
  - Relative leanness

- Muscular strength and endurance
  - Flexibility
  - 5. Activities for vigorously active individuals interested in performance
    - Sport
    - Physical task(s)
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## 2. Activities for Sedentary Individuals

**Recommendation: Inactive individuals should continue to find ways to include activity in their daily routine and should accumulate at least 30 minutes of moderate-intensity activity daily.** Most experts agree that in addition to those daily activities included in Recommendation 1, additional activities are desirable to improve one's health. This second recommendation is designed for sedentary individuals—those who currently **do no regular physical activity**, or who cannot walk for 30 minutes continuously without discomfort or pain. (Individuals who are unable to walk can substitute moving in a wheelchair, swimming, etc. See American Association for Active Lifestyles, 1995, for recommendations for activity modifications for individuals with disabilities.)

These activities for sedentary individuals include walking, yardwork, cycling, slow dancing, and low-impact exercise to music. The activity can be broken into 2–4 segments, for example, taking two 10-minute exercise breaks during the workday, and another exercise break in the morning or at night during the week, with a 30-minute walk on weekend days. Weight-bearing activities should be included with the emphasis on either being active or accumulating activity and not the intensity level.

## 3. Activities for Moderately Active People with Health Goals

**Recommendation: Those individuals who have specific health goals should perform the activities in Figure 3.2 based on the health goal desired.** Moderately active individuals are those who currently accumulate 30 minutes of activity daily, or who can walk 30 minutes continuously without pain or discomfort, but could not jog three miles (or walk six miles at a brisk pace, cycle 12 miles, or swim 3/4 mile) continuously without discomfort and undue fatigue. These individuals should continue to include activity in their normal routine, and accumulate 30 minutes of moderate-intensity activity every day. At this point, the individual's desired goals are essential in making additional recommendations. Different activities need to be recommended depending on an individual's health and fitness goals.

The consensus statement by Bouchard, Shephard, and Stephens (1994) and the Surgeon General's report both deal with the relationship between physical activity and cardiovascular and other health issues. In addition, recent issues of the *PCPFS Physical Activity and Fitness Research Digest* deal with activity recommendations for specific health goals, including cardiovascular (Haskell, 1995), bone (Shaw and Snow-Harter, 1995), cancer (Lee, 1995), healthy low back (Plowman, 1993), and obesity (Wilmore, 1994).

For those individuals who want to prevent cardiovascular and other diseases and to **promote general health**, the emphasis should be on including activity as part of the daily routine and accumulating 30 minutes of moderate-intensity activity daily. There is good evidence that this type of activity will reduce risk of cardiovascular disease. There is additional gain with longer duration of activity and/or the addition of vigorous-intensity activity. For **healthy bones**, weight-bearing activities and those activities designed to improve muscular strength and endurance are emphasized. For a **healthy low back**, static stretching in the mid-trunk area and abdominal curl-ups (slow, without feet held) are recommended. A major part of one's overall health is **psychological well-being**. Feeling good, a positive outlook on life, healthy levels of depression or anxiety, and the ability to capture the positive aspects of stress while minimizing its negative side are all components of psychological health. There is increasing evidence that an active lifestyle is associated with improved psychological well-being, although the specific activity recommendations for psychological health cannot be precisely defined at this time. Moreover, it seems logical that the emphasis for psychological health is selecting enjoyable activities and environment. The desired activities and atmosphere will, of course, vary with individuals. For example, many individuals enjoy the social interaction of being part of a group jogging, playing games, or exercising to music, while others look forward to time alone with one's own thoughts. Relaxation techniques can also be helpful for psychological well-being.

Physical activity may help prevent or minimize many other health problems that are not listed above. More research is needed before definitive exercise prescriptions can be made for each specific potential health problem. In general, the activities recommended for cardiovascular health are appropriate for a variety of health concerns.

Although the emphases for health goals are on including more activity as part of one's routine and accumulating 30 minutes of daily activity, there is additional benefit in more activity. It appears that either doing more activity (longer duration) and/or activities that are more intense can result in additional health benefits. The nature of the additional activities can often be determined by looking at specific physical fitness goals.

## FIGURE 3.2

### Physical activity for health goals.

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These activities should be considered after an individual is already doing those activities recommended for sedentary individuals. The activities should be done in addition to these activities.

Health Goal	Recommended Activity
Cardiovascular	Accumulate at least 30 min. of daily moderate-intensity activities Include longer duration and/or higher intensity
Bone	Weight-bearing activities Resistance exercises
Low Back	Static stretching in mid-trunk and thigh regions Abdominal curl-ups
Psychological	Enjoyable activities and fun atmosphere

## 4. Activities for Moderately Active People with Fitness Goals

**Recommendation:** Those individuals who have specific fitness goals should perform the activities in Figure 3.3 based on the fitness goal desired. Health-related physical fitness includes aerobic fitness, relative leanness, muscular strength and endurance, and flexibility. Individuals interested in one or more of these fitness goals should continue to do activities as part of the daily lifestyle and accumulate 30 minutes of daily activity. In addition, improvement in these fitness elements requires different types of activity.

A. **Aerobic fitness:** The aerobic fitness goal is related to the health goal for cardiovascular health and performance goals involving endurance activities. These individuals should schedule at least 20 minutes of vigorous-intensity activity (preceded and followed by 5–10 minutes of moderate-intensity activity) 3–4 days per week. These activities can include fast walking, jogging, cycling, fast dancing, low- to moderate-impact exercise to music, and swimming. The heart rate (HR) during these activities should be 70–85% of maximal heart rate (HR) (calculated by:  $(220 \text{ b/min} - 2 \text{ age}) \times 0.7$ ;  $(220 \text{ b/min} - 2 \text{ age}) \times 0.85$ ). For example, a 40-year-old individual would have an estimated maximum heart rate of 180 b/min ( $220 \text{ b/min} - 2 \times 40$ ). The target heart rate would range from 126 b/min ( $180 \text{ b/min} \times 0.7$ ) to 153 b/min ( $180 \text{ b/min} \times 0.85$ ). The individual can learn how hard to work out by stopping and counting the heart rate for 10 seconds (beats/min divided by 6). Thus in the 40-year-old example, the 10 sec HR should be from 21 b/10 sec ( $126/6$ ) to 25–26 b/10 sec ( $153/6$ ). As always, it is important for these individuals to warm up and cool down for 5–10 minutes before and after the vigorous-intensity workout. The low back routine can be included as part of the warm-up or cool-down. These activities will increase maximal oxygen uptake, make current submaximal tasks less stressful, and reduce resting and submaximal heart rate. These activities are related to additional reductions in the risk of cardiovascular disease, and provide the basis for a number of endurance-type sports and activities.

B. **Relative leanness:** The amount of fat related to the total body weight is a key health ingredient. Too little fat can have serious health consequences. Too much fat is related to the development and aggravation of numerous health problems. The healthy range for children prior to puberty and for men is 5–18%, and for women, 15–28%. Children before puberty and men have a necessary amount of fat of about 3%. Women after puberty have approximately 12% of fat that is necessary for normal body function.

Recommendations for relative leanness obviously include both nutrition and activity. For those with too little fat, increased caloric intake, especially carbohydrates, and resistance exercises for increasing body mass are recommended. In addition, the possibility of eating disorders should be checked in these individuals. Individuals with too much fat need to reduce the total calories and the percent of fat in their diet. These individuals should be encouraged to include activity as part of their routines, accumulate at least 30 minutes of moderate-intensity activity daily, and either continue the moderate-intensity activity for longer duration or include vigorous-intensity activities such as those recommended for aerobic fitness. The main emphasis is on activities that use energy (calories). Resistance exercise also should be included to increase the lean tissue mass, thereby increasing the number of calories burned throughout the day.

C. **Muscular strength and endurance:** Although elite performers need to distinguish between strength (one contraction) and endurance (repeated contractions), from health and fitness perspectives, strength and endurance can be considered together for health and fitness goals. Individuals need modest levels of strength and endurance to be able to function in normal routines that include lifting, moving, carrying, etc. Abdominal endurance is an important factor in the prevention of low back problems. Resistance activities to maintain muscle mass are particularly important for individuals who are restricting their caloric intake (Pollock, *PCPFS Digest*, 1996).

Improvement in strength and endurance includes resistance exercise, where individuals lift greater weights than normal for the major muscle groups. A routine of 10–15 repetitions of the lift for each muscle group, with 1–2 sets, done 2–3 alternate days per week is recommended. It can be done in conjunction with the vigorous-intensity aerobic activities, or on separate days.

D. **Flexibility:** The ability to move all joints through their complete range of motion without pain is important for daily tasks. In addition, flexibility in the mid-trunk and thigh region is important for low back health. A routine of daily static stretches (moving the joint to its extreme position and holding for 10–30 sec) for all the joints, repeated 2–3 times is recommended. Individuals often include these flexibility activities as part of their warm-up and cool-down.

### FIGURE 3.3

#### Physical fitness goals and recommended activities.

These activities should be considered only **after** an individual is doing the activities for sedentary individuals. The activities should be done *in addition* to these activities.

Physical Fitness Goals	Recommended Activities
Aerobic fitness	20–40 min vigorous-intensity activity, 3–5 days/week
Relative leanness	
Too little fat	Eat more calories, especially carbohydrates Include resistance exercise
Too much fat	Reduce calories, especially fat Increase duration of aerobic activities Include resistance exercise
Muscular strength/ endurance	Include resistance exercise 1–2 sets, 10–15 reps, each muscle group 2–3 days/week
Flexibility	Daily static stretching, 10–30 sec, 2–3 times, each joint

## 5. Activities for Vigorously Active Individuals with Performance Goals

**Recommendation:** Those individuals who are vigorously active and who have specific performance goals should consider the information in Figure 3.4 and the discussion below. Individuals who can run 3 miles continuously (or walk fast 6 miles, cycle 12 miles, or swim  $3/4$  mile) within their target HR, 3–4 times per week without discomfort or pain can, if interested, engage in a variety of sport and performance activities. Some individuals have specific performance goals, such as being a better tennis player, or running a 10K race in a certain time.

These individuals should continue to include activity as part of their lives, accumulate 30 minutes daily of moderate-intensity activity, and include vigorous-intensity activity at target HR those days when not engaging in sport/performance activities. Performance activities include a wide range such as soccer, basketball, racquetball, badminton, high-intensity exercise to music, road races, etc. It is not possible to make general recommendations for performance. Different sports or tasks need additional fitness levels as well as elements and skills of the game. For example, running, cycling, or swimming races demand high levels of aerobic fitness in that mode of activity, specific form to increase efficiency of movement, and strategy and mental readiness for the event. Racquetball requires aerobic and anaerobic energy, court agility and coordination, different types of strokes (serve, kill, lob, hitting after the ball rebounds from the wall), plus strategy and mental readiness for the match. Being a fire fighter requires the ability to respond quickly to emergencies, repeated anaerobic energy production in smoke-filled air, muscular endurance for carrying heavy loads up and down ladders or stairs, etc. All activities require energy sources, but the aerobic/anaerobic mix is quite different. Interval training that mimics the energy demands of the performance is one important aspect of training. The point is that each performance has its own needs for underlying fitness levels and specific skills.

### FIGURE 3.4

#### Recommended activity for performance goals.

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These activities should be considered only **after** an individual is doing activities recommended in Figure 3.3. These activities should be done *in addition* to activities in Figure 3.3.

Performance Goals	Recommended Activities
Sport or physical task(s)	Develop and/or maintain fitness levels
	Interval training
	Motor tasks related to performance
	Specific skills related to performance
	Strategy and mental readiness

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## ACHIEVING QUALITY OF LIFE

Perhaps everyone's overall goal is to be able to participate in and enjoy life fully. For most individuals, that will include several health, fitness, and performance goals. Thus, it seems logical to **start with the health goals, then progress to the fitness goals, adding performance goals for those interested.** In this way, the overall quality of one's life can be enhanced.

### Selected Reports on Physical Activity: A Brief History

The American College of Sports Medicine has been the major public voice regarding exercise recommendations for the last 20 years. Its 1978 recommendations (ACSM, 1978) have been the most quoted source in this regard. These recommendations (3-5 times per week, at least 20 minutes of vigorous-intensity aerobic activity—60-80% of maximal functional capacity) represented a good summary of the experimental literature on the effects of physical activity on cardiovascular fitness (maximal oxygen uptake). The more recent recommendations from ACSM (ACSM, 1995) and others expand the earlier statement to include evidence from epidemiological studies (e.g., Blair et al., 1989; Paffenbarger, Hyde, & Wing, 1986) on risk reduction of cardiovascular disease, encouraging everyone to accumulate at least 30 minutes of daily moderate-intensity activity. The July 1996 issue of the *PCPFS Physical Activity and Fitness Research Digest* (Now *PCPFS Research Digest*) (Corbin & Pangrazi, 1996) includes an excellent summary of the recent report on *Physical Activity and Health* by the Office of the Surgeon General. The Surgeon General's report (USDHHS, 1996) and the *PCPFS Physical Activity and Fitness Research Digest* synthesize the research findings related to physical activity and health. Its conclusions are similar to the more focused report from the NIH Consensus Conference on Physical Activity and Cardiovascular Health (NIH, 1996). Other resources for those interested in the scientific basis for this *PCPFS Research Digest* can be found in papers from the conference reported by Bouchard et al. (1994), and the statement from the ACSM, CDC, and PCPFS, published by ACSM and CDC by Pate et al. (1995). Similar recommendations for adolescents are reported by Sallis and Patrick (1994).

In recent years, professionals have modified the original ACSM recommendation in order to engage a greater proportion of the general public in regular physical activity. This was done because evidence continues to mount showing that sedentary individuals can reduce their risk of cardiovascular disease with moderate activity and a rather small percentage of people in the United States are active at the level suggested in the original ACSM position statement. The current activity status is well documented in the recent update of the **Midcourse Review of Healthy People 2000** (USDHHS, 1995) and the **Surgeon General's Report on Physical Activity and Health**. In the U.S. adult population, about 15% engage in activities recommended by the original ACSM position statement, 22% accumulate moderate-intensity activity, and 24% are completely sedentary, leaving 39% who do some activity but less than the minimum recommended (USDHHS, 1996).



However, despite these official statements and reports that have received wide recognition in the media, there is still confusion about how to answer the question, What and how much activity should be recommended? The general answer given in many reports and in the mass media seems to be “something is better than nothing,” and “although some is good, more is better.” Although this accurately reflects the research and professional opinion, it is inadequate to provide helpful guidance for physical activity patterns for individuals.

## SUMMARY

Two factors for physical activity prescription have been considered—current activity status and health/fitness/performance goals. Initial recommendations for activity should be based on the individual’s activity status—getting each person involved in routine activities and daily moderate-intensity activities. Then after an individual is engaging in the daily activities on a regular basis, without any problems of discomfort or fatigue, activities for health and fitness goals should be included. After daily physical activity and fitness activities have been included as part of a person’s lifestyle, then a variety of performance goals, based on personal interests, can be considered.

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