

REPORT
Meeting Presenting Results
Spatio-temporal modeling framework for *Aedes aegypti* transmitted diseases in the Caribbean
Barbados and Dominica

1. Objectives

Two half-day meetings were held, one in Barbados and the other Dominica, to present results thus far from (i) the analysis of national data related to the proliferation of the *Aedes Aegypti* vector and the diseases (Dengue, Chikungunya, Zika) it transmits and (ii) the influence of climate; and more specifically (iii) the potential application of a spatio-temporal model for the proliferation of the vector in these two countries.

The analyses were performed by a team from the State University of New York (SUNY) and its collaborating partners led by Dr. Anna Stewart-Ibarra , with regional support from the two eastern Caribbean countries, the Caribbean Institute for Meteorology and Hydrology (CIMH), the Caribbean Public Health Agency (CARPHA) and the Pan American Health Organization (PAHO).

2. The Meeting Proceedings

Participants were led through two major presentations by the SUNY team focusing on (i) the Stakeholder Analysis, and (ii) the Climate- Health data Analysis. During and after these presentations the results were discussed. The CIMH also presented its work related to climate and health, more specifically the regional climate and health bulletin, developed in collaboration with CARPHA and PAHO. Some of the main results and lessons learnt from the research include:

Stakeholder analyses revealed the following results:

- There is self-awareness and **a good level understanding** of the impacts on climate variability on public health.
- Interactions between temperature, drought and some social conditions with vectors is uncertain, **needing more local evidence**.
- Health practitioners perceived that senior managers and **authorities are less knowledgeable/concerned** about the public health risks of climate variability.
- Respondents agreed that climate variability impacts on vector-borne diseases (VBDs) is a relevant issue of public health but they are **not prepared** to develop the plans for climate and health adaptation measures.

The following recommendations were identified:

- Engage senior leaders from the Ministry of Health (MoH) to raise the profile of climate and health on the health agenda and so that actions are driven from the top-down.
- Sign a formal agreement for collaboration between the climate and health sectors.
- Create a committee on climate and health to specify the work that would be done jointly, the roles of each partner, a timeline for an operational plan, and standard operating procedures (SOPs).
- Create spaces for joint dialogue (forums, quarterly meetings) between climate/health sectors
- Place new weather stations in areas that are strategic for the surveillance of VBDs.
- Frame climate services for health as an economic development priority.

- **Need for integrated and accessible data** (weather-climate, epidemiological, entomological), socioeconomic, land-use and other non-physical data and information in the context of supporting adaptation to climate change, and Disaster Risk Management
- Need data at the appropriate **scale (time and space) to support decision-making processes** for vector control and interventions
- **Development of standards and protocols to support the integration of climate services** for vector surveillance and control for instance; testing and validation, along with case studies to support learning.

Preliminary statistical model results from Dominica and Barbados indicate the potential to develop dengue forecast models using local climate information.

A post-break session sought to assess the way forward for completion of the analyses, which considered that much of the data was late in arriving. The two country meetings would have also discussed how the work might be enhanced in the future, with the potential testing and use of the spatio-temporal model in these and neighbouring Caribbean territories. Discussion points from the two national meetings follow.

2.1 Barbados:

1. An MOU or LOA should be signed between the relevant agencies to move this work beyond its current results, and that SUNY and partners should seek to complete the current work with these relevant agencies. These agencies would include the Ministry of Health Barbados, CIMH, CARPHA, PAHO and other national agencies with a stake in such information and activity, including for example the Environmental Protection Department (EPD)
2. This partnership should also consider developing a proposal to further this work beyond the current data analysis. There may be opportunity for donor support for such a proposal.
3. There was also the suggestion to focus on a small section of the country from which there may be an adequate amount of data to better test the model, rather than focusing on the entire island.
4. There is also the opportunity to create linkages with other sectors and agencies, that traditionally may not be a part of the conversation, but that could be impacted. One such sector is tourism.
5. Mrs. Shermaine Clauzel (CARPHA) explored potential synergies between the spatio-temporal modelling work and CARPHA's upcoming work:
 - a. CARPHA intends to build on the study through another closely related project funded by the IADB that is also looking at the effect of heat on vectors. This study will be focused more on the impact to the vector's lifecycle, infective stages, breeding cycle, behaviour etc.
 - b. This effort for CARPHA is only a first step. This will serve as a pilot that will guide efforts to include other environmental and related epidemiological parameters to a predictive, early warning model.
 - c. Ultimately the lessons will inform policy, but this will require strengthening information, improving communication and establishing local studies to support local applications
6. Ms. Sally Edwards (PAHO) gave her thoughts on the current situation in Barbados regarding climate and health considerations:
 - a. Political will for climate mainstreaming into the health sector was high in Barbados, with its first conference on climate change and health in 2002. The then Minister of Health chaired a round table discussion on World Health Day in 2008 in Washington D.C., and

Barbados also chaired a session at the First Global Conference on Climate Change and Health in Geneva in 2014. There was also the GEF funded project that focused on climate change and health. There is concern about the current state of political will to incorporate issues related to climate and health.

- b. She continued by saying that the SUNY results shows a need for empirical analysis, and that the mosquito proliferation is not only explained by the presence of water catchments or storage. A number of other considerations that can inform the health sector include (i) epidemic thresholds (currently average of non-epidemic years), (ii) availability of laboratory supplies and preparation (e.g. reagents), (iii) Health messaging (e.g. in the health climatic bulletin), (iv) vector control (methods and supplies).
7. It was further suggested that a brief summary of both meetings (Barbados and Dominica) be sent to both the Permanent Secretary and Chief Medical Officer of the Ministry of Health, Barbados, as well as Ministers in other Ministries seen as stakeholders, so that they can be aware of concerns and recommendations.

2.2 Dominica:

1. Relevant awareness and capacity should be built in the national health sector to support this work.
2. To support such work, it is necessary to consider how health data is presented. Both climate and health data should be in similar formats.
3. Dominica needs to develop a national adaptation plan for health. The health ministry would need some assistance with resources, both financial and technical.
4. Dominica should institutionalise a partnership or consortium to plan a climate agenda that would support climate and health in the future.
5. The meeting heard that the Environmental Health Department meets every two weeks to discuss surveillance. It was suggested that the department consider how weather and climate issues could be a part of those discussions.
6. Mrs Clauzel (CARPHA) provided some information on CARPHA's interests and thoughts on the vector research and modelling activity:
 - a. The work that has taken place under this project can be refined and further developed to the benefit of the entire region.
 - b. While we can appreciate the direct impacts of climate on vectors, there are many other areas that need to be researched – e.g. the effect of heat on non-communicable diseases such as hypertension and cardiovascular disease. Climate impacts on health can be both direct and indirect e.g. droughts can reduce water availability and quality for potable use, sanitation and food security; can impact air quality, reduce agricultural productivity and therefore food security and nutrition. Impacts of extended drought and lower productivity may lead farmers to use more agrochemicals for enhanced yield and pest control, which may in turn pollute diminishing water sources. Storms and heavy rainfall events increase the likelihood of injury and disease proliferation from flooding. The impacts to health are therefore very varied and travel various pathways.
 - c. Part of CARPHA's role is to engage the different sectors in dialogue towards common planning and information sharing in an effort to bridge the gaps observed with strict sectoral approaches. CARPHA also, very importantly, supports the need for Caribbean cases studies.

3. Notes from post-workshop meeting with officials from the Environmental Health Department, Ministry of Health, Dominica

Present were:

Ferdinia Carbon and Eric St. Ville; Ministry of Health Dominica

Anna Stewart and Moory Romero; SUNY

Shermaine Clauzel; CARPHA

Adrian Trotman; CIMH

This discussion followed the morning presentation and addressed the next steps for the study and climate and health issues in Dominica.

- Data format for Dominica's entomological surveys should be changed to simplify data analysis and to coincide with epidemiological data collected by the Health Information Unit which is collected and reported on a weekly basis
- Environmental Health Department of the Ministry of Health of Dominica, to discuss and review reporting of vector data with pest company
- CARPHA to discuss Dominica's proposal for digitization of its data and to suggest technical support to determine the way forward for the project.
- A common platform for storage of digitized information considered to simplify data entry
- The Ministry of Health, Dominica, CIMH, CARPHA and SUNY should sign a Letter of Agreement (LOA) or a Memorandum of Understanding (MOU) to continue the work started under the vector proliferation pilot, as all work was not yet completed. This LOA/MOU should suggest the work be continued up until the end of the year, by all the parties mentioned, at no cost, as the BRCCC Programme would end on 23 July 2017.
- Once the LOA/MOU has been signed, a working group should be set up with all parties to advance the research
- A report should be sent to WMO about the progress of activities being undertaken on climate and health in Dominica
- The short report on Zika sent for publication should also be sent to WMO
- SUNY has sent the GIS layers created in this project to the Ministry of Health of Dominica to enable mapping to vector surveillance data.
- Once the Ministry of Health, Dominica is comfortable with the work delivered by the end of 2017, all agencies can continue to move this work forward during the next few years by writing proposals for financial support. The proposals can be extended to include one or two more eastern Caribbean islands.

A HEALTH-CLIMATE SPATIO-TEMPORAL MODELLING FRAMEWORK FOR THE CARIBBEAN

Results Presentation

Barbados and Dominica

AGENDA

Caribbean Institute for Meteorology and Hydrology, Husbands, St. James, Barbados
July 18, 2017

Ministry of Health, Roseau, Dominica
July 19, 2017

09:00 - 09:10	Welcome	
09:10 - 09:15	Objectives of the consultancy and the workshop	Dr. Anna Stewart, SUNY
09:15 - 9:45	Results of Stakeholder Analysis	Dr. Anna Stewart with Dr. Mercy Borbor, SUNY
09:45 - 10:15	Results of the Climate- Health data Analysis	Dr. Anna Stewart, SUNY
10:15 - 10:40	Discussion on Results	Dr. Cedric Van Meerbeeck, CIMH
10:40 - 11:00	COFFEE BREAK	
11:00 - 11:10	CARPHA plans on Climate/CC and Health	Ms. Shermaine Clauzel, CARPHA
11:10 - 11:20	CIMH plans on Climate and Health	Mr. Adrian Trotman, CIMH
11:20 - 12:00	Way Forward for Vector Proliferation and Climate studies, and model operationalisation	Mr. Adrian Trotman, CIMH Dr. Anna Stewart, SUNY

Participants:

Barbados

Name	Agency
Ronald Chapman	Ministry of Health
Richard Corbin	Ministry of Health
Edward St. John	Ministry of Health
Leslie Rollock	Ministry of Health
Steve Daniel	Ministry of Health
Brian Murray	Barbados Met Service
Desmond King	Ministry of Health
Clevston Winfield ?	Ministry of Health
Angela Lewis	Ministry of Health
Eric Phillips	Ministry of Health
Roger Carter	Ministry of Health
Shekira Sobers	Ministry of Health
Kerry-Ann Haynes	Ministry of Health
Charmaine Blades	Ministry of Health
Adrian Trotman	CIMH
Cedric Van Meerbeeck	CIMH
Wayne Depradine	CIMH
Lisa Kirton-Reed	CIMH
Anna Stewart	SUNY
Roory Romero	SUNY
Mercy Borbor-Cordova	SUNY
Shermaine Clauzel	CARPHA
Sally Edwards	PAHO

Dominica

Ashley Celestine	Environmental Health Dept. (EHD)
Idaline John	Chief Dental Officer
Kerveell Vidal	Min. of Tourism
otavia Denis	Environmental Health Department
Nyla Austria	Environmental Health Department
Edona Jno Baptiste	Marpin News
Augustina Jno Baptiste	Princess Margaret Hospital (PMH)
Tasie Thomas	EHD
Marilyn Cuffy-Morris	Ministry of Health
Mignan Belle-Shilling ford	Health Promotion
Annie Carrette-Joseph	Dominica Met Services

Marva Smith	Health Information Unit
Anthony Scotland	National Pest and Termite Company
Sister Cordelia Pierre	PMH
Marshall Alexander	Dominica Met Services
Dr. Phillip St. Jean	Director Primary Health Care
Lloyd Pascal	Environmental Coordinating Unit
Zilma Charles	Environmental Health Department
Clayton Bryan	PMH
Dolores St.Jean	CMS
Camica Thomas	EHD
Vanya Bruney Loblack	PMH
Jasminia Lambert	CMS
Sylvester Stville	EHD
Ferdinia Carbon	Chief Environmental Health Officer
Laura Esprit	Chief Medical Officer (Ag)