

Lifestyle Activity

Current Recommendations

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Summary

An accumulation of international scientific evidence indicates that physical inactivity is detrimental to health and that moderate levels of physical activity confer significant health benefits. Unfortunately, in countries where major surveys of physical activity have been conducted, the prevalence of sedentary behaviour has been found to be as high as 40%. In the US, where approximately 30% of adults report little or no physical activity, the Centers for Disease Control and the American College of Sports Medicine recently issued guidelines and recommendations on the amount and frequency of moderate levels of physical activity necessary to elicit health benefits in predominantly sedentary adults. These guidelines utilise a physical activity-health paradigm and, uniquely, recommend the potential effectiveness of activities of daily living or 'lifestyle activity' for achieving health benefits. This article briefly reviews the rationale behind these guidelines and, in view of the historical association of the exercise training-fitness model to health, highlights some challenges and potential problems in applying these new guidelines to the general population.

Generally speaking, all parts of the body which have a function, if used in moderation and exercised in labours to which each is accustomed, becomes thereby healthy and well developed, and age slowly: but if left unused and left idle, they become liable to disease, defective in growth, and age quickly.

— Hippocrates (ca 460-377BC)

The links between physical activity and health first proposed more than 2000 years ago had to wait until the mid-20th century for the initiation of formal scientific confirmation.^[1,2] Since that time, epidemiological and controlled clinical studies have consistently reported the positive health benefits of physical activity^[3-11] and, conversely, the negative effects of physical inactivity.^[12-14] In parallel with the plethora of scientific information,

there has been increased media focus on the desirability of exercise from both a fashion and fitness standpoint. The above factors, coupled with the aerobics and running 'boom' of the 1970s and 80s, have contributed to an apparent public acceptance that exercise is beneficial to health. Such acceptance has done little to change the fact that the majority of the population of the US^[14] and other 'developed nations' remain essentially sedentary.^[15] Data from several countries in which national level physical activity surveys have been conducted^[16-18] indicate that only about 15% of the adult population engage in vigorous physical exercise according to ACSM guidelines^[19] with the percentage of adults who are sedentary ranging from 15 to 40%.^[16-18,20]

Table 1. A comparison of American College of Sports Medicine (ACSM) exercise recommendations with Centers for Disease Control and Prevention (CDC) and ACSM physical activity recommendations^a

Activity characteristics	ACSM exercise recommendations for cardiorespiratory fitness in healthy adults (1990) [exercise training-fitness model] ^[19]	CDC/ACSM physical activity recommendations (1995) ^[24]
Frequency	3 to 5 days per week	6 to 7 days per week
Intensity	60 to 90% of maximum heart rate or 50 to 85% maximum aerobic capacity	Moderate (3 to 6 METs ^b or 4 to 7 kcal/min)
Duration	20 to 60 minutes of continuous aerobic activity	Accumulation of ≥30 minutes of activity; intermittent activity is appropriate
Type	Any activity that uses large muscle groups, can be maintained continuously and is aerobic in nature, e.g. walking, running, cycling, swimming	Any activity which can be performed at an intensity similar to that of brisk walking

a Earlier recommendations were primarily designed to improve functional capacity. Current recommendations focus on the activity requirements important for reduced risk of chronic disease.

b MET values are multiples of the resting rate of oxygen consumption during physical activity. One MET represents the approximate rate of oxygen consumption of a seated adult at rest, or about 3.5 ml/min/kg. The equivalent energy cost of 1 MET in kcal/min is about 1.2 for a 70kg person or approximately 1 kcal/kg/h.

1. Lifestyle Activity Recommendations for Adults

In the US, some 30% of adults are reported as being sedentary^[21,22] which no doubt prompted the formulation of more detailed physical activity guidelines, based on those outlined in the Healthy People 2000 objectives for the US.^[23] In February 1995, an expert panel coordinated by the Centers for Disease Control and Prevention (CDC) and the American College of Sports Medicine (ACSM) published the following recommendation: 'Every US adult should accumulate 30 minutes or more of moderate-intensity physical activity on most, preferably all, days of the week.'^[24]

The new recommendations differ from those previously published^[19,25] which were based on an 'exercise training-fitness' model and advocated vigorous physical exercise.^[26] The CDC/ACSM recommendations embrace a 'physical activity-health' paradigm,^[26] which uniquely incorporates moderate intensity and intermittent physical activity (table 1). Similar recommendations for moderate level physical activity have also recently been published in the UK.^[18]

The fact that moderate activity confers health benefits is based upon considerable epidemiological evidence. Studies have reported reduced coronary heart disease (CHD) mortality and all-cause mortality rates among individuals who regularly

engage in moderate physical activity.^[3,4,27-29] Most of the beneficial activities reported approximated an intensity of 4 to 7 kcal/min and included activities such as brisk walking, house cleaning, and lawn/garden care. Additional evidence comes from intervention studies.^[30-32] For example, a 24-week moderate-intensity (6.4 km/h) walking programme with initially sedentary women was equally effective in increasing high-density lipoprotein cholesterol (HDL-C) levels when compared with an equidistant but more vigorous (8 km/h) walking programme.^[32] This suggests that health benefits derived from physical activity may be linked to exercise volume as well as exercise intensity. An additional 'bonus' for sedentary persons is that the greatest health benefits from increased activity appear to accrue when the least active become moderately active (fig. 1).^[26]

The other unique component of the new recommendations is the concept that health benefits may be gained from multiple daily sessions of physical activity, as well as from one continuous daily session. Epidemiological research^[4,28] has identified activities associated with health benefits such as gardening, raking leaves and home repair. It is likely that many of these activities are performed in a discontinuous, rather than continuous manner.

In an intervention study,^[33] 40 men aged approximately 50 years old were randomly assigned

to one of two aerobic activity groups: the first performing moderate intensity physical activity for 30 minutes daily, and the second performing three 10-minute sessions of moderate physical activity daily. After 8 weeks of training, both groups demonstrated significant improvements in maximal oxygen uptake and exercise treadmill test duration. In addition, heart rate at submaximal workloads significantly decreased in both groups. The aforementioned studies and others^[3,34,35] support the contention that health benefits associated with improved fitness and increased physical activity are also possible with shorter, intermittent activity. The National Institutes of Health Consensus Statement^[36] provides further evidence of the health-related benefits of physical activity.

2. Interpretation of Recommendations

The new US guidelines serve as more realistic goals for the sedentary adult who wishes to adopt health-related lifestyle activities. There may be unique challenges, however, for those involved with the effective dissemination and interpretation of the guidelines. Such challenges include overcoming the inertia of an exercise history generated

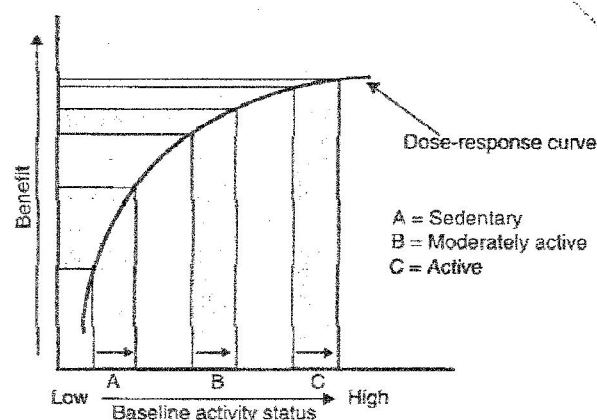


Fig. 1. Theoretical dose-response curve demonstrating that the magnitude of increased benefit for any given increase in activity is greater for less active persons (from Haskell,^[26] with permission). N.B. Persons exercising vigorously who increase their level of activity (level C) accrue only small increases in health benefit. However, they elicit the greatest absolute health benefits compared with those performing lower intensity activity (levels A and B).

by more than 2 decades of 'conventional wisdom' which emphasised only the exercise training-fitness model. Because of this there may be a credibility gap to bridge in promoting moderate exercise or customary daily activities as important health-related behaviours. It will be important therefore

Table II. Examples of common physical activities for healthy US adults illustrating how the intensity level (in METs)^a of similar activities may vary as a consequence of individual differences in perception of work effort (from Ainsworth et al.,^[37] with permission)

Light (<3 METs or <4 kcal/min)	Moderate (3-6 METs or 4-7 kcal/min)	Hard/vigorous (>6 METs or >7 kcal/min)
Walking: slowly, strolling	Walking: briskly	Walking: briskly uphill, or with load
Cycling: stationary, very light effort	Cycling: recreational or transportation	Cycling: fast or racing
Home activities: carpet sweeping, vacuuming	Home activities: cleaning, general	Home activities: moving furniture
	Home activities: standing packing or unpacking, occasional lifting of household items (light-moderate effort)	Home activities: moving household items, carrying boxes
Child care: sitting/standing playing with child	Childcare: sit/stand feeding or grooming child	
	Childcare: walk/run playing with children (moderate effort)	
Swimming: slow treading	Swimming: moderate effort	Swimming: fast-treading or crawl
Shopping: walking (non-grocery shopping)	Shopping: walking (with grocery cart)	
Home repair: carpentry	Home repair: painting	
Mowing lawn: riding power mower	Mowing lawn: walking with power mower	Mowing lawn: walking with hand mower
Gardening: walking, applying fertiliser, seeding lawn	Gardening: planting seedlings, weeding	

^a MET values are multiples of the resting rate of oxygen consumption during physical activity. One MET represents the approximate rate of oxygen consumption of a seated adult at rest, or about 3.5 ml/min/kg. The equivalent energy cost of 1 MET in kcal/min is about 1.2 for a 70kg person or approximately 1 kcal/kg/h.

Table III. Examples of physical activity programmes by level of intervention, channel, target and strategy^[42]

Level of intervention	Channel	Target	Strategy
Personal	<i>Face-to-face:</i> Physician's office, health clinics, health spas and clubs	Patients, clients	Information on risk, health benefits, counsellor support, personal monitoring and feedback, problem solving (relapse prevention)
Personal	<i>Mediated/not face to face:</i> telephone, mail (feedback systems, correspondence courses, self-help kits and booklets)	Patients, clients	Same as above
Interpersonal	Classes, telephone/mail systems, health spas and clubs, peer-led groups	Patients, healthy individuals, families, peers	Information, peer, family and counsellor support, group affiliation, personal or public monitoring and feedback, group problem solving
Organisational and/or environmental	Schools, worksite, neighbourhoods, community facilities (e.g. par course, walk/bike paths), churches, community organisations, sites for activities of daily living (public stairs, shopping malls, parking lots)	Student body, all employees, local residents, social norms or milieu	Curricula, point-of-choice education and prompts, organisational support, public feedback, incentives
Institutional/legislative	Policies, laws, regulations	Broad spectrum of the community or population	Standardisation of exercise-related curricula, insurance incentives for regular exercisers, flexible work time to permit exercise, monetary incentives for the development of adequate public facilities for exercise, Surgeon General's report on physical activity and health

for exercise professionals and the general public to recognise that the new recommendations complement, rather than replace, previous guidelines. The definition of 'moderate activity' must also be clarified, since this is of paramount importance in the setting and achieving of goals. While higher-intensity activities are often relatively easy to recognise, 'moderate intensity' activity is typically more difficult to identify, particularly given the influences of individual differences in perception of work effort (table II).

In addition, many adults routinely engage in household chores, or take an occasional walk to the corner store, albeit at an intensity that may be more appropriately termed as 'light' rather than 'moderate'. Emphasis on such commonly performed physical activities may lead to a belief that a person is already active enough and that further increases in activity are unnecessary. For example, being 'too busy' is frequently cited as a barrier to being physically active.^[38] It would indeed be a shame if 'busy-ness' was mistakenly interpreted as health-

related activity! The fact remains that most adults are not active enough and would benefit from an increase in physical activity.^[23]

3. Practical Applications

What do these new recommendations mean in practical terms for the sedentary adult who wishes to become more active? In general, he or she need not embark on a vigorous exercise programme to realise health benefits. Suggested physical activity scenarios include: (i) a brisk 10-minute walk in the morning, at lunchtime and after work; (ii) a brisk walk to the mail box, raking leaves, and stationary cycling while reading or watching television; or (iii) general house-cleaning, actively playing with children and home gardening. The accumulated duration of these activities should be gradually increased towards 30 minutes per day. The key to effect positive health results will be to perform these activities at an intensity which at least approximates brisk walking.

Since health benefits accrue in a dose-response fashion (fig. 1), adults who currently engage in vigorous activity for 20 to 30 minutes or longer should continue to do so. Furthermore, the importance of muscular strength and flexibility should also not be overlooked. A growing body of data^[39-41] indicates that maintenance and/or improvement of these two components of fitness is associated with improved daily functioning and is thus critical to a healthy aging process.

4. Implementation of Recommendations

Effective implementation of these guidelines will require interventions and involvement at levels beyond the personal and interpersonal approaches which to date have characterised previous efforts.^[42] In accordance with the approach

adopted by Healthy People 2000,^[23] the authors of the CDC/ACSM guidelines have issued a 'call to action' aimed at increasing the joint cooperation and involvement of public health agencies, corporations, schools, communities and health professionals, as well as individuals and families. Examples of the types of physical activity programmes that could be delivered across 4 hierarchical levels of intervention are illustrated in table III.^[42] Within these levels, the utility of a developmental or life-span strategy should also be stressed, i.e. one which takes account of life periods and transitions which may markedly affect physical activity behaviours (table IV).^[42]

5. Conclusions

Regular physical activity is an important component of a healthy lifestyle. A persuasive body of

Table IV. Features and examples of physical activity programmes for several major developmental milestones

Milestone (critical period)	Specific features	Goals/strategies
Adolescence	Rapid physical and emotional changes Increased concern with appearance and weight <i>Need for independence</i> Short term perspective Increased peer influence	Exercise as part of a programme of healthy weight regulation (both sexes) <i>Noncompetitive activities that are fun, varied</i> Emphasis on independence, choice Focus on proximal outcomes (e.g. body image, stress management) Peer involvement, support
Initial work entry	Increased time and scheduling constraints Short term perspective Employer demands	Choice of activities that are convenient, enjoyable Focus on proximal outcomes Involvement of worksite (environmental prompts, incentives) Realistic goal-setting/injury prevention Coeducational noncompetitive activities
Parenting	Increased family demands and time constraints Family-directed focus Postpartum effects on weight/mood	Emphasis on benefits to self and family, e.g. stress management, weight control, well-being Activities appropriate with children, e.g. walking Flexible, convenient, personalised regimen <i>Inclusion of activities of daily living</i> Neighbourhood involvement/focus Family-based public monitoring, goal-setting Availability of child-related services (childcare)
Retirement age	Increased time availability and flexibility Longer term perspective on health Increased health concerns, 'readiness' Caregiving duties, responsibilities (parent, spouse, children or grandchildren)	Identification of current and previously enjoyable activities Matching of activities to current health status Emphasis on mild and moderate intensity activities, including activities of daily living Use of 'life path point' information and prompts Emphasis on activities engendering independence Garnering support of family members, peers Availability of necessary services (e.g. caretaking services for significant others)

research has demonstrated that health benefits may be elicited from moderate intensity activities as well as those of a more vigorous nature. New guidelines from the CDC/ACSM recommend that every American adult should accumulate at least 30 minutes of moderate-intensity physical activity on most days of the week. This may be achieved in a single session, or with several sessions of 8 to 10 minutes, and may use many common activities of daily living, as well as more formalised exercise programmes.

Adults who already engage in vigorous physical activity for 30 minutes or more are advised to continue this practice. Muscular strength and flexibility are also recommended as important contributions to a healthy, independent lifestyle, particularly in later life. The mid-decade status of Healthy People 2000^[43] is that small (2%) gains in the proportion of persons exercising regularly has been reported, but with no change in those leading essentially sedentary lives and an increase (8%) in those who are overweight. The new recommendations will hopefully improve this situation by encouraging a greater number of adults to take a more active role in the improvement and maintenance of their health through increased participation in physical activity.

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