The Importance of Walking to Public Health

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ABSTRACT

LEE, I-M., and D. M. BUCHNER. The Importance of Walking to Public Health. *Med. Sci. Sports Exerc.*, Vol. 40, No. 7S, pp. S512–S518, 2008. **Purpose:** There is clear evidence that physical activity, including walking, has substantial benefits for health. This article, prepared as part of the proceedings of a conference on walking and health, discusses the type of walking that produces substantial health benefits, considers several methodological issues pertinent to epidemiologic studies investigating the association of walking and health, and reviews some of the reasons for the large public health importance of walking. **Methods:** Review of the available literature. Due to space constraints, this is not intended to be a comprehensive review; instead, selected studies are cited to illustrate the points raised. **Results:** Walking as a healthful form of physical activity began to receive attention in the 1990s due to new recommendations that emphasized moderate-intensity physical activity. The main example of moderate-intensity activity in the 1995 Centers for Disease Control/American College of Sports Medicine recommendation was brisk walking at 3 to 4 mph. Evidence for the health benefits of walking comes largely from epidemiologic studies. When interpreting the data from such studies, it is necessary to consider several methodological issues, including the design of the study, confounding by other lifestyle behaviors, and confounding by other kinds of physical activity. Walking has the potential to have a large public health impact due to its accessibility, its documented health benefits, and the fact that effective programs to promote walking already exist. **Conclusions:** Walking is a simple health behavior that can reduce rates of chronic disease and ameliorate rising health care costs, with only a modest increase in the number of activity-related injuries.

Key Words: EPIDEMIOLOGY, EXERCISE, INTERVENTION, PHYSICAL ACTIVITY, PUBLIC HEALTH, WALKING

Could something as mundane as walking be of large importance to public health? The answer is yes. Indeed, because most Americans do not attain recommended levels of physical activity, walking could have even greater public health impact if sedentary Americans began to walk so as to meet public health physical activity recommendations.

It is well known that unhealthy behaviors are the main preventable causes of chronic diseases that account for most morbidity and premature mortality in developed countries. The most important health behaviors relate to tobacco use, diet, physical inactivity, and alcohol use. As an example of their importance, the Nurses' Health Study reported that 82% of coronary events in a cohort of women were attributable to these four unhealthy behaviors (38). A surprisingly low percentage of Americans adopt healthy behaviors in all of these areas. An analysis of national survey data from 2000 reported that only 3% of American adults had all four indicators of a healthy lifestyle, in that they did not smoke, engaged in regular physical activity, ate five or more fruits and vegetables each day, and had a healthy body weight (defined as body mass index 18.5–25 $kg{\cdot}m^{-2}$) (31).

In this article, prepared as part of the proceedings of a conference on walking and health, we will discuss the type of walking that produces substantial health benefits, discuss several methodological considerations for epidemiologic studies investigating the association of walking and health, and review the reasons for the large public health importance of walking.

WHAT TYPE OF WALKING IS RECOMMENDED?

It is in the context of how lifestyle behaviors, such as those discussed previously, affect chronic diseases that walking assumes its import to public health. Interestingly, the significance of physical activity, including walking, as a predictor of lower rates of chronic diseases took a relatively long time to gain wide acceptance. For example, the first US Surgeon General's report on smoking and health was published in 1964. However, the first US Surgeon General's report on physical activity and health was not published until 1996 (41). Combining the findings of this 1996 report with

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other evidence reviews, there is now strong evidence that a lack of physical activity increases risk of premature mortality and many chronic diseases, including cardiovascular disease (CVD), thromboembolic stroke, hypertension, type 2 diabetes mellitus, osteoporosis, obesity, colon cancer, breast cancer, anxiety, and depression.

Moderate-intensity physical activity, including walking, as a healthful form of physical activity began to receive attention in the 1990s (41). Before the 1990s, public health recommendations emphasized the health benefits of increasing physical fitness by means of vigorous activities like running (19). The focus of these earlier recommendations was primarily on the benefits of exercise for physical fitness, which was considered separate from health. Then, in 1995, the Centers for Disease Control (CDC) and the American College of Sports Medicine (ACSM) published a physical activity recommendation based upon the scientific consensus that substantial health benefits can accrue from moderate-intensity physical activity (3–6 METs) of at least 30 $min{\cdot}d^{-1}$ (29). Therefore, an important feature of the more recent recommendations has been the shift in emphasis toward public health. The CDC/ACSM recommendation also stated that 30 or more minutes of activity could be accumulated from multiple bouts, as long as each bout was 10 min or more.

The main example of moderate-intensity activity in the CDC/ACSM recommendation was brisk walking at 3 to 4 mph for most adults. That is, the recommendation specified the type of walking necessary to produce substantial health benefits: a minimum frequency ("most days of the week," typically interpreted to be at least 5 $d{\cdot}wk^{-1}$), a minimum duration each day (30 min), a minimum time for each activity bout (10 min), and a minimum intensity (moderate intensity). Of course, lesser amounts of walking could be combined with other types of moderate- or vigorous-intensity activity to attain similar benefits (e.g., as seen in Ref. (27)).

It has been a challenge to communicate the information in the recommendation to the public. For example, people commonly have regarded 30 min as the target, instead of the minimum, duration of activity. Walking can be performed at light intensity (e.g., strolling while window shopping), moderate intensity, or (less commonly) at vigorous intensity (e.g., fast walking on an incline). It is not always obvious to adults which walking is moderate to vigorous in intensity and therefore counts toward the recommendation, and it is also not obvious to them which walking is light in intensity and so does not count on the recommendation. Messages about how to use pedometers usually do not communicate the minimum requirements. For example, messages along the lines that "every step counts" are useful for encouraging more physical activity, but a complete message would also include "and some steps count more than others." Additionally, although pedometers can act as an external motivation to exercise (39), there can be large variations in the number of steps recorded by inexpensive pedometers (8), and pedometers also cannot assess the intensity of the walking.

METHODOLOGICAL CONSIDERATIONS IN EPIDEMIOLOGIC STUDIES OF WALKING AND HEALTH

The evidence for the health benefits of walking come largely from epidemiologic studies. Therefore, in this section, we discuss some important methodological issues to consider when interpreting the data from such studies. Specifically, we will discuss three issues: (i) influence of study design, (ii) confounding by other lifestyle behaviors, and (iii) confounding by other aspects (kinds) of physical activity. In discussing these issues, we will draw on examples from the CVD literature because heart disease represents the leading cause of death in the United States (15).

Impact of study design. All studies that have investigated walking in the prevention of CVD (i.e., examining this clinical end point directly, as opposed to CVD risk factors) have been observational epidemiologic studies, either case–control or cohort studies; there have been no randomized clinical trials due to feasibility constraints. Because such studies—in particular, the cohort studies—typically enroll thousands or tens of thousands of participants, the most practical method of assessing walking has been by questionnaires. Often, the large cohort studies have conducted smaller validation studies to examine the reliability and the validity of the self-reported physical activity data that they have collected on questionnaires. Generally, moderate correlations have been obtained between self-reported data and data obtained using more objective methods, such as using accelerometers (18).

An important fact to consider is that a moderate, or even good, correlation coefficient does not mean that exact correspondence has occurred; it merely indicates that the rank order of subjects (i.e., ranking from lowest to highest level of physical activity), measured by self-report, correlates well with the rank order as assessed by the more objective method. For example, in the College Alumni Health Study (CAHS), walking as reported on questionnaires correlated well with walking as recorded in physical activity diaries ($r = 0.64$) (1). However, in another study by Bassett et al. (3), walking as reported on questionnaires captured only about 35% of walking as measured by pedometers. The CAHS physical activity questionnaire clearly ranks subjects well, as indicated by the correlation of 0.64. It also has face validity in that the data from CAHS had shown expected inverse associations between walking and many chronic diseases, including all-cause mortality, heart disease, stroke, and diabetes. In fact, this questionnaire, developed by Professor Ralph Paffenbarger, has provided key data on much that we know about the associations of physical activity and health (12,21–23,27,36).

One possible explanation for the discrepancy between self-reported walking and walking as measured using pedometers is that the CAHS questionnaire was intended to measure purposeful walking only—such as walking for exercise or transport, whereas the pedometer measures all walking—including incidental walking in the course of daily living (e.g., walking around in the morning while getting ready for work). A biologically relevant question is, which kind of walking, as well as at what intensity, is important for health benefits? Only purposeful walking, which is more likely to last at least 10 min per episode or, all walking, regardless if the walking episode lasts only several seconds? This is important for investigators to consider. As discussed above, perhaps the answer may differ depending on the health outcome of interest. For example, for weight management, perhaps every bit of walking counts, whereas for other diseases (such as breast cancer) or other health benefits (such as cognitive function), perhaps more sustained and faster walking may be more relevant. As mentioned above, large variations in the number of steps recorded by some pedometers also may partly explain the discrepancy between self-reported walking and walking as measured using pedometers (8).

How can we better measure walking? This is beyond the scope of this article and is covered by another article from the conference.

Confounding by other lifestyle behaviors. Men and women who walk regularly, whether for transportation or leisure, are likely to differ from those who do not walk. One way in which they differ may be concerning other lifestyle habits. Intuitively, it would seem that those who walk regularly for leisure are likely to have healthier habits. This correlation is important because if we observe that walking is associated with lower rates of CVD, we need to consider—is walking responsible for the lower rates? Or are the lower rates due to other associated healthy habits?

Some evidence for demographic differences between those who do and do not walk is provided by the 1818 randomly selected men and women throughout the United States in the US Physical Activity Study (9). When comparing the two groups, those who reported regular walking sufficient to meet current physical activity recommendations and those who reported never walking, the sex distribution is similar for the two groups. However, regular walkers were more likely than never walkers to be younger, college graduates, and employed.

The US Physical Activity Study did not provide data on other lifestyle behaviors, so to examine whether differences exist for these characteristics, let us consider an example from another study. In the Harvard Alumni Health Study, a prospective cohort study that was begun in the early 1960s, information on health habits has been updated periodically. In the 1988 cycle of data collection, men who reported any walking tended to be younger than nonwalkers (66.2 vs 68.6 yr, respectively; $P < 0.05$). The mean body mass index did not differ much between walkers and nonwalkers (24.8 vs 24.6 $kg{\cdot}m^2$; $P = 0.19$). A very low proportion smoked cigarettes, somewhat lower for walkers than nonwalkers (8.1 vs 9.5%; $P = 0.26$), but the difference was not statistically significant. Walkers in the Harvard Alumni Health Study were more likely than nonwalkers to report alcohol consumption (74.1% vs 67.2%; $P < 0.05$), which is cardioprotective in moderate amounts. Their diet also was healthier than nonwalkers; walkers ate less meat (27.8% of walkers ate ≤3 servings of meat per month compared with 23.8% of nonwalkers; $P = 0.02$) and more vegetables (25.0% of walkers ate ≤1 serving of vegetables per day compared with 31.6% of nonwalkers; $P = 0.0002$).

Therefore, in studies of walking and chronic disease prevention, it is important to consider differences between walkers and nonwalkers to exclude the possibility that the lower rates of disease among walkers may be due not to the walking itself but to other factors coexisting with walking that predict lower risk of disease.

Confounding by other aspects of physical activity. In addition to being different concerning other lifestyle behaviors, walkers also may differ from nonwalkers concerning other kinds of physical activity that are carried out. In particular, we would expect walkers to be more active overall, expending more energy in leisure-time physical activities as well as in transportation. Walkers also may be more likely to participate in vigorous activities. Therefore, in examining the association between walking and the risk of developing chronic diseases, it is important to consider this correlation between walking and participation in other kinds of activities.

In particular, the separation of the effects of walking and other associated vigorous activities is important. If we were to observe lower rates of chronic disease among persons who walk, is it the walking that is responsible? Or is it the associated vigorous activities because there are clear data showing that vigorous activities lower the risk of premature mortality and chronic diseases such as CVD (41)? This distinction is not merely academic, but it has important public health implications. One reason it is important to make the differentiation is that if it is indeed the associated vigorous activity that is responsible for the lower risk—and not the walking—then the current CDC/ACSM recommendation for moderate-intensity physical activity will not be helpful for delaying mortality and preventing CVD.

Empirical data in men and women show that walkers are more active and more likely to participate in other activities, including vigorous activities, than nonwalkers. In the Harvard Alumni Health Study with male participants only, walkers of any amount clearly were more active than nonwalkers. In the 1988 data collection cycle, the median energy expended on leisure-time physical activity (including walking) in walkers was 1902 $kcal{\cdot}wk^{-1}$, as contrasted with less than half this in nonwalkers, 700 $kcal{\cdot}wk^{-1}$. Forty-eight percent of walkers reported participation in other leisure-time activities of moderate intensity compared with 34% of nonwalkers. The difference was not as great for participation in vigorous activities, 40% of walkers, compared with 34% of nonwalkers. All these differences between walkers and nonwalkers were statistically significant.

In the Women's Health Study, a completed randomized trial of aspirin and vitamin E in the primary prevention of CVD and cancer in about 40,000 women, data were collected on physical activity at baseline (7,20,33). As with men in the Harvard Alumni Health Study, the women walkers (i.e., women reporting any regular walking) in this study also were much more active than the nonwalkers. The median energy expenditure on leisure-time physical activity (including walking) in walkers was 727 $kcal{\cdot}wk^{-1}$ but only 60 $kcal{\cdot}wk^{-1}$ in nonwalkers. Walkers also were more likely to participate in vigorous leisure-time activities than nonwalkers. With regard to specific vigorous activities, 10% of walkers jogged as compared with 3% of nonwalkers. For tennis, the corresponding figures were 5% versus 2%; for swimming, 12% versus 7%.

How might we account for such differences in epidemiologic studies of walking and chronic disease prevention? Investigators have commonly used two methods to account for such differences. First, adjustment can be made in analyses for participation in other activities, so that any results obtained are independent of the other activities. Second, analyses can be restricted only to participants who do not participate in vigorous activities, thus preventing confounding by vigorous activities. This latter method is often used in studies of women because a sizeable proportion of women do not participate in vigorous activities, and walking (of any amount) is a common activity (24). As a result of this restriction of the study sample, there cannot be confounding by vigorous activities because no subjects are participating in any vigorous activity.

In the remaining section of this article, we will discuss data from several studies of walking and CVD prevention, taking into consideration the methodological issues detailed above.

Walking and CVD prevention—epidemiologic data viewed in the context of methodological considerations. Although there have been numerous studies of physical activity in the prevention of CVD, there have been far fewer studies specifically addressing this particular activity, walking. Many of the studies that have specifically examined walking have been published after the 1995 CDC/ACSM recommendation that promoted walking. A comprehensive review of these studies is beyond the scope of this article. We will instead select several of these studies to illustrate the methodological issues discussed above.

One of the earliest studies of walking in CVD prevention was published in 1978 by the Harvard Alumni Health Study investigators (28). Paffenbarger et al. examined the physical activity habits, including walking, of 16,936 male Harvard alumni, aged 35 to 74 yr, in relation to their risk of a first heart attack. After taking into account differences in age, investigators found that alumni who walked <5 blocks a day (about 3 $miles{\cdot}wk^{-1}$) had a 26% higher risk ($P = 0.016$) compared with men who walked more. These early observations were limited by the analytical tools available then. There was no adjustment for other potentially confounding factors, such as other lifestyle habits, or participation in other physical activities. Additionally, only two levels of walking were examined, so dose–response relations could not be assessed.

In updated analyses of the Harvard Alumni Health Study, Sesso et al. (36) categorized men into more categories of walking and adjusted for differences in smoking, alcohol intake, body weight, personal and family medical history, as well as participation in other light-, moderate-, and vigorous-intensity leisure-time activities. Men who walked 5 to less than 10 $km{\cdot}wk^{-1}$ (approximately 3 to <6 $miles{\cdot}wk^{-1}$) had a 13% lower risk of coronary heart disease, statistically significant, than men walking less. With greater distances walked (10 to <20 and ≥20 $km{\cdot}wk^{-1}$), no greater risk reduction was observed (P for trend = 0.08) among these men; that is, the dose–response curve seemed to be L-shaped for this population.

The Harvard alumni comprised only men. However, several studies of women have also shown walking to be predictive of lower risk of coronary heart disease. For example in the Women's Health Study, which enrolled 39,876 women aged 45 yr or older, Lee et al. (24) observed an inverse relation between overall leisure-time physical activity and risk of developing coronary heart disease. Additionally, to examine the independent effects of walking, they separately analyzed women who did not carry out any vigorous activities. In this group, both the duration of walking and the usual pace of walking were inversely associated with coronary heart disease risk (24). Compared with women who did not walk regularly, those walking <1, 1.0–1.5, and ≥2 $h{\cdot}wk^{-1}$ had multivariate (including adjustment for smoking, alcohol, diet, use of postmenopausal hormones, and parental history) relative risks of 0.86 (95% CI, 0.57–1.29), 0.49 (0.28–0.86), and 0.48 (0.29–0.78), respectively; P for trend <0.001. Compared with women who did not walk regularly, those with usual walking paces of less than 2, 2–3, and or greater than 3 mph had multivariate relative risks of 0.56 (0.32–0.97), 0.71 (0.47–1.05), and 0.52 (0.30–0.90), respectively; P for trend = 0.02. Thus, even women walking a very modest amount—perhaps 1 to 2 $h{\cdot}wk^{-1}$—had about half the rates of heart disease compared with women who did not walk, after considering several potential confounders.

Another study of women, which included a sizeable number of minorities (16.5%), is the Women's Health Initiative Observational Study, which included 73,743 women aged 50–79 yr (25). Women were divided into those who rarely or never walked and four groups of walkers according to their usual walking pace based on self-reports. In an age-adjusted analysis, the fastest walkers, walking at greater than 4 mph, had less than half the risk of coronary heart disease compared with nonwalkers. Further adjustment for other potential confounders (including race, education, income, smoking, body mass index, waist–hip ratio, reproductive variables, diet, and family history) attenuated the association, but the fastest walkers still had about a 40% lower risk.

Investigators also examined the combined associations of walking and participation in vigorous activities in relation to CVD risk. In age-adjusted analysis, there was a significant trend of declining CVD risk with increasing time spent walking. Additionally, within each category of energy expended on walking, women who also participated in vigorous activities experienced additional risk reduction compared with women who did not. An interesting comparison is a head to head one—how do equivalent amounts of energy expended in walking or vigorous activity relate to CVD risk? The data provided do not give a precise answer because the categories used for walking and vigorous activity were not identical with respect to the amount of energy expended. However, it appears—at least in this study—that a given amount of energy expended, whether on walking or vigorous activities, is associated with approximately the same risk reduction. The age-adjusted relative risk of CVD among women who walked less than 2.5 $MET{\cdot}h{\cdot}wk^{-1}$ and also participated in more than 100 $min{\cdot}wk^{-1}$ of vigorous activities (very roughly expending some 10–12 $MET{\cdot}h{\cdot}wk^{-1}$) compared with women who walked less than 2.5 $MET{\cdot}h{\cdot}wk^{-1}$ and participated in no vigorous activity was 0.71. Using the same referent group, women who walked more than 10 $MET{\cdot}h{\cdot}wk^{-1}$ and participated in no vigorous activity had an age-adjusted relative risk of 0.67. Thus, the risk reductions (relative risks of 0.71 and 0.67) were similar for the two groups of women who expended some 10–12 $MET{\cdot}h{\cdot}wk^{-1}$, the first group primarily through vigorous activities, and the second group primarily through walking. There are two points we would like to note—these relative risks were adjusted for age only, and they may change when further adjusting for other potential confounders. The second is that although there appear to be similar risk reductions, women who only walk to expend 10–12 $MET{\cdot}h{\cdot}wk^{-1}$ would likely take 2.5–3 h to expend this energy, whereas women participating in vigorous activities to expend the same amount of energy would likely take 1–2 h only.

REASONS FOR THE LARGE PUBLIC HEALTH IMPORTANCE OF WALKING

In view of the documented health benefits of walking, the importance of walking to public health is now widely recognized, as illustrated by public health surveillance systems and Healthy People 2010 objectives. The questions about physical activity on the Behavioral Risk Factor Surveillance System list "brisk walking" as an example in a question that assesses the percent of adults engaging in moderate-intensity physical activity (5). Additionally, there is also a separate question that measures total walking. Healthy People 2010 objective 22–14 is to increase the proportion of trips made by walking, that is, to increase use of walking as a means of transportation (40).

The characterization of the relevance of walking to public health starts with its popularity. Walking is the most commonly reported activity in adults who meet physical recommendations (37). Another factor responsible for the importance of walking derives from its accessibility. Walking is a universal form of physical activity that is appropriate to promote regardless of sex, ethnic group, age, education, or income level. Walking does not require expensive equipment, special skill, or special facilities. It can be done indoors (e.g., mall walking and treadmill walking) or outdoors. In this regard, walking is particularly important for its potential to reduce disparities in health related to lack of physical activity.

Walking is poised to increase in significance to public health as the population ages. In large part, this is because the risk of chronic disease increases with age, and physical activity is effective therapy for many age-related chronic conditions. For example, physical activity plays a substantial role in the management of coronary heart disease, hypertension, type 2 diabetes, obesity, elevated cholesterol, osteoporosis, osteoarthritis, claudication, and chronic obstructive pulmonary disease—diseases that generally increase in prevalence with age. Physical activity also plays a role in the management of several other chronic conditions, including depression and anxiety disorders, dementia, pain, congestive heart failure, syncope, stroke, prophylaxis of venous thromboembolism, back pain, and constipation. Because the preference for more moderate-intensity activities, such as walking, increases with age (9), walking emerges as a leading therapeutic modality. Additionally, because the costs of medical care are substantially lower in physically active adults (30), walking has the potential to reduce medical expenditures, particularly among older adults where the prevalence of chronic diseases is high.

A few examples illustrate the importance of walking for preventing and managing chronic disease in older adults. The role of walking in controlling blood glucose is illustrated by the Diabetes Prevention Project, a randomized, controlled trial with a lifestyle intervention arm that included 150 $min{\cdot}wk^{-1}$ of brisk walking. In this trial, intervention reduced the risk of advancing from glucose intolerance to diabetes by over 50% (17). Physical activity also is effective in preventing falls and fall injuries in older adults (2). For example, a meta-analysis of four studies using a similar intervention that included walking reported a 44% reduction in fall injuries in the intervention group (34).

Physical activity is being seriously proposed as a means to prevent dementia, reflecting the probability that all the health benefits of physical activity, including walking, are not yet known. The prevalence of cognitive impairment increases dramatically with age in adults over age 65, with moderate to severe dementia affecting over 30% of adults aged 85+ (11). Research now suggests that physical activity during middle age and older reduces risk of cognitive decline with age (26). In one cohort study, walking that corresponded approximately to the amount required to meet CDC/ACSM recommendation was associated with a 34% reduction in risk of cognitive impairment (44).

Walking is also of relevance in addressing the obesity epidemic. The most obvious role of walking is in producing increases in caloric expenditure. The US Dietary Guidelines recognize that some adults prefer to increase caloric expenditure to the equivalent of at least 1 h of walking a day as a means to attain a healthy body weight (42). Short bouts of walking may play a role in weight management as well. One approach to the obesity epidemic rests on the calculation that the daily caloric excess driving the epidemic is modest, in the range of 10–50 kcal·d^{-1} (13). Because all steps expend energy, increasing steps by a modest amount each day (e.g., 1000–2000 steps) theoretically could prevent obesity, provided caloric intake does not change. Research is needed on the role of walking in weight management, particularly community approaches to promoting short bouts of walking of less than 10 min per episode, which accumulate to some sizeable total duration. That is, the obesity epidemic may offer a rationale for promoting forms of walking that do not count toward CDC/ACSM recommendations but do help manage weight. Such short bouts also may be more feasible to promote compared with longer bouts.

Another factor favoring walking over other activities is injury risk. The ability to identify physical activities with the lowest injury risk is limited by insufficient data and research on injury risk (14). But one study reported that greater amounts of walking were not associated with a greater injury risk (14). In contrast, the study reported the expected dose–response relationship, where adults performing sports for more than 3.75 h each week had the greatest risk of exercise-related injury.

The public health benefits of promoting walking extend beyond its direct benefits, that is, benefits that derive from physiologic effects (e.g., improved blood pressure, glucose control, lipid profile, etc.) in individuals who are more physically active. As an example, promoting active transportation (e.g., walking to work) reduces automobile use and thereby road congestion and air pollution. Reducing air pollution should lower rates of asthma and cancer. Reducing automobile use theoretically reduces risk of injury from automobile collisions. Hiking increases contact with natural environments. There is increasing evidence that exposure to natural environments improves mental health (10). Walking is often a group activity that results in social interaction, which also has independent effects on health as indicated by evidence that low social interaction is associated with increased mortality (35).

Finally, walking is important to public health because effective interventions to promote walking already exist. The Guide to Community Preventive Services identifies interventions that are effective in promoting walking (16). These include community-wide campaigns, such as Wheeling Walks, targeting sedentary middle age and older adults, which reported a 23% increase in the number of walkers in the community (32). Promoting access to locations for walking also increases the amount of walking the community. A study of trail enhancement and promotion reported an increased level of physical activity in adults who used the trails (4). Further, many trail projects are not expensive. A study of six trails in a medium size Midwest city estimated a $1 investment in multiuse trails would save about $3 in medical costs (43). The Community Guide also recommends signs to increase stair use (16). Because a bout of stair use is surely almost always less than 10 min in duration, this recommendation has relevance for greater caloric expenditure in obesity (and also to maintaining muscular strength and endurance). In children, there is growing interest in programs that increase the percent of children and youth who walk or bike to school (6).

CONCLUSIONS

In summary, if everyone in the United States were to obtain 30–60 min of moderate-intensity physical activity each day, the benefits would be extensive. Although it is currently difficult to quantify all the effects, one predicts lower rates of chronic diseases (such as obesity and CVD) and a dramatic reduction in medical expenditures, with only a modest increase in number of activity-related injuries. Because walking is the most popular type of moderate-intensity physical activity, walking has substantial importance to public health. We reach the interesting conclusion that part of the solution to chronic disease and rising health care costs is as simple as walking everyday. Indeed, if everyone in the United States began walking 30–60 min each day, the benefits would be extensive. Although it is currently difficult to quantify all the effects, one predicts lower rates of chronic diseases (such as obesity and CVD) and a dramatic reduction in medical expenditures, with only a modest increase in number of activity-related injuries. The evidence of health benefits and effective interventions justifies research on policies that are effective in promoting physical activity including policies that improve access to enjoyable places for walking, policies that promote walking to school and policies that promote active transportation.

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