ABSTRACT

Chronic diseases are responsible for about 70% of deaths annually, and treatment of these diseases accounts for 86% of national health care expenditures. Individuals are spending more time indoors, leading to “nature-deficit disorder.” Nurse practitioners are looking for ways to address lifestyle changes to reduce chronic disease burden. “Park prescriptions” are gaining popularity and spending time outdoors can address health problems, including obesity, depression, and behavioral problems. The National Park Prescription Initiative has been launched nationwide with support from the Surgeon General and the National Park Service. Nurse practitioners can play a role in promoting such programs and tracking outcomes.

Keywords: active living, built environment, chronic disease, nature, obesity, Park Rx

BUSY Lifestyles and technology have contributed to a shift in the United States to a sedentary lifestyle, and an increase in chronic diseases such as coronary artery disease, diabetes, and depression. According to the United States Centers for Disease Control and Prevention (CDC), chronic diseases are responsible for 7 of every 10 deaths annually and these diseases account for 86% of national health care expenditures. Richard Louv, author of Last Child in the Woods, describes an epidemic of “nature-deficit disorder,” due to children’s reduced time outdoors in exchange for electronic media and academic demands that can contribute to obesity, attention deficit-hyperactivity disorder (ADHD), and vitamin D deficiency.

Smartphones and computers, the reduction of school recess time, and concerns over neighborhood crime have decreased the amount of time spent outdoors, and less than half of all adults meet the physical activity guidelines for exercise. The No Child Left Behind Act of 2001 resulted in reduced time for physical education, art, and recess, and for increased time in the classroom. Currently, almost three fourths of teens participate in < 1 hour of physical activity per day. A report by the World Health Organization ranked lack of physical activity fourth on a list of risk factors for noncommunicable chronic diseases, behind high blood pressure, smoking, and high blood glucose. Lack of physical activity and limited exposure to nature are separate concerns, but time outdoors is ideal to promote spontaneous physical activity.

Technology has brought entertainment, social interaction, and video gaming into the home, while decreasing the need to be outside to see friends, attend a movie, or meet peers for outdoor activities. The growth in electronic devices has led to teens spending > 7 hours per day on all forms of e-media, including computer games, social media, and the internet, and < 30 minutes of outdoor time daily. The physical inactivity of screen time is often associated with increased consumption of unhealthy foods and subsequent overweight and obesity issues. Data from the National Health Interview Survey show that, if obesity rates continue, 1 in 3 persons will develop diabetes in his or her lifetime. Over the last 20 years, use of personal electronics has increased, whereas time spent outdoors has decreased. According to the
National Wildlife Federation, “our kids are out of shape, tuned out and stressed out, because they are missing something essential to their health and development: connection to the natural world.⁸

OUTDOORS AND HEALTH

Exposure to green environmental spaces is an essential component to human health that has been curtailed in modern society. Nature can promote healthy social behavior and reduce stress.⁹ Time spent outdoors offers a number of health and wellness benefits for children and adults alike. For children, green spaces have been associated with improved test scores, improved self-discipline and cognition, and decreased behavioral issues that may be attributed to ADHD.¹⁰ A study of 421 children with ADHD was conducted using an internet-based survey of parents. The findings suggest that everyday play outdoors reduces symptom severity.⁹

Obesity has numerous contributing factors and therefore has a number of complex solutions. Decreased physical activity is a contributing factor that needs to be addressed by clinicians and community efforts. Data on 2,810 Head Start children were reviewed and the results show that the children who played outdoors for roughly 37 minutes per day were less likely to be obese and those who played outdoors for 60 minutes a day showed improvements in body mass index.¹¹

Additional studies have shown that increasing time spent outdoors may be a simple strategy to reduce the risk of developing myopia and its progression in children and adolescents, given that the eye movement of looking at things close up and far away in succession in a park can be protective against myopia.¹² Studies indicate that the decline in vitamin D among older people is probably due to decreased sun exposure from decreased outdoor time.¹³ Time spent outdoors increases exposure to ultraviolet B light with improved synthesis of vitamin D.

Internationally, concepts such as Shinrin-yoku, Japanese for “forest bathing,” have demonstrated that exposure to nature improves physical and mental health. One Japanese study noted that forest environments promote lower concentrations of cortisol, lower pulse rate, lower blood pressure, greater parasympathetic nerve activity, and lower sympathetic nerve activity than do city environments.¹⁴

There are numerous innovative approaches to getting children outdoors. An elementary school teacher in Quechee, Vermont, held “Forest Mondays” class outdoors every Monday, rain or shine. Standardized test scores improved more in the year the students were outdoors than in other years in the teacher’s experience.¹⁵ The East Bay Regional Park District in California is working with the University of California, San Francisco Benioff Children’s Hospital in Oakland to provide free transportation, healthy snacks, and outdoor activities for children with chronic diseases and their families to teach about integration of outdoor time.¹⁶ Furthermore, the park has installed visuals of the parks in the clinic as a starting point to talking about outdoor time, and exam rooms are named after regional parks. Safe Routes to School, a national program providing technical assistance and funding to local municipalities, aims to making biking and walking to school safer and fun. In Apex, North Carolina, a walk-to-school coalition began a walking school bus, whereby parents and children meet at a departure point and walk to school together.¹⁷

St. Luke’s Hospital in eastern Pennsylvania partnered with the Delaware and Lehigh Heritage Corridor to form “Get on Your Tail on the Trail” to encourage physical activity on the historic pathway. Under the Affordable Care Act, nonprofit hospitals must conduct community health assessment plans and address the findings. This shift from treating chronic diseases to preventing them has resulted in residents logging > 1.8 million miles of walking, running, and biking on the trail.¹⁸

NATIONAL RECOMMENDATIONS

The 2008 Physical Guidelines for Americans and the National Physical Activity Plan support physical activity for physical and mental health purposes and suggest that adults get at least 150 minutes of moderate activity or 75 minutes of vigorous activity a week, and children be active for at least 1 hour per day.¹⁹,²⁰ In addition, political support from Michelle Obama’s “Let’s Move!” campaign and Surgeon General Vivek Murthy’s “Step it Up: The Surgeon
General’s Campaign to Promote Walking and Walkable Communities,” focus on a national call to get people outdoors and moving. The goals of the Surgeon General’s campaign include making walking a national priority; designing communities that make walking safe for people of all ages and abilities; promoting programs and policies to support walking where people live, learn, work, and play; providing information to encourage walking and walkability; and increasing the quality of data collected on walkability. The current Surgeon General’s commitment to walking can be compared with the Surgeon General C. Everett Koop’s warning on the dangers of smoking as addressing a major public health issues (Figure 1).

This national campaign seeks to encourage transportation planners to focus on safe roadways for walking. It encourages organizations to support walking programs, increase exposure in the media through campaigns to promote walking, and research on the topic by public health professionals. Last, it promotes the assessment by health care providers of physical activity and providing walking counseling to all patients, especially those at risk for chronic disease.

In 2012, the National Park Prescription Initiative (Park Rx), led by the National Park Service and the National Recreation and Park Association, was launched. Park Rx is an innovative and valuable model that can easily be incorporated into any practice setting, both out- and in-patient, and can be tailored specifically to meet the individual lifestyle of the patient or family. It is part of a global public health movement that encourages people to utilize public lands for the public good. Park Rx programs focus on the interprofessional collaboration among health care providers, public land agencies, and communities to utilize existing outdoor space, including trails and parks, for the purpose of improving health. The idea of Park Rx offers a new and low-cost tool to health care providers to promote patients’ steps to improve health care, expose patients and families to nature, and foster the growth of advocates for public lands.

One of the founding members of Park Rx is a community-based pediatrician, Dr. Robert Zarr. With the support of the local Washington, DC American Academy of Pediatrics Chapter, the National Park Service, and the George Washington School of Public Health, Dr. Zarr created a web-hosted database entitled DC Park Rx of over 350 green spaces in the District of Columbia (see Resource Table). This database is considered the “gold standard” of Park Rx programs, as it is linked with the electronic health record of the clinic and can be customized to meet the needs of patients.

Figure 1. US Surgeon General Vivek Murthy prescribing time outdoors on National Park Rx Day, April 22, 2016, at Meridian Hill Park, Washington, DC.

One of the founding members of Park Rx is a community-based pediatrician, Dr. Robert Zarr. With the support of the local Washington, DC American Academy of Pediatrics Chapter, the National Park Service, and the George Washington School of Public Health, Dr. Zarr created a web-hosted database entitled DC Park Rx of over 350 green spaces in the District of Columbia (see Resource Table). This database is considered the “gold standard” of Park Rx programs, as it is linked with the electronic health record of the clinic and can be customized to meet the needs of patients.

According to The Washington Post, the DC Park Rx is the first such tool in the country that allows providers to type a patient’s zip code into their records and retrieve specially tailored summaries and maps. This allows park prescriptions to be integrated into clinical workflows and enables researchers to collect data regarding park prescriptions. The customization can be sorted by location, facilities at each site, and what types of recreational opportunities are present at each site, as well as public transportation routes to get to each facility (see Resource Table).
Prescription Trails in Albuquerque, New Mexico, is another initiative where a health care team has been prescribing time outdoors via a field guide on safe and accessible walking environments. In the pilot project, providers enjoyed prescribing time outdoors and continued after the initial evaluation period concluded.24 Partnerships developed among local park and recreation departments, neighborhood civic groups, and health care providers, indicating the importance and value of health care workers reaching outside of the medical team to address social determinants of health.

All of these efforts recommend low- or no-cost options for time outdoors and removing the financial barriers to exercise that exist in private gyms. The majority of local and state park facilities are free, with minimal costs involved in transportation and parking.

**BUILT ENVIRONMENT AND SOCIOCULTURAL CONSIDERATIONS**

Although the benefits of park prescriptions (Park Rx) are numerous, individuals need motivation and opportunities to make lifestyle changes to benefit their health. The social structure of the built environment and the areas where people play, work, and live are directly related to how much time people spend outdoors. The layout of communities, transportation infrastructure, and access to parks and trails allow individuals to have easy access or barriers to being outdoors. In this framework, nurse practitioners (NPs) can be advocates for sidewalks, lighting in parks, improved park maintenance, and neighborhood safety to strengthen local interest in being outside. “Salud America!”, part of the Robert Wood Johnson Foundation, notes that Latino children have fewer opportunities to engage in physical activities than white children because there are fewer parks and recreation sites in their communities.25 The availability of recreational facilities and parks varies across the country. A study looking at the availability of recreational resources in low socioeconomic and minority areas in the US found access was lower in minority areas, and the authors suggested more equitable access could be achieved by developing

---

**Resource Table. Background Resources and Patient Education Sources for Prescribing Time Outdoors**

<table>
<thead>
<tr>
<th>Organization</th>
<th>Description</th>
<th>Website</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC Park Rx</td>
<td>Community health clinic initiative to tailor outdoor time based on interests and location of patients</td>
<td><a href="http://www.dcparkrx.org/">http://www.dcparkrx.org/</a></td>
</tr>
<tr>
<td>Park Rx</td>
<td>Tools for providers to inspire patients to take steps to improve their health</td>
<td><a href="http://www.parkrx.org/">http://www.parkrx.org/</a></td>
</tr>
<tr>
<td>Safe Routes to School</td>
<td>Programs are sustained efforts by parents; schools; community leaders; and local, state, and federal governments to enable walking and biking to school</td>
<td><a href="http://www.saferoutesinfo.org/">http://www.saferoutesinfo.org/</a></td>
</tr>
<tr>
<td>Let’s Move!</td>
<td>First Lady Michelle Obama’s initiative to solve the problem of obesity; worksheets for children available</td>
<td><a href="http://www.letsmove.gov/">http://www.letsmove.gov/</a></td>
</tr>
<tr>
<td>Step it Up!</td>
<td>Surgeon General Vivek Murthy’s campaign to increase walking and walkable communities</td>
<td><a href="http://www.surgeongeneral.gov/library/calls/walking-and-walkable-communities/">http://www.surgeongeneral.gov/library/calls/walking-and-walkable-communities/</a></td>
</tr>
<tr>
<td>National Environmental Education Foundation</td>
<td>Park Rx forms downloadable in English and Spanish</td>
<td><a href="https://www.neefusa.org/resource/rx-outdoor-activity">https://www.neefusa.org/resource/rx-outdoor-activity</a></td>
</tr>
<tr>
<td>National Park Service</td>
<td>Healthy Parks Healthy People is a global movement that harnesses the power of parks and public lands in contributing to a healthy civil society</td>
<td><a href="https://www.nps.gov/public_health/hphp.htm">https://www.nps.gov/public_health/hphp.htm</a></td>
</tr>
</tbody>
</table>
new parks or opening school facilities to the community to allow for physical activity. Where parks and recreational facilities do exist in low-income areas, they often need improvements to increase safety and neighborhood interest. The quality of parks, as indicated by lighting, benches for rest, bathrooms, trail maintenance, cleanliness, and attention to plants and playground infrastructure, may influence usage. Improving the types and quality of park resources is important for increasing park usage.27 “Salud America!” emphasizes the need for improvements in the built environment so that there is transportation to recreation sites and culturally and linguistically appropriate messaging about healthy living to engage families in the outdoors.25

Social determinants of health, including language, culture, and socioeconomic factors, may inhibit park use for some individuals. Understanding the offerings in each park will allow NPs to engage with patients on an individualized basis, explaining a park with a playground to parents of small children or one with a basketball court for older children. Knowing if there is signage in the language of the target population, clean bathroom facilities, and public transit routes is also helpful. Local concerns by minorities and immigrant populations in areas plagued by racial and ethnic tensions are important to explore with patients, community leaders, and advocacy groups. Partnering with a church or social service agency to hold a Park Rx launch in a local park can help build community partnerships. Local governmental park authorities should be encouraged to produce brochures with photos that reflect the ethnic diversity of the neighborhood.

In Prince George’s County, Maryland, outside of Washington, DC, 69% of adults do not meet the CDC recommendations for physical activity and the county has higher rates of obesity compared with state averages.28 The Maryland National Park and Planning Commission, the governmental agency in charge of the parks, has a goal of decreasing obesity by 10% in 20 years. Numerous park-related activities, including expansion of bike trails, a senior walking program, and yoga in the parks, are being promoted by local safety-net clinics to patients. To reach the obesity reduction goal, the parks department is working alongside clinicians and information technology teams to integrate park databases into electronic health records. It is through these kinds of partnerships that the NP’s role in health promotion can be effectively implemented and expanded.

Thinking broadly, as clinicians prescribe time outdoors, patients are being introduced to the beauty of American public spaces, which will hopefully create new stewards and advocates for parks and park lands, eventually impacting numerous environmental benefits for society as a whole. Human activities have caused environmental changes of epidemic proportions, yet small steps in human activities can be a start to reducing and reversing the profound past changes to the environment. Health care professionals can appreciate how climate change is impacting the health of the planet and its inhabitants, and, as trusted conveyors of information to patients, families, community members, and policymakers, NPs can be in the forefront of explaining the relationships between human health and environmental health to patients and communities.29

NP IMPLICATIONS

NPs are in a unique position to implement the Surgeon General’s walking campaign through counseling, prescribing time outdoors for patients, and setting examples. Health promotion and disease prevention are fundamental aspects of the NP’s role. Recommending time outdoors is not new to nursing. Florence Nightingale’s Notes on Nursing,30 based on her experience nursing the sick during the Crimean War, emphasized fresh air as a common-sense approach to caring for patients. This family-friendly healthy activity aligns with the NP model of holistic and comprehensive care of prevention, wellness, and the whole person—body and mind.

As a start, NPs can begin to ask about exercise and time outdoors along with the more frequently asked prevention and risk assessment questions regarding tobacco and alcohol use, safety, and nutritional habits. Broadly suggesting that patients exercise is something most patients already know and does not engage or support them in what they enjoy doing—playing basketball, dancing, or literally smelling the flowers. Asking about what patients like to do outdoors and following up with an individualized plan can make a deeper patient-provider
connection. A health care team from 11 Kaiser Permanente medical centers in northern California asked patients about exercise during vital sign documentation. Adding exercise as a vital sign gave clinicians an opportunity to address lack of exercise and talk about local exercise and weight-loss programs. The study showed that having clinicians address the need for exercise was correlated with small but significant changes in exercise-related outcomes, a valuable first step in addressing lack of physical activity.31

Numerous resources exist to help NPs engage with patients to recommend behaviors to improve children’s health by getting them outside and moving. Providers faced with the high rates of obesity and other chronic diseases may often focus on what not to do or eat instead of what is positive and possible. The National Wildlife Federation has a simple guide for providers (see Resource Table) to assess time spent outdoors and how much screen time children are exposed to each day. As a way of institutionalizing questions about exercise and playtime, NPs can work with information technology colleagues to embed these questions into an electronic health record. In addition, the National Environmental Education Foundation has downloadable prescription forms in English and Spanish to prescribe time outdoors (see Resource Table).

A valuable lesson in Park Rx is that time in a natural environment has no prescribed amount of time to achieve physical and mental health benefits. NPs can work with patients on goal-setting to make time outdoors part of mutual goal-setting by asking patients how they may integrate outdoor time into their commute, daily routines, and social life. As Surgeon General Dr. Murthy noted, the refills are unlimited.

The growing knowledge that our medical system is not working to curb the obesity tide, combined with the environmental movement, has led to efforts to gain the support of health care providers to simply prescribe time outdoors. “Walk With a Doc,” founded by Ohio cardiologist Dr. David Sabgir, is one effort that focuses on exercise and education about health while walking with a physician. These interactions are intended to empower the participant to continue exercising and improving his or her health. Although this framework is utilized across the country and internationally, the name implies that the physician is the only one that can provide this empowerment. The basics of walking and health education are such that nonclinical team members may also wish to be involved to have more patient interactions. In many communities, community health workers have the greatest ability to provide culturally and linguistically appropriate education to patients and could be the leaders of a walking group. Of course, nurses and NPs are other ideal leaders of such programs where health education can be provided during an active exercise session.

Starting a Park Rx program can be as basic as becoming familiar with local parks and their resources and bus lines, getting park brochures in waiting rooms, and telling patients about the benefits of outdoor time. Furthermore, NPs and the health care team can host outdoor events in parks and lead park activities as part of community outreach efforts and health fairs.

In a world of evidenced-based medicine, tracking and documenting the benefits of time outdoors can be challenging. NPs can track the number of park prescriptions given to patients and continue to follow benchmarks of weight, body mass index, blood pressure, vitamin D level, and glycated hemoglobin and cholesterol levels on those patients, as well as depression screenings, such as the 9-item Patient Health Questionnaire, to determine whether time outdoors has made an impact on overall health and wellness. Increased functionality of patient portals may be able to capture data about the user experience, including how much time was spent outdoors and what activities were conducted. Increased park utilization around clinic settings may also be noted by park and planning agencies when park prescriptions are implemented. Technologies such as social media may be utilized to document where people are spending outdoor time, such as posting a picture of themselves in a park to the agency’s website. Future research opportunities can also look at the specific factors impeding physical activity, including socio-economic status, proximity to safe outdoor spaces, and culturally and linguistically appropriate park resources such as maps and signage.

Even without sophisticated electronic databases, NPs can advocate for increased access to local parks.
particular, NPs in school-based health centers are the entry point for primary care for many school-aged students, and their families can start to engage with school systems for local cost improvements, such as night-time lighting and keeping school playgrounds open during evenings and weekends. As part of ongoing education about the built environment, the spaces where we live, play, and work, NPs can invite local park and recreation agencies to provide information on outdoor activities for clinic settings. Also,

Figure 2. Illustration depicts 7 of the benefits of spending time outdoors in parks.

(Reproduced with permission from artist Daniel Gallant for Environmental Health Perspectives.)
because walking and time outdoors is a simple fix for complicated problems, NPs and the entire health care team can start by prescribing time outdoors for themselves and their team, including walking meetings.

The National Park Service turned 100 in 2015 and the parks are among our nation’s greatest treasures. Numerous green spaces exist throughout our country and NPs can be catalysts for interprofessional teams of providers, support staff, park and recreational facilities staff, park rangers, public health officials, transportation planners, and community activists to shift gears toward engaging patients in being outside. Prevention starts outside the clinic walls, and the solution to many prevalent diseases is looking beyond those walls to the outdoors. This will provide benefits for patients, families, communities, and the providers themselves (Figure 2). JNP

References

11. Ansari A, Pettit K, Gershoff E. Combating obesity in Head Start: outdoor play for patients, families, communities, and the providers...