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Authors

Hasson, Rebecca
Sallis, James F
Coleman, Nailah
et al.

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COVID-19: Implications for Physical Activity, Health Disparities, and Health Equity

Abstract: *Physical activity is one of the most efficacious pathways to promoting mental and physical health, preventing disease, and, most important during the COVID-19 pandemic, bolstering a stronger immune system. Efforts to “flatten the curve” have resulted in the temporary closure of exercise facilities and gyms, suspension of sport activities, and advisories to avoid public recreational spaces. All of these changes have made traditional opportunities to be physically active difficult to access. These changes have also exacerbated existing disparities in access to social and environmental supports for physical activity, potentially contributing to a widening gap in physical activity participation among those at greatest risk for COVID-19. Physical activity can play a special role in reducing the inequitable consequences of COVID-19; however, expansion and better targeting of evidence-informed interventions are needed that address the unique*

barriers present in communities that have been economically and socially marginalized to achieve health equity in COVID-19 outcomes. This review highlights effective and feasible strategies that provide more equitable access to physical activity programs and spaces across the United States. With a renewed investment in physical activity, this behavior can play a crucial role in improving population health and reducing



disparities during the COVID-19 pandemic and beyond.

Keywords: coronavirus; race/ethnicity; disabilities; health

inequities; physical inactivity; sedentary behavior

Introduction

In December 2019, a novel coronavirus (severe acute respiratory syndrome coronavirus 2 [SARS-CoV-2]) emerged and began to spread efficiently throughout the world, causing a syndrome called coronavirus disease 2019 (COVID-19).¹ Public health experts and

 Several of the underlying medical conditions known to increase risk for developing severe COVID-19 can be mitigated by physical activity 

infectious disease specialists evaluated the methods of spread and developed (and continue to update) recommendations for disease prevention.² Currently, the United

DOI: 10.1177/15598276211029222. Schools of Kinesiology and Public Health, University of Michigan, Ann Arbor, Michigan (RH); Herbert Wertheim School of Public Health and Human Longevity Science, University of California San Diego, La Jolla, California (JFS); The Goldberg Center for Community Pediatric Health, Children's National Hospital, Washington, DC (NC); Department of Health Sciences, School of Health and Human Sciences, Indiana University, Indianapolis, Indiana (NK); Department of Health and Human Performance, Plymouth State University, Plymouth, New Hampshire (VGN); and Department of Kinesiology, School of Health and Human Sciences, Indiana University, Indianapolis, Indiana (NRK). Address correspondence to: Rebecca Hasson, PhD, FACSM, Schools of Public Health and Kinesiology, University of Michigan, 1402 Washington Heights, 2110 Observatory Lodge, Ann Arbor, MI 48109; e-mail: hassonr@umich.edu.

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States Centers for Disease Control and Prevention (CDC) recommends the following to prevent spread of SARS-CoV-2 and subsequent development of COVID-19: frequent handwashing; avoiding close contact with others (especially if not living together); wearing a mask or face-covering over the nose and mouth; frequent cleaning/disinfecting surfaces and commonly used objects; regular self-health monitoring; and getting a flu vaccine (<https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/prevention.html>).³ Using all available evidence-based strategies at the individual and community levels has been shown to reduce transmission and subsequent deaths related to COVID-19.⁴ We assert that maintaining regular physical activity at moderate intensities offers protection in preventing contraction of the virus and may lessen the impact of the infection.^{5,6} Notwithstanding, over 33.8 million individuals have been diagnosed with COVID-19 in the United States (US), resulting in over 606,618 fatalities, as of July 19, 2021.

While COVID-19 diagnosis and deaths continue to rise across the US, disparities in COVID-19 outcomes have emerged. Healthy People 2020 defines a health disparity as “a particular type of health difference that is closely linked with social, economic, and/or environmental disadvantage. Health disparities adversely affect groups of people who have systematically experienced greater obstacles to health based on their racial or ethnic group; religion; socioeconomic status; gender; age; mental health; cognitive, sensory, or physical disability; sexual orientation or gender identity; geographic location; or other characteristics historically linked to discrimination or exclusion.”⁷ Surveillance data reported by the CDC from January through May 2020 had already

highlighted racial/ethnic disparities in COVID-19 diagnosis with 33% of the cases in Hispanics, 22% in non-Hispanic blacks, and 1.3% in American Indian/Native Americans.^{8,9} These 3 racial/ethnic groups include over 50% of the US COVID-19 deaths, whereas Hispanics, non-Hispanic blacks, and American Indian/Native American groups account for 18%, 13%, and .7% of the US population, respectively. Data from New York state also suggest COVID-19 presents a greater risk to people with intellectual and developmental disabilities including those with cerebral palsy, Down syndrome, and autism spectrum disorders. The cumulative COVID-19 incidence rate in New York state was similar between individuals with and without disabilities (785.7 vs 710.1 per 100,000 population). The COVID-19 death rate however was 2.4 times higher for individuals with disabilities than the death rate for the state overall (9.5% vs 4.0%).^{10,11}

The majority of COVID-19 deaths occur in older people and in those with chronic diseases, including obesity, hypertension, type 2 diabetes, and cardiovascular diseases.¹² These chronic diseases are also more common in people of color, lower-income individuals, and people with disabilities¹³; hence, it is commonly believed that disparities in COVID-19 outcomes arise from preexisting differences in underlying health.^{8,9,14-17} Selden and Berdahl examined this hypothesis in an effort to identify potential explanations for racial/ethnic disparities in COVID-19 hospitalization and death.¹⁸ Using data from the Medical Expenditure Panel Survey, they determined that while non-Hispanic blacks in every age group were more likely to have underlying health conditions associated with severe COVID-19 illness, non-Hispanic whites were on average older. After adjusting for age and other factors, non-Hispanic whites presented a greater overall health risk for severe illness

compared with their non-Hispanic black, Hispanic, and Asian counterparts. Non-Hispanic blacks and Hispanics however had a greater environmental exposure risk as they were more likely to live in households containing a health-sector worker or an individual who was unable to work from home. Selden and Berdahl concluded that racial/ethnic disparities in COVID-19 outcomes are more likely to stem from long-standing social inequities rather than underlying health risk.

Discriminatory policies and practices, including redlining, highway construction, zoning ordinances, bank lending behavior, and white flight from cities, have all contributed to increased poverty and limited access to healthy food and physical activity environments in low-income racial/ethnic minority communities.^{19,20} Living in an under-resourced environment can contribute to obesity, type 2 diabetes, and other medical conditions that increase the risk for severe illness with COVID-19.^{16,17,21-23} Workplace conditions also contribute to increased COVID risk in people of color and low-income individuals as these groups tend to work in jobs that are not amenable to teleworking and use public transportation more frequently and at a higher rate, putting them at risk for exposure to COVID-19.²⁴⁻²⁷ For example, it is documented that excess COVID-19 infections have occurred among meat and poultry processing workers, mass transit workers, and in-home healthcare workers, occupations that are disproportionately filled by people of color.²⁸ Lack of personal protection equipment provided by employers is also related to increased infections among low-income individuals, Hispanics in particular.²⁹ For Indigenous communities living on tribal lands, lack of access to water, food, and personal protection equipment limit

their ability to follow public health guidelines.³⁰

People of color are also more likely to live in housing situations with multigenerational families, in multi-unit, and/or low-income public housing, which make it difficult to physically distance or self-isolate.^{31,32} Physical distancing may also be difficult for individuals with disabilities who require support to complete activities of daily living resulting in close contact with others, often from outside their household. People of color, low-income individuals, and persons with disabilities are less likely to have consistent access to health care due to lack of insurance or under-insurance.³³ Anecdotal data for these groups suggest that when they experience COVID-19 symptoms, they are less likely to be referred for testing as frequently as their more affluent white counterparts³³ suggestive of experiences of discrimination in the healthcare system.³³⁻³⁵ Lack of testing could mean further spread within these communities at greatest risk for COVID-19 diagnosis and more patients not seeking medical help until they are seriously ill.

The impact of pandemic stress on mental health is also likely to be magnified in populations that have been economically and socially marginalized.³⁶ Across the globe, individuals and communities are experiencing heightened stress during the pandemic related to fear of infection, job loss, educational disruption, and social isolation.³⁶ People of color in particular are more likely to experience loss of income and unemployment during the pandemic because they work in service industries, such as restaurants, retail, and hospitality. For example, in a nationally representative sample, a Commonwealth Fund survey noted approximately 50% of non-Hispanic black and Hispanic

respondents reported experiencing increased economic challenges because of the pandemic, compared to 21% of non-Hispanic white respondents.³⁷ Moreover, the unemployment rate among Hispanics increased to 19% in April 2020, which was higher than any other racial/ethnic group.^{38,39} Individuals with disabilities may also experience heightened stress during the pandemic as they have greater healthcare needs and rely on community-based services for health promotion. Disruptions in these services may negatively impact an individuals' ability to complete activities of daily living and cope with psychological stress during the pandemic.⁴⁰ As discussed later in this review, such COVID-related stressors, compounded by existing systemic inequities, can have deleterious effects on an individual's immune response, thereby lowering one's ability to fight off diseases like COVID-19.⁴¹ Identifying behaviors that enhance immune function will be critical to maintaining the health and well-being of Americans, particularly those in communities at greatest risk for COVID-19 diagnosis and death.

Physical Activity's Potential Utility During the COVID-19 Pandemic

Physical activity is one of the most efficacious pathways to promoting mental and physical health, preventing disease and, most important to our current context, bolstering a stronger immune system.⁴² Several of the underlying medical conditions known to increase risk for developing severe COVID-19 can be mitigated by physical activity.⁴² For example, previous research has consistently demonstrated that regular exercise decreases the risk of cardiovascular disease and hypertension, as well as their progression.^{43,44} Regular exercise also decreases the risk of developing obesity and type 2 diabetes^{45,46} and can improve blood

glucose management in individuals with and without diagnosed diabetes.⁴⁶ Physical activity is also associated with lower risk of numerous cancers⁴⁴ and supports recovery from cancer.⁴⁷ Additional physical activity benefits include decreased cholesterol, blood pressure, inflammation, improved vascular endothelium, and weight control, all of which lead to improvements in a variety of chronic diseases, including cardiovascular diseases.^{44,48} Finally, regular physical activity is associated with lower stress, anxiety, and depression; these mental health improvements can have cross over benefits in management of other chronic diseases and in disease prevention.⁴⁴ Therefore, promoting physical activity in people diagnosed with, or at risk of, these diseases could possibly reduce the severity of COVID-19 infections and risk of death after infection.

The numerous health benefits of physical activity have been extensively documented in the 2008⁴⁹ and 2018⁴² Physical Activity Guidelines Advisory Committee Reports, but neither of these reports directly addresses the impact of physical activity on reducing the risk and impact of infectious disease. Physical activity has however been promoted in pandemic-related communications from the World Health Organization.⁵⁰ They note that "physical activity and relaxation techniques can be valuable tools to help you remain calm and continue to protect your health during the pandemic." Recommendations also include "150 minutes of moderate-intensity or 75 minutes of vigorous-intensity physical activity per week, or a combination of both." Although direct evidence is limited regarding the benefits of physical activity for the prevention, treatment and recovery from COVID-19, a recent study from Brawner and colleagues (2020) determined in 246 patients (75% African American) that there

was an inverse relationship between hospitalizations from COVID-19 and maximal exercise capacity (quantified in metabolic equivalents).⁵¹ There is also substantial evidence about physical activity's relevance to the pandemic.⁵² Below are 4 potential utilities of promoting physical activity during the pandemic. If focused attention is given to promoting physical activity among communities that are disproportionately inactive, these utilities may also be relevant to understanding and reducing disparities in risk for severe COVID-19 and COVID-19-related deaths among people already at greater risk due to chronic conditions.

Physical Activity Has the Potential to Reduce Severity of COVID-19 Infections. When the SARS-CoV-2 virus attaches to the body, it triggers immune system responses to attack the invader. This attack causes an inflammatory response that sometimes gets out of control and causes lung damage. There is substantial evidence that physical activity improves immune functioning, including immunosurveillance, and reduces inflammation.^{47,53-55} These effects are primarily acute, after each session of physical activity, but chronic improvements are also seen.⁶ The benefits are most clear with moderate-intensity physical activity. Extensive vigorous aerobic exercise may be counterproductive due to evidence that marathons temporarily suppress immune function.⁵⁶ Evidence also suggests that prolonged and intense exercise before or during infection is associated with increased morbidity and mortality, especially among those who are not regularly active.⁵ Importantly, physical activity reduces the frequency of viral infections.^{56,57} Thus, evidence supports an expectation that moderate-intensity physical activity may reduce severity of COVID-19 infections.

Physical Activity Reduces Stress and Rebalances Stress Hormones.

Persistent psychological stress causes the hormone cortisol to become elevated and dysregulated, which interferes with immune functioning. Physical activity is one of the most effective interventions for reducing and rebalancing cortisol, and these benefits may be especially important for older individuals who tend to have impaired immune systems.⁵⁸ Physical activity is also documented to be as effective as medications and psychotherapy in treating anxiety and depression,⁴² so physical activity promotion is particularly indicated as a primary and/or adjunctive therapy for people worldwide who struggle with the stress of the pandemic.

Physical Activity Can Prevent Acute Respiratory Distress Syndrome.

Acute respiratory distress syndrome (ARDS) is a common and serious complication among people with COVID-19. ARDS indicates hypoxemic respiratory failure, bilateral pulmonary inflammation, and disruption of alveolar membrane barrier. These processes are related to proinflammatory cytokines and oxidative stress, and mortality rates increase substantially with age.⁵⁹ In previous studies, patients who were regularly active before hospitalization for viral lung infections appeared to be protected against ARDS.⁶⁰ Physical activity enhances immune function, reduces inflammation, and produces antioxidants that reduce risk of ARDS.⁶¹

Physical Activity Enhances Efficacy of Vaccines Among Adults. Safe and effective vaccines are anticipated to be the "ultimate solution" for the COVID-19 pandemic that will allow resumption of normal activities. However, it is known that older adults' immune systems become less effective (ie, immunosenescence),

and it is essential that older adults, who are at highest risk, have strong antibody responses to vaccines. Several studies demonstrated both acute and chronic moderate-intensity physical activity can improve immune responses to influenza vaccines.⁶² In one study, older adults assigned to an aerobic exercise group were 30–100% more likely than the comparison group to attain sufficient antibodies after vaccination to protect them from 3 strains of influenza virus 6 months later.⁶³ It is possible physical activity could improve immune responses to vaccines in other groups with weakened immune systems, such as those with chronic diseases.

Despite Benefits, Physical Activity Opportunities Were Reduced by COVID-19 Restrictions

In spite of multiple lines of evidence in support of physical activity benefits during the pandemic, physical activity is absent in public discussion and public health recommendations in the US, and some pandemic mitigation policies severely limited access to physical activity facilities. In March 2020, the US government declared a national health emergency, and the majority of governors issued shelter-in-place orders to restrict movements of individuals across the nation.^{64,65} These orders resulted in the temporary closure of many businesses with exceptions for health care, first responders, the food and agriculture sector, and other needs deemed essential. Guidelines from the CDC also included closing schools and other gathering places to mitigate virus spread.⁶⁶ These mandates were successful in flattening the COVID-19 curve during Spring of 2020 but made traditional opportunities to be physically active difficult to access. Exercise facilities and gyms were closed; parks, beaches, and camps were closed; sport activities were

suspended; and recommendations were given to individuals and families to avoid public recreational spaces. Similar restrictions were implemented across the globe leading to significant declines in physical activity both in the United States and around the world. To assess worldwide changes in physical activity, Tison and Avram acquired step count data from wellness smartphone apps before and after the March announcement of COVID-19 as a global pandemic.⁶⁷ Within 10 days of the pandemic declaration, there was a 5.5% decrease in mean steps (287 steps) worldwide, and within 30 days, there was a 27.3% decrease in mean steps (1432 steps). Step count trends were similar across cities in the US.

The COVID-19 restrictions implemented had a unique impact on physical activity and sedentary behaviors by demographic group. For older adults, gym closures reduced safe spaces to engage in supervised physical activity and stay socially engaged with others.⁶⁸ The limited contact with others has been somewhat mitigated by technology (eg, zoom exercise classes and social meetings). However, the ability to use this technology to promote exercise may not have been feasible for older individuals with limited technology skills, access to technology, and with cognitive and/or physical limitations.⁶⁹ The isolation and loneliness that some may feel from long-term physical distancing can disproportionately impact the health and well-being of aging populations as many older adults in the US live alone.⁷⁰ For middle aged working adults, stay-at-home mandates curtailed occupational and transportational physical activity opportunities as many individuals were and still are working from home. For those who may still have to go into the workplace, limited time in the home to participate in home-based activities may further reduce their

ability to be physically active⁴³ and a greater reliance on personal vehicles rather than active commuting to work may be needed as public transportation options are suspended. For children, school closures limited opportunities to engage in physical education, recess, active travel to school (eg, Safe Routes to School) programs, after school physical activity programs, and extracurricular athletic activities. School closures also eliminated access to inclusive physical activity, which can negatively impact the social, physical, emotional, and cognitive development of children with disabilities.⁷¹ While most teachers have been able to utilize online platforms to provide physical education for students without disability, this format presents many challenges for children with additional needs. For example, many online platforms are not compatible with assistive technology used for teaching children who are hard-of-hearing or have visual impairments.⁷² Online platforms have also reduced opportunities for meaningful social interactions to develop social skills thereby contributing to increased anxiety and feelings of isolation in children with disabilities.⁷¹ With the reduction in available public physical activity opportunities, finding opportunities to exercise in one's own neighborhood became the pandemic trend, which presented a significant barrier to individuals living in low-income communities.

Neighborhood environments support physical activity by having sidewalks, protected bicycle facilities, and parks; by being safer and cleaner; and by reducing traffic.⁷³⁻⁷⁶ Individuals living in low-income communities, however, are more likely to experience high crime rates, heavy policing, and perceive their neighborhoods as less safe, which reduces the likelihood of engaging in physical activity in that

space. Individuals living in low-income communities report increased physical and social disorder in their neighborhoods, including broken windows, litter, graffiti, loitering, and public drinking,⁷⁷⁻⁷⁹ all of which are barriers to physical activity participation. Indeed, Voisin and colleagues⁸⁰ found a dearth of safe recreational opportunities exist for young African American men as they were more likely to experience exposure to violence within their communities. "Fear of darkness" and "fear of the unknown" have also been cited as barriers for physical activity among African American men living in rural communities in the southeastern region of the US.⁸¹ People of color and low-income individuals disproportionately live in dense urban areas with limited green space.^{82,83} Urban areas are less likely to have a park accessible for use, and if a park is present, it is small with limited features.⁸⁴ These small parks are more likely to be restricted from public use because of their size and are typically dominated by play structures banned from use during pandemic-related closures.⁸⁵ So while shelter-in-place orders reduce physical activity options for everyone, they have likely contributed to a widening gap in physical activity opportunities among those at greatest risk for developing COVID-19.

The Inadequacy of Current Strategies to Promote Physical Activity During the Pandemic

In recognition of the environmental barriers present in many communities that prevent physical activity participation during the COVID-19 pandemic, the World Health Organization recommended "following an online exercise class" as a strategy for staying active at home during shelter-in-place restrictions.⁵⁰ As a result, industries most tied to health, fitness, and recreation have developed online

exercise programming to help individuals and families move more at home.⁶ Unfortunately but predictably, most of these online programs require a monthly subscription. While the overwhelming majority of US households have internet access (~89%) and a broadband subscription (~81%), access to broadband internet decreases by approximately 23% for those with an income of less than \$25,000.⁸⁶ Unstable internet connection (loss of internet connection and difficulties reconnecting to the internet when lost) has also been noted in low-income households.⁸⁷ The lack of accessibility of these online exercise programs may also be an issue for individuals with disabilities and low-income families where physical space may be limited. For example, Ranasinghe and colleagues provided strategies for increasing physical activity during the pandemic by identifying an “active space” within the household to use available equipment for exercise.⁸⁸ Low-income families were less likely to have exercise equipment in the home,^{89,90} and excess movement in close quarters may be burdensome to other members of the household.^{89,91} Thus, internet accessibility and space restrictions may limit the ability of low-resource communities to use newly developed online resources to engage in physical activity during the pandemic. Hence, creating innovative multi-level strategies to promote physical activity are needed to reduce disparities in physical activity participation as well as attenuating severe COVID-19 outcomes.

Social Ecological Approaches to Providing Equitable Access to Physical Activity Opportunities

While emerging work continues to improve our understanding of physical activity behavior and its

determinants among the general population affected by the pandemic [eg, Refs. 92-94], empirical investigations on how these determinants affect populations that have been economically and socially marginalized is scant and unclear based on available evidence from the scientific literature. There are no studies demonstrating whether earlier successful interventions are also effective during the COVID-19 pandemic. Hence, identifying interventions that have worked to reduce physical activity disparities in the past, followed by evaluation of these approaches for adoption in the current climate, could prove useful.

Over the past 2 decades, there has been a dramatic increase in the number and types of factors influencing physical activity behavior and social-ecological models enable a better understanding of these multiple factors.⁹⁵⁻⁹⁷ These models, when applied to understanding physical activity participation, have received empirical support as correlates of physical activity have been identified on multiple levels (behavioral, social, environment, and political).^{98,99} Findings from multi-level studies are informative as identifying strong correlates of physical activity behavior at different levels provides insight on how to design future interventions. For instance, change at the individual level might include facilitating planning and time management skills to engage in physical activity. Effective interventions focused on the individual level include those that have been adapted to the needs and preferences of groups that have been marginalized. For instance, delivering home-based physical activity programs in Spanish^{95,100} and providing suitable exercise equipment to older adults have shown promising results.¹⁰¹ Changes at the social level involve creating community groups that help instill safety, motivation, and

cohesion. An example is GirlTrek, which is one of the largest public health nonprofit community groups for African-American women in the United States.¹⁰² GirlTrek promotes an active lifestyle by facilitating walking groups and meeting opportunities that promote healthy living. Over 1 million women have already signed the GirlTrek pledge to walk each day and these numbers continue to increase even during the COVID-19 pandemic.¹⁰³

Interventions focused on the environmental level usually require creating spaces or improving the quality of parks and other physical activity facilities. Social ecological approaches imply that built environment and policy interventions may interact with individual and social support interventions to help increase and sustain physical activity behaviors. While changes at the individual or social level can be promoted directly by communities (eg, community organizations and churches), changes needed at the built environment and policy tiers depend on government action (usually municipal or state/provincial level) and, consequently, can take years to approve, fund, and complete the project. Nevertheless, the importance of implementing new parks and playgrounds has also been widely acknowledged.¹⁰⁴ In addition, the Community Prevention Services Task Force recommends planning and implementing pedestrian, bicycle, and public transportation system interventions, combined with land use and built environment interventions (eg, parks, schools, stores or retail districts, and worksites) as evidence-based interventions that effectively increase physical activity (ie, safe routes to destinations) (<https://www.thecommunityguide.org/findings/physical-activity-built-environment-approaches>).^{105,106} Implementing active travel to school programs have also been

recommended by the Task Force as having sufficient evidence of effectiveness for promoting physical activity among children, and the benefits of these programs to society have been found to be greater than their cost^{105,106} (<https://www.thecommunityguide.org/findings/physical-activity-interventions-increase-active-travel-school>).

Public bicycle share programs and designing bike-friendly cities have also been effective in promoting active transportation.^{107,108} Indeed, walking and biking for transportation may be more desirable during the pandemic in an effort to reduce potential exposures on public transportation. Though not specific to the pandemic, an example of an evolving project that could be adapted and used during the COVID-19 pandemic is Rails to Trails.¹⁰⁹ This organization promotes development and use of walking and bike trails across the US to create trail networks that connect people and places. Over 24,000 miles of rail-trails have been developed nationwide to promote leisure-time physical activity and active transportation. Focused attention should be given to places trail networks in communities that have been economically and socially marginalized to increase physical activity opportunities in these neighborhoods.

Finally, compliance with the American Disabilities Act (ADA) and using a universal design approach to improve the built environment for physical activity promotion has been lauded as an equitable strategy to accommodate all individuals, regardless of ability, to the greatest extent possible. Incorporating sloped curbs, detectable warning tiles, and way-finding bars in street design are examples of universal designs that have been shown to reduce falls and injuries among older adults and among those who use a wheelchair. Detectable warning tiles can also reduce falls among the

general population during winter seasons, and sloped curbs also help cyclists.¹¹⁰ Hence, health promotion at the environmental tier would benefit by following an ADA and universal design approach.

Transformations at the policy level include change in laws that could be facilitated by direct support from grassroots/non-profit organizations that collaborate with the local government. For instance, 8-80 Cities is a Toronto-based international organization that has a mission to enhance mobility and public space to create healthy and equitable communities.¹¹¹ One of the projects approved by the city was “Open Streets Toronto,” which temporarily opens selected streets solely to civilians by closing them to cars. The open streets welcome people of all ages and abilities to commute actively. The 8-80 Cities initiative is also raising awareness among youth by launching Emerging City Champions to encourage youth to think about equitable physical activity.¹¹² This initiative was supported by findings in Denmark, and particularly the “8-80 Study Tour Copenhagen,” which found civilians in Copenhagen to have a high quality of life where one of the correlates was walkability/access.¹¹³

Open Streets Toronto has been well-received, is still accessible during the COVID-19 pandemic, and is regulated by safety measures to avoid transmission of the virus, so individuals can commute safely. This scenario also illustrates an example where a project was successfully implemented at the policy level, based on previous evidence, and is monitored to ensure appropriate adaptation in the COVID-19 pandemic climate. Open streets and “slow streets” programs have proliferated in cities throughout the US in direct response to the pandemic, and there has been discussion of making some of these changes permanent.¹¹⁴ Overall, 8-80 is an example of a physical activity–

promoting non-profit organization that aims to create equitable cities by connecting with their communities, facilitating international connections, and collaborating with the government to produce projects that will have uptake by the residents. In summary, programs and policies found to be effective for reducing physical activity disparities are those that include specialized elements that welcomed diverse demographics by recruiting individuals from the community to lead events (eg, Open Streets), fostering a sense of relatedness (eg, GirlTrek), and providing modifications that benefit all (eg, adopting an ADA and universal design approach).

It is important to note that physical activity promotion projects that require implementation at the policy level can be effective when supported by the local community; however, in some circumstances, direct translation may highlight discrepant societal variables, especially when replicating initiatives from European to US cities. Collecting local evidence to help adapt interventions to meet local needs could prevent costly mistakes and avoid investment in initiatives that would not adapt well to US cultures and norms. Hence, partnering with researchers who have expertise in physical activity and population health could be an effective approach to reduce the likelihood of wasting resources. For instance, the Physical Activity Research Center (PARC) was initiated by the Robert Wood Johnson Foundation (RWJF) to build evidence to identify policies, practices, and aspects of the built environment that foster safe and equitable opportunities for communities have been economically and socially marginalized. An overview of PARC and research plans can be found elsewhere.¹¹⁵ Finally, the American College of Sports Medicine

(ACSM) has also spearheaded efforts to address the problem of disparities in physical activity and overall health in the US.¹¹⁶ Specific programs and initiatives are highlighted below.

ACSM's Ongoing Initiatives to Promote Equity in Physical Activity Participation

The ACSM has more than 50,000 members and certified fitness professionals, representing 70 occupations within sports medicine, basic science, applied science, allied health, education, and the fitness industry who are working together to help individuals and communities live longer, healthier lives. It is well understood by ACSM members, affiliates, and partners that achieving health equity through physical activity requires the combined efforts from large and diverse groups of professionals. Healthy People 2020 defines health equity as the “attainment of the highest level of health for all people. Achieving health equity requires valuing everyone equally with focused and ongoing societal efforts to address avoidable inequalities, historical and contemporary injustices, and the elimination of health and health care disparities.”¹¹⁷ The ACSM has launched a series of initiatives with this goal in mind.

In 2008, the ACSM launched the Exercise is Medicine (EIM) initiative that seeks “to make physical activity assessment and promotion a standard in clinical care, connecting health care with evidence-based physical activity resources for people everywhere of all abilities.” There are several subcommittees convening around this overarching goal with special attention to certain populations, including older adults, children, underrepresented minorities, and people who live in low-income and/or rural communities. The work of EIM subcommittees is ongoing and

continues to build the evidence around the importance of clinics to community connections in achieving accessible physical activity opportunities. During the COVID-19 pandemic, we recognize, more than ever, the importance of patients hearing from their clinicians about the significance of physical activity to overall health and wellness. These public health messages can be delivered both within, and external to, the healthcare setting. For example, clinicians can serve as role models by periodically walking with and delivering health promotion and education information to their patients by affiliating with the Walk with a Doc program or providing patients with park prescriptions.^{118,119} Although these programs are very successful when pandemic conditions are not impacting communities, they continue to hold promise with some virtual programming in the case of Walk with a Doc and use of parks by following CDC guidance such as physical distancing and use of masks or face coverings.^{118,119}

In 2008, the ACSM also launched the ACSM American Fitness Index¹²⁰ which ranks America's 100 largest cities on health behaviors, health outcomes, community infrastructure, and policies that support physical activity behaviors. The Fitness Index offers tailored guidance to local officials and community leaders that are ready to make their city one of the healthiest cities in America. This assistance focuses on the best evidence-based strategies and policies for improving health and increasing physical activity, with a priority on populations that have been economically and socially marginalized. During the COVID-19 pandemic, the Fitness Index website offers several resources to assist people with staying physically active and socially connected.

In 2012, ACSM established the Strategic Health Initiative for Health

Equity.¹¹⁶ The mission of this group was to “identify inequities in physical activity participation in the broader US population and develop key action steps to address these inequities in collaboration with other national organizations with a similar mission.” The work of this committee culminated in the development of a national roadmap that supports achieving equity in physical activity participation through 4 actionable, integrated pathways: communication, education, collaboration, and evaluation. The *communication* pathway highlights the continued need to raise awareness of the issue and magnitude of health inequities and convey the power of physical activity in promoting health equity. The *education* pathway calls for the education of healthcare providers and fitness professionals in improving cultural competency and eliminating barriers to effective health care. The *collaboration* pathway emphasized building partnerships and programs that integrate existing infrastructures and leverage novel stakeholders from both public and private sectors to promote health equity. The final pathway focused on *evaluation* to ensure measurable progress in reducing physical activity disparities to promote health equity. At this critical juncture during the COVID-19 pandemic, greater attention to the education, collaboration, and evaluation pathways has been emphasized to highlight and close the widening gap in physical activity disparities among populations disproportionately impacted by COVID-19.

Finally, ACSM members and leaders recognize that addressing the health equity challenges through physical activity participation during the COVID-19 pandemic and beyond requires increasing the number of scientists and clinicians who are demographically representative of the populations

with the highest rate of chronic disease. Thus, there are strategic efforts in place to address diversity in membership. For example, the Leadership and Diversity Training Program (LDTP) is one ACSM initiative specifically designed to increase the pipeline of students and early career professionals to prepare for leadership in the ACSM.¹²¹ Led by the Diversity Action Committee, the LDTP was established in 2007 and is delivered to mentor and retain members from minority groups who are underrepresented in science and medicine. All LDTP activities are mentored and include committee participation, professional presentations, publications, and other activities that ultimately lead to Fellowship, ACSM's highest level of membership. As of May 2020, the number of Fellows has increased from 1329 to 1472. While race data are self-reported and under-reported among the members, there have been 102 unique LDTP participants, 16 reached Fellowship, 7 have served on the Board of Trustees, and 3 have served on regional chapter boards.

The American College of Sports Medicine is committed to supporting the efforts to reduce physical activity disparities and achieve health equity during the COVID-19 pandemic and beyond through the work of members serving on the Strategic Health Initiative for Health Equity, several EIM Committees, and the Diversity Action Committee. While this work is robust and ongoing, a tremendous amount of work remains to be done, and it will take more than the members of ACSM to achieve health equity through physical activity, especially in the context of COVID-19. Community partnerships and coalitions made up of health and fitness professionals, medical and allied health professionals, organizations representing the needs of diverse population groups, transportation,

urban planning, housing, elected officials, and community members themselves will be needed to best address disparities and health equity.

Call to Action to Increase Equitable Physical Activity Opportunities for All Americans

There is a true threat to widening the gap in physical activity participation among the most vulnerable groups during the COVID-19 pandemic. Now more than ever, public health efforts focused on eliminating physical activity disparities require the collaboration of individuals from a variety of professions, including medicine, public health and policy, as well as those focused on the built environment, including city planning, transportation, parks and recreation, and housing. With several decades of combined work from ACSM scholars, we offer 4 recommendations to increase equitable physical activity opportunities for all Americans.

Recommendation #1: Continue to Build Evidence About the Multiple Likely Benefits of Physical Activity to Prevent or Reduce the Risk of Severe COVID-19. One probable reason why physical activity is not routinely recommended to reduce the impact of the pandemic is the dearth of direct evidence of physical activity benefits for COVID-19. This is in contrast to the extraordinary mobilization of researchers to study drug treatments and vaccines.¹²² At least one article on research priorities for physical activity and COVID-19 has been published,¹²³ as have special journal issues on physical activity and COVID-19 (eg, *Journal of Sport Health Science*¹²⁴); however, dedicated funding for physical activity research is not currently available. Additional research priorities should include the examination of differences in immune function, inflammation, antioxidants, and cortisol levels

among people of color and people with disabilities and the potential impact of exercise to reduce disparities.

Recommendation #2: Continue to Build the Evidence of Physical Activity Disparities During a Pandemic. Determinants responsible for physical activity disparities among under-resourced communities, such as lack of access to supportive physical activity environments, infrastructure quality, and safety, have been well documented in the literature.¹¹⁶ Nevertheless, surveillance data are warranted to support estimates of the predicted impact of the COVID-19 pandemic on physical activity behaviors and subsequent health outcomes in these populations. For example, due to the impact of COVID-19 in Canada, it is projected that childhood obesity rates may increase by 2%, resulting in 1.3 million new childhood obesity cases as a direct function of school closures and lack of physical activity opportunities for children, which are very likely to have inequitable effects.¹²⁵ There is an urgent need to document and monitor physical activity disparities during the pandemic in the US.

Recommendation #3: Utilize Social-Ecological Approaches to Promote Physical Activity Participation During the Pandemic. Physical activity should be promoted during the pandemic because indirect evidence suggests it could have multiple benefits. Moreover, targeted interventions for low-income people of color and individuals with disabilities are justified. Individual clinicians can take action, but they need to be supported by recommendations from authoritative groups, environmental and policy

initiatives, and well-designed national communication campaigns, with targeted strategies for populations at greatest risk for COVID-19.

Recommendation #4: Work Collaboratively Within and Across Professional Organizations and Associations. Action to take advantage of the many benefits of physical activity during the pandemic is urgently needed, especially for the multiple large segments of the population at highest risk. Organizational initiatives are needed for the following: (a) to support those conducting health equity work in research and practice, (b) to continue to feed the pipeline that prepares future professionals to sustain this work; and (c) to seek multi-sector cooperative professionals who can drive the work of translating evidence to practice and practice to policy. Accomplishing all four of these recommendations is likely to slow, stop, and reverse the widening gap of physical activity disparities in the midst of COVID-19.

Physical activity could play a special role in reducing the inequitable consequences of COVID-19; however, physical activity interventions need to be targeted to populations at highest risk, prior to infection. Thus, expansion and better targeting of evidence-informed physical activity interventions are needed, consistent with the strategies promoted in the US National Physical Activity Plan.¹²⁶ Targeted approaches must also address the unique barriers present in under-resourced communities to achieve health equity in COVID-19 outcomes. This review highlights effective and feasible strategies to provide more equitable access to physical activity programs and spaces in every city and town in the US. With a renewed investment in physical activity participation, this

behavior can play a crucial role in improving population health and reducing disparities during the current COVID-19 pandemic and beyond.

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ORCID iDs

Rebecca Hasson  <https://orcid.org/0000-0003-4526-2656>

Vincenzo G. Nocera  <https://orcid.org/0000-0003-3807-2766> 

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