CACHE | Center for Aging, Health & Environment

Member Initiated Meeting, Population Association of America

Date: Wednesday, May 6th
Time: 1:00pm-5:30pm
Location: America's Center Convention Complex, Room 261
(701 Convention Plaza, St. Louis, MO 63101, USA)

Measuring Heat for Use in Population Research

Heat is one of the most frequently examined environmental influences on population health, and a wide variety of data sources exist to measure exposure. This workshop, sponsored by the Center on Aging, Health, and Environment (CACHE), provides an overview of heat measures and examples of two, including hands-on experience with code available via the CACHE website. Participants will generate temperature exposure measures from publicly available data, as well as wet bulb temperatures. The Universal Thermal Climate Index data will also be demonstrated and linked to population data.

The workshop's first exercise demonstrates how to construct severe heat measures using the Universal Thermal Climate Index (UTCI, Copernicus ERA5-HEAT). It starts by showing data manipulation from raster (grid data) to a tabular dataset that obtains UTCI values for each municipality in Mexico as an example. Then, the data are mapped and analyzed as linked to population data. Finally, the number of days of severe heat (32°C UTCI and above) are generated. This code, also available on the CACHE website, is part of the demonstration CACHE project "Heat, Disability in older adults and Care" from El Colegio de Mexico.

The workshop's second exercise uses data from two different sources: National Oceanic and Atmospheric Administration (NOAA) weather-stations and ERA5-Land Reanalysis from the European Union's Copernicus Project. Both are publicly available. The workshop will review information on acquiring and cleaning *daily* temperature data for New York City, as an example. Key is that air temperature as well as wet bulb temperature exposure variables are generated, and at varying temporal resolution. On the CACHE website, the code is embedded in an R Markdown pdf file.

See below for instructions to complete 4 short steps (15-20 minutes max) ***before*** attending the workshop!

Agenda

Topic	Presenter/Lead	Time (approx.)
Lunch and Connection		1:00-1:45
Introduction to CACHE & Workshop Objectives	Deborah Balk, CUNY	1:45-1:55
Overview of Heat Measurements for use in Aging Research *Slide deck*	Frank Heiland, CUNY	1:55-2:30
Break		
Discussion of Overview Measures: Possibilities, Choices, Rationales	Deborah Balk, CUNY and others	2:40-3:10
Break		
Example: Measuring severe heat days using the Universal Thermal Comfort Index *Zip Folder with materials* *Slide deck*	Landy Sanchez and Marcial Yangali, El Colegio de Mexico	3:20-4:20
Break		
Example: Measuring air temperature and wet bulb temperature *Zip folder with materials*	Alex Mikulas, University of Colorado & Jenna Tipaldo, CUNY	4:30-5:30

Presenters:

Dr. Lori Hunter, University of Colorado
Dr. Frank Heiland, CUNY Institute for Demographic Research
Dr. Deborah Balk, CUNY Institute for Demographic Research
Dr. Landy Sanchez, El Colegio de Mexico
Marciel Yangali, El Colegio de Mexico
Dr. Alex Mikulas, University of Colorado, Boulder
Jenna Tipaldo, CUNY School of Public Health and CUNY Institute for Demographic Research

Please complete below steps in advance

There is a significant hands-on component to this workshop. To participate, please follow the instructions below ahead of the session, using the laptop that you plan to bring to the workshop. Steps 1 through 4 require an internet connection and should take approximately 15 minutes.

1. Install R and RStudio onto the laptop you plan to bring to the workshop.
    a. The above link directs you to *Posit*, the open-source software organization that hosts RStudio. Follow webpage step 1 to download and install the analytical software, **R**, and webpage step 2 to download and install the desktop application to interface with R, **RStudio**.

2. Download this PAA_CACHE_workshop_materials.zip zip file in advance and save it locally to your laptop (there will **not be Wi-Fi** in the room). Unzip the PAA26_CACHE_workshop_materials.zip file.
    a. Contents of .zip file:
        i. Folder CACHE Pre-PAA = Project folder for session 1: Measuring Extreme Heat Days
        ii. Folder NYC_TempDemo_PAA = Project folder for session 2: Measuring air and wet bulb temperature
        iii. setup_R_packages.R = R script to install necessary R packages for both sessions.

3. While you have an internet connection, open the R script file titled setup_R_packages.R. The file will open in the RStudio program.
    a. Follow the instructions embedded in the file to prepare your workspace for the session.

4. Once you have completed these steps, you can close RStudio. Your computing environment is now prepared for the workshop.

For those of you who already use R/RStudio on your machine, please download the PAA26_CACHE_workshop.zip folder and execute the included setup_R_packages.R script prior to attending the workshop.