

White Paper: Identifying Relevant Environmental and Policy Strategies to Increase Physical Activity among Adults with Arthritis

INTRODUCTION

The Arthritis Foundation (AF), with support from the Centers for Disease Control Arthritis Program (CDC) embarked upon a literature review to identify and recommend environmental and policy strategies for improving physical activity among adults with arthritis. This effort is in response to recommendations contained in *A National Public Health Agenda for Osteoarthritis*.

A group of experts, with professional expertise in areas related to physical activity and/or arthritis, reviewed this White Paper by e-mail in January 2011 and proposed recommendations for priority environmental and policy strategies to increase physical activity availability, accessibility, and participation among adults (defined as persons aged 18 and older) living with arthritis. In March 2011, a separate group of invited experts convened to review this White Paper, as well as the proposed recommendations. The second group of experts, based on their professional expertise, contributed to and finalized the proposed list of priority environmental and policy strategies.

The White Paper was written to assist both expert groups in their formulation of recommendations and in their deliberations of the proposed priority environmental and policy strategies. It examines current environmental and policy strategies that may be relevant for adults with arthritis including, but not limited to, policies, activities, initiatives, and interventions. Because there are relatively few policies specific to arthritis and physical activity, this White Paper is a compilation of environmental and policy strategies designed to increase physical activity among persons with disabilities and/or mobility limitations and among older adults. Within these related policy areas, the paper focuses on sectors that are uniquely positioned to implement arthritis-relevant environmental and policy strategies: the park, recreation, fitness, and sport sector; the worksite wellness sector; the built environment sector; the health care sector; and the public health and aging sector.

Public Health Burden of Arthritis

In the United States, arthritis is the most common cause of disability.^{4,5} Currently, 49.9 million American adults (22.2% of the U.S. population) have self-reported doctor-diagnosed arthritis, with 21.1 million adults (9.4% of U.S. population and 42.4% of adults with arthritis) having arthritis-attributable activity limitations (AAAL).⁵ In addition, 33.8% of women and 25.2% of men who are obese report doctor-diagnosed arthritis.⁵ These numbers are on the rise and are expected to increase in the coming years. “With the aging of the U.S. population, even assuming that the prevalence of obesity and other risk factors remain unchanged, the prevalence of doctor-diagnosed arthritis and arthritis-attributable activity limitation (AAAL) is expected to increase significantly by 2030.”^{6,5(p1261)}

Importance of Physical Activity for Adults with Arthritis

Physical activity has many benefits for the management of arthritis: “a delay in the onset of disability; improved physical functioning; enhanced functional independence; improved quality of life, aerobic

capacity, and muscle strength; reduced pain; and a reduction in the risk of other chronic diseases.^{8-18,,19(p1)} Recommendations for the management of arthritis (from clinical treatment guidelines and *A National Public Health Agenda for Osteoarthritis*) have included community-based intervention strategies such as self-management education, increased physical activity, and weight management “to reduce pain and improve physical function and health-related quality-of-life for persons with osteoarthritis.”^{21,,5(p1265)}

Weight management has other benefits as well since “obesity is associated with onset of knee osteoarthritis (the most common type of arthritis), disease progression, disability, total joint replacement, and poor clinical outcomes after knee joint replacement.”^{22,,5(p1264)} “Overweight and obesity are also known to exacerbate many chronic conditions such as hypertension and elevated cholesterol.”^{23,,24(p8)} Among adults with arthritis, “regular physical activity might also contribute to reducing the incidence and progression of other chronic diseases.”^{13,,20(p126)}

Physical activity is one of the ten recommendations in *A National Public Health Agenda for Osteoarthritis*: “Low impact, moderate intensity aerobic physical activity and muscle strengthening exercise should be promoted widely as a public health intervention for adults with OA of the hip and/or knee.”^{26(p2)} The recommended aerobic physical activity for adults,¹ which are based on the *Physical Activity Guidelines for Americans*²⁷, include: “2 hours and 30 minutes a week of moderate-intensity, or 1 hour and 15 minutes (75 minutes) a week of vigorous-intensity aerobic physical activity, or an equivalent combination of moderate- and vigorous-intensity aerobic physical activity. Aerobic activity should be performed in episodes of at least 10 minutes, preferably spread throughout the week.”^{26(p21)} In addition, based on the *Physical Activity Guidelines for Americans*²⁷, it is recommended that muscle strengthening activities should be done on at least 2 days per week^{26(p21)}

Barriers to Physical Activity for Adults with Arthritis

Physical activity has many benefits for persons with arthritis – from reducing pain and improving function to delaying disability – yet “rates of inactivity are higher in persons with arthritis than in those without.”^{28,,29(p616)} This gap is due in large part to a variety of physical, psychological, social and environmental barriers that inhibit physical activity among persons with arthritis, such as the fear of experiencing or worsening pain and the lack of programs or facilities that meet specific needs.

¹Additional information included in the physical activity recommendations in *A National Public Health Agenda for Osteoarthritis*, based on the *Physical Activity Guidelines for Americans*, is as follows: “Additional health benefits are provided by increasing to 5 hours (300 minutes) a week of moderate-intensity aerobic physical activity, or 2 hours and 30 minutes a week of vigorous-intensity physical activity, or an equivalent combination of both.” Also listed is “Special Consideration for People with Chronic Conditions”, which is included below under *Public Health and Aging Sector*. 26. Arthritis Foundation, Centers for Disease Control and Prevention. *A National Public Health Agenda for Osteoarthritis*. www.cdc.gov/arthritis/docs/OAagenda.pdf. www.arthritis.org/osteoarthritis-agenda. Atlanta (GA): Centers for Disease Control and Prevention 2010. (p21). 27. U.S. Department of Health and Human Services. *Physical Activity Guidelines for Americans*. <http://www.health.gov/PAGuidelines/guidelines>.

The hurdles to physical activity are even more challenging for people with limited mobility due to arthritis. These hurdles present an added barrier to physical activity because “while individuals living with arthritis encounter similar community and personal challenges to being physically active as those without arthritis, they navigate their environment with additional physical limitations.”^{30(p410)} Based on the 2009 National Health Interview Survey, 45.3% for persons with arthritis are considered inactive (defined as 0-9 minutes of aerobic physical activity per week) as compared to 36.5% for persons with no arthritis.³¹ To date, few policies and environmental strategies exist that address these barriers and promote physical activity in a way that is safe, accessible and effective for, and inclusive of, adults with arthritis.

Research Methodology

The environmental and policy strategies in this White Paper were compiled from: a systematic literature review; a search of organizations for existing environmental and policy strategies; and input from leaders in the field and experts in related areas. The literature review relied on PubMed searches using selected key terms and combinations to capture publications on policies, barriers and facilitators to physical activity and/or mobility for persons with disabilities and/or arthritis.

Articles from the PubMed searches were excluded from this paper if they addressed only sub-groups of the population (e.g., race, gender, nationality, or age).

Two articles^{27, 28} in this paper resulted from a search containing the following terms: “disability” AND “physical activity” AND “environment” – which returned 43 results. Two articles^{29, 30} in this paper resulted from a search containing the following terms: “disability” AND “built environment” – which returned 20 results. Literature from both of these searches that directly related to barriers and facilitators to physical activity and/or mobility was incorporated into this paper. Also, one article resulted from a search containing the following terms: “built environment” AND “physical activity” AND “arthritis” – which returned 1 result.²⁵ The same article resulted from a search with the terms: “built environment” AND “arthritis”. Articles from these searches were excluded if they did not focus directly on barriers to physical activity for persons with limited mobility and/or disabilities.

Other PubMed searches were conducted but not included because the results were not as relevant to the topic of this White Paper. These searches were intended to find literature on barriers to physical activity and/or mobility for persons with arthritis, limited mobility, and/or disability. Articles from these searches were excluded as they were either not relevant to arthritis, not specific to physical activity or mobility, did not address barriers and facilitators to physical activity, only addressed specific demographics or subgroups of the population, or were duplicative of other searches.

Articles from a search on “disability” AND “physical activity” AND “chronic disease,” that were not specific to arthritis were not included, as physical activity recommendations for persons with other chronic diseases could vary from physical activity recommendations for persons with arthritis. Only 17 of the 156 articles returned were relevant to arthritis and were excluded for reasons mentioned above. Similarly, results from searches with the terms: “arthritis” AND “physical activity” AND “disability,” which returned 97 results; “physical activity” AND “disability” AND “physical environment,” which

returned one result; “physical activity” AND “built environment” AND “disability,” which returned two results; “environment” AND “arthritis” AND “physical activity,” which returned 9 results; and “physical environment” AND “arthritis,” which returned 5 results, were all excluded for reasons mentioned above. A search for “physical environment” AND “arthritis” AND “physical activity” returned zero results. A search for “physical activity” AND “arthritis” (493 results), was narrowed to search for relevant sources. When narrowed to include “mobility” the search returned 26 results, and when narrowed instead to include “barrier” the search returned 7 results, all of which were excluded for reasons mentioned above.

Sources were also included from a search of organizations for existing policies and environmental strategies, including both national and state organizations.³¹⁻⁴⁵ Additional sources in this paper were provided by experts in arthritis and related areas who were involved with this project^{2, 15, 19-21, 24, 26, 46-49} or were cited in sources included in this paper^{1, 3-14, 16-18, 22, 23, 50-56}.

BARRIERS AND FACILITATORS

The barriers and facilitators to physical activity for persons with arthritis are both perceived and objective. An understanding of these barriers and facilitators can shape the policy and environmental strategies that are viewed as priorities to increase physical activity for persons with arthritis. It can also help identify existing policies that might serve as models for new policies specific to arthritis. The barriers and facilitators in this White Paper are grouped by the following categories: physical, psychological, social, and environmental.

Barriers	Facilitators
<p><i>Physical barriers</i>^{29(p618)}</p> <ul style="list-style-type: none"> • Pain – including occurrence of pain preventing exercise, pain experienced during exercise, and pain experienced after exercise • Fatigue – including fatigue related to medication, insomnia, and depression • Mobility – impaired mobility is a major challenge to exercise • Comorbid conditions –including conditions ranging from musculoskeletal to cardiovascular ailments 	<p><i>Physical facilitators</i>^{29(p622, 625)}</p> <ul style="list-style-type: none"> • Symptom management – including reduction of pain, stiffness and fatigue • Mobility and function – increased ability to move and function due to exercise • Strength and flexibility – including increased flexibility from yoga and being more limber from swimming • Weight loss – benefits for persons with arthritis due to exercise
<p><i>Psychological barriers</i>^{29(p618, 622)}</p> <ul style="list-style-type: none"> • Attitudes and beliefs – including lack of time, motivation, and enjoyment of exercise • Fear – including fear of experiencing or worsening pain and fear of water preventing participation in water aerobics • Perceived negative outcomes – including negative outcomes that might result from pushing beyond one’s limits 	<p><i>Psychological facilitators</i>^{29(p625)}</p> <ul style="list-style-type: none"> • Independence related reasons as motivators to exercise – including not having to be in a wheelchair, not having to go to a nursing home, and being able to remain “self-sufficient” • Attitudes and beliefs – including self-confidence, feeling of accomplishment, and an overall improved attitude towards the disease • Emotional benefits – including stress relief,

	<p>relaxation, improved mood, and helping to forget about pain</p> <ul style="list-style-type: none"> • Enjoyment – including liking exercise and having fun while exercising • Behavioral facilitator – including being internally motivated to exercise
<p><i>Social barriers</i>^{29(p622)}</p> <ul style="list-style-type: none"> • Lack of support – including not having support from family, friends, and health care providers (failure to mention exercise, not referring patients to helpful exercise programs, or not instructing patients how to exercise properly) • No one to exercise with – without exercise partners, frequency of exercise decreased • Competing role responsibilities – including feelings of responsibility to one’s family 	<p><i>Social facilitators</i></p> <ul style="list-style-type: none"> • Social interaction – including “the enjoyment of exercising with others and the positive social interaction of being around others who exercise”^{29(p625)} • Support from health care providers – if training and assistance is provided to health care providers (to provide guidance in prescribing exercise)⁵⁷, they could provide support to persons with arthritis through exercise recommendations and specific referrals^{29(p626)}
<p><i>Environmental barriers</i></p> <ul style="list-style-type: none"> • Lack of programs or facilities – including few programs or facilities that meet specific needs and lack of qualified instructors^{29(p622)} • Environmental conditions – including hot and cold weather, rain, congested parking, concrete surfaces, and presence of dogs^{29(p622)} • Cost—for both current exercisers and non-exercisers^{29(p622)} • Transportation – including lack of transportation to facilities or programs^{29(p622)} • Exercise y barriers – including lack of curb cuts, inaccessible access routes, lack of elevators, slippery floors, absence of hand rails on stairs, lack of adaptive and/or accessible equipment, paying the same membership even though the facility is not fully accessible, and poor equipment maintenance^{62 (p421-2)} <ul style="list-style-type: none"> • Park and recreational center barriers –lack of accessibility due to “challenge of complying with ADA guidelines while preserving the natural surroundings of parks and trails”^{62(p422)} • Public space barriers – including no safe curb cuts, damaged sidewalks, no sidewalks, terrain too steep a grade or slope, unsafe neighborhoods, poor weather 	<p><i>Environmental facilitators</i></p> <ul style="list-style-type: none"> • Instructors and availability of programs – instructors who understand issues related to arthritis and the availability of exercise programs that are safe and accessible for people with arthritis, including water-based exercise^{29(p625)} • Tailoring of programs – incorporating pain management skills into an exercise program and teaching people how to modify their exercise routines according to their symptoms^{19(p7)} • Exercise facility facilitators – including non-slip mats in locker rooms, adequate number of accessible parking spaces, push-button operated doors, zero-depth entry pools, and family changing rooms^{62(p421)} • Exercise equipment facilitators – including Velcro straps to allow individuals with disabilities to grip exercise equipment, pool water chairs, and upper-body aerobic exercise equipment^{62(p422)}

causing slippery or impassible sidewalks, insufficient number of benches along a trail for people who need frequent rest periods, and poorly designated signage ^{(p2022)62,63}	
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RELEVANT ENVIRONMENTAL AND POLICY STRATEGIES

This section presents an inventory of relevant environmental and policy strategies that would, in various ways, address or relate to these barriers and facilitators. The environmental and policy strategies are organized by five sectors that could influence and impact physical activity among people with arthritis.

Park, Recreation, Fitness, and Sport Sector

Many policy recommendations have been issued to address barriers and facilitators for persons with limited mobility and/or disabilities. Within this sector, policies to impact accessibility for persons with limited mobility and/or disabilities should consider the following barriers and deficiencies addressed in *Accessibility of Health Clubs for People with Mobility Disabilities and Visual Impairments*²: built environment, equipment, information, internal policies, swimming pools, and professional behavior (attitudes and knowledge).^{63(p2022)}

Below are examples of policy and environmental strategy recommendations from The National Center on Physical Activity and Disability:⁴⁰⁻⁴²

- Fewer pieces of equipment that are more spread out so users have a choice of getting on the equipment from the right or left side and more space to place a mobility device
- More space between the equipment and the wall to allow adequate room to get on the equipment
- Clear paths to the equipment to prevent any impediments to access
- No minimum speed on cardiovascular equipment so equipment can be used at any desired speed
- Classes that an instructor can adapt for a person with restricted mobility
- A facility that is accessible by both stairs and elevators
- No heavy doors and/or closets that can be a problem for people with strength difficulties
- Areas of additional seating for people who might need periodic rest

² *Accessibility of Health Clubs for People with Mobility Disabilities and Visual Impairments* listed questions that could be used to identify barriers and the need for additional policies: “Is the accessibility of the facility regularly reviewed?” “Can a consumer’s personal assistant be allowed to enter the facility without incurring additional charges?” “Do staff members make eye contact when speaking to customers?” “Do staff members ask consumers whether they need assistance before attempting to help them?” “Are pool lift controls accessible from the deck level?” and “Does the pool have a ledge to hold onto when entering the water?”⁶³. Rimmer JH, Riley B, Wang E, Rauworth A. Accessibility of health clubs for people with mobility disabilities and visual impairments. *Am J Public Health* 2005;95(11):2022-8. (p.2023).

- No door knob handles that may be difficult for people who lack hand dexterity
- Sufficient handle bars on equipment to add stability to all types of equipment
- Seats on stationary bicycles that provide adequate back support and allow users with back problems to use the equipment safely

Environmental and policy recommendations are critical, as they can put in place facilitators³ for physical activity that most fitness facilities are unlikely to have.^{63(p2024)} Another set of policies and recommendations that addresses barriers and facilitators to physical activity is found within the concept of Universal Design⁴. “Universal Design considers how the built environment and products can be used to the greatest extent possible by everyone, regardless of age or ability.”^{43(p2)} Universal Design is an inclusive approach, as it takes into consideration access for all users, so that all persons will benefit from increased access.⁴³

In addition to having classes and equipment that can be adapted for persons with arthritis, it is important that facilities also “train staff to modify the various exercises and equipment for different ability levels.”^{43(p5)} Modifications should consider each individual’s limits. It is difficult to tailor exercises and equipment to arthritis generally, and many persons with arthritis have stated that “exercise programs have to be tailored to the individual, and the type, frequency, intensity, and duration of recommended exercise was dependent on the person and the severity, type, and location of the arthritis.”^{53(p740)} It is important that fitness professionals and health professionals are trained to tailor exercise programs to individuals and “explicitly tell people who have developed arthritis how to modify their approach to exercise (e.g., by changing intensity, frequency, or type) in order to prevent pain or other negative outcomes.”^{48(p742)}

Sports facilities, which are often found at parks and recreation centers, school playgrounds and other school facilities, and community centers, is another place where policies and recommendations can be put in place to address barriers and facilitators. The Americans with Disabilities Act (ADA) Standards for

³ Based on *Accessibility of Health Clubs for People with Mobility Disabilities and Visual Impairments*, facilitators that most fitness facilities are unlikely to have include: access routes and curb cuts with a running slope below the ADA recommended limits, power-assisted or push-button operated doors, access routes free from cracks, gaps, and raised edges, hand-held showerhead units, and obstacle-free paths to lockers.⁶³ Ibid. (p2024)

⁴ Universal design suggestions from the North Carolina Office on Disability and Health include: weather protection at front doors, power door openers at exterior entrances, extra space at the end of a row of exercise equipment, extra chairs to accommodate persons who would like to participate in aerobics while seated, and uncluttered pool decks safe for people with mobility aids. Their suggestions for steps to improve equipment at fitness centers include: use of equipment with small weight increments, use of equipment that is easy to enter and exit, wider seats and benches for people who need extra surface to maintain balance, use of equipment that offers exercise for both arms and legs, use of treadmills with low MPH settings, and use of weights with different grips and weights.⁴³ North Carolina Office on Disability and Health (2008). *Removing Barriers to Health Clubs and Fitness Facilities*. <http://www.fpg.unc.edu/~ncodh/pdfs/rbfitness.pdf>. Chapel Hill (NC): FPG Child Development Institute 2008. (p.9, 27).

Accessible Design⁵ governs the construction and alteration of “places of public accommodation, commercial facilities, and state and local government facilities.”³² ADA Standards for Accessible Design (2010) was adopted by the Department of Justice (DOJ) in September 2010; after March 15, 2012, the 2010 Standards must be met for a facility to be compliant.³² However, DOJ is allowing immediate use of the 2010 standards as an alternative to the 1991 standards.³² The amendments to the ADA Standards for Accessible Design increase accessibility to sports and fitness facilities for persons with limited mobility and/or disabilities. Below is a highlight of the current 2010 Standards for Accessible Design as it applies to sports facilities, as provided by Access Board.³³

- Accessible routes for court sports are required to connect both sides of the court, i.e.. allowing easy access for changing sides of a tennis court.
- For ground surfaces in areas of sports activity, requirement that ground and floor surfaces along accessible routes be stable, firm, and slip resistance.
- Benches must have back support that is 42 inches minimum in length and that extends from a point 2 inches maximum above the seat to a point 19 inches minimum above the bench.
- Where installed in wet locations, benches must be slip-resistant and shall not accumulate water.
- At least 2 means of entry must be provided for each public or common use swimming pool (some exceptions apply). A sloped entry or lift must be one of the primary means of access.
- Handrails must be provided for means of entry to swimming pool and must comply with requirements.

Worksite Wellness Sector

Worksite wellness programs often provide access to a fitness facility and/or provide fitness classes. Because of this, the literature for the park, recreation, fitness and sport sector also yields findings that may apply to worksite wellness fitness facilities and classes. Below are additional policy recommendations pulled from the literature which address persons with limited mobility and/or disabilities for worksite wellness programs. These recommendations are adapted from the New York State Department of Health “Move for Life!” campaign and include:⁴²

- Addressing the needs of all employees regardless of their physical limitations;
- Ensuring that settings and facilities where programs are offered are accessible and safe;
- Encouraging “on-site wellness program coordinators and health care professionals to routinely talk to employees with disabilities about the program’s benefits”; and
- Encouraging program facilitators to learn how to adapt exercises and programs to persons with disabilities and/or chronic pain conditions and become familiarized with adapted equipment for persons with disabilities and/or limited mobility.

⁵ Relevant statute: ADA Standards for Accessible Design (2010) Chapters 1-10.32. Access Board. Department of Justice's ADA Standards for Accessible Design (2010). <http://www.access-board.gov/ada-aba/ada-standards-doj.cfm>. Accessed October 13, 2010.

Worksite wellness programs can also serve as an information channel for increasing physical activity. Within worksite wellness programs, there has been strong evidence of effectiveness for the use of community-wide campaigns to increase physical activity, individually-adapted health behavior change programs that teach specific behavioral skills to increase physical activity, and providing access to places for physical activity along with outreach activities—. ⁴⁹ However, it is important when implementing any worksite wellness program, to make sure that there is compliance with applicable disability and health privacy laws, such as HIPPA and ADA. ⁴⁵

Built Environment Sector

Many of the barriers and facilitators noted above are directly linked to the built environment. Policies for improving public spaces and access to public transportation could contribute to increased physical activity among adults with arthritis. Policy recommendations for increasing physical activity among older persons and persons with limited mobility and/or for reducing mobility disability from “Mobility Disability and Urban Built Environment” include: ^{64(p507, 512)}

- If street quality could be improved, even somewhat, for those adults at greatest risk for disability in outdoor mobility, the disablement process could be slowed or even reversed.
- Pedestrian oriented designs (e.g. continuous, barrier-free sidewalks, four-way stop signals, adequate street lighting, and pedestrian amenities) have been shown to be positively associated with physical activity and negatively related to obesity.
- Curb cuts (depressed curbs that act as ramps in sidewalks), smooth pavement, and barrier-free sidewalks are some of the environmental characteristics that can easily prevent mobility disability and promote independence in adults at greatest risk, such as those with underlying weakness in movement-related functions and balance.
- Sidewalk repair or the provision of pedestrian amenities can reduce mobility disability almost immediately for someone who was previously unable to navigate outside independently because of impaired gait or balance.

The National Association of Area Agencies on Aging has also looked at how built environment can pose many challenges for older adults and persons with limited mobility, and specifically how this can decrease their involvement in their communities. From this perspective, some added barriers include: ^{38(p2)}

- A lack of affordable and appropriate housing options
- Few opportunities for walking, bicycling, or other forms of physical activity, making it more difficult to remain healthy and engaged
- Inadequate mobility options
- Limited information about available health and supportive services in their community
- Concerns about the safety and security of the community.

Transportation services also make accommodations for persons with disabilities and/or limited mobility and comply with the ADA. ⁴⁴ As with fitness facilities and senior centers, Universal Design again provides

recommendations to increase access for all people. Universal Design recommendations for transportation include:^{36(p1,2)}

- Increase the time both between fare payment and opening of turnstiles and between opening and closing of turnstiles⁶⁰
- Consider vehicles that have low floors, high ceilings, and wide door openings for easy entering and exiting⁶¹
- Make sure that a signal indicating that forward movement is safe, holds long enough so people who cannot move fast have enough time to cross the street⁵⁸
- Install automated bridge plates to eliminate the gaps between trains and boarding surfaces.⁵⁵

Public Health and Aging Sector

The role of the public health and aging sector is to promote physical activity among constituencies in a way that is safe and effective for, and inclusive of, adults with arthritis. Public health professionals and practitioners often rely on the evidence-based approaches for increasing physical activity provided in *The Guide to Community Preventive Services*, including informational approaches, behavioral and social approaches, and environmental and policy approaches to increasing physical activity.⁵⁴

Recommendations for arthritis-specific interventions that are evidence-based can be found in *A National Public Health Agenda for Osteoarthritis*, as well as the *Physical Activity Guidelines for Americans*.^{26, 27} With regards to the *Physical Activity Guidelines for Americans*, it is also important to note the recommended special considerations for people with chronic conditions, which state that “any activity is better than none (as) adults with chronic conditions obtain important health benefits from regular physical activity; when adults with chronic conditions do activity according to their abilities, physical activity is safe; and adults with chronic conditions should be under the care of healthcare providers (as) people with chronic conditions and symptoms should consult their healthcare providers about the types and amounts of activity appropriate for them.”^{27,26(p21)}

With regards to aging services and senior centers, “research shows that modifying a community’s physical environment to ensure access to appropriate exercise venues and address barriers to walking may increase the physical activity of older adults.”^{52(p12)} Discussions above in the *Park, Recreation, Fitness, and Sport Sector* and the *Built Environment Sector* would also be relevant here for aging services and senior centers. In addition, specific policy recommendations to increase the functional ability of older adults based on “Aging, Disability, and Frailty: Implications for Universal Design” are applicable and include ensuring:^{30(p116)}

- Adequately wide doors of 32-36” width with thresholds ¼” or shorter,
- Lever door handles,
- Low level loop carpet or hard surface flooring (non slip, non glare),
- Contrasting color values between floor and baseboard or furniture,
- No steep entry,
- Handrails on both sides of stairs, and
- Adequate night lighting for safe walking.

Opportunities also exist for senior centers and facilities that house older adults to promote evidence-based disease management and health promotion activities.³⁸

Health Care Sector

Policies can be used to promote physical activity by supporting health care providers' and insurers' efforts to assess current physical activity levels, counsel patients on physical activity, and recommend and refer patients to community-based physical activity programs, including chronic disease self management programs. Insufficient advice from health care providers is viewed as a barrier to exercise for persons with arthritis, as "advice from their physicians often lacked concrete details on the type, frequency, or intensity of exercise that is appropriate for people with arthritis."^{19(p4)} Policies for health care providers and insurers to promote and offer detailed advice about physical activity could address this barrier. These policies could make an impact since "physician-based counseling efforts that include written materials and behavioral strategies have been shown to be effective at increasing physical activity."^{56, 59, 19(p7)}

The following are policies that health care providers could follow to promote physical activity based on the "Active Aging Toolkit:"³⁷

- Assess current physical activity levels of patients
 - Routinely ask patients during their history or physical if they are currently physically active and assess barriers/facilitators to activity.³⁴
 - Determine if the patient is meeting the recommended levels of physical activity based on the 2008 Physical Activity Guidelines for Americans.
 - For sedentary individuals who are reluctant to change, assess patient fears about physical activity.
- Counsel patients on physical activity
 - Provide concrete and consistent information, make recommendations that are clear and consistent, and recognize obstacles that people face in beginning and maintaining a physical activity program. Make appropriate referrals to physical/occupational therapy or community-based programs appropriate for people with arthritis.
 - Encourage inactive patients to talk with someone who is active, review the benefits of physical activity, and see how the benefits pertain to them
 - Emphasize role of physical activity in being able to perform functional daily activities and in the prevention and management of chronic disease
- Recommend patients increase physical activity
 - Emphasize a change in lifestyle and daily behavior to recognize opportunities for physical activity, such as: walk or ride a bike rather than driving, walk the dog, take the stairs instead of the elevator, begin hobbies requiring physical activity (gardening or hiking), incorporate light physical activity into daily routines, and participate in physical activities with grandchildren.
 - Use a pedometer to motivate increased daily activity levels.

- Encourage patients that any activity is better than none. The goal for people with arthritis is to do 150 minutes per week of at least moderate intensity aerobic activity and to do muscle strengthening exercises at least 2 days per week. Aerobic activity can be broken down into 10 minute sessions. Working up to 30 minutes per day for at least 5 days per week will meet recommendations.
- Prescribe individualized programs based on individual goals that incorporate cardiovascular, strength, flexibility, and balance activities.
- Refer patients to local community resources such as senior centers, medical fitness facilities, or university aging centers with evidence-based, structured physical activity programs.

Exercise is Medicine, from the American College of Sports Medicine, also contains relevant guidance. It specifies “physical activity to be considered by all health care providers as a vital sign in every patient visit, and that patients are effectively counseled and referred as to their physical activity and health needs thus leading to overall improvement in the public's health and long-term reduction in healthcare cost.”³⁴ Also, included is a Health Care Providers’ Action Guide, a checklist, and an exercise prescription and referral form.³⁵

CONCLUSION

Existing policies to increase physical activity among persons with disabilities, limited mobility, and older adults can be instructive when considering policies to increase physical activity for adults with arthritis. The priority environmental and policy strategies that result from this project should ideally be targeted towards the sectors with the greatest potential impact. These sectors could include: the park, recreation, fitness, and sport sector; the worksite wellness sector; the built environment sector; the health care sector; and the public health and aging sector. Priority environment and policy strategies should also take into account interventions at varying levels: “upstream interventions (that) involve policy approaches that can affect large populations through regulation, increased access, or economic incentives,” “midstream interventions (that) occur within organizations,” and “downstream interventions, which often involve individual-level behavioral approaches for prevention or disease management.”^{2(p1)} With the White Paper as a guide, it is envisioned that a feasible, evidence-based set of environmental and policy strategies will be developed to ultimately increase physical activity among adults with arthritis.

Endnotes

1. Centers for Disease Control and Prevention. Arthritis Meeting the Challenge: At a Glance 2011. <http://www.cdc.gov/chronicdisease/resources/publications/aag/pdf/2011/Arthritis-AAG-2011-508.pdf>. Accessed March 8, 2011:1-4.
2. Brownson RC, Seiler R, Eyster AA. Measuring the impact of public health policy. *Prev Chronic Dis* 2010;7(4):A77.
3. U.S. National Physical Activity Plan. <http://www.physicalactivityplan.org/NationalPhysicalActivityPlan.pdf>. Accessed February 23, 2011.
4. Centers for Disease Control and Prevention. Prevalence and Most Common Causes of Disability Among Adults--United States, 2005. *MMWR Morb Mortal Wkly Rep* 2009;58(16):421-6.
5. Centers for Disease Control and Prevention. Prevalence of doctor-diagnosed arthritis and arthritis-attributable activity limitation --- United States, 2007-2009. *MMWR Morb Mortal Wkly Rep* 2010;59(39):1261-5.
6. Hootman JM, Helmick CG. Projections of US prevalence of arthritis and associated activity limitations. *Arthritis Rheum* 2006;54(1):226-9.
7. Centers for Disease Control and Prevention. Arthritis Comorbidities. http://www.cdc.gov/arthritis/data_statistics/comorbidities.htm Source: 2007 National Health Interview Survey. Accessed March 7, 2011.
8. Arthritis Foundation, Association of State and Territorial Health Officials, Centers for Disease Control and Prevention. National Arthritis Action Plan: a public health strategy. *Atlanta (GA): Centers for Disease Control and Prevention* 1999.
9. Ettinger WH, Jr., Burns R, Messier SP, et al. A randomized trial comparing aerobic exercise and resistance exercise with a health education program in older adults with knee osteoarthritis. The Fitness Arthritis and Seniors Trial (FAST). *JAMA* 1997;277(1):25-31.
10. Friedenreich CM. Physical activity and cancer prevention: from observational to intervention research. *Cancer Epidemiol Biomarkers Prev* 2001;10(4):287-301.
11. Hakkinen A, Sokka T, Kotaniemi A, Hannonen P. A randomized two-year study of the effects of dynamic strength training on muscle strength, disease activity, functional capacity, and bone mineral density in early rheumatoid arthritis. *Arthritis Rheum* 2001;44(3):515-22.
12. Hall J, Skevington SM, Maddison PJ, Chapman K. A randomized and controlled trial of hydrotherapy in rheumatoid arthritis. *Arthritis Care Res* 1996;9(3):206-15.
13. Messier SP, Royer TD, Craven TE, O'Toole ML, Burns R, Ettinger WH, Jr. Long-term exercise and its effect on balance in older, osteoarthritic adults: results from the Fitness, Arthritis, and Seniors Trial (FAST). *J Am Geriatr Soc* 2000;48(2):131-8.
14. Minor MA. Physical activity and management of arthritis. *Ann Behav Med* 1991;13(3):117-124.
15. Penninx BW, Messier SP, Rejeski WJ, et al. Physical exercise and the prevention of disability in activities of daily living in older persons with osteoarthritis. *Arch Intern Med* 2001;161(19):2309-16.
16. Rossy LA, Buckelew SP, Dorr N, et al. A meta-analysis of fibromyalgia treatment interventions. *Ann Behav Med* 1999;21(2):180-91.
17. U.S. Department of Health and Human Services. Physical activity and health: a report of the Surgeon General. *Atlanta (GA): National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, U.S. Department of Health and Human Services* 1996.
18. van Baar ME, Assendelft WJ, Dekker J, Oostendorp RA, Bijlsma JW. Effectiveness of exercise therapy in patients with osteoarthritis of the hip or knee: a systematic review of randomized clinical trials. *Arthritis Rheum* 1999;42(7):1361-9.

19. Der Ananian C, Wilcox S, Saunders R, Watkins K, Evans A. Factors that influence exercise among adults with arthritis in three activity levels. *Prev Chronic Dis* 2006;3(3):A81 (PDF 1-16).
20. Der Ananian C, Wilcox S, Watkins K, Saunders R, Evans AE. Factors associated with exercise participation in adults with arthritis. *J Aging Phys Act* 2008;16(2):125-43.
21. Zhang W, Nuki G, Moskowitz RW, et al. OARSI recommendations for the management of hip and knee osteoarthritis: part III: Changes in evidence following systematic cumulative update of research published through January 2009. *Osteoarthritis Cartilage* 2010;18(4):476-99.
22. Anandacoomarasamy A, Caterson I, Sambrook P, Fransen M, March L. The impact of obesity on the musculoskeletal system. *Int J Obes (Lond)* 2008;32(2):211-22.
23. NIH NHLBI. Clinical guidelines on the identification, evaluation, and treatment of overweight and obesity in adults. *U.S. Department of Health and Human Services, Public Health Service* 1998:12-13.
24. U.S. Department of Health and Human Services. The Surgeon General's call to action to prevent and decrease overweight and obesity. *Rockville (MD): U.S. Department of Health and Human Services, Public Health Service, Office of the Surgeon General* 2001:v-60.
25. Messier SP, Loeser RF, Miller GD, et al. Exercise and dietary weight loss in overweight and obese older adults with knee osteoarthritis: the Arthritis, Diet, and Activity Promotion Trial. *Arthritis Rheum* 2004;50(5):1501-10.
26. Arthritis Foundation, Centers for Disease Control and Prevention. A National Public Health Agenda for Osteoarthritis. www.cdc.gov/arthritis/docs/OAagenda.pdf. www.arthritis.org/osteoarthritis-agenda. *Atlanta (GA): Centers for Disease Control and Prevention* 2010.
27. U.S. Department of Health and Human Services. Physical Activity Guidelines for Americans. <http://www.health.gov/PAGuidelines/guidelines>.
28. Hootman JM, Macera CA, Ham SA, Helmick CG, Sniezek JE. Physical activity levels among the general US adult population and in adults with and without arthritis. *Arthritis Rheum* 2003;49(1):129-35.
29. Wilcox S, Der Ananian C, Abbott J, et al. Perceived exercise barriers, enablers, and benefits among exercising and nonexercising adults with arthritis: results from a qualitative study. *Arthritis Rheum* 2006;55(4):616-27.
30. Martin KR, Schoster B, Shreffler JH, Meier A, Callahan LF. Perceived barriers to physical activity among North Carolinians with arthritis: findings from a mixed-methodology approach. *N C Med J* 2007;68(6):404-12.
31. Centers for Disease Control and Prevention -- Unpublished Data. Prevalence of leisure-time physical activity and muscle strengthening activity among adults with and without arthritis. *Source: 2009 National Health Interview Survey*.
32. Access Board. Department of Justice's ADA Standards for Accessible Design (2010). <http://www.access-board.gov/ada-aba/ada-standards-doj.cfm>. *Accessed October 13, 2010*.
33. Access Board. Accessible Sports Facilities. <http://www.access-board.gov/recreation/guides/sports.htm>. *Accessed October 13, 2010*.
34. American College of Sports Medicine -- Exercise is Medicine. About Exercise is Medicine. <http://exerciseismedicine.org/about.htm>. *Accessed November 12, 2010*.
35. American College of Sports Medicine -- Exercise is Medicine. Health Care Providers' Action Guide. http://exerciseismedicine.org/documents/HCProActionGuide_LQ.pdf. *Accessed November 12, 2010*.
36. Easter Seals Project ACTION, Rehabilitation Engineering Research Center on Accessible Public Transportation (RERC-APT) at Carnegie Mellon University and the University of Buffalo. Universal Design & Accessible Transit Systems: Facts to Consider when Updating or Expanding your Transit

System.

http://projectaction.easterseals.com/site/DocServer/Universal_Design___Transit_FactSheet.pdf?docID=107284. Accessed November 12, 2010.

37. First Step to Active Health. The Active Aging Toolkit: Promoting Physical Activity in Older Adults, Healthcare Provider Manual.

<http://www.firststeptoactivehealth.com/downloads/files/providerman-inorder.pdf>. Accessed October 13, 2010:1-11.

38. National Association of Area Agencies on Aging. A Blueprint for Action: Developing a Liveable Community for All Ages. <http://www.n4a.org/files/programs/livable-communities/blueprint-for-action.pdf>. Accessed October 13, 2010:1-74.

39. National Association of States United for Aging and Disabilities. National Association of States United for Aging and Disabilities's Policy Priorities.

http://www.nasudad.org/federal_policy/index.html. Accessed October 13, 2010.

40. National Center on Physical Activity and Disability. Before & After a Fitness Center Makeover. <http://www.ncpad.org/get/fitnessCenter/index.html>. Accessed October 13, 2010.

41. National Center on Physical Activity and Disability. Exercise/Fitness: Choosing a Fitness Center. http://www.ncpad.org/exercise/fact_sheet.php?sheet=359§ion=2130. Accessed October 13, 2010.

42. National Center on Physical Activity and Disability. Virtual Tour: Equipment Index. <http://www.ncpad.org/get/VirtualTour/Equipment.html>. Accessed October 13, 2010.

43. North Carolina Office on Disability and Health (2008). Removing Barriers to Health Clubs and Fitness Facilities. <http://www.fpg.unc.edu/~ncodh/pdfs/rbfitness.pdf>. Chapel Hill (NC): FPG Child Development Institute 2008.

44. U.S. Department of Labor's Office of Disability Employment Policy -- Disability.gov. Transportation Accessibility Tools and Guidelines.

http://www.disability.gov/transportation/accessibility_tools_%26_guidelines. Accessed November 12, 2010.

45. William Mitchell College of Law PHLC. Worksite Wellness and the Americans with Disabilities Act Medical Information. <http://www.publichealthlawcenter.org/sites/default/files/resources/shipfs-ww-adamedinfo-2010.pdf>. Accessed December 29, 2010.

46. Centers for Disease Control and Prevention. Physical Activity for Everyone.

<http://www.cdc.gov/physicalactivity/everyone/guidelines/adults.html#Aerobic>. Accessed March 7, 2011.

47. Tilden HM, Reicherter AE, Reicherter F. Use of an Aquatics Program for Older Adults With Osteoarthritis From Clinic to the Community. *Topics in Geriatric Rehabilitation* 2010;26(2):128-139.

48. Task Force on Community Preventive Services. Recommendations for worksite-based interventions to improve workers' health. *Am J Prev Med* 2010;38(2 Suppl):S232-6.

49. Pronk NP. Physical activity promotion in business and industry: evidence, context, and recommendations for a national plan. *J Phys Act Health* 2009;6 Suppl 2:S220-35.

50. Soler RE, Leeks KD, Razi S, et al. A systematic review of selected interventions for worksite health promotion. The assessment of health risks with feedback. *Am J Prev Med* 2010;38(2 Suppl):S237-62.

51. Pronk NP, Kottke TE. Physical activity promotion as a strategic corporate priority to improve worker health and business performance. *Prev Med* 2009;49(4):316-21.

52. Centers for Disease Control and Prevention, The Merck Company Foundation. The State of Aging and Health in America 2007. www.cdc.gov/aging. www.merck.com/cr. Whitehouse Station (NJ): The Merck Company Foundation 2007:1-36.

53. Der Ananian CA, Wilcox S, Abbott J, et al. The exercise experience in adults with arthritis: a qualitative approach. *Am J Health Behav* 2006;30(6):731-44.
54. Zaza S, Harris KW, Briss PA, Task Force on Community Preventive Services (U.S.). The guide to community preventive services : what works to promote health? New York: Oxford University Press; 2005.
55. Access Board. Draft revisions to the ADA accessibility guidelines for buses and vans. <http://www.access-board.gov/vguidedraft.htm>. Accessed December 29, 2010.
56. Fontaine KR, Bartlett SJ, Heo M. Are health care professionals advising adults with arthritis to become more physically active? *Arthritis Rheum* 2005;53(2):279-83.
57. Lambert BL, Butin DN, Moran D, et al. Arthritis care: comparison of physicians' and patients' views. *Semin Arthritis Rheum* 2000;30(2):100-10.
58. Mitchell C. Pedestrian mobility and safety - A key to independence for older people. *Topics in Geriatric Rehabilitation* 2006;22(1):45-52.
59. Petrella RJ, Lattanzio CN. Does counseling help patients get active? Systematic review of the literature. *Can Fam Physician* 2002;48:72-80.
60. Rehabilitation Engineering Research Center on Accessible Public Transportation (RERC-APT) at Carnegie Mellon University and the University of Buffalo -- Unpublished Data. Cited in "Universal Design & Accessible Transit Systems: Facts to Consider when Updating or Expanding your Transit System": http://projectaction.easterseals.com/site/DocServer/Universal_Design___Transit_FactSheet.pdf?docID=107284.
61. United Spinal Association. Cited in "Universal Design & Accessible Transit Systems: Facts to Consider when Updating or Expanding your Transit System": http://projectaction.easterseals.com/site/DocServer/Universal_Design___Transit_FactSheet.pdf?docID=107284.
62. Rimmer JH, Riley B, Wang E, Rauworth A, Jurkowski J. Physical activity participation among persons with disabilities: barriers and facilitators. *Am J Prev Med* 2004;26(5):419-25.
63. Rimmer JH, Riley B, Wang E, Rauworth A. Accessibility of health clubs for people with mobility disabilities and visual impairments. *Am J Public Health* 2005;95(11):2022-8.
64. Clarke P, Ailshire JA, Bader M, Morenoff JD, House JS. Mobility disability and the urban built environment. *Am J Epidemiol* 2008;168(5):506-13.
65. White DK, Jette AM, Felson DT, et al. Are features of the neighborhood environment associated with disability in older adults? *Disabil Rehabil* 2010;32(8):639-45.
66. Crews DE, Zavotka S. Aging, disability, and frailty: implications for universal design. *J Physiol Anthropol* 2006;25(1):113-8.