



HEAT HEALTH IN HONG KONG

LEARNING FROM THE 1ST GLOBAL FORUM ON HEAT AND HEALTH

Hong Kong faces unique challenges from environmental hazards, such as climate change and variability, due to its densely populated and almost entirely urbanized living environment. An increased vulnerability to the urban heat island effect means that its inhabitants are more susceptible to the harmful, and sometimes deadly, health effects of extreme heat.

Hong Kong's urban communities are particularly vulnerable to climate-related health impacts due to the high incidence of highly dense and often unauthorized living arrangements, such as sub-divided flats. The sub-divided flats may lack fresh air, appropriate cooling systems or access to essential services (such as energy and water). Hong Kong also has an incredibly high proportion of citizens over 65 years of age, with this population-based figure expected to rise to 27% by 2033.

The Forum leveraged the expertise and diverse experiences of partners in Hong Kong to help participants better understand and manage heat risk in a subtropical metropolis. This section outlines the Forum's key messages from presentations and discussions surrounding heat health in Hong Kong

"By bringing together local and global experts, the Forum galvanized local actions and raised awareness of the policy implications of the current scientific evidence in Hong Kong."



Emily YY Chan
Director, Collaborating Centre for Oxford University and
CUHK for Disaster and Medical Humanitarian Response

Public Health Research in Action

Hong Kong has a rich network of public health research on climate-sensitive health impacts which include extreme heat. One of the research institutions is the Collaborating Centre for Oxford University and CUHK for Disaster and Medical Humanitarian Response (CCOUC) at the Chinese University of Hong Kong - a research centre that acts as an intermediary for research partners.

Recent research under the Hong Kong Weather Acquisition Study examined Hong Kong citizens' health and carbon-reduction behaviours to understand the practices of reducing electricity consumption, including curtailing the use of air conditioners, along with the impact of these measures on health perceptions and protective behaviours. This research found the best methods for communicating weather-related risk information among its population. Much of this cutting edge work is enabled by the availability of high quality and tailored climate and meteorological information through the Hong Kong Observatory (HKO) and innovative research partnerships. A considerable portion of this work has informed Hong Kong's Climate Action Plan 2030+.

The Hong Kong Observatory

HKO, established in 1883, is the meteorological authority responsible for monitoring and forecasting weather, issuing warnings on weather-related hazards and providing climate services in Hong Kong, amongst others. Given the uniquely vulnerable demography and the known link between weather conditions and public health in Hong Kong, HKO has been studying, in collaboration with others, the impact of weather on public health with a particular focus on thermal stress. Moreover, HKO has been evolving continuously to ensure the delivery of people-oriented quality services to meet the increasing need of special users and various sectors in the community and to enhance the society's capability in natural disaster prevention, such as those vulnerable to extreme heat.

Hong Kong Heat Index

To enhance the heat stress information services, HKO and the Chinese University of Hong Kong collaborated to develop the Hong Kong Heat Index for use in hot and humid climates. Based on the study of hospitalization data and heat stress measurement data, two reference criteria for the Index were identified to establish a two-tier approach for the enhancement of the heat stress information service.

Caring for Senior Citizens

Previous studies suggest that thermal stress under cold and hot weather conditions is strongly linked with higher mortality and hospitalization rate in Hong Kong, particularly among the elderly. With the goal to provide better care for the elderly people in Hong Kong, HKO has been working closely with the Senior Citizen Home Safety Association (SCHSA). The association is a self-financing and not-for-profit organization which provides a 24-hour personal emergency support and caring service through the use of weather and climate information, including the study of health impacts of weather and climate on senior citizens.

Some of these services include: real time weather information services, developing the new version of "Weather Information for Senior Citizens" webpage, annual joint press conferences to promote proactive and timely assistance for the elderly when very hot or cold weather is expected, and the "Sky of Silver Age" weather photo competition and cloud appreciation workshops to encourage elderly people to adopt an outdoor lifestyle by maintaining an active interest in weather that affects them. The decade-long collaboration between HKO and SCHSA in using climate information for elderly caring services has also been documented in the WMO-WHO Joint Office for Climate and Health publication [Climate Services for Health](#).

Urban Planning and Building Environment Design

The design and development in a high-density city like Hong Kong may have significant impacts on the urban climate (e.g. urban heat island effect, lower wind speed etc.) resulting in uncomfortable living conditions and an increase in cooling energy consumption.

To help mitigate these negative effects and improve the quality of living environment, climatic considerations have been integrated in to urban planning and design. HKO provides meteorological data and expert advice to local planning department and its consultants, as well as other professional bodies, to establish guidelines to assess and regulate the impact of potential city/community, and building developments on urban ventilation and micro-climate.

Furthermore, Hong Kong's urban climatic map has been created through analyzing and evaluating climate data together with different geometric and urban development data to classify Hong Kong into different urban climatic zones, each with recommended design actions and development strategies. This has informed decision making at the community level, including for new town planning and old town renewal in the Hong Kong 2030+ long-term planning strategies.

Public Engagement

Hong Kong's civil society and non-governmental organizations represent a world-leading example of public engagement. The Hong Kong Red Cross engages the public and volunteers to provide a set of auxiliary services to the government during emergencies. This includes local community care services, humanitarian education, first aid, and health training.

Increased public awareness of heat risk is achieved through a dedicated disaster preparedness mobile app, and vulnerable communities are provided with targeted information on preparedness and risk reduction via educational initiatives. Volunteer

community responders are deployed by the Hong Kong Red Cross to visit vulnerable elderly populations and provide heat wave related information.

The HKO also utilizes different channels, including media (TV, radio and newspaper), Dial-a-Weather service, webpages, mobile platforms and social media, to engage the public and disseminate various weather information, forecasts and warnings of HKO to different sectors.

The online information service and location specific weather services offered by HKO's "MyObservatory" mobile app and website allow urban dwellers to access various first-hand weather information anywhere and anytime. HKO also launched its Facebook page and Instagram platform to enhance communication with the public in March 2018, with encouraging responses. Facebook posts on various weather phenomena and services, including heat stress information services and other heat health information, were released regularly to enhance public understanding of the weather and related risk.

Local Action, Global Network

The Forum provided a platform for a broad exchange of research and good practices from Hong Kong's diverse range of actors in heat health, and provided a forum for increased political commitment to reduce the drivers of heat risk both locally, and globally. The forum allowed for the unique expertise and experience in Hong Kong to be shared globally, and for new partnerships to be formed with Hong Kong-based experts to further galvanize action to reduce the risks of extreme heat.

Hong Kong Heat Project Site Visits

Hong Kong has experienced increasing extreme temperatures for many decades. As a highly urbanized city with high population density, Hong Kong experiences heightened heat risk from many factors, including sub-divided housing units, an intense Urban Heat Island effect, an ageing society, and a large number of elderly residents living in care facilities. Hong Kong is a world leader in managing these issues-actively advancing interdisciplinary research, city management, planning and design, as well as public engagement and NGO efforts.

On the final day of the Forum, participants took a rare look into the heat health management challenges and solutions of Hong Kong.

1. Senior Citizen Home Safety Association

In September 1996, the Senior Citizen Home Safety Association (SCHSA) was founded as a self-financing, not-for-profit organization providing 24-hour personal emergency support and caring service to elderly citizens in Hong Kong. SCHSA enhances quality of life for older populations through the use of technology, people-oriented services, and innovative methods, including special weather forecasts and information for the elderly.

2. Hong Kong Housing Authority Exhibition Centre

The Hong Kong Housing Authority Exhibition Centre is a showcase of public housing development in Hong Kong, as well as their work and achievements over the years. This visit began with a short talk from the Chief Architect of the Hong Kong Housing Authority, who introduced their successful practical experience on microclimate design since 2004.

In the compact 1,000-square-metre venue, there are informative display panels, building models, mock-up flats and myriad collections of photos and videos of Hong Kong's public housing.

Nearly half of Hong Kong's residents live in some form of public housing. As prices of these accommodations have risen, many residents have begun to seek accommodation in sub-divided flats or bedspace apartments. These small, makeshift spaces are often not properly ventilated or cooled, contributing to the heat health crisis in the city.



3. Hong Kong Observatory

The Hong Kong Observatory is the government department responsible for monitoring and forecasting weather, as well as issuing warnings on weather-related hazards. The Observatory also monitors and assesses radiation levels in Hong Kong, and provides other meteorological and geophysical services to meet the needs of the public and the shipping, aviation, industrial and engineering sectors.

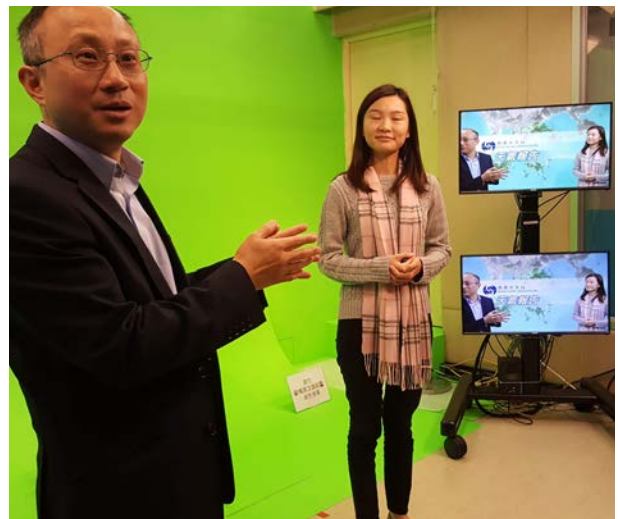
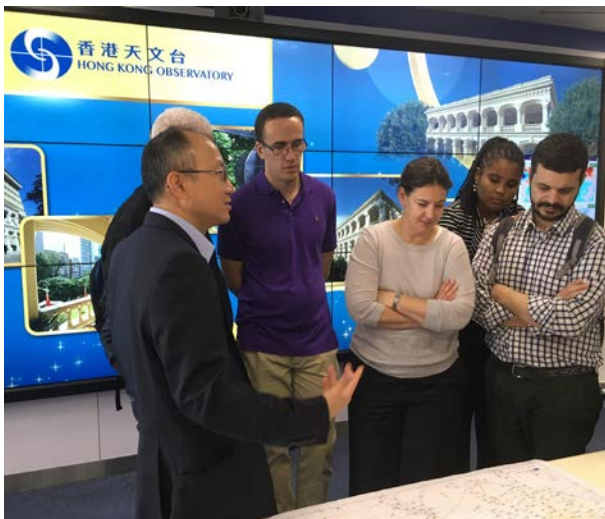
Amidst the hustle and bustle of Tsim Sha Tsui, the Observatory Headquarters enjoys a serenity uncharacteristic of this hectic business area. It is surrounded by rich fauna and flora, some of which is uncommon in Hong Kong. The guided tour took visitors backward in time to trace the development of the Observatory in the past 130 years to see how weather forecasts are made and how technology is put to use.

4. Energy poverty Lab - Simulated Subdivided Flat tour

This field trip involved a trip to a simulation of Hong Kong's subdivided flats at the 'Energy Poverty Lab', built by the World Green Organisation (WGO), a non-profit concerned with the environmental conservation and its relation to livelihood and economic affairs. Through interactive household activities, this field trip to Hunghom provided a glance into how families may live in apartments less than 70 square feet.

Photos (clockwise from top):

1. Subdivided flat / Hunter Jones
2. Hong Kong Observatory / Joy Shumake
3. Hong Kong Observatory / Rosa Barciela



Ongoing work in Hong Kong: Presentations

Heat-related Health Impacts in Sub-tropical Cities: Global Overview and Research Frontiers in Hong Kong

Emily YY Chan, Director of the Centre for Global Health, Chinese University of Hong Kong;
Chi-Ming Shun, Director, Hong Kong Observatory

Regional Perspectives of Heat Risks in North and East Asia

Gabriel Lau, Chinese University of Hong Kong

Regional Perspectives of Heat Action and Innovation in North and East Asia

Gloria KW Chan, Deputy Director, CCOUC, Chinese University of Hong Kong

The Future of Heat Information Products

Lap-Shun Lee, Senior Scientific Officer, Hong Kong Observatory

Personal Heat Protective measures during the 2017 heat wave in Hong Kong: a telephone survey study

Holly CY Lam, Postdoctoral Fellow, Chinese University of Hong Kong

Institutional capacity building through partnerships

Donald Li, President Elect of World Association of Family Doctors and Chairman of Hong Kong Jockey Club Disaster Preparedness and Response Institute

Urban Heat Island Mitigation, Heat Risk Mapping

Chao Ren, University of Hong Kong Faculty of Architecture

Communicating Weather Hazards in the Digital Era

Alex Tsoi, Scientific Officer, Hong Kong Observatory

Communicating through vulnerable communities

Candy Yeung, Hong Kong Red Cross

Perspectives on communicating risk from a family doctor

Yu Fat Chow, World Association of Family Doctors and Hong Kong Academy of Medicine

Ongoing work in Hong Kong: Posters

A vertical approach to monitoring microclimates of urban street canyons

Paulina PY Wong, Lingnan University

Urban Heat Islands in Hong Kong: Statistical Modeling and Trend Detection

Weiwen Wang, Wen Zhou, Edward Yang Yung Ng, Yong Xu; Jinan University, Chinese University of Hong Kong, City University of Hong Kong

Heat Stress in Future Hong Kong

KY Cheung, PW Chan, W Zhou
City University of Hong Kong, Hong Kong Observatory

Effects of high temperature on existing allergic symptoms among adults: an exploratory cross-sectional telephone study

Emily YY Chan, Holly CY Lam, Asta YT Man;
CCOUC, Chinese University of Hong Kong

Personal Heat Protective Measures During the 2017 Heatwave in Hong Kong: A Telephone Survey Study

Emily YY Chan, Holly CY Lam, Asta YT Man;
CCOUC, Chinese University of Hong Kong

The development of Hong Kong Heat-Health Warning System

Chao Ren, TC Lee; University of Hong Kong, Hong Kong Observatory

Energy Poverty, Heat Stress, Bacterial Concentration and IAQ

William Yu; World Green Organisation

Summary of key partners and projects addressing heat health in Hong Kong

Partner	Role	Links
Hong Kong Observatory (HKO)	Weather and climate monitoring; weather forecasts for different time-scales; weather warnings and alerts; research; public education	www.hko.gov.hk www.hko.gov.hk/wservice/warning/coldhot.htm www.hko.gov.hk/wxinfo/ts/display_element_hkhi_e.htm
Department of Health	Public health advice	www.chp.gov.hk/en/static/90064.html
Labour Department	Public health Advice; guidelines on risk assessment for heat stroke prevention at work	www.labour.gov.hk/eng/public/oh/heat.pdf www.labour.gov.hk/eng/public/oh/HeatStress.pdf
Home Affairs Department	Heat shelters	www.had.gov.hk/en/public_services/emergency_services/emergency.htm
Education Bureau	Guidelines on physical education	www.edb.gov.hk/attachment/en/curriculum-development/kla/pe/references_resource/safety-guidelines/Safe_e.pdf
Senior Citizen Home Safety Association (SCHSA)	24-hour personal emergency support and caring service for elderly citizens.	www.schsa.org.hk/en/home/index.html
Occupational Safety and Health Council	Promoting occupational safety and health in the community; education and training; research and strategy development	www.oshc.org.hk/eng/main/hot/Heat
Collaborating Centre for Oxford University and CUHK for Disaster and Medical Humanitarian Response (CCOUC)	Research; providing scientific evidence for tackling heat health impact Developed a set of animations describing the main research outcomes were produced and targeted for primary and secondary school children in Hong Kong	ccouc.org/publications ccouc.org/video
Hospital Authority	Public hospitals services; Research; Community engagement	



Heat health collaborations and research in Hong Kong

Research subject and research body/bodies	Purpose and links
Series of Heat-health association studies on mortality and morbidity [CCOUC, JCSPHPC (CUHK)]	Establishing heat-health associations, identifying vulnerable groups and evaluating urban heat island effects on health. A list of publications of research findings can be found in the "Climate change and health research" section at ccouc.org/publications
Help seeking behaviors among the older population in Hong Kong during hot days [CCOUC, JCSPHPC (CUHK) and SCHSA]	Understanding the patterns, including proportions and thresholds, of the help seeking behaviors of the older populations in Hong Kong during hot seasons. Help seeking behavior was measured by counting the number of emergency calls to the Hong Kong Senior Citizen Home Safety Association. Published paper: www.ncbi.nlm.nih.gov/pubmed/21761264
Collaboration in developing the Hong Kong Heat Index [HKO and JCSPHPC (CUHK)]	Enhance heat stress information services in Hong Kong. Published paper: www.ncbi.nlm.nih.gov/pubmed/26546311
Telephone survey study assessing risk perception and the uptake of heat protective measures in Hong Kong population. [CCOUC, JCSPHPC (CUHK), London School of Hygiene and Tropical Medicine]	Understanding the patterns of the uptake of heat-protective measures and associated factors in Hong Kong. A comparison study with a UK collaborator is also being conducted to compare the perception and heat-related behavior patterns between Hong Kong and the United Kingdom. Manuscripts under preparation.
Joint study on the effect of weather on the health of elderly and their help-seeking behaviour [HKO and SCHSA]	Use Hong Kong Observatory climate data and the number of users activating SCHSA's personal emergency and caring service and requiring subsequent hospitalization to study the impact of weather on the elderly. Paper published: Mok, H.Y. and B. Leung, 2009 : The impact of cold and hot weather on senior citizens in Hong Kong, Hong Kong Meteorological Society Bulletin, 19, August 2011.
Study on the impact of extreme heat events [HKO and Institute of Future Cities (CUHK)]	Study the spatial variations of prolonged high temperature events and their impacts on public health.



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