

HEI Staying Connected, Moving Ahead

Since mid-March, HEI staff — in keeping with Massachusetts orders — have been working remotely to help stem the tide of the coronavirus pandemic and protect their health. While unable to meet in person, the staff are collaborating online to keep important HEI projects moving to the fullest extent possible.

“There is no part of our world that has not been affected,” said HEI President Dan Greenbaum, “but we have been pleased that our important work on air pollution and health has been able to continue and strengthen.”

During the early stages, HEI wrestled with the difficult decision whether to cancel the 2020 Annual Conference. It quickly became clear that holding the event would potentially put attendees, staff, and supporting personnel at risk. In very short order, staff started working with the session speakers and chairs to turn the conference sessions into a series of [webinars](#) (see related article).

Since then, HEI has been holding meetings via Skype and Zoom. Staff have

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Annual Conference 2020 Goes Virtual

Hundreds Tune In to HEI Webinars

In these uncertain times, sharing and communicating high-quality, insightful science have become more important than ever. In that spirit, HEI transformed the 2020 Annual Conference into a [webinar series](#) to continue vital conversations on innovation and discovery in the field of air pollution–health research.

Over the course of five webinars, HEI engaged experts on a range of subjects, including big data and causal inference, ultrafine particles and health, inequalities in air pollution exposure, brain health and air pollution, and particle composition.

The series kicked off on April 7 with a session entitled “The Big Deal About Big Data, Causal Inference, and Accountability Research.” More than 475 people around the world tuned in.

Hundreds also attended the subsequent webinars: “Particle Components and Associated Health Effects: Then and Now” (April 29), “Understanding Ultrafine Particles and Health: How Can We Make Progress” (May 5), “Brain Health and Air Pollution” (May 13), and “Inequalities of Air Pollution Exposure and Associated Health Effects” (May 20).

A lively discussion followed each webinar as speakers fielded audience questions.

Webinar recordings, along with presentation slides, will soon be available at www.healtheffects.org/annual-conference.



Presenters for the third webinar, which focused on ultrafine particles and health.

Encouraging New Researchers

For the past few years, HEI has funded Student and Postdoc Travel Awards to engage young researchers at the HEI conference. This year, six abstracts were selected based on scientific merit, quality, and relevance to HEI’s research interests.

The winners of the HEI 2020 Annual Conference Travel Awards are Matthew Raifman (Boston University), Jiayuan Wang (University of Massachusetts, Amherst), Qing Ye (MIT), Farnaz Fouladi (University of North Carolina at Charlotte), Yan Lin (Duke University), and Laura Matchett (University of Alberta).

While HEI is not able to congratulate the winners in person, they will be honored with a certificate. We extend our best wishes to them and hope to see them at future HEI events.

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HEI Launches Strategic Plan for 2020–2025

Effective April 1, HEI launched its *Strategic Plan for Understanding the Health Effects of Air Pollution* for the coming five years, guiding the Institute's direction based on extensive input from sponsors, the scientific community, environmental organizations, and others. The Plan seeks to produce and advance timely and credible science to inform key decisions with one overarching theme: informing air quality and health decisions for 2020–2025...and beyond. The four core program opportunities are:

- Accountability: Testing the Links Between Air Quality Action and Health;
- Complex Questions for the Air Pollution Mixture;
- Transport and Urban Health; and
- Global Health.

The Plan is off to a quick start, with a dozen new studies in key priority areas like accountability and enhanced exposure assessment getting underway. In addition, HEI will seek to include several cross-cutting issues in the studies it funds: transparency in policy-relevant science; sensitive and at-risk populations; and enhanced exposure assessment. [HEI](#)

View the Strategic Plan at www.healtheffects.org/about/strategic-plan.

Research Committee Welcomes New Epidemiologist

The HEI Board of Directors has appointed Neil Pearce, professor of epidemiology and biostatistics at the London School of Hygiene and Tropical Medicine (LSHTM), to the [HEI Research Committee](#). This multidisciplinary committee is responsible for developing and overseeing the Institute's research program.

Pearce brings additional expertise in epidemiology and biostatistics to the committee. He joined LSHTM at the beginning of 2011, after working in New Zealand for 30 years. He originally trained in biostatistics before earning a PhD in epidemiological methods. Since the completion of his PhD in 1985, Pearce has been engaged in a wide range of public health research activities. His current research interests focus on epidemiological and biostatistical methods, and their application to studies of noncommunicable diseases, including occupational and environmental health, asthma, kidney disease, and neurological disease. He has a particular interest in global epidemiological studies.

Pearce is a Fellow of the Royal Society of New Zealand and the Academy of Medical Sciences and past president of the International Epidemiological Association. [HEI](#)



Neil Pearce.

Second Part of Major Ozone Study Confirms Earlier Evidence of Lung Effects

HEI has published the *Multicenter Ozone Study in older Subjects (MOSES): Part 2. Effects of Personal and Ambient Concentrations of Ozone and Other Pollutants on Cardiovascular and Pulmonary Function*. This second part of Research Report 192 was led by David Rich and Mark Frampton of the University of Rochester Medical Center in Rochester, New York.

Part 1 of MOSES, *Effects of Exposure to Low Concentrations of Ozone on Respiratory and Cardiovascular Outcomes*, was published in 2017. In Part 1, the investigators and their colleagues found that controlled ozone exposure at concentrations similar to the current U.S. air quality standard was not associated with changes in cardiovascular endpoints in 87 healthy, older adults, but there were moderate adverse effects on lung function and two markers of lung injury and inflammation.

Part 2 of the MOSES research report presents additional analyses, aimed at evaluating whether the MOSES 1 results were influenced by participants' exposure to ambient air pollutants up to 4 days prior to the controlled ozone exposures. It also evaluated whether the prior exposures were associated with changes in baseline levels of biomarkers.

MOSES 2 showed that the MOSES 1 results were not affected by participants' immediate prior exposures to ambient air pollutants, providing confidence in the results. The MOSES Review Panel agreed with the main findings of the study and determined that the results support the conclusion that adverse lung effects can be observed at ozone concentrations resembling the current 8-hour U.S. National Ambient Air Quality Standard (NAAQS) of 70 parts per billion. It remains possible, the Panel said, that ozone may lead to cardiovascular effects in more susceptible individuals, following longer exposures, or in the presence of common ambient air pollutants.

MOSES 2 presented evidence that ambient air pollution exposure may be associated with changes in baseline levels of some cardiovascular and pulmonary biomarkers measured before the clinical visits. These results add to the body of evidence of changes in health outcomes associated with air pollutant exposures at the current — relatively low — ambient concentrations in the United States. [HEI](#)

Research Report 192, Part 2, is available for downloading, free of charge, at www.healtheffects.org/publications. For more information, please contact [Annemoon van Erp](#).

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HEI is a nonprofit organization funded jointly by government and industry to research and evaluate the health effects of air pollution. An overview of HEI, information on its current research program, and all published HEI reports are available for downloading, free of charge, from the website.

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Study Compares Statistical Models for Use in Exposure Assessment

Traffic emissions are a key source of urban air pollution, and exposure to traffic-related air pollution is associated with various adverse health effects. Because extensive direct monitoring of air pollutant concentrations is difficult and expensive, scientists have developed a number of modeling approaches to assess exposure to traffic-related air pollution, but each model has its own limitations and errors.

In recent years HEI has funded several studies to improve techniques for predicting exposure of people living close to roadways and this spring published [Research Report 202, *Enhancing Models and Measurements of Traffic-Related Air Pollutants for Health Studies Using Dispersion Modeling and Bayesian Data Fusion*](#), describing a study led by Stuart Batterman at the University of Michigan, Ann Arbor.

Batterman and colleagues evaluated the ability to predict traffic-related air pollution using a variety of methods and models, including a line source air pollution dispersion model and sophisticated spatiotemporal Bayesian data fusion methods. They sought to improve model estimations by applying and systematically comparing the performance of different statistical models. Specifically, they evaluated whether inclusion of predictions from the RLINE model of traffic-related air pollution (a U.S. Environmental Protection Agency research model that treats

on-road emissions as line sources) would improve sophisticated statistical models for potential use in exposure assessment.

The study made extensive use of data collected in the Near-road EXposures and effects of Urban air pollutants Study (NEXUS), a cohort study designed to examine the relationship between near-roadway pollutant exposures and respiratory outcomes in children with asthma who live close to major roadways in Detroit, Michigan.

Batterman and colleagues found that the statistical models with or without RLINE provided different useful information. The best-performing models had relationships among spatial variables that stayed the same over time for NO_x and were allowed to change over time for PM_{2.5}. In general, inclusion of RLINE improved predictions of the increase in near-road concentrations of PM_{2.5}, but not of NO_x, relative to background levels.

In its independent review of the report, the HEI Review Committee appreciated the application and systematic comparisons of the statistical models. They recommended additional model evaluation with long-term measurements prior to wider use in epidemiological studies. [HEI](#)

Research Report 202 is available for downloading, free of charge, at www.healtheffects.org/publications. For more information on the study, contact [Allison Patton](#) at HEI.

Presenting Our Progress

HEI sponsors and the Research Committee gathered in Boston in early March. This yearly meeting provides an opportunity for the sponsors to hear an update on HEI's activities.

PHOTOS BY MELISSA OSTROW



Terry Keating, U.S. EPA.



Bryan Hubbell, EPA (speaking), with Jeffrey Brook of the HEI Research Committee and HEI Principal Scientist Katy Walker.



Susan Collet of Toyota (center left) with Barbara Hoffmann, HEI Research Committee. At back, HEI Vice President Robert O'Keefe and Staff Scientist Allison Patton.



Erika Sasser and Terry Keating (right) both of the U.S. EPA, with David Foster, HEI Research Committee.



From left: Allen Robinson, HEI Research Committee; Erika Sasser, U.S. EPA; Tim Wallington, Ford; and David Foster, HEI Research Committee.



From left: Karen Wesson, U.S. EPA; Marusia Popovich, ExxonMobil; and HEI Director of Energy Research Donna Vorhees.

Hindustan Times

“Strong Link Between Coronavirus Count, Bad Air: Study” (April 30, 2020)

This article cites research concluding that the risk of contracting COVID-19 in Italy is highest in its most heavily polluted cities and provinces, and quotes HEI Staff Scientist Pallavi Pant, who is closely watching the developing science on whether air pollution contributes to lower resistance. While acknowledging that such a relationship was suspected during the severe acute respiratory syndrome (SARS) outbreak in the early 2000s, Pant said, “Ideally, we would like to see multiple studies

showing these results for the scientific process to work.”

The Straits Times (Singapore)

“India Lockdown Reduces Pollution in Some of the World’s Most Polluted Cities” (April 8, 2020)

This story noted the rare appearance, during the COVID-19 lockdowns, of blue skies over Indian cities that are normally among the world’s most polluted. It mentioned HEI, whose *State of Global Air 2019* report cited air pollution as causing about 1.2 million premature deaths in India in 2017.

The Boston Globe

“Massachusetts Communities with Dirty Air Are Coronavirus Hotspots” (April 29, 2020)

The online edition of this article on scientific evidence associating long-term exposure to air pollution and elevated COVID-19 mortality rates includes a link to a 2019 [paper](#) written by HEI Staff Scientist Anna Rosofsky and colleagues at the Boston University School of Public Health. The team explored the impact of inadequate ventilation typical of older apartment buildings in heavily polluted, low-income neighborhoods on people’s level of exposure. [HEI](#)



HEI staff in a recent Zoom session.

HEI MOVING AHEAD (Continued from page 1)

rallied together to stay productive, publish reports, and hold panel meetings. Recently, the Traffic Literature Review panel, Low-Exposure Epidemiology investigators (discussing follow-on work), and the HEI Board of Directors had successful Zoom meetings. Staff have also met virtually to catch up and spend some much-needed social time together.

At the same time, HEI began its next cycle of the 5-year [Strategic Plan](#) on April 1 and is off to a good start with 12 new [accountability](#), [exposure](#), and [Walter A. Rosenblith New Investigator](#) studies

underway or starting soon. Staff have been communicating with the Research and Review Committees to accommodate some unavoidable delays owing to lab lockdowns and difficulties in accessing or analyzing data resulting from the pandemic. They are working with HEI investigators to minimize any delays. Also, in recognition of such challenges, HEI has extended submission deadlines for its current [Requests for Applications](#), including RFA 20-1A “Health Effects of Air Pollution,” which was issued in December 2019 (see sidebar).

Deadline Extended for RFA 20-1

In light of challenges posed by the COVID-19 pandemic, HEI has extended the deadline for Request for Applications (RFA) 20-1A, “Health Effects of Air Pollution,” to **August 19**. HEI is particularly interested in applications that address the following topics:

- (a) accountability, or effectiveness of air quality regulations;
- (b) strengthening causal interpretation of evidence from existing cohorts; and
- (c) contributions of wildland and agricultural burning to air quality and health.

In addition, HEI has issued RFA 20-1B, “Air Pollution, COVID-19, and Human Health,” to study the intersection of air pollution and the coronavirus pandemic. The deadline for Letters of Intent is **June 8**.

For details, see www.healtheffects.org/research/funding. [HEI](#)

Additionally, HEI is exploring possible ways to study the intersection of coronavirus and air quality. This includes both potential opportunities for accountability studies in view of air quality improvements experienced during the lockdowns and/or studies of how socioeconomic factors and high air pollution exposures may increase people’s vulnerability to the virus. Investigators are welcome to submit proposals on this topic under RFA 20-1B, “Air Pollution, COVID-19, and Human Health,” which was developed and issued this spring. More information is available on HEI’s [Funding](#) page, or contact [Lissa McBurney](#). [HEI](#)

Important Transition for HEI Science

After many years of extraordinary service, HEI Director of Science Rashid Shaikh has announced his plans to retire at the end of June. Until then he has taken the position of Director of Science Emeritus and will continue to contribute to the Institute's important scientific activities. Effective April 1, Managing Scientist Annemoon van Erp has agreed to serve as Acting Director of Science while HEI conducts a search for Shaikh's successor.



Rashid Shaikh.



Annemoon van Erp.

Shaikh has served HEI and science in many ways since the Institute's earliest days, when he was one of its first scientists. Among other projects, he led HEI's sister organization HEI-Asbestos Research during the late 1980s and early 1990s, and returned to HEI in 2008 to serve as Director of Science. Shaikh has led the scientific staff and worked with the [Research](#) and [Review](#) Committees to produce a series of landmark studies for HEI on the effects of [particulate matter](#) components, cardiovascular effects of [ozone](#), effects of [low-level exposures](#), and much more. He contributed extensively to the three most recent HEI [Strategic Plans](#), and led the work of the Special Committee on Emerging Technologies, keeping HEI abreast of rapid changes in vehicle fuels and technologies that continue to inform its research priorities. During his tenure, Shaikh has represented HEI science across the United States and around the world.

"Above and beyond these many scientific achievements, Rashid has played a central role in building and strengthening the scientific staff, navigating through major staff changes, and providing invaluable

mentorship and guidance to our talented scientific staff," said HEI President Dan Greenbaum. "We will, of course, make the most of the additional assistance from Rashid in the next few months until he retires. We were disappointed to not have the opportunity at our Annual Conference to thank him more formally this spring, but we will find other ways — even in these unusual times — to say thank you for all his good work.

"We are very fortunate to have Annemoon step in as Acting Director," Greenbaum continued. "She has worked closely with Rashid for many years as Managing Scientist, ensuring the smooth, intelligent, and high-quality operation of our scientific enterprise. She comes to the Acting Director role with a strong scientific background and extensive experience at HEI for over two decades, playing lead roles in many projects including HEI's [Accountability](#) initiative, our Advanced Collaborative Emissions Study (ACES) of new-technology diesel, the [MOSES](#) study of ozone and cardiovascular health, and the annual [Walter A. Rosenblith New Investigator Award](#), through which HEI each year fosters a new generation of scientists entering the field. We are pleased to have her ready to step in and keep us moving forward."

HEI has engaged the search firm Isaacson, Miller to help conduct the search for a new science director. To suggest possible candidates, contact the firm through its position page at www.imsearch.com/7406. [HEI](#)

Communicating the Science

Indian Public Health Conference

In March, HEI's Pallavi Pant attended and presented at the [64th Annual National Conference of the Indian Public Health Association](#). HEI, together with its partners in India (All India Institute for Medical Sciences [AIIMS], Indian Institute of Technology-Delhi [IIT-Delhi], and Sri Ramachandra Institute of Higher Education and Research [SRIHER]), organized a plenary session on "Advancements in Air Pollution and Health Effects Research in India."

Speakers for the session highlighted the state of the research in India and globally, and identified opportunities for engagement from the broader public health community. Pant and Sagnik Dey (IIT-Delhi) gave an overview of the state of research on health effects of air pollution. The session concluded with the release of a report by the organizing partners summarizing a December workshop co-organized by HEI and highlighting ongoing studies and future directions for research.

During the conference, the team also officially launched a new national collaborative research network, CAPHER-India (Collaborative on Air Pollution and Health Effects

Research). The network aims to bring together teams of researchers from various scientific disciplines including atmospheric chemistry, air pollution measurement and modeling, epidemiology, biostatistics, medicine, basic sciences, and health policy.

New Angles on the Exposome

HEI's Eleanne van Vliet attended the second annual Exposome Symposium, "Measuring the Exposome Using Novel Methods and Big Data to Improve Human Health," hosted in early March by the [Institute for Exposomic Research at the Icahn School of Medicine at Mount Sinai](#).

The two-day event, held at the New York Academy of Medicine, focused on developments in [exposomics](#) data integration, analytical tools, and potential application in precision medicine. Speakers discussed the inherent challenges in measuring exposure from environmental pollutants, occupation, diet, chemicals, and lifestyle throughout an individual's life course (from pre-conception to death), and in relating those exposures to health.

The symposium brought together senior and junior research scientists interested in novel approaches to comprehensive exposure

analysis and designs. Among their topics: the complementary nature of the human genome and exposome, the complexities of exposure, and the need to expand beyond traditional environmental health and analytical chemistry approaches to incorporate high-quality, *untargeted* screening measures to enable measurement of tens of thousands of exposures in an individual's lifetime, and provide key insights into exposure and associated biological responses.

The talks underscored the challenge in integrating and harmonizing exposomics data across individual studies, and the need for sustained funding for multidisciplinary, collaborative science to further develop exposome methodologies on a global scale. Initiatives already underway include the [2020 EU Human Exposome Project](#), recently launched in 24 countries across 126 research groups, and NIEHS repositories that allow data harmonization and sharing across projects.

For symposium video presentations, see <https://www.sinaixposomics.com/>. [HEI](#)



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HEI Remembers Founder Donald Kennedy



Donald Kennedy, one of three founding members of the Health Effects Institute Board of Directors and a major architect of the HEI review process, passed away in April after a long illness.

Kennedy, a neurobiologist, joined the Stanford University faculty in 1960. From 1977

to 1979, he served as commissioner of the U.S. Food and Drug Administration before returning to Stanford and becoming its eighth president in 1980. That same year he joined Archibald Cox, the founding chair of HEI, and William O. Baker, then head of Bell Laboratories, as a member of the inaugural HEI Board of Directors, setting the structure and procedures for the high-quality and impartial science that HEI works to continue today.

Kennedy served on the Board through 2002, overseeing many major HEI research and re-analysis projects, and opening doors as well for what has become HEI's Global Health program.

From 2000 to 2008, Kennedy served as editor-in-chief of *Science* magazine. He was elected to the National Academy of Sciences, the American Academy of Arts and Sciences, the National Commission for Public Service, and the American Philosophical Society.

The chair of HEI's Board of Directors, Richard Celeste, remembered being recruited by Kennedy for HEI: "Don conveyed enthusiasm for the mission and at the same time clarity about its operation: the commitment to excellence in science to serve thoughtful and relevant public policy. The prospect of joining Don and his colleagues on the HEI Board was irresistible. And almost 19 years later I am deeply grateful for Don Kennedy's contagious enthusiasm for HEI's mission."

HEI President Dan Greenbaum said, "Don was a consummate scientist, a scientific leader, and a long-time supporter of HEI even after he retired from the Board. I have missed his counsel greatly over the past years during his illness but know that the work we do every day is very much the legacy that he valued highly." 