The Hawaiʻi Climate Change & Health Working Group

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Imposter Syndrome

really feeling my impostor syndrome lately

Reality

what if i'm not as good as everyone says i am?

what are you talking about, everyone says you're the worst, including me

What others know
The National RISA Program

• National NOAA research grant
  – 11 regional currently funded programs
  – 5 years, flexible, use-inspired climate research
  – RISA’s have different research foci, but commonalities include:
    1. Interdisciplinary research that provides climate science and decision support to diverse stakeholders;
    2. Participatory approach – continual dialogue between researchers and end-users;
    3. Sustained relationships;
Pacific Regional Integrated Sciences and Assessments
The Pacific RISA

- Interdisciplinary team of PI’s: Hydrology, climatology, phys. & social geography, resource economics, law & policy, psychology, decision science
- Building island resilience and freshwater resource sustainability under conditions of climate variability and change
- Dynamical and statistical downscaling of climate models
- Watershed modeling
  - Groundwater dynamics, ecosystem services, scenario planning
- Social network analysis
- State and territorial law and policy analysis
  - Freshwater, climate migration law
- U.S. National Climate Assessment & Pacific Islands Regional Climate Assessment
Indicators of a Changing Climate in the Pacific Islands Region

- Extreme Events Changing
- Surface Air Temperature Rising
- Changing Rainfall
- Sea Surface Temperature Rising
- Ocean Heat Content Rising
- Carbon Dioxide Concentrations Rising
- Changing Winds, Waves, and Water Levels
- Changing Habitats and Species Distributions
- Sea Level Rising
- Baseflow in Streams Decreasing
- Carbonate Chemistry Changing

(Keener et al, 2012: PIRCA)
Heat, energy, and public schools in Hawai‘i

• Temperatures reached record highs at least 25 times during the school year in 2015
  – Students and teachers with heat exhaustion
  – Trade wind frequency decreasing; ocean temperatures increasing

• 94% of public schools do not have air conditioning
  – Electrical systems too old to handle the extra load
  – AC at all schools would cost ~$1.7 billion in addition to extra electricity costs (already the nation’s highest)

![Heat Index Change, 2080-2099, RCP8.5](Zhang et al. 2017)
El Niño: Food & Water Security

- Driest period on record from 2008-2012
- Hawaii is 99% groundwater dependent, and baseflows have declined over the past 100 years
- Declining size of fish in Pacific fisheries
- Record cyclone season in Hawaii in 2015
- Wildfire burns ~8000 acres of Hawaii every year for the past decade

Kruk & Keener, draft figure for NCA4
Dengue Fever on Hawai‘i Island

As of April 20 2016

*Total number of confirmed cases*: 263

Number of Cases

Onset Date

- Sep-1, Oct-1, Nov-1, Dec-1, Jan-1, Feb-1, Mar-1, Apr-1, May-1

- **Brown** = Cases no longer infectious to mosquitoes
- **Red** = Cases likely still infectious to mosquitoes
- **Blue** = Illness that began during this time may not yet be reported to/confirmed by HDOH

(HDOH preliminary data - subject to change pending new information)
The Perceived Non-Immediacy of Climate Risk

• Not interested in climate impacts on health when they immediate necessities like vector control are de-funded

• How to put health policies in place that look forward – climate disasters can cut islands off quickly (Puerto Rico)

• Planning for health needs of Pacific Island migrants to HI and other states and territories
  – Though the medical issues climate migrants bring might not be directly caused by climate change, they present new problems to medical professionals in destination communities
Origins of the Hawaiʻi Working Group

• Hawaii Public Health Association (HPHA) Survey, Fall 2014
  – 58% of public health professionals were “very concerned” about the potential impacts of climate change and health on Hawaiʻi residents
  – 66% thought that the impacts of climate change and health in Hawaiʻi had received “little to no attention”

• Initially convened in August of 2015 (HCR 108, SD1)
  – To help the State consider and plan for the impacts of climate change on human health
  – Develop preliminary findings and recommendations for policymakers
  – Report to the Twenty-Eight HI State Legislature in 2016
Working Group Composition

15 people representing:

• Federal
  – Centers for Disease Control & Prevention (CDC)
  – U.S. Pacific Command (PACOM) Surgeon

• State
  – Department of Health
  – Office of Environmental Quality Control

• NGO/Non-Profit
  – Hawai‘i Public Health Association
  – East-West Center/Pacific RISA
  – The Pacific Islands Health Officers’ Association (PIHOA)
  – Hawai‘i Public Health Institute
  – Hawai‘i Primary Care Association

• Academia/Professional
  – UH-Manoa Dept. of Family Medicine & Community Health, JABSOM
  – UH-Manoa School of Law
Topics Covered at Meetings

• State and regional disease surveillance and monitoring
• Water and food security
• Vector-borne infectious diseases
• Respiratory/pulmonary effects
• Cardiovascular effects
• Mental and behavioral health, at-risk communities
• Climate justice, migration, and health
• Strategies and funding priorities
Recommendations to the Hawai’i State Legislature for 2016

• Climate Change is projected to increase/exacerbate already-existing public health problems.

• A major challenge will be to measure & analyze/interpret key health indicators to determine changing health trends that are attributable to climate change conditions.

• Disparities in health impacts are projected for already vulnerable populations —elderly, poor, young, ill, marginalized populations, as well as specific at-risk groups (outdoor workers).

• Get DoH dedicated resources to lead effort: Climate Change/environmental epidemiologist and a Climate Change health planner/coordinator.

• Develop and implement improved disease surveillance for major projected Climate Change threats in order to link climate indicators to health impacts and to provide early warning.

• Support more climate monitoring stations in Hawaii and the Pacific

• Develop and implement CDC BRACE framework in Hawaii - request technical support and support from CDC

• Develop close coordination with other Climate Change stakeholders. Align coordination for climate change and health with 6 targeted goals for the Hawaii ALOHA Plus Challenge, for 2030
Overall findings

• A major focus for health should be on comprehensive and coordinated adaptation strategies by Hawai‘i’s public health system and related services, engaging scientists/researchers, planners, and policymakers to support adaptation to changing environmental challenges and conditions.

• The Hawai‘i State Department of Health should have increased dedicated fiscal and personnel resources to lead efforts addressing development of climate change and health issues.

• Protections against both infectious and chronic climate-associated disease threats should be strengthened.
Outreach

Connecting Climate Change, Our Health and Our 'Aina

Why Should We Care About Health and Climate Change?

Climate Change is happening now and its impacts will only increase.

Health impacts from climate change will affect us all directly and indirectly.

Climate change cannot be prevented, but we can adapt to the changes with education and action.

Sources

http://www.nrdc.org/health/climate/hi.asp
http://climate.nasa.gov/
2015 Preliminary Report and Recommendations from the Hawai‘i Climate Change & Health Working Group

A Collaboration of

Hawaii Climate Change and Health Working Group
Hawaii Public Health Association
Hawaii State Department of Health
Infographic Developed by Shelby Wardle, Hawaii Pacific University

11.1% of Hawaii’s population have asthma.
Air temperatures are likely to increase by 4-7.
With sea levels rising worldwide, dislocation and loss of land along the coast line is expected to increase. With this, the public health impacts to the general population will be less water and food security ease.

Climate change impacts on your community:

- The weather on hot days, even on frail neighbors and those sure to stay hydrated
- The need for animal-based food and to save on resources required for growing food
- The need for community’s business plan in case of natural disasters
- The need for expecting and protecting the 'Aina
After the release...

- Paper minimizing impacts of VBD and climate in Hawaii
- Climate change could increase migration, potentially, increasing the costs of service to additional at-risk populations in receiving communities in Hawaiʻi
- “The expected migration of populations that contain infectious persons as a result of sea-level rise is a different matter that is related to climate change. Existing public health policies and medical services are adequate to sufficiently cope with this level of influx and prevent significant outbreaks.” Canyon and Burkle (2017)
  - …Does it? Trouble meeting current needs
  - Zero people in vector monitoring division
  - HI has 3-7 days of food. Medical supplies?
  - Containing health shocks during a disaster
<table>
<thead>
<tr>
<th>Infection</th>
<th>Current Status and Forecasted Vulnerability by 2050</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mosquitoes</td>
<td><em>Aedes albopictus, Ae. aegypti, Ochlerotatus japonicas, Wyeomyia Mitchellii, Culex quinquefasciatus, Ae. vexans nocturnus</em> present.</td>
</tr>
<tr>
<td>Dengue</td>
<td>Disease intermittent. Vectors present. May become intermittent due to increased travel.</td>
</tr>
<tr>
<td>Chikungunya</td>
<td>Disease not present. Vectors present. May become intermittent due to increased travel.</td>
</tr>
<tr>
<td>Zika</td>
<td>Disease not present. Vectors not present. Likelihood not expected to change.</td>
</tr>
<tr>
<td>Malaria</td>
<td>Disease not present. Vectors present. Likelihood not expected to change.</td>
</tr>
<tr>
<td>West Nile virus</td>
<td>Disease not present and not expected to change due to climate change.</td>
</tr>
<tr>
<td>Cholera <em>Vibrio vulnificus</em> and <em>V. parahaemolyticus</em></td>
<td>Pathogen not present. Effects of climate change are unpredictable.</td>
</tr>
<tr>
<td>Melioidosis</td>
<td>Pathogen not present, but likely to increase if introduced. Introduction and spread will not be due to climate change.</td>
</tr>
<tr>
<td>Cryptococcus gattii</td>
<td>Pathogen present but seasonal and effects of climate are unpredictable.</td>
</tr>
<tr>
<td>Salmonellosis</td>
<td>Pathogen present but should decline</td>
</tr>
<tr>
<td>Cryptosporidiosis</td>
<td>Pathogen present but effects of climate change are unpredictable.</td>
</tr>
<tr>
<td>Giardiasis</td>
<td>Effects of climate change will likely change pattern of incidence.</td>
</tr>
<tr>
<td>Leptospirosis</td>
<td>Unlikely to increase due to climate change.</td>
</tr>
<tr>
<td><em>Campylobacter</em></td>
<td>Unlikely to increase due to climate change.</td>
</tr>
<tr>
<td><em>Staphylococcus aureus</em></td>
<td>Effects of climate change on abundance or distribution are unpredictable; insufficient data.</td>
</tr>
<tr>
<td>Gastroenteritis: adenovirus, enterovirus, norovirus GI/GII</td>
<td>Highly localized and not expected to change due to climate change.</td>
</tr>
<tr>
<td>Arsenic</td>
<td>Common and not expected to change due to climate change.</td>
</tr>
<tr>
<td>Polluted runoff</td>
<td>Common and unlikely to increase because seas here are already warm.</td>
</tr>
<tr>
<td>Ciguatera</td>
<td>Associated with temperate climates and colder coastal waters and are not a concern in Hawaii</td>
</tr>
<tr>
<td>Paralytic and diarrheic shellfish poisoning</td>
<td>Nontoxic blooms exist in Hawaii and the introduction of toxic varieties would not be associated with climate change.</td>
</tr>
</tbody>
</table>
PIRCA Products

**Climate Change and Pacific Islands: Indicators and Impacts (2012)**

- Full Report
- Case Studies
- Executive Summary
- NCA Pacific Islands chapter (2014)

PIRCA.org
Next PIRCA (www.pirca.org)

• Developed in coordination with 4th US National Climate Assessment Chapter – contains more regionally relevant info and case studies

• Update to the 2012 report

• Stronger USAPI inclusion than 2012 report

• Online formats; easy to access

• Anticipated release in 2018
New Sector: Pacific Island Climate and Health Indicators

• Key questions:
  – What health-related decisions are stakeholders making now or likely to make in the future that are impacted by climate variability and change?
  – What data are currently being collected, and what research, tools, and information are needed to support climate and health assessments?
  – Which technical climate variables should be continuously tracked to support preparedness efforts?

• Are there white papers, reports, data, or peer-reviewed publications we can promote?

Health and climate adaptation stories?
www.PacificRISA.org
www.PIRCA.org

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