

May 2009 ■ RFF DP 09-21

Outdoor Recreation, Health, and Wellness

*Understanding and Enhancing
the Relationship*

Geoffrey Godbey

**Prepared for the Outdoor Resources Review Group
Resources for the Future Background Study**

1616 P St. NW
Washington, DC 20036
202-328-5000 www.rff.org



Outdoor Recreation, Health, and Wellness: Understanding and Enhancing the Relationship

Geoffrey Godbey

Abstract

The research literature on outdoor recreation as it relates to human health is vast and growing. To help policymakers take new and emerging findings into account when designing recreation and park services and initiatives for the 21st century, this paper summarizes the salient issues and identifies research gaps. It considers how being outside in natural surroundings may improve health and how outdoor physical activities benefit participants. Particular attention is given to children's health problems that can be mitigated through outdoor play, sports, and nature study. The paper describes approaches to measuring physical activity and recent trends in park visitation and outdoor activity participation. It looks at variables that affect participation in outdoor activities and considers the projected demographic changes that will affect policymaking in this arena. The findings of this literature review point to potential new directions for outdoor recreation policy, as well as new policy questions to be explored.

Key Words: outdoor recreation, public health, physical activity, children's health

JEL Classification Numbers: I18, Q26

© 2009 Resources for the Future. All rights reserved. No portion of this paper may be reproduced without permission of the authors.

Discussion papers are research materials circulated by their authors for purposes of information and discussion. They have not necessarily undergone formal peer review.

Contents

1. Introduction.....	1
2. Health Benefits of Being Outdoors.....	2
General Health Benefits of Natural Spaces	3
Stress and the Environment	3
3. Health Benefits of Outdoor Recreation.....	5
General Health Benefits of Outdoor Activity	5
Stress and Outdoor Recreation.....	6
Obesity and Outdoor Activity.....	7
4. Outdoor Recreation and Children’s Health.....	7
Childhood Obesity	8
Attention Deficit Hyperactivity Disorder	8
Lack of Connection with Nature.....	9
Addressing Children’s Wellness Issues	10
5. Measures of Activity and Participation	12
Measures of Intensity	12
New Metrics.....	13
Trends in Participation.....	14
Use of Public Outdoor Spaces	15
6. Factors that Affect Participation.....	16
Leisure Time	17
Community Attributes	18
Proximity to Outdoor Spaces	19
Safety of Parks	20
Supply of Outdoor Spaces	21
Park and Playground Design and Features	21

Social Setting in Parks	22
Park Management and Policies	23
7. Looking Ahead	24
8. Policy Implications.....	26
Managing Outdoor Recreation for Healthy Outcomes	26
Developing an Urban Strategy.....	26
Policy Options and Questions.....	27
References	29

Outdoor Recreation, Health, and Wellness: Understanding and Enhancing the Relationship

Geoffrey Godbey*

1. Introduction

When the President's Commission on Americans Outdoors reviewed the nation's policies on outdoor recreation in 1985, the social, economic, and environmental benefits of recreation were recognized, but little attention was paid to human health benefits. Since then, however, research has confirmed a link between physical activity that takes place outdoors and positive health outcomes—and also an association between an indoor, sedentary lifestyle and negative health consequences. There is also evidence that both being outdoors and viewing natural scenes can reduce stress. The links are sufficiently strong that researchers and practitioners in health-related fields are now beginning to identify parks and recreation as a health service.

Outdoor recreation's contribution to health can be considered in the context of "wellness." The World Health Organization (2003) defines health as "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity." This definition moves from a strictly medical model of health toward the concept of well-being. The Alberta Centre for Well Being (1989) finds that "the concept of well-being or optimal health involves a delicate balance among physical, emotional, spiritual, intellectual and social health" and then lists a wide range of dimensions, from fitness, nutrition, and stress management to meditation, education, and relationships. Outdoor recreation touches on all those aspects of health and can enhance not only physical health but also emotional well-being. Just being outdoors, for example, has been shown to confer health benefits.

The research literature on outdoor recreation as it relates to human health is vast and growing. To help policymakers take these new and emerging findings into account when designing recreation and park services and initiatives for the 21st century, this paper summarizes

* Professor Emeritus, Department of Recreation, Park and Tourism Management, Pennsylvania State University. The author acknowledges the help of Dr. B. L. Driver, Dr. Andrew Mowen and Dr. Laura Payne in the development of this paper.

the salient issues. Throughout, the reader will find questions that identify research gaps—an indication that the subject area is fertile ground for additional attention.

Section 2 considers how being outside in natural surroundings may improve health, and Section 3, how outdoor physical activities benefit participants. Section 4 examines children's health problems—obesity and hyperactivity in particular—that can be mitigated through outdoor play, sports, and nature study.

Section 5 describes approaches to measuring physical activity and recent trends in park visitation and outdoor activity participation, and Section 6 looks at the many variables that affect people's participation in outdoor activities. Section 7 considers the projected demographic changes that will affect policymaking in this arena. The concluding section brainstorms policy options.

2. Health Benefits of Being Outdoors

Living in comparatively natural areas, viewing nature, and having outdoor recreation areas and facilities nearby appear to provide health benefits:

...the major determinants of health may have little to do with the health-care system (Hancock 1999) and public health needs to focus on the environmental and social aspects of health (Chu and Simpson 1994). Publicly owned natural spaces are an ideal resource to support these and other aspects of human health and well-being. (Maller et al. 2005, 5)

That assertion is based on anthropological understanding. Humans evolved for a life spent in small groups, hunting and gathering on the plains of Africa. Natural selection has not had time to revise our bodies for coping with fatty diets, automobiles, artificial light, and central heating. This mismatch between our design and today's environment may account for many preventable modern diseases (Nesse and Williams 1996).

Even the landscapes we find preferable may reflect our origins. Of all the possible landscapes, the African savanna—grassy plains punctuated by spreading, mature trees, usually with water present—is the most popular: “So well do we love the savanna that we have recreated it all over the globe in the wide tree canopies and lack of undergrowth found in the Japanese Zen garden, the English landscape, and the American city park” (Knize 1998, 132).

Historically, public parks and outdoor recreation areas, particularly in cities, were developed for health purposes. By the 1890s, landscape architects and park planners were concerned about sedentary lifestyles. The 19th-century Rational Recreation movements sought to

encourage forms of leisure considered superior—and contact with nature was a primary component. Parks were the “lungs of the city” (Cranz 1982). The health benefit of exposure to nature was an article of faith. Today those health benefits are being quantified, and scientific research is documenting the truth of what 19th-century planners believed.

General Health Benefits of Natural Spaces

There is increasing evidence that closeness to the natural environment is healthy. One study found that living in a green environment was positively related to such health indicators as levels of stress and amount of physical activity; the relationship between green space and health indicators was somewhat stronger for less educated people (de Vries et al. 2003).

One health advantage of being outdoors today is that being indoors may pose greater dangers, since pollution exposure in homes and offices is often greater than outdoors. The California Air Resources Board estimates that indoor air pollutant levels are 25 to 62 percent greater than outside levels and can pose serious health problems¹. Moreover, when indoors at home, people are more likely to snack. Medium and high TV viewership is associated with snacking more frequently, and frequent viewers also report more consumption of energy-dense snacks (Thomson et al. 2008). Thus, one benefit of outdoor recreation, from a health perspective, is a decreased likelihood of overeating and suffering pollution-related health problems. And of course, while outdoors, people are less likely to be sedentary.

Stress and the Environment

According to the American Institute of Stress (2002), 43 percent of U.S. adults experience adverse health conditions due to acute or chronic stress. Moreover, an estimated 75 percent of all visits to primary care physicians are for stress-related complaints and disorders. People with high stress levels are more at risk for the common cold, heart attack, and cancer. Stress has also been linked to obesity, high systolic blood pressure, and elevated heart rates (Bell et al. 1998; Brand et al. 2000). Mental stress can decrease blood flow to the heart. *Circulation*, the journal of the American Heart Association, has called stress a risk factor for coronary heart disease patients (www.news.health.ufl.edu/news/tape.aspx?ID=157). Migraine headaches, rheumatoid arthritis, chronic fatigue, receptiveness to allergies, and other maladies are also

¹ See www.lbl.gov/Education/ELSI/pollution-main.html

related to chronic stress. Stress may both suppress the body's immune system and lead to hormonal imbalances that increase production of abnormal cells.

Stress is particularly problematic for older adults, since aging is accompanied by physical, psychological, and social changes. Age-related changes—from chronic disease and disability to care-giving responsibilities and loss of a loved one—are potential stressors (Baltes and Baltes 1990).

Some research has shown that too much “artificial” stimulation and time spent in purely human environments may cause exhaustion and a loss of vitality and health (Katcher and Beck 1987; Stilgoe 2001). The demands of everyday life—commuting, work, complex decisions—cause mental fatigue, a state characterized by inattentiveness, irritability, and impulsiveness. “In contrast,” according to Kuo and Sullivan (2001, 545), “natural settings and stimuli such as landscapes and animals seem to effortlessly engage our attention, allowing us to attend without paying attention.”

That the physical environment can trigger human aggression is well established. Crowding, high temperatures, and noise have all been linked to aggression and violence (Kuo and Sullivan 2001). High stress levels are associated with youth violence. Some believe that stress produces “social illness”—pathological responses such as violent and reckless behavior, crime, or drug abuse. Antisocial behavior is a common reaction to stressful life situations. Spending time in nature or even viewing nature appears to reduce stress, however, and thus contact with nature may reduce aggression and violence (Kaplan 1995).

Rejuvenating effects have been associated with natural settings, including wilderness areas (Hartig et al. 1991; Kaplan 1984), prairies (Miles et al. 1998), community parks (Canin 1991; Cimprich 1993), and even rooms with houseplants (Lohr et al. 1996). Numerous studies find speedier recovery time from injury through exposure to plants or nature, fewer illnesses in prison inmates whose cell windows face nature, and calming effects of viewing natural landscape images after people are stressed (e.g., Frumkin 2001; Moore 1981; Ulrich 1984; Parsons et al. 1998).

Empirical, theoretical, and anecdotal evidence demonstrates that contact with nature positively affects blood pressure, cholesterol, outlook on life, stress reduction, and behavioral problems among children (Moore 1981; Kaplan and Kaplan 1989; Hartig et al. 1991; Ulrich et al. 1991a, 1991b; Kaplan 1993; Rohde and Kendle 1997; Leather et al. 1998; Parsons et al. 1998; Frumkin 2001). These outcomes have particular relevance for mental health and cardiovascular

disease, which are expected to become the two biggest contributors to disease worldwide by the year 2020 (Murray and Lopez 1996).

3. Health Benefits of Outdoor Recreation

Outdoor recreation contributes to wellness mostly through prevention, and the most beneficial outdoor pursuits are those that become part of one's life, done on a regular basis. Many participants embark on a "career" in a particular activity, becoming more devoted to it and adapting their participation to changing life circumstances (e.g., Bryan 1970; Stebbins 1992).

Research question: Is there a link between outdoor recreation "careers" and positive health consequences that would demonstrate the benefits of long-term, serious involvement in outdoor recreation?

General Health Benefits of Outdoor Activity

Outdoor recreation often comprises several kinds of activity. Bird watching, for example, may involve walking, interpreting sounds and visual clues, and socializing with fellow birdwatchers; each of these has its wellness implications. Walking is a common denominator for most forms of outdoor recreation. Brisk walking for just three hours a week or half an hour each day is associated with a 30 to 40 percent lower risk of heart disease in women (AARP 2008, citing the 20-Year Nurses' Health Study). Walking has been shown to have many health benefits for older adults:

- managing weight;
- controlling blood pressure;
- decreasing risk of heart attack;
- boosting "good" cholesterol;
- lowering risk of stroke;
- reducing risk of breast cancer and Type 2 diabetes;
- avoiding need for gallstone surgery;
- protecting against hip fracture;
- preventing depression, colon cancer, constipation, osteoporosis, and impotence;

- lengthening lifespan;
- lowering stress levels;
- relieving arthritis and back pain;
- strengthening muscles, bones, and joints;
- improving sleep; and
- elevating overall mood and sense of well-being.

Thus, any outdoor pursuit that includes walking can contribute to overall health and wellness.

Researchers exploring the relations between outdoor recreation participation and wellness (e.g., Driver and Knopf 1976; Driver and Cooksey 1977; Driver 1985; Godbey et al. 1992; Tinsley et al. 2003; Kaczynski and Henderson 2007) have found beneficial effects on two problems in particular, stress and obesity.

Stress and Outdoor Recreation

Stress reduction appears to be an important benefit reported by older visitors to local parks (Godbey and Blazey 1983). Negative moods decrease after spending time in a park, and park users report lower levels of anxiety and sadness (More and Payne 1978). The longer people stay at a park, the less stressed they report feeling (Hull and Michael 1995). A national telephone survey of 1,300 households found that the benefits the American public most frequently associated with use of recreational services were exercise and fitness; relaxation and “peace” (stress reduction) were the second most frequently mentioned (Godbey et al. 1992).

One study based on self-reported stress found statistically significant relationships between the use of urban green spaces and stress reduction, regardless of the respondent’s age, sex, or socioeconomic status. The results suggest that the more often a person visits urban green spaces, the less often he or she reports stress-related illnesses (Grahn and Stigsdotter 2003).

Some studies have addressed the connection between stress reduction and outdoor recreation more quantitatively, by measuring cortisol levels (consistently high levels of which contribute to a hormonal condition considered damaging to the brain and other tissues; see www.medicinenet.com). A study using cortisol testing provides evidence that park-based leisure, daily stress, and health are significantly, if modestly, related (Orsega-Smith et al. 2004). Other measures used include galvanic skin response, blood pressure, EEG, and muscular tension.

Research questions: To what extent are high and chronic stress levels affected by outdoor recreation? What is the relative importance of the natural environment, behavior, socializing, solitude, and other factors in such changes?

Obesity and Outdoor Activity

Because the major causes of death for people in developed nations have shifted from disaster (starvation, war) and disease (smallpox, malaria) to decay (heart disease, cancer), individual behaviors play an increasingly bigger role in both longevity and quality of life (Nesse and Williams 1996). Among the behaviors that have changed is physical activity: Americans are less physically active today than in the past. Although the causes of obesity are multiple and not completely understood, insufficient physical activity is one factor.

The incidence of obesity in the United States has been increasing steadily over the past two decades. Between 1991 and 2001, obesity rates increased 75 percent among adults. Thirty-four percent of American adults are overweight, and 27 percent—45 million people—are obese.

Only 25 percent of adults in the United States report engaging in recommended physical activity levels, 29 percent report no regular physical activity during leisure time, and only 27 percent of high school students engage in moderate-intensity physical activity. Only 50 percent of young people ages 12–21 regularly participate in vigorous physical activity, and 25 percent report no vigorous physical activity at all (Hedley et al. 2004).

Exercise today can be classified by cultural function:

- exercise necessary for work, housework, and personal care (walking to the car, mopping a floor, taking a shower);
- exercise undertaken to improve health (aerobics, weightlifting); and
- exercise undertaken for pleasure (gardening, hiking, playing tennis, dancing).

Of the three, inherently pleasurable activities have the greatest potential to increase human movement in daily life. Middle-aged and older adults are more physically active during leisure activity than they are at their jobs or doing housework or personal care (Chow 2007).

4. Outdoor Recreation and Children's Health

Children who spend time outdoors are healthier, overall, than their indoor counterparts. Two health consequences of insufficient physical activity are obesity and attention deficit

hyperactivity disorder (ADHD); another childhood phenomenon that has broad implications for wellness has been called “nature deficit disorder.”

Childhood Obesity

The fitness of young children has declined, and childhood obesity has increased (Milnes 2008). Approximately 8 million children are overweight. Obesity rates have doubled for children (ages 6–11) and trebled for adolescents (ages 12–19) in just two decades. Today, 13 percent of children and 14 percent of adolescents are significantly overweight (RAND 2004; CDCP 2003; NANA 2003).

More than 60 percent of the overweight children ages 5–10 have at least one risk factor of cardiovascular disease, such as elevated insulin, high cholesterol, or high blood pressure, and 25 percent have two or more. Obesity can increase the risk of bone disease and some cancers later in life and increase the risk of adult-onset (Type 2) diabetes. In addition, children who are overweight before the age of 8 tend to become overweight adults. Childhood obesity means an increased chance of orthopedic problems and poor sleeping habits, as well as low self-esteem and peer relationship difficulties (Healthlink, Medical College of Wisconsin, January 14, 2009). Someone who is 40 percent overweight is twice as likely to die prematurely as an average-weight person. Obesity is also linked to gallbladder disease and gallstones, osteoarthritis, gout, and asthma (WEB MD, January 14, 2009).

Parents are apparently aware of those risks. A recent nationwide survey (Mott Foundation 2008) found that parents ranked obesity as their primary concern about their children’s health, ahead of drug abuse, smoking, bullying, and Internet safety.

Three studies using direct observation of preschool children report that being outdoors is the strongest correlate of the children’s physical activity (Sallis et al. 2000). Moreover, outdoor temperatures, both hot and cold, prompt the body to burn more calories than do heated and air-conditioned environments. Most simply, time spent outdoors is time not spent indoors, where children are more likely to be sedentary.

Attention Deficit Hyperactivity Disorder

ADHD is a neurobehavioral disorder characterized by pervasive inattention and/or hyperactivity-impulsivity, and it results in significant functional impairment (www.cdc.gov/ncbddd/ADHD/). The Centers for Disease Control estimates that 4.4 million youth ages 4–17 have been professionally diagnosed with ADHD, and as of 2003, 2.5 million

were receiving medication treatment for the disorder. In addition, 7.8 percent of school-age children were reported by their parents to have ADHD.

Researchers have discovered that spending even a little time outdoors can reduce the symptoms of ADHD. A direct observation study concluded that even children whose symptoms had not responded to medication showed a definite behavioral improvement in outdoor settings (Kuo and Taylor 2004). The symptoms were reduced most in green outdoor settings. Some children were able to cut their dosage of medication in half just by spending some time outside. The researchers recommended that children with ADHD spend after-school hours and weekend time outdoors:

Overall, our findings indicate that exposure to ordinary natural settings in the course of common after-school and weekend activities may be widely effective in reducing attention deficit symptoms in children. A green dose could be a lifesaver for the 10 percent of children whose symptoms don't respond to medication ... (1586)

Lack of Connection with Nature

The term *nature deficit disorder* was coined to capture the general consequences of not being outdoors in natural surroundings. According to Richard Louv (2005, 32), author of *Last Child in the Woods—Saving Our Children from Nature-Deficit Disorder*, nature deficit leads to “diminished use of the senses, attention difficulties, and higher rates of physical and emotional illnesses.”

Green space has been replaced by “screen space” in children’s free time. A Kaiser Family Foundation (2005) study found that the average American child spends 44 hours per week (more than 6 hours a day) in front of an electronic screen. Per week, youth ages 5–18 spend 5 hours participating in organized activities versus 15 hours watching TV. Pergams and Zaradic (2008a, 388) call this “videophilia”—the love of playing video games, surfing the Internet, and watching movies and TV:

The replacement of vigorous outdoor activities by sedentary, indoor videophilia has far-reaching consequences for physical and mental health, especially in children. Videophilia has been shown to be a cause of obesity, lack of socialization, attention disorders and poor academic performance.

The freewheeling outdoor play of the past is declining sharply. Louv (2005, 31) writes,

The cumulative impact of overdevelopment, multiplying park rules, well meaning (and usually necessary) environmental regulations, building regulations, community covenants, and fear of litigation sends a chilling message to our

children that their free range play is unwelcome, that organized sports on manicured playing fields is the only officially sanctioned form of outdoor recreation.

Moore (cited by Louv 2005) adds the following reasons for the decline of outdoor play: poorly designed outdoor spaces, domestic air-conditioning, apprehensive parents who keep their children close to home, state-mandated curricula that do not allow time for play outdoors, and overly structured lifestyles.

Addressing Children's Wellness Issues

The forces arrayed against children's free outdoor play are complex and will not be easily overcome. The changes needed might include adoption of Smart Growth principles in urban planning, a less litigious society, and more provision for unstructured play outdoors, both at school and in the neighborhood.

Although no absolute standards for children's physical activity have been set, Milnes (2008) recommends the following:

- Daily structured physical activity (active play with parents or day-care providers): toddlers, one-half hour; preschoolers, one hour.
- Daily unstructured physical activity (riding tricycles, running, climbing): toddlers and preschoolers, at least one hour, and preferably several hours.
- Sitting, being inactive: no more than an hour at a time (except for sleeping).

Research confirms what common sense would suggest: children and adolescents with easy access to recreational facilities and programs are more active than those without (Sallis et al. 2000). Adolescent girls' physical activity is related to the proximity of recreational facilities (Norman et al. in press). The more often young adolescents use recreational facilities, the greater their total physical activity; parks and the neighborhood play areas are most important for boys, and commercial facilities and neighborhood play areas are most important for girls (Hofer et al. 2002). Preschool children are more active the greater the number of nearby places where vigorous play is welcome and the more time they spend in those places (Sallis et al. 1993).

Access to playgrounds is an important variable shaping children's leisure choices. A nationwide Gallup (2003) survey found that fewer than half of American children have a playground within walking distance of their homes. Sixty-one percent of the surveyed parents say simple lack of access to a playground is a barrier to their children's playing on one. One-

third believe their community does not have enough playgrounds, and two-thirds believe that using a playground is a deterrent to watching television.

School policy is another variable in outdoor physical activity. One study found that few students used opportunities to be physically active during leisure time at school, and that changes in supervision, equipment, structured programs, and other policies were needed to involve more adolescents, especially girls (McKenzie et al. 2000). A literature review by Wechsler et al. (2000) identifies four factors: recess periods, intramural sports and physical education programs, physical activity facilities, and psychosocial support for physical activity. Schools can encourage physical activity (and healthy eating) through school policies, administrative commitment, role modeling by school staff, and the use of cues and incentives. The researchers conclude that enough is known from theory, practice, and research to warrant implementation of school-based environmental strategies to promote physical activity.

Assessing the association of middle-school students' physical activity with school facilities, including area type, size, improvements (such as basketball courts), and the presence of equipment and supervision, Sallis et al. (2001) found that environmental characteristics explained 42 percent of the variance in the proportion of girls who were physically active and 59 percent of the variance for boys. They concluded that schools with high levels of supervision and improvements stimulated both girls and boys to be more physically active.

Although being outdoors is known to be conducive to physical activity (and to reduce stress-related disorders), little research addresses children's outdoor playtime as it relates specifically to health. One reason, according to Sallis (cited by Louv 2005, 33) is that free play is free: "When kids are running around or riding their bikes, they are not burning fossil fuel, not anyone's captive audience, they aren't making money for anyone. Follow the money."

Finally, the simple act of spending more money for parks and recreation may be a critical factor in the physical activity levels of youth. A recent study, for instance, found that spending for parks and recreation within a given state was positively correlated with two measures of girls' overall physical activity and with more time spent in strength-building activity for both girls and boys (Cawley et al. 2007, 514): "... an extra \$10 spent per capita on parks and recreation is associated with a third of a day more per week of vigorous exercise."

Research questions: Of the many variables—school policy, park policy, recreation programs, outdoor skills education, parental attitudes, community design, outdoor play resources—which are more important in predicting children's outdoor activity? What strategies increase such activity?

5. Measures of Activity and Participation

The time most Americans devote to outdoor recreation is comparatively brief but may nonetheless confer benefits. Although we lack a generally accepted criterion of physical activity (U.S. Department of Health and Human Services 1996), criterion-reference standards for moderate and vigorous physical activity have been proposed (Pate et al. 1995):

- Moderate: 30 minutes per day for five or more days per week.
- Vigorous: 20 minutes per day for three or more days per week.

We can't manage what we don't measure, however, and measuring physical activity in outdoor recreation and other settings is complex. Studies vary greatly in methodology, sampling techniques, and methods of analysis. Further, many do not measure duration or intensity of physical activity, or they do so only through self-reports. A meta analysis of such studies could form the basis for convening an expert panel to establish a standardized protocol for future research.

Measures of Intensity

Currently, two basic approaches are used to measure the intensity of physical activity: indirect and direct (Mood et al. 2007). Indirect assessments can range from single-response questions on self-report surveys to detailed diaries of physical activity. Although such assessments are commonly used, little is known about their reliability and validity (LaPorte et al. 1985). Ainsworth et al. (1993) examined the test-retest (stability) reliability of 10 commonly used physical activity questionnaires for 1-month and 12-month periods and reported reliability estimates ranging from a low of .12 to a high of .95; in other words, the reliability of such instruments varies greatly.

Direct monitoring approaches range from simple job classifications to pedometers, accelerometers, and heart monitors. These assessments can include number of steps taken, number of calories expended, metabolic equivalents, and duration of activity. To estimate energy expenditure, the frequency, time, and intensity of physical activity must be measured. Ainsworth et al. (1993, 2000) developed a compendium that classifies activities by energy expenditure levels. This allows the comparison of different types of physical activity along a common metric of energy expenditure.

Several studies have attempted to quantify physical activity in public parks. A study based on more than 3,000 observations of 18,000 activity groups in 13 Chicago parks found that 41 percent of the activity groups were engaged in mobile activities, such as walking, biking, and

jogging, and 14 percent were engaged in sports (Hutchison 1987). A survey of Chicago's Lincoln Park found 45 percent of the park's users participating in "active-individual activities," such as walking and jogging, and 23 percent playing active team sports (Gobster 2002). Another study of Lincoln Park found that 43 percent of users ages 55 and older used bicycle and footpaths and considered exercise an important benefit of park visits (Tinsley et al. 2002).

Of the users of Cleveland metroparks, 44 percent reported walking or hiking as their primary activity. This ranked second behind "relaxing," at 49 percent. A study of Cleveland park users ages 55 and older found that more than 69 percent obtained moderate or high levels of physical activity; an average visit lasted about two hours, and users spent about half their time walking (Ho et al. 2003).

Walking for pleasure or exercise is a common activity for older adults in parks, according to Scott (1997). An onsite survey of a large metropolitan park found that 55 percent of older adult users walked or hiked; other activities included walking dogs, playing with children, bicycling, and swimming (Raymore and Scott 1998).

New Metrics

Some direct measures of park use and contribution to physical activity are beginning to be used. McKenzie and Cohen (2006) developed a way to obtain direct information on park and recreation areas. Their System for Observing Play and Recreation in Communities (SOPARC) is used to categorize park users' physical activity levels, sex, activity modes and types, and estimated age and ethnicity. It also provides information on park activity area characteristics, such as accessibility, usability, supervision, and organization.

Other metrics for park audits include the BRAT-DO, which measures the environmental characteristics of parks; the Environmental Assessment of Public Recreation Spaces (EAPRS) tool, which provides a comprehensive direct observation assessment of the physical environments of parks and playgrounds; the Path Environment Audit Tool (PEAT), a computer-based instrument that can be used by trained observers to assess physical characteristics of community trails and paths; and the Core Measures of Trail Use, a set of questionnaire items about trail use and factors that may influence it in different populations.²

² See www.activelivingresearch.org

Although these tools are not yet extensively used, they hold promise of providing more reliable information about physical activity in outdoor recreation areas and its correlates. Park and recreation practitioners are often unaware of such instruments and may lack staff members trained to use them. The need for training in the measurement of physical activity within parks and outdoor areas as well as other health-related measures is critical and, so far, appears to remain problematic.

Trends in Participation

Perhaps the most important correlate between outdoor recreation and health is a relationship of mutual influence between good health and participation in outdoor recreation. That is, people who participate in outdoor recreation are disproportionately in good health, and people in good health disproportionately participate in outdoor recreation. This relation is also true for use of local park services (e.g., Payne et al. 2005).

Most of the national surveys that track participation in outdoor activities ask respondents whether they have recently engaged in various forms of recreation. However, they usually do not measure duration and often assess frequency of participation crudely. Since length of time spent in an outdoor recreation activity is a critical variable for dealing with obesity, stress reduction, and other health issues, the results from these surveys are of limited help in assessing health outcomes. Also, outdoor recreation may be defined in such a way that the surveys fail to capture important trends. For example, 35 percent of the nation's 96.4 million households grow vegetables, sometimes in community gardens on public land (Collins 2008), yet gardening is rarely included in outdoor recreation surveys.

Recreation surveys generally accept respondents' estimates without validation, and since outdoor recreation is considered a desirable activity, respondents may overestimate their participation. Additionally, most surveys ask people about their activities over the previous seven days, two weeks, or even a year. A natural inability to recall behavior over long periods of time, combined with selective forgetting (based on the saliency of the experience) and telescoping (a tendency to remember more recent events more accurately), leads to inaccurate estimates (Robinson and Godbey 1999).

That said, studies do indicate certain trends. Since the late 1980s, the percentage of Americans taking part in fishing, hunting, camping, and other nature-based activities has declined by slightly more than 1 percent a year, for a cumulative reduction of 18 to 25 percent from peak levels (Pergams and Zaradic 2006, 2008a).

The annual number of recreation visits to National Park Service sites declined from 281 million in 1986 to 273 million in 2006, almost 10 percent (NPS 2007). Visits to national forests dropped from 204.8 million in 2004 to 178.6 million in 2007, a 13 percent decline (Milstein 2008, citing U.S. Forest Service 2008).

The premise that participation in outdoor recreation is declining (Pergams and Zadaric 2008a) has been challenged; Jacobs and Manfredo (2008) contend that declines in certain activities have been generalized to all forms of outdoor recreation, when in fact, other activities are gaining in popularity. Hunting, for instance, is declining, but nonconsumptive wildlife viewing is increasing. The annual U.S. Forest Service survey (Cordell et al. 2008, 8) finds an increase in participation between 2000 and 2007 in nature-based recreation: “The growth in viewing and photographing plants and natural scenery has been most rapid, at about 78 and 60 percent, respectively.” Driving motor vehicles off-road occupies the number three slot; it grew by 56 percent. After that come viewing, photographing, and identifying wildlife and birds. Four of the top five activities in the national forests, then, involve viewing, photographing, and otherwise observing nature.

Research questions: In terms of managing outdoor recreation resources, should priority be placed on increasing participation or on improving opportunities for those who are already regularly involved? What levels of outdoor recreation opportunities are optimal for enhancing the health of citizens?

Use of Public Outdoor Spaces

To a remarkable extent, the frequency, duration, and types of use of municipal and county parks are unknown. “Given a lack of recent federal support for park and recreation research, there has been scant systematic research in the area of population-based physical activity habits” (Kruger et al. 2007, 1). Much of the existing research has been funded by local governments, which use various survey measures and research methods (Mowen et al. 2008).

Despite the incomparability of the data, it seems certain that local governments serve many more outdoor recreation participants than either state or federal agencies. A five-city study of local parks found that 85 percent of adult users ages 50 and older had visited a local park in the previous 12 months: 38 percent once a week or more, 22 percent one to three times per month, and 25 percent less than once per month; only 15 percent had not gone to a local park at all (Godbey et al. 2004). In contrast, only 32 percent of Americans were found to have visited the national parks, and only 28 percent the national forests (Roper ASW 2004).

Ethnic minorities constitute an important user group of urban parks. A study of neighborhood parks in low-income, minority urban communities found that more males than females used the parks, and males were twice as likely to be physically active (Cohen et al. 2007). Interviewees identified the neighborhood park as the most common place they exercised. Proximity to the park predicted both park use and exercise levels. The researchers conclude that public parks are critical resources for physical activity in minority communities.

The National Association of State Park Directors reports that state parks had 735 million visitors in 2001, and 91.2 percent were daytime users. State parks represent less than 2 percent of the total outdoor recreation estate but account for more than 29 percent of all visitors at state and federal outdoor recreation areas.³

A study of six Pennsylvania state parks (Mowen et al. 2009b) found that a majority of respondents (63 percent) reported being moderately or vigorously active during their visits and were more active in the parks than in their daily lives. Overnight visitors reported an average of 90 minutes of moderate and 49 minutes of vigorous activity per day, and day users reported an average of 68 minutes of moderate and 68 minutes of vigorous activity. However, visits to the survey parks and other state parks were infrequent, with overnight visitors reporting an average of only 6.4 visits per year and day users only 8.2 visits per year. There is some evidence of a “the more—the more” phenomenon in leisure behavior (Robinson and Godbey 1999). That is, the more likely are people to use one venue for physical activity, the more they are likely to use another. Thus, how to assess infrequent but active use of public outdoor recreation areas remains problematic—especially since funding for municipal and state recreation and park services is already suffering and may decline in the current economic recession (Dolesh 2008).

Research questions: Can the health benefits associated with use of public recreation and park services be better and more systematically documented? Can a better understanding of the different benefits provided by nearby local parks, state parks, and other open spaces be gained through additional surveys and research?

6. Factors that Affect Participation

A growing research literature supports the proposition that people who live in activity-friendly environments are more likely to be more physically active during their leisure time

³ See www.naspd.org.

(Sallis et al. 2000; Humpel et al. 2002; Killingsworth 2003; Owen et al. 2004). Active Living Research (www.activelivingresearch.org) summarizes the important findings of such research: that the proximity, safety, supply, and design of recreational spaces are important factors in predicting physical outdoor activity. Other factors affecting participation are availability of leisure time and the nature of the community. The following subsections consider these variables.

Leisure Time

Time use studies show that Americans have an average of 35 to 40 hours of free time per week (Robinson and Godbey 1999; BLS 2006). The majority of this time, however, comes in small chunks during weekdays, rather than in big blocks on weekends. TV viewing takes up about half of all free time (Table 1). Add to this the 27 hours per month of Internet use (for both work and leisure) and it is apparent that staring at screens is a major use of Americans' time (Nielsen and Hansen 2007). By contrast, exercise, sports, and outdoor recreation account for only about 8.5 hours per month. Outdoor recreation, then, is comparatively rare. Indeed, if car travel is considered an "indoor" activity, Americans spend 95 percent of their lives indoors (Robinson and Godbey 1999).

Table 1. Americans' Leisure Time, 2006

<i>Leisure activity</i>	<i>Average minutes per day</i>
Watching TV	156 (2.6 hours)
Socializing, communicating	46
Other leisure activities	29
Reading	22
Relaxing, thinking	19
Playing games, using computer for leisure	19
Sports, exercise, recreation	17
Total	308 (5.1 hours)

Note: Data include persons ages 15 and older. Data include all days of the week and are annual averages. Source: American Time Use Survey, U.S. Bureau of Labor Statistics, 2006.

Americans take shorter and fewer vacations than the residents of any modern nation. According to Take Back Your Time (www.timeday.org), only 14 percent of Americans have

vacations of two weeks or longer. A third of women and a quarter of men have no annual leave. Some people do not use their paid leave for fear they could be laid off or demoted.

Unlike 127 other countries, the United States has no minimum paid-leave law. By law, Australians have four weeks off, Europeans four or five weeks, the Japanese two weeks. The paucity of vacations and extended personal time has health consequences for Americans, leading to fatigue, accidents, and injuries. Job stress and burnout cost the U.S. economy more than \$300 billion a year (www.timeday.org). A recent survey determined that two-thirds of Americans thought vacations should be mandated by federal law (www.timeday.org).

While on vacation, people spend more time outdoors, walk more, and watch TV less (Robinson and Godbey 1999). More frequent annual vacations for middle-aged men at high risk for chronic heart disease are associated with a reduced risk of all-cause mortality and specifically mortality attributed to chronic heart disease (Gump and Matthews 2000). Vacations can alleviate perceived job stress and burnout (Westman and Etzion 2001). In short, vacationing may be good for one's health (Gump and Matthews 2000).

Yet comparatively little is known about health and the durations and types of vacations, or about the relation between the amount and sequencing of free time during the weekly cycle and health-related variables, such as the amount and types of outdoor recreation participation.

Research question: How does free time—its duration, its frequency, its occurrence over the course of a week or year—affect the likelihood of engaging in outdoor recreational activities?

Community Attributes

Increases in obesity have been blamed on the single-use zoning that helped create today's sprawling suburbs because it is said to have removed physical activity from daily life: when people can no longer walk to work or the grocery store, they get less exercise. People living in urban sprawl do tend to have higher body mass indices. Conversely, people with higher body mass indexes are disproportionately likely to move to and prefer areas of urban sprawl (Plantinga and Bernell 2007). A review of 17 studies found that walking as a mode of transportation was strongly related to living in high-density residential neighborhoods and short distances to destinations (Saelena and Karr in press). Although such findings are not unequivocal—Eida et al. (2008) find no evidence that urban sprawl causes obesity—Active Living Research (2008) reports that six studies show walking is positively related to population density and only two do not; eight studies show that walking is positively related to mixed land use and only three do not; and seven studies show that distance to destination is related to walking and only two do not.

Active Living Research (2008) concludes that people living in traditional communities—defined as those with walking and bike trails, easy access to public transportation, and a town center where homes are clustered around shops and office buildings—are more physically active and less likely to be overweight. The organization also notes that traditionally designed neighborhoods are endorsed by the Surgeon General and the Institute of Medicine.

Interest in living in Smart Growth communities may be increasing. National survey data show that public support for traditionally designed communities increased from 44 percent in 2003 to nearly 60 percent in 2005 (Handy et al. 2008). Several strategies recommended by advocates of Smart Growth⁴ relate to outdoor recreation and access to green spaces and parks:

- creating walkable neighborhoods;
- preserving open space, farmland, natural beauty, and critical environmental areas; and
- providing a variety of transportation choices.

Research questions: What government policies best promote Smart Growth outcomes, and how do parks, open space, and natural areas figure into those outcomes? What aspects of Smart Growth best promote physical activity in the daily life of community residents?

Proximity to Outdoor Spaces

Proximity to outdoor recreation opportunities is a critical variable for explaining participation rates. Beginning in the 1960s, studies showed an inverse relationship between recreation participation and distance between a place of residence and recreation opportunity (e.g., Cicchetti et al. 1969). Creating and improving recreational spaces can spark a 25 percent increase in those who exercise at least three times per week (CDC 2002). The closer people live to a bikeway, the more likely they are to use it (Troped et al. 2001).

Kaczynski and Henderson (2007) summarize the evidence concerning the role of park proximity in physical activity. Eight of 13 articles reported positive associations between park proximity and physical activity. For example, a national survey of U.S. adults found that perceived access to parks and recreational facilities was significantly related to self-reported physical activity (Brownson et al. 2001). Another study found that having at least one recreation or open space setting within one kilometer of youths' homes was consistently related to walking

⁴ See www.smartgrowth.org.

at least once in a two-day period and walking greater than a half-mile each day (Frank et al. 2005).

Across six cities, adolescent girls who had a higher number of parks less than a mile from home were more likely to achieve higher levels of physical activity (measured using accelerometers) than girls who had fewer parks near their homes (Cohen et al. 2006). A five-city study found that having a park within walking distance of one's home was the strongest predictor that an older person would use a park (Godbey et al. 2004).

Adults in New York City, Baltimore, and Forsyth County, North Carolina, were 28 percent more likely to participate in recreation activities if there were parks and recreation facilities within five miles of home. Having facilities within one mile was associated with significantly higher levels of physical activity among Hispanics and African Americans (Diez-Roux et al. 2007).

Safety of Parks

An association between actual safety (as opposed to fear of crime) and outdoor physical activity has not been definitively established. In a review of the literature, Powell et al. (2003) report that four studies found no significant relation between safety and walking in one's neighborhood, but three other studies found such a relation. One of the latter found that recommended activity levels were met by 43 percent of people who had safe places to walk within 10 minutes of home, versus only 27 percent of those without safe places (Powell et al. 2003).

An onsite survey in a large metropolitan park found that among older adults, female park visitors had significantly more fear of crime than did males (Raymore and Scott 1998).

A large sample study of AARP members ages 60 and older examined relations between crime and local park visitation in five East Coast cities (Godbey et al. 1982). Fear of crime was found to be an important variable, and former crime victims (9 percent of all those surveyed) were particularly fearful. Respondents reported that traveling to and from the park was more worrisome than being in the park itself.

A research technique that may elucidate relations between crime and park use involves using geographic information systems. GIS can demonstrate spatial relations between disparate data, such as crime statistics, census information, and land use. Pendleton and Thompson (2000) suggest that criminal occupation and activity within parks may follow a recognized pattern, and such patterns can be revealed and represented using GIS (Suau and Confer 2005).

Supply of Outdoor Spaces

The number and area of parks and playgrounds in a community are positively related to physical activity levels. Numerous studies document this connection. For example, a study of some 500 older adults from 56 neighborhoods in Portland, Oregon, found that both the number of recreation facilities and the area of green or open space were significantly related to high levels of walking (Li et al. 2005). In West Virginia, total county acres managed by public agencies, total county acres devoted to water-based recreation, and the number of recreation facilities were positively related to countywide physical activity (Rosenberger et al. 2005).

Although the number and area of parks in a community can have a positive influence on physical activity, large parks are no more likely to be associated with higher activity levels than smaller parks. For example, a study of four neighborhoods in Ontario found no relationship between the size of parks and their use for physical activity (Kaczynski et al. 2008).

The lack of parks in many communities is exacerbated by the shrinkage of schoolyards as schools install portable classrooms and as land becomes increasingly scarce and expensive. Schools' physical education programs are being cut, and many children lack access to safe recreation facilities. Children of color often do not have access to parks and schoolyards in their communities, and many cannot travel—whether by car or transit—to neighborhoods that have parks (Giles-Corti and Donovan 2003; Gobster 2001; Garcia 2002).

Park and Playground Design and Features

Certain features of parks promote physical activity. A literature review by Mowen et al. (2008) cites an observational study that assessed visitors' activities and energy expenditures in 28 parks in Tampa and Chicago. Parks with soccer fields, tennis and racquetball courts, basketball courts, volleyball courts, and playgrounds were associated with moderate to vigorous levels of physical activity and overall higher levels of park-based energy expenditures (Floyd et al. 2008).

In another study, researchers examined 28 features—bike paths, ball fields, and so forth—in 33 parks and found that parks with more features were more likely to be used for physical activity than parks with fewer features. Parks with paved trails, for example, were 26 times more likely to be used for physical activity than parks without paved trails (Kaczynski et al. 2008). A study of four park types (city park, neighborhood park, waterfront park, “extreme” park) found that levels of moderate or vigorous activity were highest in the areas containing

courts, playgrounds, sports fields, and paths, whereas sedentary activity was observed in open green spaces and in picnic and pavilion areas (Shores and West 2008).

The features and biophysical characteristics that encourage park use may vary. Natural areas are associated with high use rates in some cities, but fear of crime may discourage use of natural areas in others. Schroeder and Anderson (1984) found that degree of naturalness and woody vegetation increased the perceived scenic quality of park environments. However, naturalness and vegetation correlated negatively with perceived safety, suggesting that open lines of sight enhance perceptions of safety (Gobster and Westphal 2003). Some research indicates that African Americans prefer environments that are open, well-groomed, and have more built amenities like ball fields and pavilions, as opposed to wildland recreation areas (Johnson and Bowker 1998; Payne et al. 2001).

Park managers and groundskeepers can alter environmental factors in outdoor recreation areas to promote park visitation and physical activity. Problems with proximity can be mitigated by locating facilities and program areas along the perimeters so that the attractions are visible and easily accessible (Gobster 2001; Giles-Corti and Donovan 2003).

Research questions: How can parks and outdoor recreation areas be designed or redesigned more specifically for health benefits? How can recreation, park, and health research findings be shared with land-use planners, park designers, and landscape architects?

Social Setting in Parks

The social setting—the composition of recreation and park users and their interactions—is another variable affecting participation in outdoor activity. Crowding in outdoor settings involves not only physical limits but also norms, which are generally influenced by the personal characteristics of visitors, the characteristics of those they encounter, and the features of the park itself. Crowding is typically perceived as a negative that detracts from the quality of a user's experience (Manning 1999), especially in backcountry areas, but is often associated with positive visitor experiences in urban parks (Westover and Collins 1987), mostly because it is associated with safety.

Many researchers have observed that crowding norms are different for different user groups. Perceptions of crowding may vary depending upon experience, motivations, and expectations (Ditton et al. 1991). Determining what is undesirable must begin by determining the norms for crowding at the specific area or facility (Manning et al. 2001).

A few studies have examined the effect of intra-activity conflict on urban park use and found that conflict does not seem to detract from park experiences (Schneider 2000). Again, however, perceptions may vary by activity group. For example, Moore et al. (1998) found that greater proportions of walkers and runners reported that skaters and bikers detracted from their enjoyment than vice versa.

Qualitative studies indicate that criminal activity, such as the sale and use of illegal drugs, deters park use by children and adults (Outley and Floyd 2002). Use of urban parks can also be affected by having to traverse “gang territory” (West 1993).

Park Management and Policies

Park administrative activities can promote or discourage use of parks. Some social interactions, including the issues described above, can be managed by regulating certain uses, equipment (e.g., motorized vs. nonmotorized), and activities, as well as by temporal spacing of activity types (Godbey et al. 2005).

Since the mid-1990s, user fees have been implemented or increased at local, state, and federal recreation areas. Fishing, hunting, and snowmobiling, for example, often require licenses, permits, or user fees; the revenue collected may support other forms of outdoor recreation overseen by the regulating agency. Findings on the effect of recreation pricing are mixed. A study of six U.S. Army Corps of Engineers day-use areas found that 40 percent of respondents would reduce their visits if fees were implemented (Reiling et al. 1996). On the other hand, studies from state parks indicate that pricing has little or no effect on recreation use levels (Becker et al. 1985).

However, Scott and Munson (1994) noted that among low-income households, reduced costs, in addition to better public transportation, childcare, and safety, would cause residents to use parks more often. This finding is congruent with a national study that found that 50 percent of low-income respondents cited cost or affordability as barriers to physical activity (Moore 1996). Some visitors, however, may avoid free recreation and park areas because uncontrolled access is associated with higher crime rates (Fletcher 1983).

Research questions: Leaving aside people’s attitudes toward fees, do user fees actually depress park visitation and thus have health consequences? Can fee structures encourage participation in beneficial activities?

7. Looking Ahead

If outdoor recreation is to contribute to the health of Americans, recreation policy needs to be formulated in the context of demographic and lifestyle changes. The post–World War II boom in outdoor recreation participation was a product of several forces, including an economic surge, the rise of the middle class, jobs that included paid vacations as a benefit, and the huge cohort of children born from 1946 to 1964. Outdoor recreation became part of the white, middle-class lifestyle. Recreation managers worked to keep supply adequate to demand, and the federal government incorporated recreation into governance, providing funding, research, and planning expertise to states and municipalities.

Today, American culture is faster-paced and impatient. Outdoor recreation activities that have broad appeal are those done in a day without specialized gear (Outdoor Industry Foundation 2006). Some marketers characterize the expectations of today’s outdoor recreation participants as “done by dinner.”

The economy has changed, too. Historically, during economic downturns, people have used public recreation and park services more, not less: economic woes tend to change leisure behavior in ways that favor outdoor recreation (e.g., Knapp and Hartsoe 1979).

White, middle-class families—the traditional base for outdoor recreation—have declined as a proportion of the population, and participation in outdoor recreation occurs at lower levels across the faster-growing demographic segments. Dwyer (1994, 3) reports “significant differences across racial and ethnic groups, with significantly lower participation for African-Americans for activities taking place in a wild land environment.”

Lower rates of participation by some minority groups are attributed both to limited economic resources and to differences in norms, value systems, and socialization patterns (Floyd and Gramann 1993). More recent studies find some increase in participation by ethnic minorities, disproportionately young males (Outdoor Industry Foundation 2006).

The historical gaps in ethnic minorities’ participation may be exacerbated by demographic change. Consider the following U.S. Census Bureau predictions for 2050, when the total U.S. population is expected to have grown to 439 million:

- Ethnic minorities will increase from one-third of the population today to more than half by 2050; non-Hispanic, single-race whites will account for 46 percent.
- Nearly one in three U.S. residents will be Hispanic.
- The black population is projected to increase from 14 percent of the total to 15 percent.

- The Asian population is projected to climb from 5.1 percent to 9.2 percent.
- The population of minority children is expected to rise from 44 percent to 62 percent.

Ethnic minorities are less likely to participate in outdoor recreation or value government involvement in the provision of such services (e.g., Ho et al. 2005; Sasidharan et al. 2005). Additionally, their obesity rates are considerably higher (Table 2).

Table 2. Obesity Rates for 18- to 26-year-olds, 1992–1995

	<i>Females</i>	<i>Males</i>
Native American	28%	41%
African American	34	22
Hispanic	26	22
White	21	19
Asian American	9	21

Source: Wang and Beydoun 2007.

The size of U.S. age cohorts will also change by 2050, according to the U.S. Census Bureau:

- People 65 and older will have doubled in number and account for nearly one-fifth of the population.
- The 85-and-older population is expected to more than triple.
- The working-age population—18 to 64—is projected to decline from 63 percent today to 57 percent.

Another important demographic issue involves the role of gender and how males and females participate in outdoor activities. State game and fish commissions cater more to the interests of primarily male hunters and anglers, for example, than to birdwatchers or nature photographers of either sex, even though the latter activities are all growing dramatically (Cordell et al. 2008).

Research questions: What do we know about how to engage minority youth in outdoor recreation? About programs and activities that attract girls and women? About providing outdoor recreation services that are appropriate for older people? How can such knowledge be used to further the involvement of such groups?

8. Policy Implications

Outdoor recreation has generally been an auxiliary use of government-managed lands, and federal recreational land often lies far distant from its potential users. Funding for local recreation and park services varies widely across the states (Crompton and Kaczynski 2003). Given the health contribution of outdoor recreation—and the associated health cost savings that could accrue from a general increase in Americans’ outdoor physical activity—it may be appropriate to rethink where and how the nation provides recreational services.

Managing Outdoor Recreation for Healthy Outcomes

The organizations that manage outdoor recreation opportunities should plan, manage, lead, and evaluate for health benefits. A growing number of public park and recreation agencies in several countries are now planning and managing for beneficial outcomes. Detailed reviews of some of these applications of benefits-based management, now called outcomes-focused management (OFM), appear in Driver (2009).

What does a focus on “healthy benefits” mean? Practitioners must shift from merely providing recreation opportunities to promoting activities that deliver health benefits.

One way to manage for health benefits involves partnerships among schools, recreation and park agencies, and health organizations. Such partnerships can be effective in raising health awareness (Spangler and Caldwell 2007). A national survey finds that almost nine out of ten local recreation and park agencies are already participating in at least one such partnership (Mowen et al. 2009a). Schools and public health agencies are the most common partners, and physical activity promotion, obesity prevention, and general wellness are the primary aims. Respondents whose health partnership focused on promoting physical activity took primarily programmatic and environmental approaches—that is, holding special events like five-K walks, setting up programs like water exercise for arthritic adults, and creating park features like bicycle trails.

Developing an Urban Strategy

Incorporating outdoor recreation into city dwellers’ daily routines should be a priority strategy. Use of local parks and recreation services is much more frequent than visits to national parks and may therefore have more health benefits. As we have seen, proximity to local parks, playgrounds, and other outdoor recreation resources is a critical variable for participating in outdoor physical activities. The outdoor recreation “supply” is a crucial variable in determining use: the availability and variety of features and facilities are critical.

Providing recreation facilities for urban and suburban children is especially important. Children need places where they can be outdoors and physically active on a regular basis, in their own neighborhoods; such places include both public parks and commercial facilities. Because children engage in such a variety of activities and because their recreational needs vary widely by age, providing many different types of facilities is a promising policy objective (Sallis and Glanz 2006).

School policy, leadership, and facilities are important determinants of the physical activity levels of students. Outdoor skills and appreciation must be taught and the existing outdoor recreation preferences of minority children better understood and provided for.

Policy Options and Questions

The findings of this literature review point to potential new directions for outdoor recreation policy, as well as new questions to be explored.

- The U.S. Fair Labor Standards Act should be amended to require paid vacations for workers.
- Planning for outdoor recreation in urban areas should involve not only schools and recreation and park departments, but also public health, transportation, public utilities, hospitals, and organizations like The Nature Conservancy and Master Gardeners.
- Governments could invest in outdoor recreation by developing trail systems in urban areas and rehabilitating potential recreation sites, including brownfields.
- Crime reduction efforts that focus on parks and surrounding areas would help people feel safe both in the park and walking to it.
- Land-use planners who adopt the Smart Growth principles of mixed-use zoning and walkable neighborhoods may encourage more physical activity.
- Training in the techniques of measuring physical activity and other health-related measures is needed. Park and recreation practitioners are often unaware of new, reliable metrics or may lack staff members trained to use them.
- More funding for research is needed. Measurement has been a barrier to promoting public health programs in an outdoor recreation setting, and funding for research largely determines the extent to which sophisticated measures can be used.

- A meta analysis of studies of local park and playground use could form the basis for convening an expert panel to establish a standardized research protocol, so that future research on physical activity can collect comparable data for analysis.
- Fees for some activities could be used to subsidize other activities that deliver greater health benefits, making them more attractive.

The Center for Law in the Public Interest has already advocated similar measures, including open space for recreation (parks, schoolyards, beaches, national forests and parks), joint use of parks and schools to make optimal use of land and public resources, daily physical education for all students, educational programs in schools and parks to instill lifelong values of physical fitness and good nutrition, public education campaigns to articulate the need for active recreation as a matter of human health, and diversifying access to and support for wilderness areas.

Several policy questions also emerge from this literature review. Should time and resources be spent to encourage participation in outdoor activities that show declines, such as fishing, hunting, and tent camping, or should we invest more resources in the activities that are gaining in popularity, such as nature photography?

Should emphasis be on increasing the frequency, duration, and intensity of participation by those who are already likely to participate? Or should emphasis be on involving those with low participation rates, such as African Americans, Hispanics, poor people, and females?

How can state-level provision of outdoor recreation more deliberately include the interests of women and ethnic minorities to maximize contributions to their health? How can these groups be exposed to attractive outdoor recreation opportunities?

Should the United States embark on massive projects to develop and improve community parks and recreation services, like the programs of the Great Depression?

Funding is always a question, but especially in an economic downturn. Historically, funding for parks has come from departments concerned with land acquisition and management or with urban affairs; today, efforts to increase outdoor recreation activities need to originate in public health agencies, with the cooperation of federal land management agencies and state park, community affairs, and related agencies. Incorporating such efforts into the national agenda for public health can make the required funding both palatable to Congress and effective in meeting the goal.

References

- AARP. 2008. www.aarp.org/health/fitness/walking/a2004-06-17-walking-numerousbenefits.html.
- Active Living Research. 2008. *Designing for Active Recreation*. San Diego: Active Living Research.
- Ainsworth, B., W. Haskell, A. Leon, D. Jacobs, H. Montoye, J. Sallis, and R. Paffenbarger. 1993. Compendium of Physical Activities: Classification of Energy Costs of Human Physical Activities. *Medicine and Science in Sport and Exercise* 25(1): 71–80.
- Ainsworth, B., W. Haskell, M. Whitt, M. Irwin, A. Swartz, S. Strath, W. O'Brien, D. Bassett, K. Schmitz, P. Emplaincourt, D. Jacobs, and A. Leon. 2000. Compendium of Physical Activity: An Update on Activity Codes and MET Intensities. *Medicine and Science in Sports and Exercise* 32: 498–504.
- Alberta Centre for Well Being. 1989. Wellness Defined. <http://www.centre4activeliving.ca/>.
- American Institute of Stress. 2008. America's No. 1 Health Problem. <http://www.stress.org/about.htm>.
- Baltes, P., and M. Baltes. 1990. *Successful Aging: Perspectives from the Behavioral Sciences*. Cambridge: Cambridge University Press.
- Becker, R., D. Berrier, and G. Barker. 1985. Entrance Fees and Visitation Levels. *Journal of Park and Recreation Administration* 3: 28–32.
- Bell, R., J. Summerson, J. Spangler, and J. Konen. 1998. Body Fat, Fat Distribution, and Psychosocial Factors among Patients with Type 2 Diabetes Mellitus. *Behavioral Medicine* 24(3): 138–43.
- Brand, N., E. Hanson, and G. Godaert. 2000. Chronic Stress Affects Blood Pressure and Speed of Short-Term Memory. *Perceptual and Motor Skills* 91: 291–98.
- Brownson R., E. Baker, L. Housemann, et al. 2001. Environmental and Policy Determinants of Physical Activity in the United States. *American Journal of Public Health* 91(12): 1995–2003.
- Bryan. H. 1970. *Conflict in the Great Outdoors: Toward Understanding and Managing for Diverse Sportsmen Preferences*. Tuscaloosa, AL: University of Alabama.

- Bureau of Labor Statistics (BLS). 2006. American Time Use Survey: Leisure and Sports. <http://www.bls.gov/tus/current/leisure.htm>.
- Canin, H. 1991. Psychological Restoration among AIDS Caregivers: Maintaining Self Care. Unpublished doctoral dissertation. University of Michigan.
- Cawley, J., C. Meyerhoefer, and D. Newhouse. 2007. The Correlation of Youth Physical Activity with State Policies. *Contemporary Economic Policy* 25(4): 506–17.
- Centers for Disease Control and Prevention (CDCP). 2003. Preventing Obesity and Chronic Diseases through Good Nutrition and Physical Activity. <http://www.cdc.gov/nccdphp/>. July.
- Chow, H. 2007. *Physically Active Leisure among Older Adults: Measurement, Comparison and Impact*. Germany: VDM Verlag Publishers.
- Chu, C., and R. Simpson. 1994. *Ecological Public Health: From Vision to Practice*. Institute of Applied Environmental Research, Griffith University, Queensland, Australia, and Centre for Health Promotion, University of Toronto, Canada.
- Cicchetti C, J. Seneca, and P. Davidson. 1969. *The Demand and Supply of Outdoor Recreation*. New Brunswick, NJ: Rutgers Bureau of Economic Research.
- Cimprich, B. 1993. Development of an Intervention to Restore Attention in Cancer Patients. *Cancer Nursing* 16: 83–92.
- Cohen, D., J. Ashwood, M. Scott, et al. 2006. Public Parks and Physical Activity among Adolescent Girls. *Pediatrics* 118(5): 1381–89.
- Cohen, D., T. McKenzie, A. Sehgal, S. Williamson, D. Golinelli, and N. Lurie. 2007. Contribution of Public Parks to Physical Activity. *American Journal of Public Health* 97(3): 514–23.
- Collins, G. 2008. Increase in Home Gardening Yields Bumper Crop of Sales. *New York Times*, November 17.
- Cordell, H., K. Betz, J. Carter, and G. Green. 2008. Nature-Based Outdoor Recreation Trends and Wilderness. *International Journal of Wilderness* 14(2): 7–13.
- Cranz, G. 1982. *The Politics of Park Design*. Cambridge, MA: MIT Press.

- Crompton J., and A. Kaczynski. 2003. Trends in Local Recreation and Park Department Finances and Staffing from 1964–5 to 1999–2000. *Journal of Park and Recreation Administration* 21: 124–44.
- de Vries, S., R. Verheij, H. Groenewegen, and P. Spreeuwenberg. 2003. Natural Environments—Healthy Environments? An Exploratory Analysis of the Relationship between Green Space and Health. *Environment and Planning* 35(10): 1717–31.
- Diez-Roux, A., K. Evenson, A. McGinn, D. Brown, L. Moore, S. Brines, and D. Jacobs. 2007. Availability of Recreational Resources and Public Activity in Adults. *American Journal of Public Health* 97: 493–99.
- Ditton, R., A. Fedler, and A. Graefe. 1991. Factors Contributing to Perceptions of Recreational Crowding. *Leisure Science* 5: 273–88.
- Dolesh, R. 2008. The State of Our State Parks. *Parks and Recreation* November: 65–68.
- Driver, B. 1985. Specifying What Is Produced by Management of Wildlife by Public Agencies. *Leisure Sciences* 7: 281–95.
- . (ed.). 2009. *Managing to Optimize the Beneficial Outcomes of Recreation*. State College, PA: Venture Publishing.
- Driver, B., and R. Cooksey. 1977. Preferred Psychological Outcomes of Recreational Fishing. in R.A. Barnhart and T.D. Roelofs (eds.), *Catch-and-Release Fishing As a Management Tool*. Arcata, CA: Humboldt State University, Cooperative Fishery Research Unit, 27–40.
- Driver, B., and R. Knopf. 1976. Temporary Escape: One Product of Sport Fisheries Management. *Fisheries* 1(2): 21–29.
- Dwyer, J. 1994. *Customer Diversity and the Future Demand for Outdoor Recreation*. Fort Collins, CO: USDA Forest Service.
- Eckenrode, J., and N. Bolger. 1997. Daily and Within Daily Event Measurement. In Cohen, Kessler, and Gordon (eds.), *Measuring Stress: A Guide for Health and Social Scientists*. New York: Oxford University Press, 80–101.
- Eida, J., H. Overan, D. Puga, and M. Turner. 2008. Fat City: Questioning the Relationship between Urban Sprawl and Obesity. *Journal of Urban Economics* 63(2) (March): 385–404.

- Fletcher, J. 1983. Assessing the Impact of Actual and Perceived Safety and Security Problems on Park Use and Enjoyment. *Journal of Park and Recreation Administration* 1: 21–36.
- Floyd, M., and J. Gramann. 1993. Effects of Acculturation and Structural Assimilation in Resource-Based Recreation: The Case of Mexican Americans. *Journal of Leisure Research* 25: 24–37.
- Floyd, M., J. Spengler, J. Maddock, et al. 2008. Park-Based Physical Activity in Diverse Communities of Two US Cities: An Observational Study. *American Journal of Preventive Medicine* 34(4): 299–305.
- Frank, L., T. Schmid, J. Sallis, et al. 2005. Linking Objectively Measured Physical Activity with Objectively Measured Urban Form. *American Journal of Preventive Medicine* 28: 117.
- Frumkin, H. 2001. Beyond Toxicity Human Health and the Natural Environment. *American Journal of Preventive Medicine* 20(3): 234–40.
- Gallup. 2003.
<http://kaboom.org/GettingStarted/WhyPlayMatters/StudiesandStatistics/2003GallupStudyResults>. Gallup Organization.
- Garcia, R., et al. 2002. Center for Law in the Public. Interest, Dreams of Fields: Soccer, Community, and Equal Justice. <http://www.clipi.org/currentactivities.html>.
- Giles-Corti, B., and R. Donovan. 2003. Relative Influences of Individual, Social Environmental, and Physical Environmental Correlates of Walking. *American Journal of Public Health* 93: 1583–89.
- Gobster, P. 2001. Neighborhood-Open Space Relationships in Metropolitan Planning: A Look across Four Scales of Concern. *Local Environment* 6: 199–212.
- . 2002. Managing Urban Parks for a Racially and Ethnically Diverse Clientele. *Leisure Sciences* 24: 143–59.
- Gobster, P., and L. Westphal. 2003. The Human Dimensions of Urban Greenways: Planning for Recreation and Related Experiences. *Landscape and Urban Planning* 68: 147–65.
- Godbey, G. 1982. Demand for Recreation in America: An Overview. Prepared for National Recreation and Park Association for submission to the Outdoor Recreation Policy Review Group. Reprinted as Quest for Quality Series, Number 1. NRPA
- Godbey, G., and M. Blazey. 1983. Old People in Urban Parks: An Exploratory Investigation. *Journal of Leisure Research* 15: 229–44.

- Godbey, G., L. Caldwell, M. Floyd, and L. Payne. 2005. Contributions of Leisure Studies and Recreation and Park Management Research to the Active Living Agenda. *American Journal of Preventive Medicine* 28(2): 150–58.
- Godbey, G., A. Graefe, and S. James. 1992. The Benefits of Local Recreation and Park Services: A Nationwide Study of the Perceptions of the American Public. Arlington, VA: National Recreation and Park Association.
- Godbey, G., L. Payne, and B. Orsega-Smith. 2004. Examining the Relationship of Local Government Recreation and Park Services to the Health of Older Adults. Robert Wood Johnson Foundation Grant Research Results.
- Grahn, P., and U. Stigsdotter. 2003. Landscape Planning and Stress. *Urban Forestry and Urban Greening* 2: 1–18.
- Gump, B., and K. Matthews. 2000. Are Vacations Good for Your Health? The 9-Year Mortality Experience after the Multiple Risk Factor Intervention Trial. *Psychosomatic Medicine* 62(5): 608–12.
- Hancock, T. 1999. Healthy and Sustainable Communities—Creating Community Capital. In Proceedings of Fourth European IUHPE Conference on Effectiveness and Quality of Health Promotion. Estonia: IUHPE.
- Handy, S., J. Sallis, D. Weber, E. Maibach, and M. Hollander. 2008. Is Support for Traditionally Designed Communities Growing? Evidence from Two National Surveys. *Journal of the American Planning Association* 74: 209–21.
- Hartig, T., M. Mang, and G. Evans. 1991. Restorative Effects of Natural Environment Experiences. *Environment and Behavior* 23: 3–26.
- Healthlink: Medical College of Wisconsin. 2009. Childhood Obesity Causes Diabetes and Other Health Problems. January 14.
- Hedley, C.O., L. Clifford, L. Johnson, M. Carroll, L. Curtin, and K. Flegal. 2004. Prevalence of Overweight and Obesity among US Children, Adolescents, and Adults, 1999-2002. *Journal of the American Medical Association* 291: 2847-50.
- Ho, C., L. Payne, B. Orsega-Smith, and G. Godbey. 2003. Parks, Recreation and Public Health. *Parks and Recreation* 18 (April): 20-27.

- Ho, C., V. Sasidharan, W. Elmendorf, F. Willits, A. Graefe, and G. Godbey. 2005. Gender and Ethnic Variations in Urban Park Preferences, Visitation and Perceived Benefits. *Journal of Leisure Research* 37: 23–35.
- Hoefler, W., et al. 2002. Parental Provision of Transportation for Adolescent Physical Activity. *American Journal of Preventive Medicine* 21: 48–51.
- Hull, R., and S. Michael. 1995. Nature-Based Recreation, Mood Change and Stress Restoration. *Leisure Sciences* 17: 1–14.
- Humpel, N., N. Owen, and E. Leslie. 2002. Environmental Factors Associated with Adults' Participation in Physical Activity. *American Journal of Preventive Medicine* 22: 188–99.
- Hutchison, R. 1987. Ethnicity and Urban Recreation: Whites, Blacks and Hispanics in Chicago's Public Parks. *Leisure Sciences* 1: 205–22.
- Jacobs, M.H., and M.J. Manfredi. 2008. Decline in Nature-Based Recreation Is Not Evident. *Proceedings of the National Academy of Sciences of the United States of America* 105(27) (July 8).
- Johnson, C., and J. Bowker. 1998. Onsite Wildland Activity Choices among African Americans and White Americans in the Rural South: Implications for Management. *Journal of Leisure Research* 30: 101–20.
- Kaczynski A., and K. Henderson. 2007. Environmental Correlates of Physical Activity: A Review of Evidence about Parks and Recreation. *Leisure Sciences* 29(4): 315–54.
- Kaczynski A., L. Potwarka, and B. Saelens. 2008. Association of Park Size, Distance, and Features with Physical Activity in Neighborhood Parks. *American Journal of Public Health* 98(8): 1451–56.
- Kaiser Family Foundation. 2005. Generation M: Media in the Lives of 8–18-Year-Olds. www.kff.org/entmedia/7250.cfm.
- Kaplan, R. 1984. Impact of Urban Nature: A Theoretical Analysis. *Urban Ecology* 8(1): 189–97.
- . 1993. The Role of Nature in the Context of the Workplace. *Landscape and Urban Planning* 26: 193–201.
- Kaplan, S. 1995. The Restorative Benefits of Nature: Toward an Integrative Framework. *Journal of Environmental Psychology* 15: 169–82.

- Kaplan, R., and S. Kaplan. 1989. *The Experience of Nature: A Psychological Perspective*. New York: Cambridge University Press.
- Katcher, A., and A. Beck. 1987. Health and Caring for Living Things. *Anthrozoos* 1: 175–83.
- Killingsworth, R. (ed.). 2003. Health Promoting Community Design [Special issue]. *American Journal of Health Promotion* 18: 1–122.
- Knapp, R., and C. Hartsoe. 1979. *Play for America: The National Recreation Association, 1906–1965*. Arlington, VA: National Recreation and Park Association.
- Knize, P. 1998. Nurture by Nature—Why Do So Many Travelers Head for Greener Pastures? The Answer May Be a Matter of Biological Necessity. *Conde Nast Traveler* May: 130–32.
- Kruger, J., A.J. Mowen, and J. Librett. 2007. Recreation, Parks, and the Public Health Agenda: Developing Collaborative Surveillance to Measure Leisure Activity and Active Park Use. *Journal of Physical Activity and Health* 4(Suppl. 1): S1–S10.
- Kuo, F., and A. Taylor. 2004. A Potential Natural Treatment for Attention-Deficit/Hyperactivity Disorder: Evidence from a National Study. *American Journal of Public Health* 94 (9): 1580–86.
- Kuo, F., and W. Sullivan. 2001. Aggression and Violence in the Inner City: Effects of Environment via Mental Fatigue. *Environment and Behavior* 33(4): 543–71.
- LaPorte, H., L. Montoye, and C. Caspersen. 1985. Assessment of Physical Activity in Epidemiologic Research: Problems and Prospects. *Public Health Reports* 100(2): 131–46.
- Leather, P., M. Pyrgas, D. Beale, and C. Lawrence. 1998. Windows in the Workplace: Sunlight, View, and Occupational Stress. *Environment and Behavior* 30(6): 739–62.
- Li, F., J. Fisher, R. Brownson, et al. 2005. Multilevel Modeling of Built Environment Characteristics Related to Neighborhood Walking Activity in Older Adults. *Journal of Epidemiology and Community Health* 59: 558–64.
- Lohr, V., H. Pearson-Mims., and G. Goodwin. 1996. Interior Plants May Improve Worker Productivity and Reduce Stress in a Windowless Environment. *Journal of Environmental Horticulture* 14: 97–100.
- Louv, R. 2005. *Last Child in the Woods: Saving Our Children from Nature Deficit Disorder*. Chapel Hill, NC: Algonquin Books.

- Maller, C., A. Townsend, P. Pryor, P. Brown, and L. St Leger. 2006. Healthy Nature Healthy People: “Contact with Nature” as an Upstream Health Promotion Intervention for Populations. *Health Promotion International* 21: 45–54.
- Manning R. 1999. Crowding and Carrying Capacity in Outdoor Recreation: From Normative Standards to Standards of Quality. In E. Jackson and T. Burton (eds.), *Leisure Studies: Prospects for the Twenty-First Century*. State College, PA: Venture Publishing, 323–34.
- Manning, R., P. Newman, W. Valliere, B. Wang, and S. Lawson. 2001. Respondent Self-Assessment of Research on Crowding Norms in Outdoor Recreation. *Journal of Leisure Research* 33: 251–71.
- McKenzie, T., and D. Cohen. 2006. *SOPARC—System for Observing Play and Recreation in Communities*. RAND.
- McKenzie, T., J. Simon, M. Marshall, J. Sallis, and T. Conway. 2000. Leisure-Time Physical Activity in School Environments: An Observational Study Using SOPLAY. *American Journal of Preventive Medicine* 30(1): 70–77.
- Miles, I., W. Sullivan, and F. Kuo. 1998. Prairie Restoration Volunteers: The Benefits of Participation. *Urban Ecosystems* 2: 27–41.
- Milnes, S. 2008. Penn State Web Based learning Units.
betterkidcare.psu.edu/AngelUnits/OneHour/OutdoorPlay/OutdoorPlayLessonA.html.
- Milstein, M. 2008. Visits to National Forests Declining. *The Oregonian*, November 17.
- Mood, D., W. Allen, W. Jackson, and J. Morrow Jr. 2007. Measurement of Physical Fitness and Physical Activity: Fifty Years of Change. *Measurement in Physical Education & Exercise Science* 11: 217–24.
- Moore, E. 1981. A Prison Environment’s Effect on Health Care Service Demands. *Journal of Environmental Systems* 11(1): 17-34.
- Moore, R. 1996. The Need for Nature: A Childhood Right. *Social Justice* 24(1): 34–48.
- Moore, R., D. Scott, and A. Graefe. 1998. The Effects of Activity Differences on Recreation Experiences along a Suburban Greenway Trail. *Journal of Park and Recreation Administration* 16: 35–53.
- More, T., and B. Payne. 1978. Affective Responses to Natural Areas Near Cities. *Journal of Leisure Research* 10(1): 7–12.

- Mott Foundation. 2008. Motts Children's Hospital National Poll on Children's Health. C.S. Mott Children's Hospital, University of Michigan Department of Pediatrics and Communicable Diseases, and the University of Michigan Child Health Evaluation and Research Unit. July 14.
- Mowen, A., Kaczynsk, A., and D. Cohen. 2008. The Potential of Parks and Recreation in Addressing Physical Activity and Fitness. *Research Digest*, Series 9(1), March. President's Council on Physical Activity and Sport.
- Mowen, A., L. Payne, B. Orsega-Smith, and G. Godbey. 2009a. An Assessment of Health Partnership Practices in the Park and Recreation Profession: Findings and Implications from a National Survey. *Journal of Park and Recreation Administration*. In press.
- Mowen, A., N. Trautvein, A. Graefe, and M. Ivy. 2009b. Assessing Physical Activity in Parks and Its Role in Shaping Park Program and Setting Preferences: A Survey of Pennsylvania State Park Day Users and Overnight Visitors. Manuscript.
- Murray, C., and A. Lopez. 1996. *The Global Burden of Disease: A Comprehensive Assessment of Mortality and Disability From Diseases, Injuries, and Risk Factors in 1990 and Projected to 2020—Summary*. World Health Organization, Geneva, the World Bank, and the Harvard School of Public Health.
- National Alliance for Nutrition and Activity (NANA). 2003. Obesity and Other Diet- and Inactivity-Related Diseases: National Impact, Costs, and Solutions. www.cspinet.org/nutritionpolicy/briefingbookfy04.ppt.
- National Park Service (NPS). 2007. National Park System Attendance Rises in 2007. <http://home.nps.gov/applications/release/Detail.cfm?ID=785>.
- Nesse, R., and G. Williams. 1996. *Why We Get Sick*. New York: Vintage Books.
- Nielsen, T., and K. Hansen. 2007. Do Green Areas Affect Health? *Health and Place* 13(4): 839–50.
- Orsega-Smith, B., A. Mowen, L. Payne, and G. Godbey. 2004. The Interaction of Stress and Park Use on Psycho-Physiological Health in Older Adults. *Journal of Leisure Research* 36: 1–28.
- Outdoor Industry Foundation. 2006. Outdoor Recreation Participation Study. 8th Edition. Boulder, CO.

- Outley, C., and M. Floyd. 2002. The Home They Live In: Inner City Children's Views on the Influence of Parenting Strategies on Their Leisure Behavior. *Leisure Sciences* 24(2): 161–79.
- Owen, N., N. Humpel, F. Leslie, et al. 2004. Understanding Environmental Influences on Walking: Review and Research Agenda. *American Journal of Preventive Medicine* 27: 67–76.
- Parsons, R., L. Tassinary, R. Ulrich, M. Hebl, and M. Grossman-Alexander. 1998. The View from the Road: Implications for Stress Recovery and Immunization. *Journal of Environmental Psychology* 18: 113–40.
- Pate, R., M. Pratt, S. Blair, W. Haskell, C. Macera, C. Bouchard, D. Buchner, W. Ettinger, G. Heath, and A. King. 1995. Physical activity and public health: A recommendation from the Centers for Disease Control and Prevention and the American College of Sports Medicine. *Journal of the American Medical Association* 273(5): 402–407.
- Payne, L., A. Mowen, and B. Orsega-Smith. 2001. An Examination of Park Preferences and Behaviors among Urban Residents: The Role of Residential Location, Race and Age. *Leisure Sciences* 24: 81–98.
- Payne, L., B. Orsega-Smith, K. Roy, and G. Godbey. 2005. Local Park Use and Personal Health among Older Adults: An Exploratory Study. *Journal of Park and Recreation Administration* 23(2): 1–20.
- Pendleton, M., and H. Thompson. 2000. The Criminal Career of Parks and Recreation Hotspots. *Parks and Recreation* 35(7): 56–63.
- Pergams, O., and P. Zaradic. 2006. Is Love of Nature in the US Becoming Love of Electronic Media? 16-Year Downtrend in National Park Visits Explained by Watching Movies, Playing Video Games, Internet Use, and Oil Prices. *Journal of Environmental Management* 80(4) (September): 387–93.
- . 2008a. Evidence for a Fundamental and Pervasive Shift away from Nature-Based Recreation. National Academy of Sciences. www.pnas.org.
- . 2008b. Reply to Jacobs and Manfred: More Support for a Pervasive Decline in Nature-Based Recreation. National Science Foundation. July 1. www.pnas.org.
- Plantinga, A., and S. Bernell. 2007. The Association between Urban Sprawl and Obesity: Is It a Two-Way Street? *Journal of Regional Science* 47(5): 857–79.

- Powell, K., L. Martin, and P. Chowdhury. 2003. Places to Walk: Convenience and Regular Physical Activity. *American Journal of Public Health* 93(1): 1519–21.
- RAND. 2004. Obesity and Disability: The Shape of Things to Come. <http://www.rand.org/publications/RB/RB9043/RB9043.pdf>.
- Raymore, L., and D. Scott. 1998. The Characteristics and Activities of Older Adult Visitors to Metropolitan Park Districts. *Journal of Park and Recreation Administration* 16: 1–21.
- Reiling, S., H. Cheng, C. Robinson, R. McCarville, and C. White 1996. Potential Equity Effects of a New Day-Use Fee. *Proceedings of the 1995 Northeastern Recreation Research Symposium*. USDA Forest Service General Technical Report NE-218, 27–31.
- Robinson, J., and G. Godbey. 1999. *Time for Life: The Surprising Ways Americans Use Their Time*. Rev. ed. University Park, PA: Pennsylvania State University Press.
- Rohde, C., and A. Kendle. 1997. Nature for People. In A. Kendle and S. Forbes (eds.), *Urban Nature Conservation—Landscape Management in the Urban Countryside*. London: E. and F. N. Spon, 319–35.
- Roper ASW. 2004. Outdoor Recreation in America 2003: Recreation’s Benefits to Society Challenged by Trends—A Report Prepared for the Recreation Roundtable. Washington, D.C.
- Rosenberger, R., Y. Sneh, T. Phipps, et al. 2005. A Spatial Analysis of Linkages between Health Care Expenditures, Physical Inactivity, Obesity and Recreation Supply. *Journal of Leisure Research* 37(2): 216–35.
- Saelens, B., and J. Kerr. In press. Built Environment Correlates of Walking: A Review. *Medicine and Science in Sport and Exercise* 40(1): 550–66.
- Sallis, J., and P. Glanz. 2006. The Role of Built Environments in Physical Activity, Eating, and Obesity in Childhood. *The Future of Children* 16(1): 89–108.
- Sallis, J., et al. 1993. Correlates of Physical Activity at Home in Mexican-American and Anglo-American Preschool Children. *Health Psychology* 12: 390–98.
- Sallis, J., J. Prochaska, and W. Taylor. 2000. A Review of Correlate of Physical Activity of Children and Adolescents. *Medicine and Science in Sports and Exercise* 32: 963–75.
- Sallis, J., L. Frank, B. Saelens, and M. Kraft. 2001. Active Transportation and Physical Activity: Opportunities for Collaboration on Transportation and Public Health Research. *Transportation Research* 38(4): 249–68.

- Sasidharan, V., F. Willits, and G. Godbey. 2005. Cultural Differences in Urban Recreation Patterns: An Examination of Park Usage and Activity Participation across Six Population Groups. *Managing Leisure* 10: 19–38.
- Schneider, I. 2000. Responses to Conflict in Urban-Proximate Areas. *Journal of Park and Recreation Administration* 18: 37–53.
- Schroeder, H., and L. Anderson. 1984. Perception of Personal Safety in Urban Recreation Sites. *Journal of Leisure Research* 16: 178–94.
- Scott, D. 1997. Exploring Time Patterns in People's Use of a Metropolitan Park District. *Leisure Sciences* 19: 159–74.
- Scott, D., and W. Munson. 1994. Perceived Constraints to Park Usage among Individuals with Low Incomes. *Journal of Park and Recreation Administration* 12: 79–96.
- Shores K., and S. West 2008. The Relationship between Built Park Environments and Physical Activity in Four Park Locations. *Journal of Public Health Management Practice* 14(3): E9–E16.
- Spangler, K., and L. Caldwell. 2007. The Implications of Public Policy Related to Parks, Recreation, and Public Health: A Focus on Physical Activity. *Journal of Physical Activity and Health* 4(1): 64–71.
- Stebbins, R. 1992. *Amateurs, Professionals, and Serious Leisure*. Montreal and Kingston: McGill-Queens University Press.
- Stilgoe, J. 2001. Gone Barefoot Lately? *American Journal of Preventative Medicine* 20: 243–44.
- Suau, L., and J. Confer. 2005. Parks and the Geography of Fear: Using Geographical Information Systems to Detect Criminal Activity and to Prevent Crime, and to Reduce Fear of Crime as a Deterrent to Park Visitation. Proceedings of the 2005 Northeastern Recreation Research Symposium. www.americantrails.org/resources/safety/parkcrime.html.
- Thomson, M., J. Spence, K. Raine, and L. Laing. 2008. The Association of Television Viewing with Snacking Behavior and Body Weight of Young Adults. *American Journal of Health Promotion* 22(5): 329–35.
- Tinsley, H., C. Tinsley, and C. Croskeys. 2002. Park Usage, Social Milieu, and Psychosocial Benefits of Park Use Reported by Older Urban Park Users from Four Ethnic Groups. *Leisure Sciences* 24: 199–218.

- Troped, P., R. Saunders, R. Pate, and B. Reininger. 2001. Associations between Self-Reported and Objective Physical Environmental Factors and Use of a Community Rail-Trail. *Preventive Medicine* 32(2): 191–200.
- Ulrich, R. 1984. View through a Window May Influence Recovery from Surgery. *Science* 224: 420–21.
- Ulrich, R., U. Dimberg, and B. Driver. 1991a. Psychophysiological Indicators of Leisure Benefits. In B. Driver, L. Brown, and G. Peterson (eds.), *Benefits of Leisure*. State College, PA: Venture Publishing, 73–89.
- Ulrich, R. R. Simons, B. Losito, E. Fiorito, M. Miles, and M. Zelson. 1991b. Stress Recovery during Exposure to Natural and Urban Environments. *Journal of Environmental Psychology*. 11(1): 201–30.
- U.S. Department of Health and Human Services. 1996. Physical Activity and Health: A Report of the Surgeon General. U.S. Department of Health and Human Services, Centers for Disease Control and Prevention. Atlanta: National Center for Chronic Disease Prevention and Health Promotion.
- U.S. Secretaries of Health and Human Services and Education. 2008. Promoting Better Health for Young People through Physical Activity and Sports: A Report to the President. Washington, DC.
- Wang, Y., and M. Beydoun. 2007. The Obesity Epidemic in the United States—Gender, Age, Socioeconomic, Racial/Ethnic and Geographic Characteristics: A Systematic Review and Meta-Regression Analysis. *Epidemiologic Reviews* 29: 6–28.
- WEB MD. 2009. Weight Loss: Health Risks Associated with Obesity. January 14.
- Wechsler, H., S. Randolph, A. Devereaux, M. Davis, and J. Collins. 2000. Using the School Environment to Promote Physical Activity and Healthy Eating. *Preventive Medicine* 31(2): S121–S137.
- West, P. 1993. The Tyranny of Metaphor: Interracial Relations, Minority Recreation, and the Wildland-Urban Interface. In A. Ewert, D. Chavez, and A. Magill (eds.), *Culture, Conflict, and Communication in the Wildland-Urban Interface*. Boulder, CO: Westview Press, 109–15.
- Westman, M., and D. Etzion. 2001. The Impact of Vacation and Job Stress on Burnout and Absenteeism. *Psychology and Health* 16(5): 595–606.

Westover, T., and J. Collins. 1987. Perceived Crowding in Recreation Settings: An Urban Case Study. *Leisure Sciences* 9: 87–99.

World Health Organization. 2003. www.who.int/about/definition/en/print.html.