

EHS Bulletin

A quarterly update increasing awareness and understanding of the interaction between human health and the environment



A Quarterly Update

Issue 4 -- Summer 2012

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Message from the Editor

Devon Payne-Sturges

National Center for Environmental Research

Welcome to the Environment, Health and Society research methods bulletin. Every quarter, this bulletin features a method for evaluating the interaction of human health and the environment, explaining and providing information and news about the featured method.

Along with the newly launched EHS website (epa.gov/ncer/ehs), this bulletin seeks to bridge the gap across disciplines in an effort to transform human health and environmental protection. In this edition, we feature a discussion on Health Impact Assessment (HIA), a decision support tool to help local governments and agencies consider the health consequences of policies, plans, programs or regulations. HIA views health holistically and can help decision-makers understand the impact of the decision on health outcomes and their social and economic determinants. HIA can help decision-makers and stakeholders



examine the health equity implications of decisions. HIA also recommends ways to boost the health benefits of those activities and mitigate their negative impacts.

EPA Science to Achieve Results (STAR) fellow, Rachel Krause, shares her research on municipal governments' attempts to address climate change at the local level. Her research may help other local governments make better policy decisions concerning climate change mitigation strategies in the future.

This issue of the bulletin includes

information about conferences, resources and articles about research methods.

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Health Impact Assessment: A Review of Its Potential

Tina K. Yuen, Fellow, National Center for Environmental Research

Florence Fulk, Branch Chief, National Exposure Research Laboratory

Health Impact Assessment (HIA) is an emerging decision-support tool that has shown promise in assisting local, state and federal agencies in evaluating the public health consequences of a project, plan or policy and in utilizing scientific evidence to support decision outcomes that will potentially produce the best possible health outcomes (NRC, 2011). It is defined as “a systematic process that uses an array of data sources and analytic methods and considers input from stakeholders to determine the potential effects of a proposed policy, plan, program or project on the health of a population and the distribution of those effects within a population. HIA provides recommendations on monitoring and managing those effects” (NRC, 2011).

HIA is a structured approach that uses scientific data, professional expertise and stakeholder participation to identify and evaluate public health impacts of a pending decision or action (Wernham, 2011). As

both a health protection and health promotion tool, HIA typically recommends actions to minimize adverse health impacts and optimize beneficial ones (NRC, 2011). The true value of HIA is its ability to shed light on potentially significant information that would otherwise be under-recognized, unanticipated or marginalized (Cole et al, 2005), especially concerning decision settings that do not typically include health as an important consideration. In this article, we provide an overview of the practice of HIA and its potential value to decision-makers and stakeholders.

What makes HIA different from other health assessments commonly used such as human health risk assessment (HHRA), or those conducted as part of an environmental impact statement (EIS), is that HIAs will often focus on multiple determinants and dimensions of health in its assessment. An HHRA will usually only examine the exposure patterns and attributable health

effects from a single pollutant.

Health assessments in EIS tend to be very narrow and not to consider health broadly (Bhatia & Corburn, 2007). With this conceptualization of health, the practice of HIA also draws attention to the structures and policies that shape health determinants and their distribution that have consequences for disproportionate disease burden (Bhatia & Corburn, 2007). One step in the HIA process is to develop a logic framework, or a causal model, to provide a schematic for understanding how the decision under consideration operating through the various pathways can affect human health (Cole & Fielding, 2007; Bhatia, 2011). An example of a logic framework is depicted in Figure 1 from the Road Pricing HIA in San Francisco, CA. The road pricing policy proposes to increase travel costs to the downtown area in order to reduce traffic congestion and improve investments in public transit infrastructure which, in turn, would

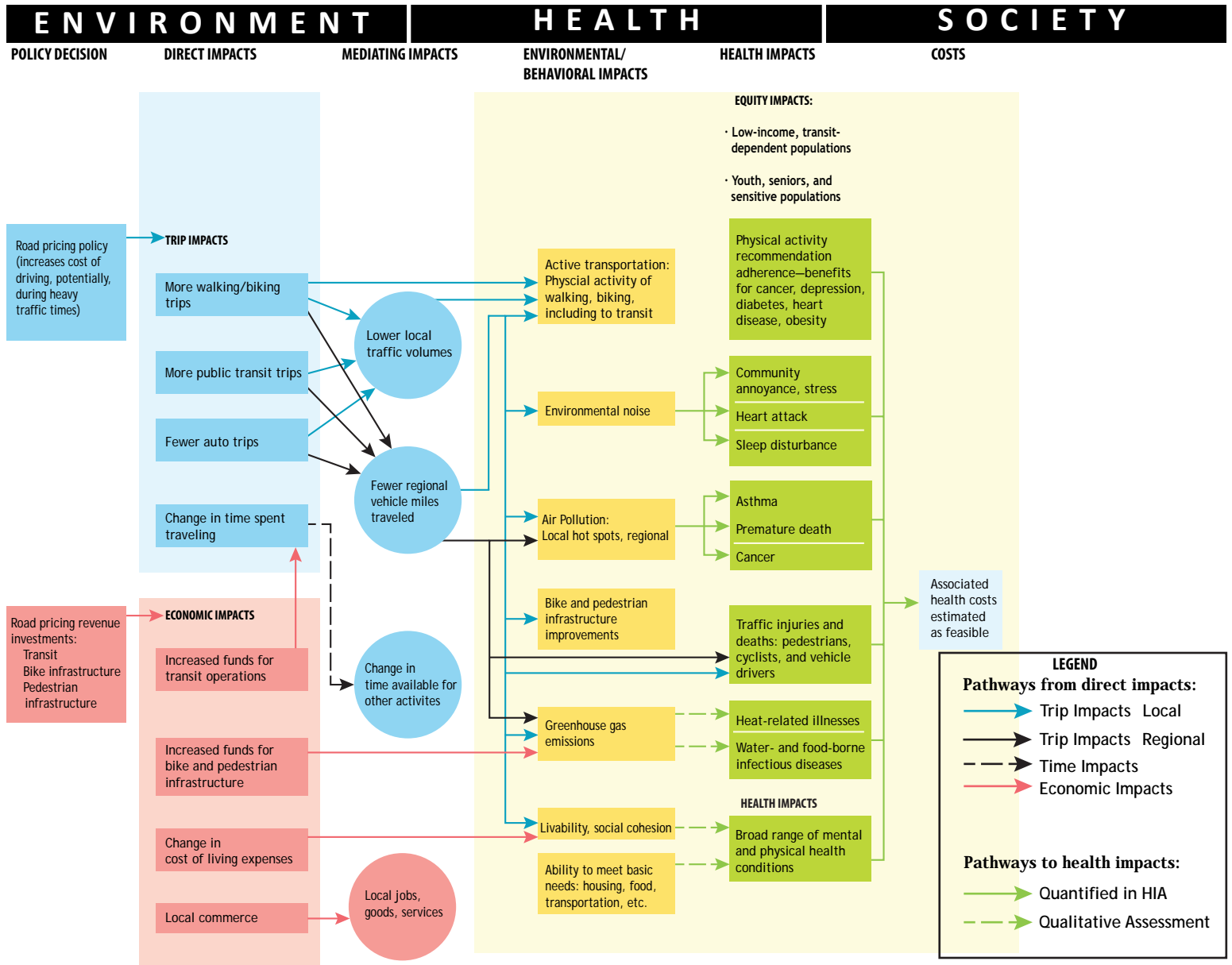


Figure 1: Logic model from Road Pricing Policy HIA. (Adapted with permission from Bhatia, 2011).

affect other travel habits, access to resources and neighborhood livability.

A litany of public health literature has demonstrated that social and economic factors are important drivers of health outcomes and health inequities (CSDH, 2008; Galea et al, 2011). Despite this growing awareness, governmental policy decisions that shapes these factors are often made without these considerations (Gottlieb et al, 2011). Thus, a more expansive public health conceptualization is impor-

tant to understand the full health implications of policies and practices forwarded by governmental bodies (NRC, 2011). Furthermore in 2002 the prestigious Institute of Medicine found that “governmental public health agencies alone cannot assure the nation’s health” (IOM, 2002), which signaled the need for a more cross-disciplinary approach to how society must address the most entrenched and stubborn public health dilemmas. It is becoming apparent that our government agencies and other decision-making bodies can no

longer work in silos of isolation and ignore the complicated and complex interplay between social, economic and environmental factors on our nation’s health. HIA provides a flexible, yet structured, process for transdisciplinary research with the aim of providing a broader understanding of health consequences and the health equity implications of a decision.

The HIA process is typically articulated in a formal product or report; thus, HIA is both a process and a product. HIA is identi-

fied as one approach to integrate public health in all policies, a goal articulated in the National Prevention Council’s Strategy report and by other public agencies (Collins & Koplan, 2009; HiAP, 2010; NPC, 2011). The World Health Organization strongly supports the use

social disparities in health ought to be a central concern for policymaking. Examining a decision’s effect on existing or future distribution of health impacts is fundamental to its practice and objectives (North American HIA Practice Standards Working Group, 2010). HIA is

2007; North American HIA Practice Standards Working Group, 2010). Quantification of data is seen as the gold standard, but such methods have high information requirements. Only a small number of health impacts are amenable to quantification. For example, dose-response functions used in HHRAs exist for a limited number of environmental exposures and attributable health outcomes due to the high evidence threshold for establishing causality (Bhatia & Seto, 2011). Relying solely on these techniques would present only a partial accounting of relevant health effects (Bhatia, 2011; NRC, 2011).

By including qualitative data, HIAs are able to provide insights into people’s behaviors, perception of risk and the social, cultural and political considerations that influence exposures to environmental hazards. HIA is able to assess and characterize health impacts through formal methods such as structured and unstructured interviews, focus groups, surveys and public testimony or written comments (Bhatia, 2011). Unlike HHRA, HIA is also able to qualitatively describe relationships between health determinants and health outcomes lacking dose-response functions (Cole et al, 2005). Chief limitations of these approaches are that the information generated may be given little legitimacy within the regulatory context and a litigious system that puts a premium on quantitative evidence (Cole & Fielding, 2007).

HIA Step	Elements of HIA Practice
Screening	Determines if an HIA is needed and likely to provide useful information, considers availability of information, time constraints and openness of decision-makers to the HIA process
Scoping	Develops a plan for the HIA with stakeholders, such as identifying health risks and benefits, research questions, methods and data sources to be used and populations likely to be affected by the decision outcome
Assessment	Assessment of health impacts usually begins with a baseline health status; potential health effects of the decision are conducted using a range of methods and data sources
Recommendation	Develops recommendations to boost health benefits and mitigate negative impacts; develops a plan for implementing recommendations; considers stakeholder input
Reporting	Disseminates findings to decision-makers, affected communities and other stakeholders via written reports, summaries, presentations, fact sheets, etc.; information is usually tailored to the intended audience
Monitoring and Evaluation	Process evaluation assess the process of carrying out the HIA and its fidelity to best practices or standards; impact evaluation focuses on the impact of the HIA on the decision-making process; outcome evaluation assesses the implementation of the decision affected by the health outcomes or health determinants

Table 1. Six Steps of HIA. (Adapted from Wernham, 2011).

of HIA in decision making and has identified four core values fundamental to HIA: equity, sustainability, democratic participation and best use of evidence (WHO, 1999). HIA’s strong emphasis on public participation, especially of overly impacted communities, also distinguishes it from HHRAs and EISs. Active public participation provides highly relevant information of perceived exposure health outcomes, risks to health and safety and community health outcomes (Tamburri et al., 2011). HIAs also highlight the perspective that reduction in

typically thought to consist of six steps as depicted in Table 1.

The practice of HIA recognizes that an assessment of health impacts should be based on the synthesis of the best available evidence, which could be either quantitative or qualitative in nature depending on the research questions and the availability of data (North American HIA Practice Standards Working Group, 2010). Potentially significant health impacts may not lend themselves to quantification but deserve consideration in the decision-making context nonetheless (Cole & Fielding,

Quantitative analyses also can and do play important roles in the practice of HIA. These analyses add precision to the evaluation of the magnitude of health effects, where enough data is available, and allow for direct comparison among alternatives or with a numerical threshold (Bhatia & Seto, 2011; NRC, 2011). Although HIA methods are not standardized, analyses can be descriptive, inferential or predictive through the use of mathematical models to forecast the potential effects of policy proposals (Bhatia, 2011; Cole & Fielding, 2007).

HIAs have applied quantitative techniques to estimate numerous health effects, such as avoidable mortality, pedestrian injuries, asthma hospitalizations and sleep disturbances. HIAs often employ methods utilized in HHRA to predict health impacts due to changes in exposures (Bhatia & Seto, 2011). For example, the HIA on road pricing in San Francisco, CA estimated changes in health impacts attributable to traffic-related particulate matter 2.5 micrometers in diameter ($PM_{2.5}$), traffic-related noise, changes in walking and bicycling patterns and injuries related to pedestrian and bicycling collisions with vehicles. This HIA used a host of models which forecasted variations in transportation patterns and volume, noise and air quality as well as dose-response functions based on published equations (Wier et al, 2011). In another HIA in San Francisco regarding a living wage ordi-



The Massachusetts Low-Income Energy Assistance Program (LIEAP) HIA addressed health risks for low-income children associated with unaffordable energy costs. (Child Health Impact Working Group, 2007). Note: The picture above is for demonstration purposes only.

nance, observational models based on the peer-reviewed published studies of the relationship between income and health were applied to predict improvements in premature deaths of workers and improvements in school completion and risk of early childbirth of their offspring (Bhatia & Katz, 2001). HIA, as demonstrated, is flexible enough to incorporate HHRA as one component of its overall scope of analysis when appropriate and achievable. Most HIAs use mixed qualitative and quantitative approaches.

HIAs are conducted by practitioners from a variety of backgrounds and disciplines both within and external to the field of public health, such as urban planners, policy analysts, environmental health scientists, physicians, epidemiologists and community advocates. Each brings useful expertise and per-

spectives to the process; thus, the practice of HIA does not necessitate a rigid set of skill requirements. Engaging in the practice of HIA may help build the technical capacity of those involved to conduct, understand and communicate the findings of the HIA as well as build the interpersonal capacity of practitioners to work across disciplines toward a common goal. HIA does, however, require practitioners and decision-makers, as well as other stakeholders, to possess some understanding of determinants of health, a commitment to the values and principles of HIA and an appreciation of both qualitative and quantitative data.

The practice of HIA is committed to the concept of equity; therefore this tool has the potential to examine environmental justice concerns and may help federal agencies fulfill the objectives under

Executive Order 12898, which states that federal agencies shall make environmental justice part of their mission by considering impacts of their activities on low-income and minority populations (Clinton, 1994). The U.S. Environmental Protection Agency (EPA), along with other federal agencies, has recently prioritized the integration of environmental justice into its programs and decisions (Jackson, 2010; OEJ, 2011).

Equity can be integrated into every stage of an HIA. It is derived both through the process of conducting the analysis (process equity) and by supporting a decision outcome that will potentially produce the most equitable results (decision equity). Process equity is achieved through the consideration of data and methods to highlight the distribution of impacts across subgroups, the use of a broad definition of health that incorporates social determinants. Cumulative impacts and distribution of impacts across demographic subgroups are often considered to some degree; however, it is usually not the objective to reduce the combined health effects of the decision or action to a single metric (Bhatia, 2011). Reducing different kinds of hazards to a common measure can be problematic, especially when concerned about distributional effects (NRC, 1989). Instead, HIA attempts to synthesize and present results on dissimilar health effects that are intelligible and useful to stakeholders and



The HIA on road pricing in San Francisco considered health impacts due to traffic-related noise and particulate matter and forecasted variations in traffic patterns, volume, noise and air quality. Note: The picture above is for demonstration purposes only.

decision-makers (NRC, 2011). Key findings from the various determinative pathways analyzed can be discussed descriptively or displayed in a summary table for ease of comparison and communication (Bhatia, 2011). Decision equity involves making recommendations that may increase health benefits and ensure that the distributions of health impacts or health determinants are fair to all stakeholders (Harris-Roxas et al, 2004). The recommendation stage is an important step needed to communicate research findings and suggest strategies to boost health benefits and mitigate against negative ones. HIA is also outcomes-driven and solutions-oriented with

an overall aim of using the best available evidence to support decision options that have the highest potential to produce the most favorable health outcomes.

A health assessment describing health outcomes, health determinants, distribution of health impacts and/or the health status of affected and vulnerable populations is also typically conducted within an HIA (North American HIA Practice Standards Working Group, 2010). Such an assessment of baseline distribution of health and environmental risks is essential for comparing equity impacts of policy options and identifying opportunities to address existing disproportionate burdens

(OPEI, 2010). A baseline conditions assessment is recommended in HHRA (NRC, 2009), but is not routinely conducted.

The EPA has also recognized the potential of HIA. The recently created Sustainable and Healthy Communities Research Program within the Office of Research and Development has highlighted HIA as a promising approach to “inform and empower decision-makers to equitably weigh and integrate human health, socio-economic, environmental and ecological factors to foster community sustainability” (US EPA ORD, 2011). The Office of Federal Activities within the Office of Compliance and Enforcement also elevates the practice of HIA as a meaningful method to support environmental justice considerations in assessments related to the National Environmental Policy Act (OECA, 2011). HIA is a tool that can help EISs improve the consideration of health as required under NEPA (Wernham, 2011; Cole et al, 2004) as well as incorporate public participatory and transdisciplinary approaches into research conducted at the EPA as outlined in Plan EJ 2014 (US EPA, 2011). Other federal agencies and interagency workgroups such as the Centers for Disease Control and Prevention and the National Prevention Council have also promoted the potential of HIAs to introduce a broader consideration of public health determinants in decision-making processes in order to maximize health (CDC,



The Northeast National Petroleum Reserve Supplemental EIS HIA assessed potential impacts to traditional culture and food supply of the surrounding Alaska Native communities. (Wernham, 2007). Note: The picture above is for demonstration purposes only.

2012; NPC, 2011).

The practice of HIA is a propitious approach providing governmental agencies, from local to national levels, a more holistic assessment of the both the benefits and detriments of the proposed actions or projects. It has the potential to improve public participation in decision-making activities, expand the consideration of health, and help incorporate environmental justice into decisions regarding actions and policies at all levels.

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Recommended Additional Reading

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Featured Science Article: Health Impact Assessments Are Needed in Decision Making about Environmental and Land-Use Policy

Abstract

The importance to public health of environmental decisions – including those about land use, transportation, power generation, agriculture and environmental regulation – is increasingly well documented. Yet many decision makers in fields not traditionally focused on health continue to pay little if any attention to the important health effects of their

work. This article examines the emerging practice of health impact assessment and offers real-world examples of its effective implementation, including studying the impact of nearby highways – a major source of air pollution – on proposed new housing for seniors. The article argues that officials at the federal, state and local levels should consult health experts and consider using

health impact assessments when their decisions on such issues as urban planning, land use and environmental regulation have the potential to directly affect the conditions in which people live and work.

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CONFERENCES & OPPORTUNITIES

1. *The 12th Annual HIA Conference*
August 29 – 31, 2012
Quebec, Canada
<http://www.hia2012.ca/en/home.aspx>
2. *The Joint Center for Political and Economic Studies Health Policy Institute 2012 Place Matters National Health Equity Conference, “Models of Action, Innovation, and Collaboration”*
September 5, 2012
Renaissance Hotel
Washington, DC
<http://www.jointcenter.org/events/place-matters-2012-national-health-equity-conference>
3. *2012 Summit on the Science of Eliminating Health Disparities: Building a Healthier Society, Integrating Science, Policy and Practice*
October 31 – November 3, 2012
Gaylord National Resort & Convention Center
National Harbor, MD (outside Wash, DC)
http://www.nimhd.nih.gov/summit_site/index.html
4. *The National Environmental Justice Advisory Committee (NEJAC) Public Meeting*
July 24 – 25, 2012
Crystal City, VA
<http://www.epa.gov/environmental-justice/nejac/register.html>
5. *The Health Impact Project: 2012 Advancing Smarter Policies for Healthier Communities Call for Proposals*
September 14, 2012 (deadline)
<http://www.healthimpactproject.org/project/opportunities/document/2012-Health-Impact-Project-CFP.pdf>





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ENVIRONMENT, HEALTH AND SOCIETY PROGRAM UPDATES

Children's Environmental Health Webinar Series (ongoing)

The webinar series kicked off in February 2012 and is held the second Wednesday of each month, 1:00 p.m. – 2:30 p.m. EST. The purpose of the webinars is to highlight and discuss the research findings from the various EPA/NIEHS Children's Centers and to give the Centers an opportunity to share their work with a wider audience. The August webinars will focus on autism-related research. For more information and to register for future webinars, please visit <http://www.epa.gov/ncer/events/index.html#cehc-webinar>

Upcoming Tribal Environmental Health Research Program Grantee Progress Webinars

These webinars will take place on October 17 and November 7, 2012. The purpose of the webinars is to highlight and discuss the research findings from the various STAR Tribal grantees and to allow the researchers an opportunity to share their work with a wider audience. For more information and to register for future webinars, please visit <http://www.epa.gov/ncer/>

Cumulative Risk Assessment Webinar Series

EPA's Risk Assessment Forum (RAF) Cumulative Risk Assessment (CRA) Technical Panel, in collaboration with EPA's NCER STAR Grants Program, announces a monthly CRA Webinar Series. Addressing multiple exposures to chemical and nonchemical stressors and cumulative risks and impacts in environmental decisions has long been a challenge for EPA and a concern of communities and environmental justice organizations. The CRA Webinar Series will be presented monthly, and be announced in two sessions, the first running through Dec. 2012, and the second to be announced in December 2012 and to run through December 2013. For more information and to register for future webinars, please visit <http://www.epa.gov/ncer/>



A Conversation with Rachel Krause

Eric Hal Schwartz, NCER

Greenhouse gasses like carbon dioxide are major contributors to climate change. Overarching policy efforts at the national and international levels to implement and enforce greenhouse gas reductions are necessary to address climate change, but have been difficult to achieve. Even in the absence of a larger policy agenda, over a thousand local governments in the United States are voluntarily reducing their greenhouse gas emissions. This phenomenon is initially surprising considering that it runs counter to established economic principles, such as free-riding, where some communities would take advantage of stricter regulations elsewhere to boost their own economies as well

as the common belief that smaller governments do not focus on larger, global issues. “There’s no climate legislation nationally, which is why policymaking at the state and particularly the local level matters so much,” said Rachel Krause, a former EPA STAR fellow.

The ability of these small local governments to address large-scale environmental problems drew Krause’s interest while she earned her Ph.D at the University of Indiana examining environmental policy, particularly as it relates to urban governance and management. She was interested in understanding not only what these communities were doing, but also why they made these policy decisions, and

how effective they were in tackling this complex problem. Her research examined the type and extent of greenhouse gas mitigating activities that have been implemented. Her work contributes to the broader understanding of policy decision-making around climate change at the local level.

“It’s the opposite of what you might expect,” Krause said. She explained that the active commitment by these cities to regulate emissions in their area against all expectations to do so was clear, but at the time she began her research there was little data to support their efforts. Research would be necessary to analyze the activities undertaken by the cities to limit the effects of

climate change. In addition, other communities may be able to learn from their experiences. Krause undertook an extensive survey of these municipalities, sending online questionnaires to gather data on their greenhouse gas mitigation activities. Krause eventually collected information on 329 cities, almost half of all American cities with more than 50,000 people.

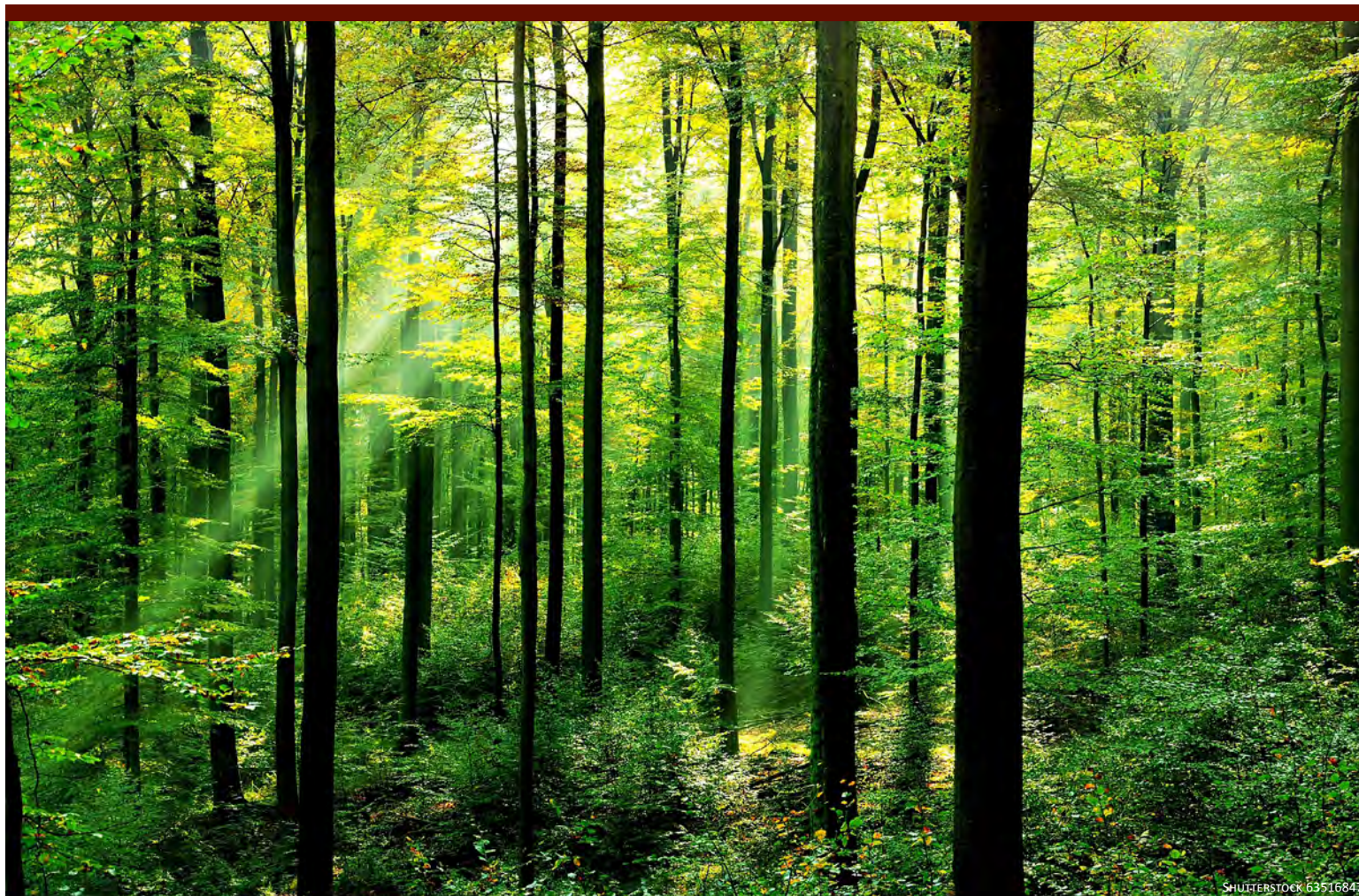
She found that the reasons for addressing climate change and methods to meet their aims varied from city to city, but there were some notable trends. All of the cities surveyed implemented some type of greenhouse gas reducing measure. Of the 26 identified activities to

address climate change, the average city engaged in nearly half. The main finding of the study was that it was the size and assets of a local government that were the primary drivers of climate change mitigation strategies at the municipal level. “Human and financial resources mattered much more than anything else,” Krause said. Cities with more staff and funding had the resources to devote significant attention to greenhouse gas reduction initiatives and often did so. There was a range of measurable effects of the plans undertaken by the cities, Krause stated. Cumulative efforts resulting from a single action to use renewable electricity to power city gov-

ernment operations was estimated to produce an annual abatement of between 5.8 and 29.2 million metric tons of carbon dioxide equivalent.

These results point to the idea that climate protection even on a local scale can have an impact on energy-saving and reducing greenhouse gas emissions. Gathering this information into one place and analyzing it will, therefore, provide a resource for future municipal climate protection plans which will influence policymakers as they work on strategies to limit climate change caused by humans and industry.

Editor's note: Cynthia McOliver and Tina K.Yuen contributed to this article.





RESOURCES AT YOUR FINGERTIPS

HIA Funding Opportunities

The Health Impact Project, a collaboration of the Robert Wood Johnson Foundation and The Pew Charitable Trusts. <http://www.healthimpactproject.org/>

Robert Wood Johnson Foundation (RWJF). <http://www.rwjf.org>

Active Living Research (RWJF). <http://www.activelivingresearch.org>

Centers for Disease Control and Prevention, Healthy Places. <http://www.cdc.gov/healthyplaces/hia.htm>

HIA Resources

Health Impact Project resources. This website is a clearinghouse of published HIAs. <http://www.healthimpactproject.org/resources>

Centers for Disease Control and Prevention, Healthy Places website. <http://www.cdc.gov/healthyplaces/hia.htm>

San Francisco Department of Public Health: Program on Health, Equity, and Sustainability. This website has a number of tools and models. <http://www.sfpbes.org/resources>

Human Impact Partners tools and resources. This website has a range of

tools and guidances for the practice of HIA. <http://www.humanimpact.org/hips-hia-tools-and-resources>

UCLA HIA-CLIC Methods and Resources. This website is also a clearinghouse on published HIAs. <http://www.hiaguide.org/methods-resources>

National Association of County & City Health Officials. <http://www.naccho.org/topics/environmental/landuse-planning/HIAresources.cfm>

HIA Trainings

Planning for Healthy Places with Health Impact Assessments Online Training. <http://professional.captus.com/Planning/hia2/Lists/PreCourseSurvey/NewForm.aspx?Source=http%3A%2F%2Fprofessional.captus.com%2FPlanning%2Fhia2%2FLists%2FPreCourseSurvey%2Foverview.aspx>

San Francisco Department of Public Health: Program on Health, Equity, and Sustainability. HIA Training. <http://www.sfpbes.org/services/hia-training>

Human Impact Partners. HIA Training. <http://www.humanimpact.org/hia-training>

UCLA HIA-CLIC. HIA Training. <http://www.hiaguide.org/training>

HIA Tools & Guides

Transportation Health Impact Assessment Toolkit.

This toolkit is designed for use by planning and health professionals, and provides a framework for public health departments, city planners, project managers, and other stakeholders to conduct HIAs on proposed transportation projects, plans, and policies. A key question at the core is how public officials, community members, and planners can ensure that future transportation policies consider health. http://www.cdc.gov/healthyplaces/transportation/HIA_toolkit.htm

Design for Health.

This is a collaborative project between the University of Minnesota, Cornell University, and the University of Colorado that serves to bridge the gap between the emerging research base on community design and healthy living and the everyday realities of local government planning. <http://www.designforhealth.net/>

HIA Blog

Health Impact Assessment Blog. <http://healthimpactassessment.blogspot.com/>