



Note From the Director

Welcome

Welcome to the first newsletter of the Water, Climate and Health Program. This program is possible because of the generous support of the Claire M. Hubbard Foundation and is designed to create interdisciplinary collaborations to address Nebraska's public health challenges related to water and climate. We are housed in the College of Public Health at the University of Nebraska Medical Center, and we are connected to the Daughtery Water for Food Global Institute and UNL's Institute of Agriculture and Natural Resources.

This has been an exciting start for our new program. Over the last year, I came on as director and Meghan Langel was hired as the Program Manager. Since then, we have continued to grow our personnel, and are working hard to expand our reach across the University of Nebraska system and the State. Even though there were many challenges because of COVID, we have continued to build the program and establish numerous partnerships throughout Nebraska. We have engaged with NRDs, NDEE, local public health departments, academics, educators, producers and many others. Our hope is to understand Nebraska's challenges and concerns dealing with water and health, especially from the perspective of the people working on the ground. By understanding these issues, we can help find our place to create practical solutions. Our goal is to improve the health of Nebraska.

Challenges

Nebraska has many challenges associated with water quality and water quantity. Flooding and drought are a common occurrence in the state - as I write this, parts of Nebraska are in moderate to extreme drought. These extreme weather and climate events can lead to negative health outcomes. In addition, we face multiple water pollution issues in Nebraska. Many areas of the state have concerning high concentrations of Nitrate and Atrazine in ground and surface water. Studies have shown that these chemicals are linked to higher rates of cancer, birth defects, and other health problems. To better understand Nebraska's health threats from changes in water quality and water quantity, we are conducting a variety of research projects here in the state. We face many public health challenges associated with water and climate, but with these challenges there are many opportunities. There are also many good partners in the state that are willing to help address these issues. Over the last year, we have come a long way and some of our work is highlighted in this newsletter. However, there is still a lot of work to be done and we look forward to working with you to make Nebraska a safer and healthier place to live.



Jesse E. Bell, PhD

Jesse E. Bell

Water, Climate, & Health Program Hosts Health Summit

Frances Hayes and Meghan Langel



The Water and Health Summit was held June 29-30 in Lincoln, NE with the goal of improving the health of Nebraska. The in-person event brought together stakeholders in health and water to clarify issues in Nebraska, define obstacles to key solutions and operationalize solutions. The Summit has paved the way to building a community of practice that links health professionals and researchers to those doing work in water resources and agriculture. Another outcome of the Summit is the beginning production of a white paper and policy brief on the challenges and solutions identified, with a final presentation set for policymakers later this year. Invited participants included experts from the University of Nebraska Medical Center (UNMC), Daugherty Water for Food Global Institute (DWFI), the University of Nebraska's Institute of Agriculture and Natural Resources (IANR), as well as Natural Resources Districts managers, physicians, donors, government entities, non-governmental organizations, growers and others. The Summit was sponsored by the Water, Climate and Health Program, DWFI, and IANR. Proceeding the Summit, the Program conducted a survey on perceptions related to water and health issues in the State of Nebraska. The survey had a 38% response rate, and respondents represented a variety of entities, mirroring the diverse professional representation at the Summit. Survey results will be used in the white paper and to help guide future education and outreach endeavors. Recorded sessions from the Summit can be viewed on the WCH website - [Click Here](#)

The UNMC Water, Climate, & Health Program Hosted a Regional Launch Event for the 2020 Lancet Countdown on Health and Climate Change

Meghan Langel

In March 2021, the Water, Climate and Health Program, along with the Daugherty Water for Food Global Institute hosted a regional launch event for the 2020 Lancet Countdown on Health and Climate Change. This was one of a handful of regional launch events across the country, designed to disseminate the findings of the Lancet Countdown, which is a yearly report featuring the most up to date data related to the connection between public health and climate change. The broader purpose of the regional launch event was to contextualize and frame the report findings for a local audience so that we can describe how climate change is impacting our communities in Nebraska and what we can do to build resilience. This year's Lancet Countdown U.S. Policy Brief featured a case study on the health impacts of the 2019 Nebraska floods, which was co-authored by Jesse Bell, PhD, Rachel Lookadoo, JD, and Chris Dethlefs, UNMC medical student. The regional launch event featured a keynote address from Linda Emanuel - Community Health Director for AgriSafe and an ag producer in North Bend, Nebraska. She shared how her community was impacted by the floods and the health impacts that emerged in the wake of the event. The launch also featured a variety of other presentations from Nebraskans to highlight how our changing climate is impacting a variety of sectors, from law to medicine. The recorded event can be viewed on the WCH website - [Click Here](#)

Beyond Keystone XLP - Oil Pipeline Preparedness for Nebraska

Meghan Langel

Plans for the Keystone XL Pipeline project may be currently halted but did you know there are already multiple operational oil pipelines in the state of Nebraska? The Keystone XLP has been at the center of the debate surrounding America's energy future, but even without it the U.S. will import a record volume of crude oil this year. Though pipeline safety has increased, breaches do occur. Given this, it is imperative that we be aware of the potential consequences of an oil spill and ensure Nebraska is prepared for such an event. In response to this call, the Water, Climate and Health Program along with the Center for Preparedness Education hosted a webinar in March titled, "Inland Oil Spills: Exploring Environmental and Human Health Consequences." The webinar focused on movement of oil into water and soil following a spill, as well as indigenous and legal perspectives on oil pipelines. The overall purpose of the webinar was to provide an informational primer for an in-person training event to take place in the Fall of 2021 in Norfolk, Nebraska. The in-person event will target Nebraska public health and emergency preparedness personnel and will provide a facilitated conversation and consensus process to arrive at planning strategies tailored to attendees' roles in an oil pipeline breach response to mitigate adverse outcomes. The webinar can be viewed on the ECHO 360 website - [Click Here](#)

College of Medicine to Vote on Climate and Health Curriculum Proposal

Conor O'Neill and Meghan Langel

One of the long-term objectives of the WCH Program is to incorporate environmental issues into UNMC's curriculum. Climate change is the first educational initiative being tackled. This initiative has received broad support across UNMC's campus, with each of UNMC's colleges participating in an ongoing Climate Change and Health Committee. Bradly Britigan, MD, Dean of the UNMC College of Medicine (COM) and H. Dele Davies, MD, Senior Vice Chancellor for Academic Affairs have shown enthusiastic support of this issue. In the spring of 2021, Dr. Jesse Bell and Conor O'Neill, MPH student and WCH Program student worker, spoke directly with the leadership team for the College of Medicine Curriculum Committee and presented them with a 20-page climate and health curriculum proposal that contained an audit of every didactic block for M1 and M2 students, learning objectives, peer reviewed resources and associated faculty information to make implementing the proposed curriculum change as easy as possible. At the end of July, the Curriculum Committee will vote on whether to reform the current curriculum to incorporate Climate Change & Health related content.

Interdisciplinary Team Investigating Potential Impacts of Pollution from AltEn Ethanol Plant in Mead

Hannah Lund



Considering the environmental contamination from AltEn Ethanol Plant in Mead and surrounding areas, UNMC and the Water, Climate, and Health Program have partnered with Creighton, UNL (University of Nebraska Lincoln), and Three Rivers Health Department to evaluate the impacts on human, wildlife, and environmental health. Soil and water samples have been collected from the area, as well as animal samples. While sampling continues, a community health survey will be implemented in Mead and the area around the AltEn plant to get a better idea about potential exposures and health impacts from the pollution. The UNMC team is planning to implement the survey the weekend of July 17th and 18th. More information about the University's work related to the pollution in Mead can be found on the Mead project website - [Click Here](#)

UNMC Develops Drought and Public Health Strategy for NIDIS

Jesse E. Bell, PhD

Dr. Jesse Bell has a contract with the National Integrated Drought Information System (NIDIS) to conduct research on the impacts of drought on human health and develop a NIDIS strategy document for engaging with public health on topics dealing with drought. He has put together an interdisciplinary team to conduct this work including Water, Climate and Health Program team members Yeongjin Gwon, PhD and Azar Abadi, PhD. As part of the contract, Dr. Bell is working with Keith Hansen and Rachel Lookadoo at the Center for Preparedness Education to host drought and health workshops and interview state public health officials on topics dealing with drought. To date, workshops have been held in Minnesota and Arizona. There are plans to hold future workshops in Oregon and Montana.

UNMC, Nebraska DHHS and Collaborators, Compare Change in Mortality with Historical Drought Events

Jesse E. Bell, PhD

UNMC received funding from the National Oceanic and Atmospheric Administration (NOAA) to study the impacts of drought on human health. The interdisciplinary team, led by Dr. Jesse Bell, brings together a team of researchers from UNMC, University of Minnesota, North Carolina State University, Centers for Disease Control and Prevention, and Nebraska Department of Health and Human Services. The UNMC team includes Dr. Azar Abadi, Dr. Yeongjin Gwon, Siddhi Munde, and Rachel Lookadoo. The research evaluates changes in mortality rates with historical drought events using a national high resolution mortality database.

Daugherty Water for Food Global Institute (DWFI) awards Claire M. Hubbard Water, Climate and Health Fellowships

Meghan Langel

The Claire M. Hubbard Water, Climate and Health Fellowship program, supported by DWFI, provides student support funding for projects that address topics at the nexus of water and health. The inaugural funding cycle yielded many applications, and two were awarded.

2021 Claire M. Hubbard Water, Climate and Health Fellowship Awardees:



Tirthanker Roy, PhD

Assistant Professor, UNL Civil and Environmental Engineering

Developing a comprehensive framework that can assess flood-induced health risk by considering hazard, exposure, vulnerability, and response.



Stephen Thomas, PhD

Associate Professor, UNL School of Natural Resources.

Producing baseline data that can be used to compare spatial and temporal variation in veterinary and human antibiotics in select streams of Nebraska.

The UNMC Water, Climate, & Health Program Team Has Grown!



Hannah Lund

Recently graduated from the UNMC College of Public Health with a Masters degree in Public Health, Hannah studied epidemiology and was involved in various student organizations on campus including UNMC Student Senate, COPH Student Association, and UNMC One Health. Hannah is temporarily working for the Program as she awaits the beginning of her new fellowship in Pennsylvania. Hannah has done an excellent job coordinating efforts related to our Mead, Nebraska project.



Kylie Johnson

Currently pursuing her Masters degree in Public Health at the UNMC College of Public Health, Kylie is coordinating the Mead, Nebraska project. Specifically, Kylie has worked with the Centers for Disease Control and Prevention to create a community health needs assessment that will be distributed in and around the Mead community in July, 2021.

The UNMC Water, Climate, & Health Program Team Has Grown!



Raimee Seal

A senior at Millard West High School, Raimee plans to pursue a career in data analysis and/or finance. Over the summer, she has been working under the supervision of Dr. Azar Abadi to analyze water quality data collected from the Shell Creek Watershed.



Yeongjin Gwon, PHD

Dr. Gwon is an Assistant Professor in the Department of Biostatistics at the College of Public Health at UNMC and leads biostatistical analysis for the WCH Program. Dr. Gwon has collaborated with Dr. Jesse Bell on multiple projects related to the nexus of water and health and is interested in helping to advance data analysis techniques in this area.

Staff Spotlight: Siddhi Munde, MS



Siddhi Munde is a research data analyst in the College of Public Health at the University of Nebraska Medical Center (UNMC). Siddhi has a Master's in Geoinformatics and a Bachelor's in Engineering in Information Technology (IT). She has extensive experience in the application of Geo-information analytics and public health outcomes. This includes, but not limited to, utilization of spatial data analysis and predictive modelling for determining effects of environmental exposures on health outcomes. Her current research work is identifying associations of water quality related contaminants with thyroid cancer incidences in Nebraska. This project is being developed in collaboration with researchers at the UNMC College of Public Health as well as the clinical side at Nebraska Medicine. She is also actively involved in assessing associations between pesticides applied from agricultural and Parkinson's disease incidences in various counties of Nebraska state, and comparative review of drought metrics for public health research applications.

Student Spotlight: Conor O'Neill

Conor O'Neill is a talented graduate student who has been working with the Water, Climate, and Health Program since the Fall of 2020. Conor is originally from Spokane, WA and received his Bachelor of Science in Pre-Medicine/Dentistry and Zoology from Washington State University. After college, he worked at a healthcare consulting firm, helping to digitally enable healthcare companies by implementing electronic medical records. In 2020, he went back to school for his Master of Public Health in Environmental, Occupational, and Agricultural Health. The focus of Conor's work with the Program has been incorporating Climate and Health education into UNMC's curriculum. Toward this goal, he has conducted countless interviews with other institutions, researched methods for curriculum reform, formulated the committee structure for the Healthy Earth Alliance (HEAL) student group, created a new Enhanced Medical Education Track for Climate Change & Health, and wrote and presented a curriculum proposal for the College of Medicine. These efforts garnered attention from the premier group on Climate Change & Health related educational efforts, the Global Consortium for Climate Change & Health Education (GCCHE), who invited Conor to give a keynote presentation on UNMC's progress. Conor was subsequently invited to join GCCHE's Student Advisory Committee, a handpicked group of healthcare students from around the country. In addition, Conor has twice given comments to the University of Nebraska Board of Regents on fossil fuel divestment. The student-led efforts resulted in divestment commitments from the University President and the newly appointed Chief Sustainability Officer. When Conor graduates, he wants to work for the CDC (Centers for Disease Control) Climate and Health team or in the field of academic institution researching and educating on the topic of Climate Change and Health. He is also passionate about permaculture and sustainable living and wishes to incorporate this into his future career.



NDEE and UNL Extension to Hire Source Water Protection Position

The Nebraska Department of Environment and Energy and UNL Extension will soon begin the hiring process for a Source Water Protection position. The individual will be responsible for education, outreach and community development related to source water protection, with emphasis on water, climate, and health initiatives. This individual will work closely with the Water, Climate and Health Program, with Dr. Jesse Bell serving as supervisor to this individual on the University side.

New Faculty Hire

In the coming months, the WCH Program will begin a nationwide search for an early career faculty hire. This individual will have expertise in environmental health epidemiology.

Presentations

As part of the Program's education and outreach efforts, Dr. Bell and other team members present to a wide range of audiences and stakeholders on topics at the nexus of water, climate, and health. Below are key events and publications from the past six months:

- 01/13/2021 - Dr. Bell presented to the Creighton University Global Health Journal Club on climate change and health.
- 01/19/2021 - Dr. Bell presented to the Nebraska Actuary Club about climate change.
- 03/02/2021 - Dr. Bell recorded an episode for New Mexico State University's "Come Rain or Shine" podcast on the topic of drought and mental health.
- 04/02/2021 - Dr. Bell presented at the Center for Great Plains Studies 2021 Symposium titled "Climate Change and Culture in the Great Plains." Dr. Bell presented on climate change and health.
- 04/08/2021 - Dr. Bell gave a presentation at the Nebraska Public Health Conference on climate and health. Dr. Bell was involved in the planning for this event.
- 04/12/2021 - Dr. Bell gave a presentation to the State Emergency Response Commission on the Mead, Nebraska environmental situation.
- 04/21/2021 - Dr. Bell gave a presentation to Lincoln Rotary Club on water, climate and health.
- 04/22/2021 - Dr. Bell gave a presentation to Columbia University's Global Consortium on Climate and Health Education on UNMC's efforts to integrate climate and health education into curriculum.
- 05/13/2021 - Dr. Bell gave a presentation to Nebraska Department of Environment and Energy on water and health.
- 06/16/2021 - Dr. Bell presented on climate change and health at a virtual workshop titled "Chemical Toxicants in Water: A GeoHealth Perspective in the Context of Climate Change."
- 07/14/2021 - Dr. Bell recorded a podcast for the Society of Actuaries on the impact of climate change on health.

Publications

Schramm, P.J., Brown, C.L., Saha, S., Conlon, K.C., Manangan, A.P., **Bell, J.E.**, et al. A systematic review of the effects of temperature and precipitation on pollen concentrations and season timing, and implications for human health. *Int J Biometeorol* (2021). <https://doi.org/10.1007/s00484-021-02128-7>

Bell, J.E., Puvvula, J., Abadi, A. Determining the Role of Anthropogenic Climate Change on Human Health Outcomes: A Case Study on Heat Related Illness Attribution. *Society of Actuaries*. 2021 February. <https://www.soa.org/globalassets/assets/files/resources/research-report/2021/determining-role-climate-change.pdf>

Lookadoo RE, **Bell JE**. Public Health Policy Actions to Address Health Issues Associated with Drought in a Changing Climate. *The Journal of Law, Medicine & Ethics*. 2020;48(4):653-663. doi:10.1177/1073110520979372

Ebi KL, Vanos J, Baldwin JW, **Bell JE**, Hondula DM, Errett NA, Hayes K, Reid CE, Saha S, Spector J, Berry P. Extreme Weather and Climate Change: Population Health and Health System Implications. *Annu Rev Public Health*. 2021 Jan 6. doi: 10.1146/annurev-publhealth-012420-105026. Epub ahead of print. PMID: 33406378.

Hunt, E.D., Christian, J. I., Basara, J. B., Lowman, L., Otkin, J. A., **Bell, J. E.**, Jarecke, K., Wakefield, R. A., & Randall, R. M. (2020). The flash drought of 1936. Accepted for publication to *Journal of Applied and Service Climatology*

Bartelt-Hunt SL, Bell JE. Surface and Groundwater Contamination, Community and Ecosystem Exposures Are the Unintentional. Consequences from "Recycling" Treated Seed Products. *Environmental Science & Technology*. 2021. doi: 10.1021/acs.est.1c01305

Watanabe-Galloway, S, Chasek, TC, Yoder, AM, Bell, JE. Substance use disorders in the farming population: scoping review. *J Rural Health*. 2021; 1– 22. <https://doi.org/10.1111/jrh.12575>

Fard, B. J., Mahmood, R., Hayes, M., Rowe, C., Abadi, A. M., Shulski, M., Medcalf, S., Lookadoo, R., & Bell, J. E. (2021). Mapping Heat Vulnerability Index Based on Different Urbanization Levels in Nebraska, USA. *Earth and Space Science* DOI:10.1002/essoar.10507450.1