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Nature, Health, and Wellbeing
Insights from 2019 CIHF Roundtable

Reported by Sherrie Negrea

Roundtable chaired by:

Mardelle Shepley, Associate Director, Cornell Institute for Healthy Futures
Department Chair, Cornell University, Dept. of Design and Environmental Analysis

Naomi Sachs, Industry Scholar, Cornell Institute for Healthy Futures
Assistant Professor, University of Maryland, Dept. of Plant Science and Landscape Architecture

Taking a walk in the woods or even viewing nature through a window can improve our health and wellbeing in countless ways. It can reduce stress in our daily lives, help us recover from surgery, lower our blood pressure, and boost our memory. As the benefits of spending time in nature have been increasingly recognized, green spaces now play a critical role in how many communities are designed, how schools are structured, and how patients are treated at healthcare facilities.

The Cornell Institute for Healthy Futures (CIHF) sponsored a roundtable on April 26 that explored the impact nature can have on individuals in a variety of settings including: communities, schools, senior living, and healthcare facilities. Nearly 50 industry leaders, researchers, healthcare professionals, government representatives, and administrators of nonprofit organizations attended the conference at Cornell University in Ithaca, N.Y.
The Nature, Health, and Wellbeing roundtable opened with a “State of the Science” overview of the research exploring the intersection of nature and health on issues ranging from the impact gardens have on people with autism to the effect green space has on crime in urban neighborhoods. The “State of the Practice” discussions then examined strategies to integrate therapeutic environments into architectural design, city planning, recreational areas, and park systems. The roundtable concluded with a series of working groups that discussed identifying areas for future study, translating research into practice, and establishing a business case for the benefits of interacting with nature.

State of the Science

Americans face increasing levels of stress and anxiety from our 24-hour news cycle, around-the-clock texting, and constant social media updates. Numerous studies have confirmed what anecdotal evidence has shown for decades — that spending time in nature, whether walking or simply sitting, can relieve stress.

Research finds that people who engage with nature have lower salivary cortisol levels, blood pressure, and heart rates compared to those who have spent equivalent amounts of time in an urban setting, said Don Rakow, an associate professor in the School of Integrative Plant Science at Cornell.

According to Rakow, a 2019 study conducted by researchers at the University of Michigan found that spending just 20 minutes in nature is enough to significantly reduce these biomarkers. That conclusion was similar to a review of 14 studies Rakow, Sachs, and Shepley conducted on the effect experiencing nature can have on improving the mental health of college-age students; their review showed that as little as 10 minutes can have a significant impact.

“When we are less stressed, we are less likely to become anxious and to fall into an anxiety-prone state,” said Rakow, coauthor of Nature Rx: Improving College-Student Mental Health. “And when we are less anxious, we are less likely to become depressed.”

Another benefit of exposure to nature is that it helps students with memory recall. A study conducted at Stanford showed that when a group of elementary school students had an experience in a natural setting, they could better recall a series of facts they had been given before the experiment, compared to a group of students in a city environment, Rakow said.

In hospital settings, patients who can simply view a natural setting from a window have better outcomes after surgery. Roger Ulrich’s landmark study, “View Through a Window May Influence Recovery from Surgery” published in 1984 showed that patients who underwent gallbladder surgery had a quicker recovery, needed less pain medication, and had fewer complaints logged by nurses than an equal number of patients who had a view of a brick wall.

Exposure to nature can also potentially extend our lives. A longitudinal study of nurses that has been underway since the 1970s found that
nurses who had the highest degree of greenness surrounding their homes had longer lifespans than those who lived in settings with the least amount of greenery, Rakow said.

In 2017, Cornell launched Nature Rx@Cornell, a program to encourage college students to spend time in nature. Since Cornell is situated in a scenic landscape, the goal of the program is to induce students to use the natural resources on campus as a preventative intervention for unhealthy stress.

Based at Cornell Health, the campus health service, the program uses a paper or electronic prescription signed by healthcare providers to recommend how often students should spend time in a natural setting on campus. In the first year of the program, the number of NatureRx prescriptions given to students increased more than seven-fold, from 65 to 483.

“The students thought it was really cool that we were prescribing nature,” said Catherine Thrasher-Carroll, the mental health promotion program director at the Skorton Center for Health Initiatives at Cornell Health. “They were really glad that we were offering something that was palliative, accessible, and not pharmacological.”

Spending time in nature has also been shown to have positive effects in children diagnosed with autism. That impact has been demonstrated at the Els for Autism Foundation, a center for people with autism in Jupiter, Florida. The 26-acre campus includes a sensory garden that allows students, ranging in age from 3 to 21, to explore nature on their own and interact with plants using all of their senses.

“One of the overlying characteristics of autism is a dysregulated sensory system,” said Amy Wagenfeld, associate professor in the College of Health & Wellness at Johnson & Wales University in Providence, Rhode Island, who helped design the garden. “So every design decision of this garden was really based on principles of regulating the sensory system and providing the children with an outlet for autonomous play and interaction.”

Incorporating green space into healthcare facilities was not always part of the industry’s design guidelines. Researchers and organizations such as the Center for Health Design, have recommended that hospitals and long-term care facilities provide guidelines and other natural spaces as places of respite and positive distraction for decades. Currently access to nature is part of the guidelines of the Facilities Guidelines Institute (FGI), an organization that establishes standards for the healthcare industry.

“Change takes time, but it’s worth it if you persevere,” said Jerry Smith, principal and owner of SMITH|GreenHealth Consulting in Columbus, Ohio, who serves on the Environmental Standards Council of The Center for Health Design.

Another organization that addressed the need for the design of therapeutic environments, specifically for social interaction, was the Sustainable Sites Initiative (SITES), a program developed through a collaborative effort of the American Society of Landscape Architects, the Lady Bird Johnson Wildflower Center at the University of Texas at Austin, and the United States Botanic Garden.
“The outcome is that we did provide a new paradigm and it’s that people are a part of, not apart from, the environmental equation, and that we have a role and we can practice that in our work,” said Smith, who served on the Technical Core Committee and Human Health & WellBeing Subcommittee of the Sustainable Sites Initiative. “This was transformational.”

Integrating Green Spaces in Cities

Beyond healthcare facilities, sanctuaries of green space are also critical for creating healthy communities. One organization, Nature Sacred, has developed a customizable model for cities to adopt what it calls Open Spaces, Sacred Places — small green spaces in the built environment.

“Nature has a tremendous capacity to heal and transform individuals — and also communities,” said Erin Robertson, executive director of Nature Sacred, TKF Foundation, based in Annapolis, Maryland. “But it’s often overlooked and underutilized.”

The model developed by Nature Sacred relies on community engagement for the design and creation of enclaves of nature that are not typical parks or recreation spots, Robertson said. Instead, the sites are designed for specific spaces and community needs to encourage mindful reflection or respite within urban areas.

Over the past 25 years, Nature Sacred has provided 130 grants to establish public green spaces using a collaborative community creation process. Cities that want to create public green areas are asked to identify a “firesoul,” a community advocate and ambassador who then works with landscape architects and local residents to design the space.

Grants from Nature Sacred and the TKF Foundation have allowed communities that have been suffering from acute or chronic trauma to develop public green spaces. The projects have included the Butterfly Garden and Overlook on the site of a devastating tornado in Joplin, Missouri; the Naval Cemetery Landscape at the formerly chain-linked Brooklyn Navy Yard; and the Beach 41st Street Gardens at the site of the destruction from Hurricane Sandy in Queens, New York.

Therapeutic natural environments can also have a positive impact on another aspect of urban communities — violent crime. Statistics show that the rate of gun-related homicides in the United States is the highest among developed countries, and Americans are 10 times more likely to die by firearms than people in other countries. Every day, gun violence claims 96 lives in the United States.

To assess the impact green space has on violent crime, Shepley, Sachs, and other researchers at Cornell and the University of Virginia have been conducting a systematic literature review of studies published on the topic, which will update the most recent literature review, completed in 2013. After screening over 21,000 titles, 1,200 abstracts, and 300 full-text articles on the relationship between green space and urban violence, the team is now analyzing 60 articles that fit all of their search criteria.

“Our findings are promising, but it’s complicated,” said Sachs. “There’s definitely an indication that
green space, and a higher amount of green space, does contribute to a sense of community and a reduction in violent crime. But the quality of those green spaces also matters, and many other variables also come into play.”

One of the most definitive studies shows that transforming empty lots in Philadelphia into green spaces led to statistically significant reductions in violent crime and improvement in symptoms of depression among residents in those neighborhoods, Sachs said. The study was conducted by the University of Pennsylvania and the U.S. Forest Service based on work performed by the Philadelphia Horticultural Society.

The Cornell and University of Virginia researchers are now working to identify the mechanisms that affect the crime rate. The decrease in crime could be caused by the interaction with nature that reduces stress, the role green space plays in building community by bringing people together, and the impact of perceived investment in the neighborhood, Shepley said.

Shepley, chair of the Department of Design and Environmental Analysis at Cornell, further stated: “Once we know we want to study a specific mechanism, we will test this in the field to demonstrate whether or not it has the effectiveness that we think it has.”

Current State of the Practice

One of the first utopian cities where people could live harmoniously with nature was designed by Sir Ebenezer Howard, a British academic who created the concept of the Garden City in the late nineteenth century. Hoping to combine the best aspects of cities and the countryside, Howard designed his Garden Cities around an urban core, which was surrounded by concentric circles of farmland.

In the United States, the landscape architect Frederick Law Olmsted designed public parks and gardens because he wanted to help restore people and keep them healthy. “He knew what nature could do for everybody, and he did it on a very large scale,” said Jack Sullivan, associate professor in the Department of Plant Science and Landscape Architecture at the University of Maryland.

While modern cities moved away from emphasizing green space, the trend now shows signs of reversing, Sullivan said. In China, for example, Kongjian Yu, who founded the School of Landscape Architecture at Peking University, has transformed post-industrial sites throughout the country with public gardens and parks. Cities around the world have reestablished a connection to nature with trees planted on horizontal ledges on buildings, or vertical gardens or vertical farms growing on exterior walls.

The impact of green spaces can be demonstrated in other types of projects, such as the Green Road, a half-mile creek-side pathway created to provide a place of respite for U.S. veterans at the Walter Reed National Military Medical Center in Bethesda, Maryland. Funded with a $1 million grant from the TKF Foundation, the project includes a follow-up study that will measure how spending time on the pathway and surrounding woodland garden affects physiological and psychological metrics and...
stress levels of the veterans, said Sullivan, who is on the project’s team.

Teaching the next generation of landscape architects about the relationship between nature and health is now part of the curriculum at many universities. At the University of Washington, about 30 percent of graduate applicants to the Department of Landscape Architecture report their primary interest in the program is studying therapeutic environments, said Daniel Winterbottom, a professor in the department.

One way Winterbottom teaches students about the impact of nature on health is through a design/build program that has created therapeutic green spaces and gardens throughout the world. Since launching the program in 1995, Winterbottom and his students have integrated green spaces into prisons, healthcare facilities, senior living communities, schools, and veterans’ centers.

In an area of Guatemala that is infested with gang activity, Winterbottom and his students built therapeutic environments at local schools, including sensory gardens, playgrounds, and meeting places for families. In Croatia, they developed a series of therapeutic gardens at a psychiatric hospital built in a former concentration camp, where team members lived at the site to learn what the patients needed.

“That is really how we learn the most, by observing, living, seeing how people function with their body in space and in their activities,” Winterbottom said. “We were able to use some of that to inform some of the decisions that we made.”

One strategy that has also been successful in designing public green space is engaging local residents in the planning process. Design Workshop, an urban design, planning, and landscape architecture firm in Aspen, Colorado, used that process when it redeveloped a three-mile corridor in New Orleans in the aftermath of Hurricane Katrina.

During the planning process, nearly 13,600 residents were surveyed about their current health conditions, activity levels, and hopes for the corridor by the Tulane Prevention Research Center. Since it was completed in 2015, more than 300,000 people annually use the corridor for walking, biking, and other recreational activities, said Anna Laybourn, a principal at Design Workshop.

In another project in Vancouver, British Columbia, Design Workshop considered the issue of spatial equity, which assesses whether the most vulnerable neighborhoods have access to public parks. The concept was integrated into creating a master plan for the park system in Vancouver so that investment could be directed to underserved neighborhoods and residents in those areas could become more involved in the city’s public parks.

Another strategy to connect residents to recreational services is to link the concept to the healthcare system. Dr. Chethan Sarabu, a pediatrician and clinical instructor at Stanford University School of Medicine and director of clinical informatics at doc.ai, is working on a project to assess how to connect information on the recreational needs of pediatric patients with policymakers and planners in the community.

“Working as a healthcare provider with individual patients provides us with an

Chethan Sarabu: “How do we start to close this loop and involve the healthcare provider in this broader conversation between planners and policy makers?”

Cornell Institute for Healthy Futures
amazing opportunity to learn about someone’s health environment,” said Dr. Sarabu. “But then there really isn’t much of an opportunity for a healthcare professional to share the fact that this eight-year-old boy I just spoke to really wants to play soccer but there’s no soccer field anywhere near his house. How do we start to close this loop and involve the healthcare provider in this broader conversation between planners and policy makers?”

One way healthcare can integrate therapeutic environments is through Nature Explore classrooms, which are outdoor learning areas connected not only to schools and museums but also to doctors’ offices and hospitals. Now located in dozens of cities, the classrooms have been developed through a partnership with Nature Explore, a national nonprofit organization that has received funding from the U.S. Forest Service.

In Washington, D.C., a Nature Explore therapeutic landscape is being added to the Unity Health Care – Upper Cardozo Health Center. Sachs, a former postdoctoral associate in the Department of Design and Environmental Analysis at Cornell, is part of the team developing the site and conducting research on health outcomes.

“There is a lot of partnership opportunity to develop the green space at the facility because it’s one of those areas in greatest need of tree canopy,” said Tamberly Conway, partnerships, diversity, and inclusion specialist with the U.S. Forest Service.

**Next Steps**

After a series of guided nature walks around the Cornell Botanic Gardens, roundtable participants joined three discussion groups that explored future research; translating research into practice, education, and policy; and establishing the business case for the benefits of green spaces. The groups identified opportunities for short and long-term solutions to link nature and health, including but not limited to healthcare.

One area for further study is research that could determine whether the benefits of spending time in nature can be built up and positively affect people over long periods of time. Another potential area for research is assessing how health practitioners’ recommendations for patients to visit natural settings could be incorporated into medical health records and how outcomes of patient experiences in nature could be assessed.

Roundtable participants pointed out that researchers need to communicate their message about the benefits of nature to the public in more effective ways. For example, Irene Lekstutis, landscape designer at the Cornell Botanic Gardens, suggested including nature and wellbeing information in first-year student orientation materials at Cornell. Further discussions focused on ensuring that health professionals in all settings are informed and sensitized to Nature Rx programs so that they can incorporate nature prescriptions into their clinical care.

In addition, programs that encourage community residents to become involved in activities in public parks and recreation areas
need to be assessed to determine how they could be promoted to diverse sectors of the population so that more people are exposed to the benefits of nature.

Roundtable participants agreed that research will lead to more financial and academic investment in programs that encourage engagement with nature. Creating partnerships with researchers so that research findings are communicated to organizations outside academia will increase interest in the impact of nature on physical and mental wellbeing.

The roundtable concluded with a call for conference participants to continue to communicate with one another about their research and programs in an online discussion group. Organizers of the roundtable also proposed holding another symposium to track progress and research in a few years.

“To me, even if we just had this day together, that’s fantastic,” Sachs said. “I know that a lot of you have made contacts and are excited about meeting someone whom you’re going to work with on a project, and that also is fantastic. But one of our goals is to potentially carry this forward and have another symposium to see if we can attain some of the solutions that we’ve set out.”

Going forward, the collaboration and exchange of innovative ideas will continue and, hopefully as a result, more widespread acceptance of the necessity of nature for our wellbeing will be realized.

For additional information on CIHF programs, please contact the institute at CIHF@cornell.edu.
Agenda

Cornell Institute for Healthy Futures
Innovating Across Health, Hospitality, and Design


Thursday, April 25, 2019

5:30 - 7:30 p.m.  Welcome Reception

Roundtable Co-Chairs:  Mardelle Shepley, Associate Director of CIHF and Department Chair of Design and Environmental Analysis at Cornell University

Naomi Sachs, CIHF Industry Scholar and Postdoctoral Associate in Design and Environmental Analysis at Cornell University

Friday, April 26 2019

7:30 - 8:15 a.m.  Registration and Networking Breakfast

8:15 - 8:45 a.m.  Welcome and Introductions

AM Session 1  Current State of the Science

8:45 - 10:00 a.m.  Don Rakow, Associate Professor, School of Integrative Plant Science, Horticulture Section, Cornell University

Catherine Thrasher-Carroll, Mental Health Promotion Program Director, Skorton Center for Health Initiatives, Cornell Health, Cornell University

Tamsin Smith, Public Health Fellow, Skorton Center for Health Initiatives, Cornell Health, Cornell University

Amy Wagenfeld, Associate Professor, Capstone Coordinator, College of Health & Wellness, Johnson & Wales University

Jerry Smith, Principal/Owner, SMITH | GreenHealth Consulting

Erin Robertson, Executive Director, Nature Sacred, TKF Foundation

Naomi Sachs, CIHF Industry Scholar and Postdoctoral Associate in Design and Environmental Analysis at Cornell University

Mardelle Shepley, Associate Director of CIHF and Department Chair of Design and Environmental Analysis at Cornell University
10:00 - 10:15 a.m.  Networking Break

**AM Session 2  Current State of the Practice**

10:15 - 11:30 a.m.  Jack Sullivan, Associate Professor, Department of Plant Science & Landscape Architecture, University of Maryland

Daniel Winterbottom, Professor, Department of Landscape Architecture, University of Washington

Anna Laybourn, Principal, Design Workshop, Aspen Office

Chethan Sarabu, MD, Pediatrician, Stanford Medicine; Director of Clinical Informatics, doc.ai

Tamberly Conway, Partnerships, Diversity & Inclusion Specialist, U.S. Forest Service

11:30 - 11:45 a.m.  Assemble Working Groups

11:45 - 12:15 p.m.  Mindfulness Walk
Cornell Botanic Gardens

12:15 - 1:15 p.m.  Lunch with Working Groups

1:15 - 2:15 p.m.  Working Groups Continue

2:15 - 2:30 p.m.  Break

2:30 - 3:30 p.m.  Reports from Working Groups

3:30 - 4:00 p.m.  Closing Remarks, Next Steps

Rachel Dunifon, Interim Dean, College of Human Ecology, Cornell University
**Roundtable Co-Chairs**

**Mardelle Shepley**  
Associate Director, Cornell Institute for Healthy Futures  
Department Chair, Department of Design and Environmental Analysis  
Cornell University

**Naomi Sachs**  
Industry Scholar, Cornell Institute for Healthy Futures  
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**Melissa Carlisle, CALS ’97**  
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**LaWanda Cook**  
Extension Associate, Cornell University

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University Landscape Architect, Cornell University

**Joseph De Los Santos**  
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**Vaibhav Garg**  
Chief Business Excellence Officer, Raisecrown Group

**Asheesh Gupta**  
Founder and MD, Samarth Life Management

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**Mio Jia**  
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**Andrew Jenis, MD**  
Regional Vice President, USACS

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**Heather Kolakowski, SHA ’00**  
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Operations Manager, Ithaca Children’s Garden

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Founder, Owner, Artist Elizabeth Weiner Gallery

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Rana Zadeh
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Innovating across health, hospitality, and design to create a...