

Yale Climate Change and Health Initiative Annual Report

August 1, 2017 to July 31, 2018

Executive Summary

During Year 3 (August 1, 2017 – July 31, 2018) of the Overlook International Foundation grant to support the Climate Change and Health Initiative (CCHI) at Yale School of Public Health (YSPH), we have implemented all the activities described in the grant proposal; become known nationally as a locus for climate change and health at Yale; and planned a full set of activities for Year 4.

In summary, our Year 3 accomplishments include:

- hosting a globally-recognized climate change leader in residence
- matriculation of our second pre-doctoral fellow
- teaching of the course “Climate Change and Public Health” for the second time
- teaching of a case study entitled “The role of nuclear power in climate change mitigation in Connecticut” in the “Climate Change and Public Health” course
- two funded summer internships
- teaching of the “Practicum in Climate Change, Sustainability, and Public Health” for the second time, including two innovative climate justice projects
- continuation of the CCHI Student Associates program that provides a venue for students across the university to learn from experts in the field and discuss ideas in an interdisciplinary environment
- three prominent climate change and health researchers for our speaker series
- our third pilot research grant
- launching an international search for a second core faculty member for CCHI
- launching an online Climate Change and Health Certificate program for working professionals
- collaborating on a Workshop on Environmental Sustainability in Clinical Care
- collaborating on Yale Climate Day
- receipt of a \$70,400 donation to support CCHI research

Furthermore, CCHI continues to receive strong support from the administration as evidenced by:

- an ongoing financial commitment to our pre-doctoral fellowship program
- a commitment by the Dean that all revenue from the Climate Change and Health Certificate program will support CCHI activities
- a new faculty line funded by the Dean to attract an international or national leader in climate change and health research
- A \$461,000 grant from the Center for Teaching and Learning to create and implement the Climate Change and Health Certificate program
- a Sustainability Committee that guided the school’s initiative to reduce waste at YSPH catered events in partnership with a student group that received funding from the Yale Office of Sustainability
- conduct of a workshop for students on “Climate justice: greenhouse gas emissions reduction in developing countries” during MPH student orientation week that resulted in a YSPH contribution of \$16,500 to Cool Effect projects
- a departmental competition on waste reduction at catered events that resulted in a 30% reduction in waste

I. CCHI Structure and Administration

A. Executive Committee

The Executive Committee acts as CCHI's governing body. The Executive Committee meets quarterly and has interim communication via email as needed. The following is the Executive Committee's current membership:

- **Dr. Robert Dubrow**, Faculty Director of CCHI, Professor of Epidemiology (Environmental Health)
- **Dr. Martin Klein**, Executive Director of CCHI, Senior Advisor, YSPH Dean's Office
- **Dr. Albert Ko**, Chair of Department of Epidemiology of Microbial Diseases, Professor of Epidemiology (Microbial Diseases)
- **Dr. Vasilis Vasiliou**, Chair of Department of Environmental Health Sciences, Professor of Epidemiology (Environmental Health)
- **Dr. Yawei Zhang**, Associate Professor of Epidemiology (Environmental Health), Section Chief of Surgical Outcomes and Epidemiology, Department of Surgery, School of Medicine
- **Dr. Michelle Bell**, Mary E. Pinchot Professor of Environmental Health, School of Forestry & Environmental Studies

B. Affiliated Faculty

We have 27 [Affiliated Faculty](#), 19 with primary appointments at YSPH and 8 with primary appointments in other schools or departments.

C. CCHI Website

We continue to maintain a [CCHI website](#) within the YSPH website.

D. Student assistants

Emma Ryan, a fifth-year student in the joint BA-MPH program, served as the CCHI Research Assistant. Her duties included maintaining and updating the CCHI website and calendar; helping to organize and publicize CCHI events; identifying summer internship opportunities; conducting research on topics and organizations; acting as an advocate and representative of the program to student groups; and supporting the work of the faculty director and executive director as needed.

Arsalan Marsani, a second-year MPH student, helped support the work of the Sustainability Committee.

E. Affiliations

CCHI has affiliated with the following organizations:

- [Global Consortium on Climate and Health Education](#)
- [Planetary Health Alliance](#)
- [US Climate and Health Alliance](#)

II. Program accomplishments

A. Leadership

1. Dean's Fund for Climate Change and Health

The Dean's Fund for Climate Change and Health supported the CCHI Student Associates program (see II.B.6).

2. Climate Change Leader in Residence

Our third "Climate Change Leader in Residence" was Dr. Anthony Costello, who visited Yale April 3-8, 2018. Dr. Costello is Professor of Global Health, University College London. He served as chair of the 2009 Lancet Commission on Managing the Health Effects of Climate Change and as co-chair of the 2015 Lancet Commission on Health and Climate Change. He currently co-chairs "Lancet Countdown: Tracking Progress on Health and Climate Change," an international collaboration dedicated to tracking progress on health and climate change. Dr. Costello is former Director of Maternal, Child and Adolescent Health, WHO. In 2011, he received the James Spence Medal of the Royal College of Pediatrics and Child Health. In 2016, he received the BMJ Lifetime Achievement Award. His activities as a Climate Change Leader in residence included:

- a public talk at YSPH: "Lancet Countdown: tracking progress on health and climate change"
- a public talk at Yale School of Medicine, sponsored by the Yale chapter of Physicians for Social Responsibility: "How to change health systems for a sustainable future"
- dinner with CCHI Student Associates
- dinner with Physicians for Social Responsibility students
- various individual and group meetings with faculty and students
- keynote speaker at The Workshop on Environmental Sustainability in Clinical Care (see II.C.3): "The Lancet Countdown to 2030: Health Care's Role"

See Appendix II.A.2 for Dr. Costello's complete itinerary and event fliers.

3. Climate Change and Health Leadership Development Workshop

In our grant proposal, we included a weekend workshop on leadership, strategy development, and policy implementation for a select group of Yale students from across the University. As described in the 2016-17 Annual Report, we linked the workshop to the new course, "EPH 555b, Practicum in Climate Change, Sustainability, and Public Health" that Dr. Dubrow taught for the first time in the Spring 2017 term. For the Spring 2018 term, we decided to apply the funds budgeted for the workshop toward funds needed to conduct two of the course projects that involved student travel and rental of air monitoring equipment.

4. Faculty Recruitment

Dean Sten Vermund approved an international search for a faculty position in the field of climate change and health at the level of Assistant, Associate, or Full Professor. The successful candidate will serve as a core faculty member of CCHI. The Dean constituted a search committee that Dr. Dubrow is chairing. We received 57 applications and had three candidates visit Yale for interviews and seminars. Our top candidate came for a second visit and the Dean made him an offer in March 2018 that he initially accepted, but unfortunately turned down a few

days later due to family reasons. We re-opened the search in April 2018 and received another eleven applications. We have invited two candidates for interviews in August and September 2018. See Appendix II.A.4 for the faculty search advertisement.

B. Education

1. Climate Change and Health Pre-Doctoral Fellowships

Our first pre-doctoral fellow, Alyssa Parpia, completed her second year in the YSPH doctoral program in the Department of Epidemiology of Microbial Diseases. She is interested in the mathematical modeling of infectious disease risks in relation to climate change. In June 2018 she passed her qualifying exam with distinction. Her dissertation topic is focused on understanding the relationship between meteorological variables and dengue incidence in Costa Rica.

Sappho Gilbert, our second pre-doctoral fellow, matriculated in September 2017 and successfully completed her first year. She is interested in the effects of climate change on the health of indigenous Arctic communities. Her work focuses on Inuit communities in Nunavut, Canada.

2. Graduate Course on Climate Change and Health

In the Fall 2017 term, Dr. Dubrow taught the course, “CDE 547a, Climate Change and Public Health” for the second time. The following is the course description (see Appendix II.B.2 for course syllabus):

This course takes an interdisciplinary approach to examining relationships between climate change and public health. After placing climate change in the context of the Anthropocene and planetary health and exploring the fundamentals of climate change science, the course covers impacts of climate change on public health, including heat waves; occupational heat stress; tropospheric ozone; wildfires; aeroallergens; vector-borne, foodborne, and waterborne diseases; water scarcity; food security; migration; violent conflict; natural disasters; and health benefits of climate change mitigation. The course integrates climate justice issues and adaptation strategies into the discussion of specific topics. The course is reading-intensive and makes ample use of case studies, with a focus on critical reading of the literature. This course should be of interest to students across Yale School of Public Health and the University.

Seventeen students took the course, which received a rating of 4.1 (out of 5) according to the student course evaluations.

3. Climate Change and Health Case Study

Case studies are powerful tools to examine real world problems from multiple perspectives. They allow students to explore the complexities of an issue, understand the motivations of individuals and organizations, and determine the factors that can lead to success or failure.

Dr. Dubrow used the web-based case study, entitled “[The role of nuclear power in climate change mitigation in Connecticut](#),” as a group debate assignment (Appendix II.B.3.) in his course, “CDE 547a, Climate Change and Public Health.” The case study was developed in Years 1 and 2 and was taught for the first time in the Fall 2016 term in the environmental health sciences MPH core course.

4. Summer Internships on Climate Change and Health

All MPH students are required to complete a 10-12 week full-time summer internship. The internship enables students to participate in real world public health projects and research and provides an opportunity for students to clarify their professional goals and to evaluate their career options. We provided funding for two summer internships:

- **Saskia Comess:** Prenatal Environmental Exposures and Neonatal Health Outcomes in Oregon (Preceptor: Dr. Nicole Deziel, Assistant Professor of Epidemiology, Department of Environmental Health Sciences) (co-funded by the Stolwijk Fellowship)
- **Victoria Shirriff:** Internship at the Pan American Health Organization- PAHO Health Emergencies (PHE)/ Health Information Management (HIM) Unit (Preceptor: Dr. Robert Dubrow, Professor of Epidemiology, Department of Environmental Health Sciences)

5. Practicum in Climate Change, Sustainability, and Public Health

In the Spring 2018 term, Dr. Dubrow taught the course entitled “EPH 555b, Practicum in Climate Change, Sustainability, and Public Health” for the second time. The following is the course description:

This course is one of the options available to students to fulfill the practice requirement for the MPH degree. In this course, interdisciplinary student teams carry out applied public health research or practice projects in the area of climate change, sustainability, and public health. Each team works with a sponsoring organization (e.g., unit within Yale, local health department, state agency, community organization, other non-governmental organization). During the Fall term, students apply for entry into the course. Admitted students join one of the student teams, which implement their projects during the Spring Term course. The course affords the opportunity to apply concepts and competencies learned in in the classroom to this important area of climate change, sustainability, and public health. This course should be of interest to students across Yale School of Public Health and the University, including Yale College juniors and seniors.

We issued a request for applications to enroll in the course in October 2018. Each student who enrolled became a member of a student team working on one of the following four projects:

Project	Organization
Yale Food Waste Reduction Initiative	Yale Hospitality
Climate and Health Benefits of Solar-Powered Electric Pump-Out Boats	East Shore District Health Department (East Haven, Branford, North Branford)
Air Quality Impacts of the Stone’s Throw Landfill in Tallassee, Alabama	Environmental Justice Clinic, Yale Law School
Air Quality Impacts of the ExxonMobil Refinery in Beaumont, Texas	Environmental Justice Clinic, Yale Law School

The two air quality projects were partnerships with the Yale Law School Environmental Justice Clinic, led by Marianne Engelman-Lado. These were environmental justice projects because they involved adverse impacts of air pollution in poor African-American communities, where both landfills and oil refineries tend to be disproportionately located. In both projects, before spring break students developed protocols for carrying out the necessary field work; during spring break students traveled to Tallassee and Beaumont respectively, to perform the field work; and after spring break students analyzed data wrote reports.

Seventeen students took the course, which received a rating of 4.4 (out of 5) according to the student course evaluations. Dr. Dubrow gave an oral presentation about the course at the American Public Health Association Annual Meeting, November 4-8, 2017 in a session entitled “Climate change in public health education and public health practice.” In addition, Charlotte Lawrence, a member of the Spring term 2017 student team that conducted the project entitled “Carbon footprint impact of reduction in unnecessary medical testing in a hospital clinic,” presented the results of the project in a Roundtable sponsored by the Health Administration Section and entitled “Hot topics for health administrators.”

See Appendix II.B.5 for the request for applications to enroll in the course, the course application, the course syllabus, and project descriptions.

6. CCHI Student Associates

The CCHI Student Associates program provides a venue for students across the university to discuss ideas in an interdisciplinary environment, learn from experts in the field, and grow together to ultimately perform research or implement interventions on pressing topics related to climate change and health. Sappho Gilbert, the second CCHI Pre-Doctoral Fellow, served as the program coordinator. In September 2017, we issued a request for applications. We received 31 applications and admitted [19 students](#) as CCHI Student Associates. These students were from the Schools of Public Health, Forestry and Environmental Studies, and Medicine, and Yale College. The Students Associates organized seminars with [Dr. Daniel Costa](#), National Program Director (now retired) for the Air Climate & Energy Research Program U.S. Environmental Protection Agency; [Dr. Michelle Bell](#), Mary E. Pinchot Professor of Environmental Health, Yale School of Forestry & Environmental Studies; [Peggy Shepard](#), Co-Founder and Executive Director of WE ACT for Environmental Justice; and [Lenore Manderson](#), Visiting Professor of Anthropology, Brown University. The students also attended a special CCHI-Student-Associates-only discussion session with a CCHI speakers (Dr. Rocklov [see II.C.1]), as well as a dinner with Dr. Costello, the 2018 CCHI Climate Change Leader in Residence. See Appendix II.B.6 for request for student application form.

[7. On-line Certificate Program in Climate Change and Health](#)

The recognition of climate change as one of the leading public health challenges of this century has been relatively recent, such that most practicing public health professionals did not receive education about climate change and health during their training. We have therefore launched an online certificate program in climate change and health for a student population of working professionals outside of Yale. The program prepares public health professionals and those in related fields to address the health impacts of climate change and is open to any qualified person in the world – it is completed exclusively online with no requirement to travel to New Haven. The program consists of three consecutive six-week courses: Introduction to Climate Change and Health (Instructor: Robert Dubrow), Climate Adaptation for Human Health (Instructor: Kathryn Conlon, Epidemiologist, Climate and Health Program, Centers for Disease Control and Prevention), and Communicating Climate Change and Health (Instructor: Connie Roser-Renouf, Associate Research Professor, Center for Climate Change Communication, George Mason University). While focusing on distinct topics, all three courses interweave common themes of climate change health impacts, vulnerability and health equity, and the co-benefits of mitigation and adaptation. The cost for the certificate is \$1,500. Full scholarships, discounts for members of professional organizations, and financial aid are available. The program will launch on September 4, 2018 and will be offered twice per year. It is funded by a four-year \$461,000 grant from the Yale Center for Teaching and Learning, secured by Dr. Klein, to cover all expenses during this period. The revenue will be used to support CCHI activities.

C. Research

1. Speaker Series on Climate Change and Health

In the Fall 2017 term, we hosted Dr. Sabrina McCormick, Associate Professor, Department of Environmental and Occupational Health, Milken Institute School of Public Health at George Washington University, who spoke about “Taking climate change to court: the role of public health.” We also hosted Dr. Carina Gronlund, Environmental Epidemiologist & Postdoctoral Research Fellow, Center for Social Epidemiology and Population Health, University of Michigan School of Public Health, who spoke about “Causal mechanisms of disparities in weather-associated health effects for sustainable adaptation to climate change.”

In the Spring 2018 term, we hosted Dr. Joacim Rocklöv, Professor of Epidemiology and Public Health, Umeå University, Sweden, who spoke about “How climate influences arboviral diseases & big data can enhance control.”

See Appendix II.C.1 for the speakers’ event fliers.

2. Climate Change and Health Pilot Research Grant

The purpose of this annual \$25,000 award is to catalyze climate change and health research among our faculty. The expectation is that the pilot project will allow faculty to gather preliminary data necessary to apply for federal or foundation grants. The 2017 award went to Principal Investigator Dr. Daniel Weinberger, Assistant Professor, Department of Epidemiology of Microbial Diseases for a project entitled “Effects of extreme climate events on environmental reservoirs and dispersion of Legionella.” This project resulted in the following publication:

Cassell, K., Gacek, P., Warren, J. L., Raymond, P. A., Cartter, M., & Weinberger, D. M. Association Between Sporadic Legionellosis and River Systems in Connecticut. *The Journal of Infectious Diseases* 2018; 217: 179–187.

For the 2018 award, we had a two-stage application process. First, we received six letters of intent. These letters were reviewed by the Executive Committee, which chose two for submission of full applications. A review committee composed of faculty with no conflicts of interest then reviewed the full applications and chose the project entitled “Ambient temperature and risk of ischemic stroke in the elderly,” submitted by Dr. Judith Lichtman, Associate Professor and Chair, Department of Chronic Disease Epidemiology.

See Appendix II.C.2 for Dr. Weinberger’s final report, the 2018 Request for Applications, and the successful 2018 application.

3. [Workshop on Environmental Sustainability in Clinical Care](#)

This workshop, conducted at Yale University on April 6-8, 2018, brought together 40 experts in engineering, sustainability science, clinical care and health systems management to tackle the issue of resource consumption and environmental emissions associated with medicine and health care services. The workshop organizers were Dr. Jodi Sherman, Associate Professor of Anesthesiology at Yale School of Medicine and a CCHI Affiliated Faculty, and Cassandra Thiel, Assistant Professor, Population Health and Ophthalmology, New York University Langone Health, New York University Wagner School of Public Service, and New York University Tandon School of Engineering. The healthcare industry is a leading emitter of greenhouse gases and other pollutants. The premise of this conference is that reducing waste in healthcare results in improved patient safety (e.g., reduced unnecessary medical tests that often lead to false positive results and further invasive procedures) and in improved community health (through reduced emission of greenhouse gases and other pollutants). As mentioned above, Dr. Anthony Costello, the 2018 CCHI Climate Change Leader in Residence, served as a

keynote speaker at the workshop. Dr. Dubrow served on the workshop's Advisory Board, and YSPH was one of the workshop sponsors.

4. [Yale Climate Day](#)

Yale Climate Day was held on May 4, 2018 at Yale Peabody Museum. The morning plenary session featured six Yale faculty speakers working on climate change. This was followed by a faculty working lunch attended by 40 Yale faculty. Finally, the afternoon session was a student poster session that included 58 posters, 11 from YSPH. One of the three awards for the most outstanding posters was given to Elsie Moore, a second-year MPH student. Dr. Dubrow served on the Steering Committee for this event.

5. Donation to support research

We received a \$70,400 donation to support CCHI climate change and health research. We applied \$25,000 of these funds to the pilot research grant program.

III. YSPH Commitment

A. Pre-Doctoral Fellowships

As committed, YSPH paid half the tuition and the full health insurance for our Climate Change and Health Pre-Doctoral Fellows, Alyssa Parpia and Sappho Gilbert.

B. [Sustainability Committee](#)

In 2015, YSPH established a Sustainability Committee, co-chaired by Dr. Dubrow and Heidi Richard (Administrative Director, Office of the Dean). The Committee has the following mission: "the YSPH Sustainability Committee guides the School's efforts to implement its ongoing Sustainability Action Plan, which includes the areas of energy and greenhouse gas emissions; natural and built environment; materials management; food and well-being; and sustainability leadership and capacity building; The Committee's efforts at greenhouse gas reduction will be guided by both the Sustainability Action Plan and the school-wide Climate Change and Health Initiative. The Committee collaborates with YSPH faculty, students and staff and the Yale Office of Sustainability to achieve its goals." This year, the committee adopted the following vision: "We envision a YSPH in which the integral relationship between sustainability and health is seamlessly incorporated into our teaching, research, practice, operations, and culture."

The membership of the Committee for the 2017-18 academic year was:

- Dr. Robert Dubrow, Professor of Epidemiology (co-chair)
- Heidi Richard (Administrative Director, Office of the Dean) (co-chair)
- Dr. Peter Krause, Senior Research Scientist in Epidemiology
- Dr. Brian Weiss, Research Scientist in Epidemiology
- Dr. Debbie Humphries, Clinical Instructor in Epidemiology
- Elizabeth Eocaci-Tucker, Senior Administrative Assistant
- Jennifer Farkas, Director of Financial Aid
- Katie Owers, PhD student
- Arsalan Marsani, second-year MPH student
- Sheridan Finnie, second-year MPH student

- Victoria Shirriff, first-year MPH student
- Natasha Wasim, first-year MPH student

During the 2017-18 academic year, the committee finalized the 2017-2025 Sustainability Action Plan in coordination with the new [Yale Sustainability Plan 2025](#). Sustainability milestones included building new above-ground student spaces (more sustainable because most student spaces have been in the windowless basement), installing water bottle refill stations to promote use of reusable as opposed to disposable water bottles, a listing of local healthy restaurants for incoming YSPH students, and Green Lab certifications. But our main initiative was orchestrating a shift from using disposable dishware, silverware, and cups at YSPH catered events to using non-disposable food and beverage containers and utensils. This initiative was funded by a competitive grant from the Yale Office of Sustainability to Sheridan Finnie, a second-year MPH student. The title of the grant, funded for \$17,322, was “Minimal disposal practices for catered events,” with Dr. Dubrow as her faculty advisor. Ms. Finnie formed a new student group, Sustainable Waste Reduction at YSPH (SWAY), that initiated a school-wide Bring Your Own (BYO) campaign. The BYO campaign provided YSPH-branded reusable food and beverage containers (eco-boxes, tumblers, and sporks) to the entire YSPH community and promoted their use at catered departmental events. On average, each department has two to four lunch events per month. To monitor progress, SWAY students evaluated events and found that after the BYO campaign was launched, 32% of event attendees brought their reusable items to the events. This is a great improvement over the essentially <0-3% of attendees who brought their own before the campaign and provides a baseline over which we aim to improve during the 2018-19 academic year. SWAY is continuing during the 2018-19 academic year under new student leadership.

See Appendix III.B for the YSPH Sustainability Action Plan; a SWAY field action report; and a document about lessons learned from the SWAY BYO campaign.

C. Greenhouse Gas Reduction Program for Students and Partnership with Cool Effect

On Wednesday, August 23, 2017, Dr. Dubrow conducted a workshop for YSPH first-year MPH students during orientation week on “Climate justice: greenhouse gas emissions reduction in developing countries.” The following was the workshop learning objective: Completion of this one-hour workshop will enable students to evaluate strengths and weaknesses of greenhouse gas emissions reduction projects in developing countries from a climate justice perspective at an introductory level. After giving a general introduction to climate change, Dr. Dubrow put greenhouse gas emissions reduction projects in the developing world into a climate justice framework, with a discussion of co-benefits. He then spoke about public and private climate financing for developing countries and described Cool Effect. He emphasized how private donations to greenhouse gas emissions reduction projects could help take up some of the slack due to the lack of US government donations to the Green Climate Fund, and that seemed to resonate with the students. He then presented two projects: Uganda cookstoves and Costa Rica wind farm. Students then voted on which project they considered to be more meritorious. The vote was 70 for the Uganda cook stove project and 54 for the Costa Rica Wind Farm Project. YSPH donated a total of \$16,500: \$9,315 to the Uganda project and \$7,185 to the Costa Rica project. See Appendix III.C for a fuller description of the workshop.

D. YSPH Departmental Competition

YSPH committed to sponsoring a greenhouse gas reduction competition among YSPH departments. The 2017-18 competition was tied to SWAY’s BYO campaign. The winning

department was Environmental Health Sciences (EHS) – 73% of attendees at EHS catered events brought their own reusable eco-boxes, tumblers, and utensils.

IV. Major Year 4 Goals

A. Faculty Recruitment

We aim to conclude our faculty search with a successful recruitment.

B. On-line Certificate Program in Climate Change and Public Health

We aim to offer the program twice during the 2018-19 academic year. We will perform a thorough evaluation of these two offerings with the goal of producing the best possible certificate program.

C. Connecticut Countdown on Health and Climate Change

[The Lancet Countdown on Health and Climate Change](#) is a global effort to track important indicators related to climate change and health and to chart improvements and well as challenges. We aim to create a countdown for the state of CT, in partnership with local and state government agencies, NGOs, and community organizations. The goal will be to create Connecticut-specific indicators on which we would report annually, with the hope that it can serve as a model for other states. This would be more than an academic exercise – we aim to create a report that will help policymakers and advocates track progress on addressing key climate change and health issues in Connecticut and to make appropriate adjustments based on the data, all to protect and improve the health of Connecticut residents.

To achieve these goals, CCHI seeks to diversify and grow its funding streams, moving beyond a single grant to a model that includes individual gifts, government and foundation grants, and University support. Achievement of our goals, combined with success to date, will position YSPH to be a locus for research, education, and practice at Yale and beyond and to attract the best students and faculty.