Workshop Summary

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Themes from the Discussion

Both the health and conservation communities are in periods of transformational change. The need to improve human health, while reducing costs and increasing access, is leading health care organizations “upstream” toward more preventive and community-based measures. At the same time, the need to expand the value of conserved land to a wider range of people is pushing conservation organizations toward incorporating their lands into broader efforts to build healthy communities.

The purpose of the 2013 Berkley Workshop was to explore some of these growing interconnections and to identify ways that the participants and others might help take them even further. The following areas were identified as among the most promising for work in the future:

· Focus on creating a healthy future, not just better health care;
· Reframe land trust missions to make improving health a core goal;
· Extend the research being done on the connections between access to nature and improved health;
· Disseminate both the research results and the practical lessons learned in this area to key actors through credible channels;
· Expand regional efforts around both research and action on these opportunities; and
· Connect networks of networks across the wide range of actors from the conservation, health, and related communities.

“Rising health care costs constitute a national crisis. The Affordable Care Act, by focusing national attention on prevention, offers a timely opportunity to bend the cost curve down. How can we prevent illness, and reduce health care costs, through ‘upstream’ interventions? How do we document the benefits of nature contact in this regard?”

– Howard Frumkin, University of Washington
The purpose of this summary is to highlight some of the major themes that ran through the discussions. More detailed write-ups of the specific topics covered are contained in the Sections that follow below – each of which contains a chapter of the background paper that was distributed prior to the workshop, as well as some of the additional examples and sources of information provided by the participants during the meeting.

**Where and how do we start to explore these connections?**

As the participants discussed the connections between human health and access to nature, they appeared to be building on a number of foundational assumptions:

- Humans have always had a love/hate relationship with nature – both dependent on, but fearful of it.
- Widespread destruction of natural habitats in the pursuit of economic growth and in the name of progress has resulted in many major, negative health consequences, for people and the environment.
- Epidemics of infectious diseases – solved in the past through public infrastructure to manage drinking water, garbage pickup and sanitary sewers – have been replaced by new epidemics of chronic diseases – obesity, diabetes, heart disease, and cancer.
- Infrastructure that promotes outdoor activity and accessible nature may well be part of the answer.
- Humans should invest in protecting, restoring and managing natural areas for many different reasons – including improving human health, while reducing costs and increasing access.

**Who are the major players in both health and in conservation?**

Capturing the opportunities to improve public health through improved access to nature, as well as managing the risks, requires recognition of the wide range of interests and groups involved in both the health and conservation arenas. Doing so will inform both an understanding of their needs/incentives, as well as strategies for influencing them.

On the health side, this includes a wide range of parties, such as:

- Individual patients: for many of whom drugs and technology represent progress; while appeals to nature are seen as primitive steps backwards.
- Health professionals: who will want to be sure that access to nature is effective and safe before changing their standard treatment practices.
- Hospitals: which are engaging more widely in the communities in which they work as part of their efforts to improve quality, increase access and reduce overall costs.
- Insurers: as they try to reduce health-care costs through their standards for reimbursements and support for community-based prevention programs.
- Employers: as they explore ways to improve the health of their employees and manage the costs of doing so.
- Policy makers: as they conduct cost benefit analyses and develop policy interventions around the best suite of incentives and behaviors for improving public health at the lowest cost.
· Health foundations: as they consider how grant-making and investment might best be coordinated for the greatest impact.

· Public health authorities and advocacy/research groups: as they work to overcome systemic health disparities (often in communities with little access to nature) and expanding health crises.

· Community planners/developers: as they seek to promote development in ways that both restore/protect critical natural resources and make those natural resources accessible to those living or working in those communities.

For each of these actors in the health sector, a number of different questions are important to understand better, including:

· What incentives affect how they do their work?
· To what information do they respond?
  - That based on: science? morals? business cases? broader public welfare?
  - Delivered through what channels and by whom?

Gathering this information across the variety of actors in the health sector will enhance efforts to identify overlapping areas of interests and pathways of influence as the opportunities and risks of improving human health through access to nature are explored further.

What are the social determinants of health?

According to the World Health Organization, the “social determinants of health are the circumstances in which people are born, grow up, live, work and age, and the systems put in place to deal with illness. These circumstances are in turn shaped by a wider set of forces: economics, social policies, and politics.”

For more information see: http://www.who.int/social_determinants/thecommission/finalreport/key_concepts/en/index.html

Presenting a similar segmentation of organizations involved in land conservation seems useful, as they do not all face the same institutional imperatives. For example:

· Public park agencies are subject to public funding processes – thereby requiring continual efforts to prove their value in the often short-term political domain.

· Water utilities protect large swaths of land as a means of reducing their capital and operating costs – subject to regulatory and pricing oversight.

· Private land trusts were set up to respond to threats of development by acting quickly to acquire interests in land of high conservation value – in order to protect that land in perpetuity, they now need to demonstrate continuing value to the communities in which the land is located.
- Public regulatory agencies oversee land development in many parts of the US – and vary in the extent to which those regulatory controls incentivize development, restoration or protection of natural areas.

- Environmental advocacy groups often focus on stopping particular development projects or supporting the adoption of land use regulations that slow development – rather than on supporting investments in "healthy" communities.

- Conservation funders, like those in the health community, are constantly seeking to lever their grant-making and investments in ways that deliver the greatest conservation values.

- Owners of working lands (such as forests or farms/ranches) are seeking new income streams from the stewardship of their holdings over time.

- Conservation developers are looking to combine attractive natural surroundings with attractive, healthy residences.

- Policymakers at the local, state and national level are facing a host of choices as they seek to increase the overall benefits to society from public lands and conservation funding.

How might this variety of conservation organizations best work with the variety of actors in the health community to help improve human health by improving access to and time in natural areas? The participants’ answers to this question offered both top-down and bottom-up approaches.

On the one hand, there was support for developing a shared, overarching vision for what was hoped to be achieved. Such a vision could then be used to help coordinate and measure success across a wide range of efforts. The last section of this summary describes some of the participants’ thinking on what such an overarching vision might include.

At the same time, there are a lot of exciting, bottom-up initiatives already underway – which need to be supported. Such efforts also offer opportunities for harvesting lessons learned and using them to help spur an even greater number of such efforts across even more communities.

“In the UK, we had plenty of good science but no policy support. Our strategy was grassroots with ambition. Start at the community level and expand upward.”

– William Bird, Intelligent Health

Some of the efforts to bring health and conservation actors together at the regional level (such as in the Pacific Northwest, Maine or Connecticut) may offer examples of ways to combine these top-down and bottom-up approaches. More attention should be paid in the future to documenting and sharing this work across regions.

### What are the potential health benefits of increasing access to nature?

There are many different connections to be made between health and land conservation, including many that were not directly covered in this workshop, such as:
Preserving access to clean water – the number one reason people vote in favor of local ballot measures to fund land conservation programs.

Reducing obesity and related diseases through outdoor exercise – a huge driver of investments in trails and park areas (see Section 6 below).

Increasing access to local, healthy food through the expansion of urban agriculture (farms and gardens) and/or regional processing and distribution networks connecting local farms to urban communities.

Mitigating urban flooding by increasing natural areas for receiving and retaining stormwater.

Reducing air pollution and respiratory diseases by increasing urban tree/vegetation cover or improving on-farm practices.

Reducing climate stresses to communities through natural vegetation effects – mitigating heat islands and offsetting rising temperatures in hot weather, while providing shelter from wind in cold.

Strengthening communities by creating a sense of place and fostering social connections among residents.

Capturing the co-benefits that accompany the creation of parks, trails or other “green infrastructure” in pursuit of any one of these benefits – while then providing the other benefits as well.

For the connections that we did cover – essentially improving the mental health of adults and the cognitive development of children – we heard about the:

Growing body of research demonstrating the benefits to mental health/development from time spent in nature.

Growing numbers of organizations working to deliver these benefits in their communities.

Need to dig into the details of who is deciding what types of mental health or educational programs are worth pursuing and what evidence/stories are convincing to them – so that access to nature can be presented as an effective and attractive option.

**Mental health resilience and access to nature**

As described in Section 2 below, while great work is being done in the UK to bring increased time in nature into the national health effort, Dr. William Bird (of Intelligent Health, http://www.intelligenthealth.co.uk/) summarized the difficulties they continue to face with the following story:

“At a recent medical conference, I described the health benefits from time in nature, but gave it the name ‘Fitirex’ so that people would think it was a medication. At first, they were all excited about this new drug…but the excitement ebbed away when I revealed that it was time spent walking in nature…”
So, as the evidence of these benefits mount, the need to overcome such reactions becomes even more clear. One way to do so might be to tell stories about why the benefits of nature exist — and to do so in ways that people can relate to across the scales of our native habitat, our bodies, our brains and our cells. Such responses also highlight the need to frame the opportunities in different ways for different audiences. As one participant noted:

“If we just take the angle from the public health lens, we may have limited penetration with hospitals and doctors. If we just take a business or clinical lens, then we might lose the sectors that want the broader vision. We need to be able to do both.”

While our technologies and societies have changed dramatically in the past few centuries, our bodies are still those of a hunter-gatherer. As such, we need healthy, natural places in which to live.

“Every zookeeper knows that great habitat is essential for animals, and the metric of success is obvious: thriving animal populations. But we rarely think about healthy human habitats in that same way. We are seeing substantial increases in a range of ailments: obesity; asthma; neurobehavioral disorders; autoimmune diseases; reproductive disorders; car crashes; depression. Can healthy human habitats, including nature contact, be part of the solution?”

— Howard Frumkin, University of Washington

Dr. Bird noted that evidence shows people need the following in order to thrive:

- To live in a place that is healthy or supports healthy choices,
- With groups of people that we trust,
- For and with whom we serve a purpose.

Our individual health diminishes if we lose any of these three factors — including a healthy habitat. While some efforts have been made to define the key factors in creating such a healthy habitat for humans, more work should be done to catalogue and disseminate those findings.

At the level of our brains, we need to recharge our mental energy by offsetting the time we spend devoting “direct attention” to our work by spending time on activities with a high degree of “indirect attention.” The fascination that comes from relaxing in nature has been shown to be a good source of indirect attention and, hence, a site of replenishment for “direct attention” (Kaplan, 1995, Berto, 2005 – cited in Section 2 below).

At the cellular level, chronic stress, obesity and inactivity all cause damage to our mitochondria by increasing the production of free radicals that eventually result in cellular damage and increased inflammation, which is a trigger to many Western diseases of concern — such as diabetes, cardiovascular disease and Alzheimer’s. Being active in a natural environment (so called “Green Exercise”) reduces stress and increases activity in a manner that can reduce this damage (Moylana et al., 2013 – cited in Section 2 below).
Not only is this an attractive, accessible way to tell the story of the health benefits of time spent in nature – from healthy habitats, to the health of our bodies, our brains and our cells – there is much anecdotal evidence and a growing number of smaller studies to support these conclusions.

Unfortunately, there has been relatively little uptake of this information by the “traditional” medical or health communities in the U.S. This raises a number of questions:

- How might we aggregate the information being collected across these decentralized research and application efforts? Would it be worthwhile to develop a standard protocol/“science in a box” like package for use by members of coordinated networks of actors?

- How should the findings of this research best be presented so as to enhance its uptake within and use by medical audiences? What are the key data types, methods of collection and channels of communication that need to be used?

- What new approaches to research on the health benefits of time in nature – such as those using clinical trials and randomized sampling to focus on systems, doses and responses – should we be using to increase the credibility of the findings within the medical community?

- Should we be applying the same standard of proof to time in nature as a treatment method that we require for pharmaceuticals and other therapeutic methods – given the apparently small down-side risks and large co-benefits?

The discussion then moved from research on nature and mental health to how one might attract more people into nature – particularly from communities that are not known for spending large amounts of time in the woods.

We were fortunate to have Rue Mapp, the founder of Outdoor Afro (http://www.outdoorafro.com/ – see description in Section 2 below), with us to talk about her efforts to (re)connect more African-Americans to the land. While Ms. Mapp enjoyed a childhood spent in the outdoors at her family’s ranch, such has not been the case for a large proportion of African-Americans. Many families were disconnected from their traditional lands when their parents or grandparents moved to the cities. The memories of violence committed against African-Americans in rural areas are also strong and widespread. Finally, even if an African-American family chooses to go to a national park today, they are not likely to see many people who look like them among the other visitors.

In response, Outdoor Afro focuses on connecting its members to “nearby nature.” Instead of getting on a bus to travel somewhere else to nature, urban hikes to farmers’ markets are organized among the members. Such easy, accessible, repeatable and enjoyable experiences build connections among the members and with the land, thereby creating opportunities to branch out even further.
Ambassador Landscapes - A New Mission For Preserved Lands

“Given the long-term nature of conservation, many land trusts are now re-thinking how some of their nature preserves could become more people-focused,” Judy Anderson, Community Conservation Consultant and a participant in the workshop, noted. Such lands may become “Ambassador Landscapes,” a phrase Anderson coined to describe a preserved area that is “very different from a traditional, or typical, nature preserve” in its mission. These landscapes, “from as small as a ¼ acre to hundreds of acres,” are designed “to bring the joy of the out-of-doors and natural or agricultural landscapes to life in a way that is meaningful” to users.

“Ambassador Landscapes’ have important work to do,” Anderson says, “to instill a comfort for, and connection with, the landscape over generations.”

Such experiences do raise questions about who do the parks “belong to”? What roles did neighbors have in creating or designing the park? Does it offer activities that are attractive and accessible to local residents? If not, is the park more likely to go “feral” and become a site feared – rather than used – by surrounding populations?

If the success of these ventures comes from building relationships with nature and each other, is there any way to help many more such relationships spring up in a decentralized process? Might “relationships in a box” be offered to help interested groups develop their own activities? This might draw from the work of groups like Outdoor Afro or the Children and Nature Network and its “family nature club” model (http://www.childrenandnature.org/directory/clubs/). Other communities with deep ties to land – Native American? New immigrants from agricultural or mountainous areas? – might also be valuable partners in these efforts.

Land trusts seem particularly well suited for helping to make these connections, given their roots in local communities. They will, however, need to shift their focus from solely acquiring interests in land to also building culturally-attractive pathways into nature for members of the surrounding communities. This may well be an effective theme around which to build their stewardship programs over time. Additionally, they might be in the position to sponsor local groups to support the renovation of local parks, improving facilities or offering richer programing and enhanced security in the process.

“Jim Fixx’s book, The Art of Running, helped to create the running culture we now see in much of the U.S. We need similar books to help make spending time in nature a popular lifestyle choice across communities and cultures.”

— Robert Ogilvie, ChangeLab Solutions
Children’s cognitive development and access to nature

A similar storyline exists on the connections between children’s cognitive development and access to nature:

- A growing body of research demonstrates the benefits; and
- Many schools are incorporating time in nature into programs for their students.

On the research side, it was noted that there are over 200 abstracts of studies showing these connections on the website of the Children and Nature Network (http://www.childrenandnature.org/ – see also Section 3 below). According to Dr. Ming Kuo from the Landscape and Human Health Laboratory at the University of Illinois (http://lhhl.illinois.edu/index.htm) this research includes findings such as the following:

- Children’s’ academic performance improved with more access to greenspace in the Chicago public schools, with the most powerful beneficial effects on children at risk;
- In the Netherlands, proximity to parks was connected to improvements in test scores – raising the possibility of understanding dose/response effects; and
- For children with ADHD, walks in green areas have been found to have similar effects as a dose of Ritalin – and parents are reporting that they notice the difference.

“Can we now say that a 20 minute walk in nature has the same effects on ADHD as a dose of Ritalin? If so, I can get people’s attention with that.”

- Rand Wentworth, Land Trust Alliance

The gap between the findings of these studies and their use by the medical system, however, poses the question of how might better use of this compelling body of evidence be made? Some of the areas to explore that came out of the discussions included the following:

- How might the researchers doing this work be helped to publish more of their findings more quickly? Might foundations and other donors find ways to help relieve them of other duties so that publications can be finished earlier? Might blogs be used to get initial findings out to interested networks before final academic articles are published?
- How might the various data sets being gathered and used in this work – across schools, cities, regions, countries – best be linked to allow for aggregated analysis and reporting?
- Should this research be shifting to designs that more closely mirror traditional approaches for research on medical treatments – such as clinical trials?
- How best respond to offers from health care groups like Kaiser Permanente to explore indicators of health outcomes – such as proximity to parks – in their enormous data sets?
The potential for analyzing "big data" sets in this arena seems huge – such as combining data on health and academic achievement with spatial proximity to parks and other features. In addition, finding ways to redesign or reframe the results of the research to appeal to the different audiences who might act on it is a critical on-going need.

On the delivery side, many schools are working to incorporate nature more directly into their educational programs. For example, we heard about the work being done by Common Ground in New Haven, CT (http://commongroundct.org/) – see also the description in Section 3 below). The organization offers a nature center, urban farm and small high school at the gateway to an urban park to students, their families, as well as students and teachers from across New Haven.

They have developed a pedagogy that relies heavily on “experiential learning” to convey key academic concepts while developing a connection to the natural world. At the core of their approach is an effort to incorporate nature into their teaching by asking students to:

- Get outside,
- Identify a problem (with some guidance from the teachers),
- And solve it –
- Using techniques learned from the teachers, textbooks and each other.

The hooks they use for attracting students, parents and others to their site include:

- Enhancing the academic performance of their students;
- Offering employment opportunities connected to food production and/or the natural environment for teenagers during the school year and the summer;
- Offering scholarships to help increase the affordability of their programs; and
- Making it “fun” to be outdoors by carefully incorporating unstructured outdoor play into their programs.

“Getting kids outside for the first time is hard – getting them out the 2nd time is easier. So we need to get them out once and make it fun.”

– William Bird, Intelligent Health

Common Ground has found that food, farming and animal husbandry make effective gateways for kids and their families to use the site. Cooking and eating food immediately after harvesting it from the farm is particularly attractive. Food is also a powerful vehicle for raising issues of social justice in urban environments, as students recognize that the food raised by Common Ground is just one small part of a complex system and set of challenges surrounding access to a healthy diet.
“Public gardens should change their signs from saying ‘don’t pick the grapes,’ to ‘pick, eat, save and plant the seeds’.”

— Marcie Tyre Berkley, Maine Huts & Trails

Parents and school officials generally have one of two reactions to the role that time outdoors has in their educational programs. Some are completely on board and think it is great. Many others see it as bad, as it takes time out of the classroom where “real learning” occurs. In many of these people’s views, time spent with technology is progress, while time spent in nature is a step backwards.

The faculty and staff at Common Ground are trying to reframe this discussion around the question of – “what is the best way for your child to develop the brain that you would want her or him to have?” Access to the studies like those cited above is a huge help in this effort, as is the student body’s continued high performance on traditional academic measures of success. The continuing efforts to digitize even more learning appear to raise both concerns and opportunities. If they mean that children will spend more time at desks indoors, that compounds the problem still further. If they offer new ways for children to enjoy their time in nature, say through games, they could be a major boost to efforts to get children outside.

Fortunately, land trusts and other conservation organizations have been and are doing even more with such programs in and near cities, such as the:

· Weekly “mud clubs” offered to four year olds by local land trusts.
· Efforts of the U.S. Fish and Wildlife Service to develop urban refuges for use by surrounding communities.
· Offer by the Warm Springs Tribe in Oregon to provide connections to the land to immigrant populations in the cities.
· Development of “unplug summer camps” for adults – and the opportunity to see the traditional summer camps for kids in a newly attractive light.
· Incorporation of technology into time in nature, such as through “geocaching” (http://www.geocaching.com/) and other activities.

All of these mean that there are many partnership opportunities available for groups who would like to promote the development of healthy brains in children by connecting them more regularly to natural areas.

Understanding and managing the risks from nature

At the same time, many people fear nature – whether they “should” or not. Workshop discussions included two perspectives on this question – one from the urban ecology research community and one from the management activities of the National Park Service.
“As Woody Allen said, ‘I am at two with nature.’ Just as with medications, people vary in their responses to nature. How much do we need to know about the benefits – and risks – of nature before we can more fully incorporate it into health practices?”

– Howard Frumkin, University of Washington

On the research side, we heard from Dr. Shannon LaDeau at the Cary Institute of Ecosystem Studies (http://www.caryinstitute.org/, see also the discussion in Section 4 below) about her work on the links between the ecology of disease and the greenspace restoration efforts in Baltimore. These links build from both the:

· Long-Term Ecological Research effort that has been underway in Baltimore for many years (http://www.beslter.org/frame4-page_3h_06.html), as well as the

· Decision by the City that a greener Baltimore is a more attractive Baltimore for the types of employers and employees they are seeking to have relocate there as part of their economic redevelopment efforts (http://www.baltimoresustainability.org/).

Dr. LaDeau noted that there is a growing body of scientific evidence that shows that, while there certainly are health risks associated with nature, they are usually outweighed by the health benefits (including those described above). It does appear that the risks of arthropod-borne diseases – Lyme Disease, Dengue Fever, West Nile, others – are on the rise as a result of spreading invasive species, climate change and the abandonment of urban areas (such as in parts of Baltimore) in the U.S. Since these vector-borne diseases are spread by insects and ticks interacting with both animals and humans, the risks are often the worst where there is the greatest mixing of people and animals – i.e., in the suburbs.

Dr. LaDeau reported, however, that many of the neighborhoods in which they are working in Baltimore are not supportive of efforts to restore natural areas. For example, many community members oppose planting more trees because they are seen as bringing more mosquitoes, trash and criminals. Similarly, installing retention ponds or other green infrastructure to retain stormwater is also associated with more mosquitoes and trash dumping as well.

Both logic and emotion are involved in these concerns. For example, even if the “actual” risks from planting trees or installing green infrastructure are low (for reasons related to insect behavior, project design, management or other factors), the “perceived” risks can be quite high – particularly if they are unfamiliar and involuntarily imposed. This means that while comparative risk analyses need to be done, residents’ concerns need to be addressed with information they can relate to, provided by people they trust.

“If you don’t have a pet, you are likely to be frightened of dogs. If you are not spending time in nature, you are likely to be afraid of it.”

– William Bird, Intelligent Health

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On the management side, we learned that the National Park Service (NPS) is one of the few organizations in the U.S. currently working to incorporate both health and conservation values into its central mission. Through the Healthy Parks, Healthy People US initiative (http://www.nps.gov/public_health/hp/hphp.htm) the NPS is “working to reintegrate human, environmental and ecological health into the mission of public parks and public lands.”

Dr. David Wong, chief of the Epidemiology Branch at the NPS, then discussed their approach to managing these sometimes conflicting goals.

The first step is to prevent health issues from arising by reducing visitor exposure to health risks. Monitoring and surveillance is a huge part of this effort, both by the NPS itself, as well as in partnership with state and local health officials.

Such monitoring goes beyond human health to include environmental factors – such as numbers of snakes or numbers of snakes biting domestic animals – as indicators of possible elevated risks to humans. Integrated dashboards are being developed across different datasets established by these collaborating institutions to help managers identify areas of possible threat. Developers of these dashboards envision that when a vet reports a dog being treated for a snake-bite in one county, nearby park managers and doctors will have access to that alert. Efforts are also underway to establish baselines for both patterns of park use, as well as the likely effects of a changing climate (such as mosquitos in the Everglades), so that changes can be tracked and used to predict new risks over time.

Based on the information collected, a wide range of management actions can be taken – from closures, to warnings, educational materials and programs. One new area of experimentation is to have interpretative rangers include more information on the history of health issues in and around the park as part of their tours – such as in the national historical park in the industrial city of Lowell, MA (http://www.nps.gov/lowe/index.htm).

In addition, targeted, efficient interventions – such as in building design or limited pesticide applications – can be used to help reduce identified risks. More broadly, efforts are underway to improve the healthy food options available as part of the effort to promote the public’s health while visiting the national parks.

Even with such preventative efforts, outbreaks of diseases will still occur. In those situations, the NPS has rapid response mechanisms in place, again working with state and local health officials.

It was not clear to the participants whether many land trusts faced similar issues in their efforts to bring more people onto their lands or, if they did, how they were responding. Fortunately, the NPS is happy to share the lessons from their work with land trusts as they develop their own educational programs or risk management plans.

**Linking incentives to conserve land to access to improved health care**

In addition to considering the health benefits and risks of connecting people to nature, one of the new ways that protecting nature is being used to help fund access to better health care was also discussed.
As described in more detail in Section 5 below, the participants heard about the Pinchot Institute’s effort to offer forest landowners expanded health care coverage by monetizing the carbon stored in their trees. This effort grew out of surveys of landowners and their children in the Pacific Northwest. Among the most striking results were the likely impacts of health care costs on the owners’ ability to pass the forest to their children. In many cases, there was a real fear that the forest would have to be sold for development to pay the expected costs of caring for aging parents.

In response to this projected risk, the Pinchot Institute is offering an “ATreeM card” (http://www.pinchot.org/news/451) to help cover health care costs to forest landowners. The money available through the card comes from helping the landowner tap the markets for forest carbon – in which emitters of greenhouse gasses pay owners of forestland to manage their forests to store more carbon than they would otherwise. The proceeds from such sales are then transferred to the ATreeM card account and can be used to offset specified categories of health expenses.

Some of these emitters are in the health care industry. Market research suggests that they find the link between the amounts paid to store carbon and the use of those proceeds for health services attractive. The Pinchot Institute points to a variety of other potential benefits as well, including possibly keeping the landowners healthier for longer by keeping them engaged with their forests and by avoiding the carbon emissions that would occur should the forest be sold and cut down for development.

The success of this model depends on outside sources of funding (in this case, carbon credit buyers) “purchasing” the conservation value of the land in return for access to expanded health coverage. Under this model, markets for “ecosystem services” other than carbon storage – wetlands, endangered species, water quality, etc. – might also be tapped. More traditional sources of conservation funding – donations from individuals or foundations, public grants/loans – might also be used to engage landowners who are not yet ready to sell or permanently transfer rights. New funding from the health system around preventive programs might also be accessed to help promote healthier landowners, cleaner water and air, as well as the other health benefits of natural areas.

These efforts are one example of the work being done to explore new ways to connect land conservation and human health. Instead of just focusing on acquiring interests in land, might land trusts and other conservation organizations help create incentives for the more sustainable management of working forests and farms by investing in improved access to health care? More such efforts should be encouraged as these possible connections are explored more widely.

**What are the critical next steps for making access to nature a key part of efforts to improve health?**

After these wide-ranging discussions on just some of the connections between health and access to nature, participants broke into four small groups to develop their lists of critical
next steps. While each of the groups developed its own answers, the following broad themes emerged from across their discussions:

· Focus on creating a healthy future, not just better health care: the conservation community should join the health sector in looking upstream to community-based, preventive measures as part of efforts to build a healthier future.

· Reframe land trust missions to make promoting health a core goal: as part of both acquisition and stewardship activities, thereby enhancing their continuing relevance to the communities in which they work.

· Extend the research being done on the connections between access to nature and improved health: in both quantity and form, so that it can be even more readily used by health and conservation organizations.

· Disseminate both the research results and the practical lessons learned to key actors through credible channels: translate the results of both research and action into the language of the intended audiences and deliver it through messengers they trust.

· Expand regional efforts around both research and action: involve as wide an array of partners as best fits the local context.

· Connect networks of networks across the wide range of actors from both the conservation and health sectors: use existing networks to increase the sharing of information and the development of new projects across the huge number of actors in the health and conservation fields.

In considering these areas for possible further work, no effort was made to negotiate an agreed set of tasks for the group as a whole. Rather, the participants were asked to describe at least one action they were planning to take based on the workshop discussions. This list may be seen as a working menu of possible actions by participants and others interested in deepening these connections.

Using the broad themes described above as an organizing structure, this menu of possible actions suggested by the participants included the following (in no particular order):

· Focus on a healthy future:
  
  o Ensure that access to natural areas is reflected in the work by health institutions on building healthy communities.
  
  o Join with local hospitals to include time in/access to nature as part of their Community Health Needs Assessment under the Affordable Care Act.

  o Offer an attractive “nature rich future” as an alternative to the “dystopic”/“post-apocalyptic” stories that appeal to so many young adults today.
“Convinced that children, since they are an inalienable part of nature, not only have the right to a healthy environment, but also to a connection with nature and to the gifts of nature for their physical and psychological health and ability to learn and create…” the World Conservation Congress “[e]ndorses the child’s right to nature and a healthy environment.”

- Declaration of The World Conservation Congress, at its session in Jeju, Republic of Korea, 6–15 September 2012

- Reframe land trust missions:
  - Encourage land trusts to also work where people are, not just where they are not.
  - Encourage land trusts to be robust members of their communities, actively helping to improve access to food, education, health and jobs.
  - Highlight the accessibility to and use of land trust land by members of their neighboring communities.
  - Support efforts to inventory and make available lists of publicly accessible natural areas across the country.
  - Add more medical/health professionals to land trust boards.
  - Provide to health organizations the data being collected on proximity to parks by groups such as the Trust for Public Land.
  - Use their influence in Congress to seek additional NIH funding for this line of research.
  - Explore a new type of easement – possibly called a Public Health Easement – that ensures access to green space, local food and other public health benefits.
  - Encourage “gamefying nature,” such as through walking events/challenges, geocaching competitions and similar activities.

“Long term goal: change infrastructure to get people walking more. Short term goal: grab kids’ attention and get them outside.”

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- Extend the research:
  - Replicate the analyses done in Chicago on children’s academic performance/attention span using the data available in New Haven and elsewhere.
  - Respond to Kaiser Permanente’s request for proposals to run analyses on its health data to search for indicators of improved health related to proximity to/time in nature.
  - Determine who does and does not have a walking route under 0.5 of a mile between home and a public park entrance.
- Revisit the basic ecological research being done in Baltimore and elsewhere with an eye on making it more relevant to the greening efforts underway in the City, as well as to broader work on the health implications of access to natural areas.

- Collect more data on the impacts of “greener” school programs and others designed to increase children’s time in nature.

- Develop new forms of research to meet even more directly the needs of the medical community.

- Specifically look at the role of access to nature in improving the social determinants of health.

- Disseminate the lessons learned:
  - Petition the Environmental Health Roundtable of the Institute of Medicine (http://www.iom.edu/) to do a roundtable on/review of the science linking access to nature and improved health.
  - Make the work being done/lessons being learned on managing vector-borne diseases in the National and other parks available to land trusts and other conservation organizations.
  - Post more articles and blogs, while encouraging others to do so as well, on the Children and Nature Network’s (http://blog.childrenandnature.org/) and other sites.
  - Assemble the available data and use it to inform testimony to state legislatures about the importance of supporting the links between improved health and access to natural areas.
  - Run innovation labs among graduate students at Yale (environment, management, health, others) and elsewhere to generate new ideas for strengthening these connections still further.
  - Have leaders in the public health and land trust arenas jointly prepare an editorial for the Journal of the American Medical Association on the importance of these connections.
  - Capture opportunities for reflecting the lessons learned in the UK in new medical school curricula being developed in the U.S.
  - Bring these concepts into the strategic planning process already underway at foundations focused on improving public health.
  - Run for local school boards to help bring these ideas into the local schools.
  - Work together to write/edit books on the subject, such as the one underway in response to a request from Oxford University Press.
  - Consider having the Land Trust Alliance and the Children and Nature Network jointly hire a health educator to work with land trusts to help them reframe their missions to include public health, as well as to help them communicate with donors and the public around this reframing.
Focus on developing “natural leaders” – young people trained to form small neighborhood groups of their peers and to lead those groups in outdoor activities.

Encourage retired folks seeking to remain engaged in “Encore Careers” to serve as mentors for youth and families engaging outdoors.

The “Gray is Green” program of the Natural Resources Defense Council (grayisgreen.org) is an example of an environmental education, advocacy, and action organization for older adults.

Create more compelling graphical representations and infographics on these connections, such as the “23½ hours” infographic (http://www.youtube.com/watch?v=aUaInS6HIGo).

Find a land trust/group to work with a local MacDonald’s or other restaurants to “green the play space,” by including more plants, shade and less plastic.

Encourage and support the building of community gardens at neighborhood health clinics.

Distribute models for land trusts to use when working to get children out into nature and invest in regional pilot projects – both implementation and evaluation/sharing of lessons learned.

Encourage the American Academy of Pediatrics to examine the evidence, issue guidelines, publish research and advocate to the Institute of Medicine.

Be alert to the roles/impacts of power and privilege on access to health care and healthy habitats.

Advocate for municipal, county and state zoning codes/requirements to include “walk-to” natural spaces and gardens in every school and neighborhood.

Include access to natural areas in pre-school/headstart program requirements, as well as in elementary and high school curricula.

What might long-term goals look like for these efforts?

1. Parents, teachers, school administrators and government leaders are aware of the connection between nature and health.

2. Doctors, hospitals and public health administrators understand the connection between nature and health.

3. Ensure that every child growing up in America will be within a 10 minute walk of an entrance to a safe and accessible park, trail or public garden.

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• Expand regional efforts:
  o Gather groups in Maine, the Pacific Northwest, Connecticut and elsewhere to pursue locally effective connections among conservation, health, school, food and related groups’ efforts to build healthy, vibrant communities.
  o Focus on a key opportunity for making progress – such as on children’s obesity – which holds strong appeal among parents.
  o Do a local pilot project on gaming as a way to increase children’s time on trails and in the woods.
  o Explore the expansion of the ATreeM card approach to farm and ranch lands using food production guarantees or other mechanisms as a means for offering better health care to farmers.
  o Connect urban and rural audiences around health and land in Oregon and elsewhere.
  o Catalogue actions underway in Maine so that they can be taken to the Maine Health and Social Services Funders Network to explore collaboration opportunities.
  o Reflect the lessons learned about healthy design in efforts to redesign and rebuild state and municipal parks.
  o Do more wellness walks on conserved land with doctors, nurses, health clinic staff, students and their families.
  o Run a “forest bathing” pilot project in a part of Oregon near a medical school and a Veteran’s Affairs hospital.
  o Reflect health co-benefits in efforts to expand the use of “green infrastructure” for water, air quality, temperature reduction and other purposes.

• Connect networks of networks:
  o Inventory and explore ways to connect the work of the many organizations that share overlapping goals in this arena, including the:
    ▪ One Health Initiative - http://www.onehealthinitiative.com/
    ▪ Convergence Partnerships - http://www.convergencepartnership.org
    ▪ North American Association for Environmental Educators - http://www.naee.net/
    ▪ Child Left Inside Coalition - http://www.earthday.org/partner/no-child-left-inside-coalition
    ▪ American Planning Association - https://www.planning.org/
    ▪ Centers for Disease Control and Prevention - http://www.cdc.gov/
- Prevention Institute - http://www.preventioninstitute.org/
- Funders Network for Smart Growth - http://www.fundersnetwork.org/
- Smart Growth America - http://www.smartgrowthamerica.org/
- Local food organizations
- Farm Based Education Association - http://www.farmbasededucation.org/
- Community Garden Association - http://www.communitygarden.org/
- Local business organizations, such as Chambers of Commerce, Rotaries, outdoor businesses and others
- Youth service organizations such as the Scouts, YMCA, Boys and Girls Clubs
- National Park Recreation Association - http://www.nrpa.org/
- AARP – particularly its research on walking - http://assets.aarp.org/www.aarp.org_/articles/health/2009_walking_guide_o9%5B1%5D.pdf
- Rails to Trails Conservancies - http://www.railstotrails.org/
- Association of Schools of Public Health - http://www.aspph.org/
- Health Insurers, particularly their Wellness Programs
- Urban Land Institute - http://www.uli.org/
- Community foundations
- Community hospitals
- Community economic development organizations
- Transportation Demand Management Programs
- Safe Routes to School Programs - http://www.saferoutesinfo.org/

- Review and promote the Global Impact Investor Network’s metrics on the human health outcomes of investments (http://giirs.org/).
- Explore connections with friends from the health or conservation sectors – such as a former head of the American Medical Association who is now a board member of a foundation working on these issues.
- Pursue coordinated strategies across health, education and conservation funders.
- Connect these efforts to build healthy human habitats to grassroots organizations working to improve neighborhoods in their cities.
- Form a coalition of land trusts and health professionals/organizations to influence public policy at the federal, state and local levels.
How to mobilize action across organizations — using the process recommended by Hanley-brown, Kania, & Kramer in the Stanford Social Innovation Review (2012) Channeling Change:

1. Start by listening to those in need.
2. Develop a common agenda.
3. Agree on shared measurements.
4. Implement mutually reinforcing activities.
5. Engage in continuous communications.
6. Fund backbone support organizations.

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For more information see: http://www.ssireview.org/blog/entry/channeling_change_making_collective_impact_work