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JOINT OFFICE FOR CLIMATE AND HEALTH

Harnessing Climate Science and Services for Healthier Societies

Pathways to Sustainable Growth Under a Changing Climate
APEC Climate Symposium, Punta Arenas Chile
August 20-22, 2019

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Overview: Getting to Impact

- Health and climate in context the SDGs
- Four opportunities for climate services to help build healthier societies
- Four frontiers of public health and technology to shape next generation climate services

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Health is at the

Beginning

Center

End

of development pathways

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Health of the biosphere:

water, climate, land and oceans

underlie healthy, prosperous, peaceful societies

Graphics by Jerker Lokra

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Climate services provide the intelligence to guide us to build healthy societies and protect them from setbacks.

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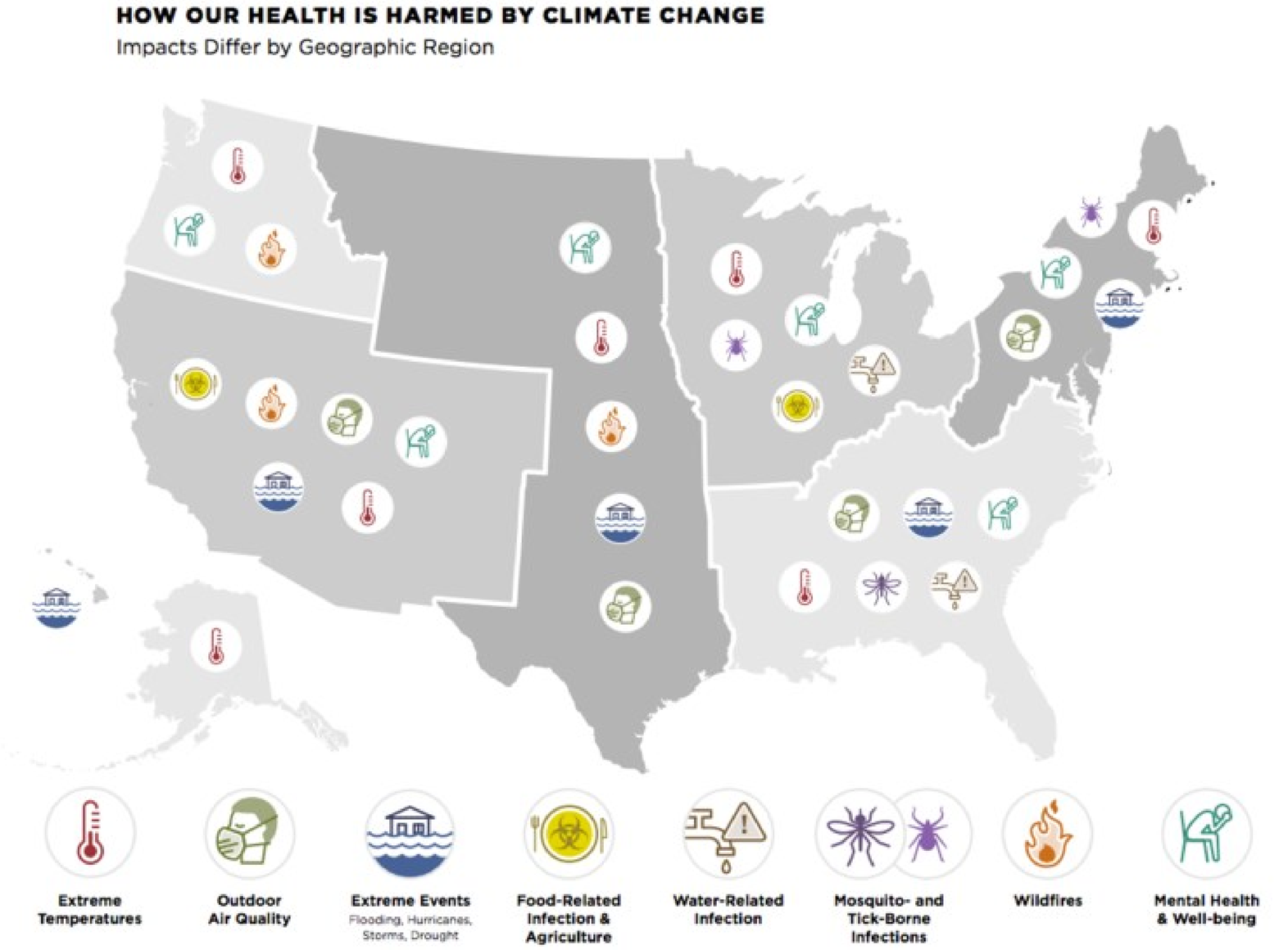
How does climate influence health?



Source: USGCRP

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How does climate influence health?

Table 3. **Highest priority climate-sensitive health risks in Pacific island countries**

CLIMATE-SENSITIVE HEALTH RISK	COUNTRY												
	Cook Islands	Fiji	Kiribati	Marshall Islands	Micronesia (Federated States)	Nauru	Niue	Palau	Samoa	Solomon Islands	Tonga	Tuvalu	Vanuatu
Direct effects													
Health impacts of extreme weather events[1]	x	x		x	x	x	x	x	x	x	x	x	x
Heat-related illness[2]	x					x	x			x			x
Indirect effects													
Water security & safety (including waterborne diseases)[3]	x	x	x	x	x	x	x	x	x	x	x	x	x
Food security & safety (including malnutrition & foodborne diseases)[4]	x	x	x	x	x	x	x		x	x	x	x	x
Vector-borne diseases[5]	x	x	x	x	x	x	x	x	x	x	x	x	x
Zoonoses[6]		x			x			x					
Respiratory illness[7]	x			x	x	x	x	x		x		x	x
Disorders of the eyes, ears, skin and other body systems[8]		x		x			x			x		x	x
Diffuse effects													
Disorders of mental/ psychosocial health[A,9]		x		x	x	x		x		x		x	x
Noncommunicable diseases (NCDs)[A,10]		x		x	x		x	x		x	x	x	x
Health systems problems[A,11]		x	x										
Population pressures[12]			x										

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Source: WHO/WPRO 2015

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Climate Service Access and Use in the Health Sector

Status:
underserved

2019 Indicator 2.5*

The National Meteorlogical Hydrological Services (**NMHS**) of **70/193 countries** report **engagement** (n=35) and **providing** (n=35) climate services to the health sector.

2017 Regional Breakdown

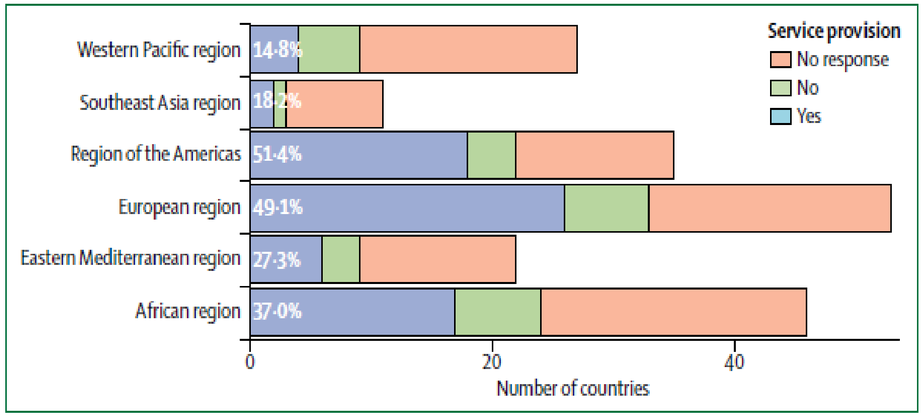
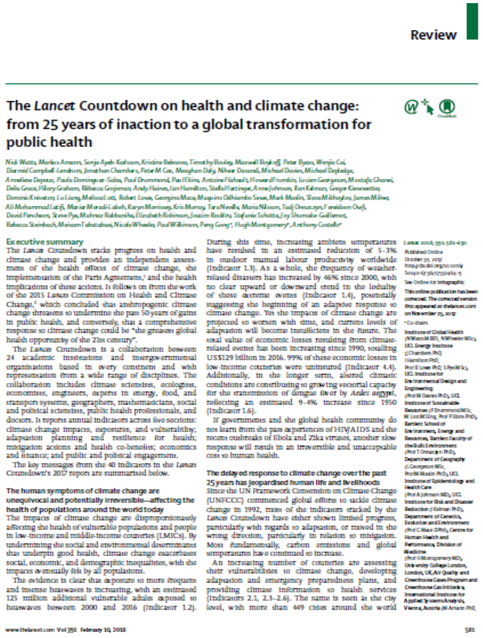


Figure 14: National Meteorological and Hydrological Services of WHO member states reporting to provide targeted or tailored climate information, products, and services to the health sector

*unpublished. Publication Nov 2019


Review

The *Lancet* Countdown on health and climate change: from 25 years of inaction to a global transformation for public health

Four opportunities for climate science & services to build healthier societies

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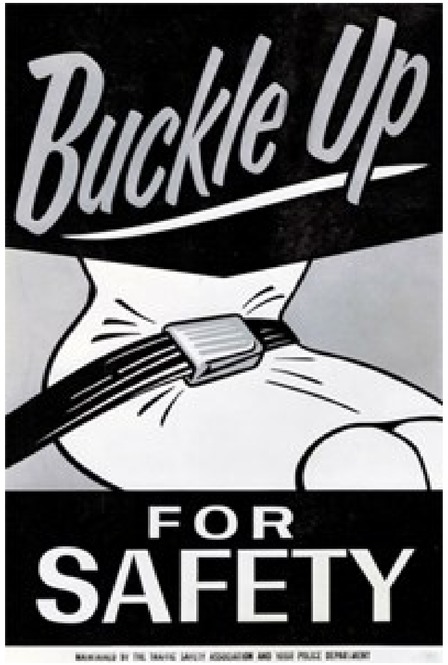
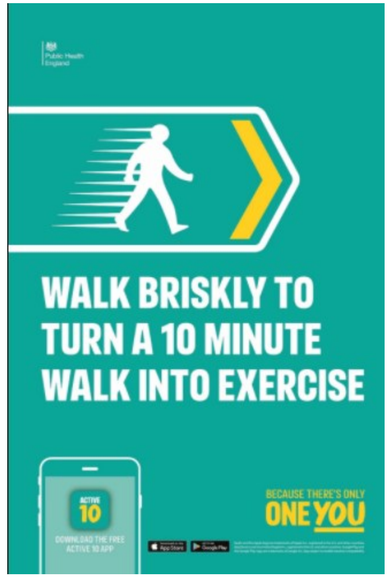
Health sector has strong track record of successful evidence-based

advocacy,

behavior change,

policy change.





Health sector has strong track record of successful evidence-based

advocacy,

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Doctors are trusted voices

YOUR HEALTH

Has Your Doctor Talked To You About Climate Change?

July 13, 2019 · 8:26 AM ET

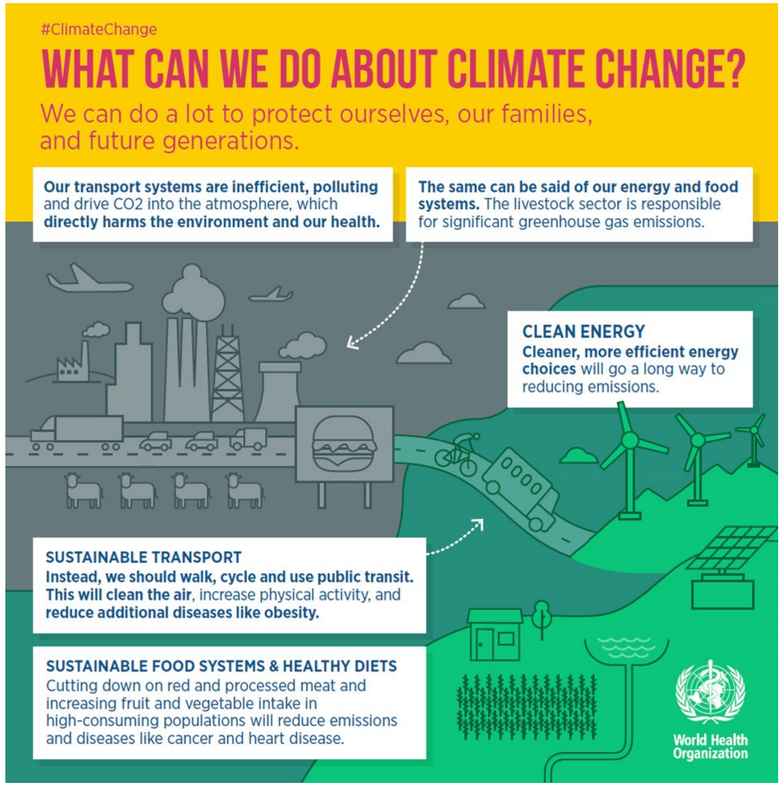
Heard on Weekend Edition Saturday

MARTHA BEBINGER

People care about their health

US President Barack Obama at children's asthma ward, during launch of US national climate plan, May 2014.

Messages of health co-benefits of climate change mitigation resonate



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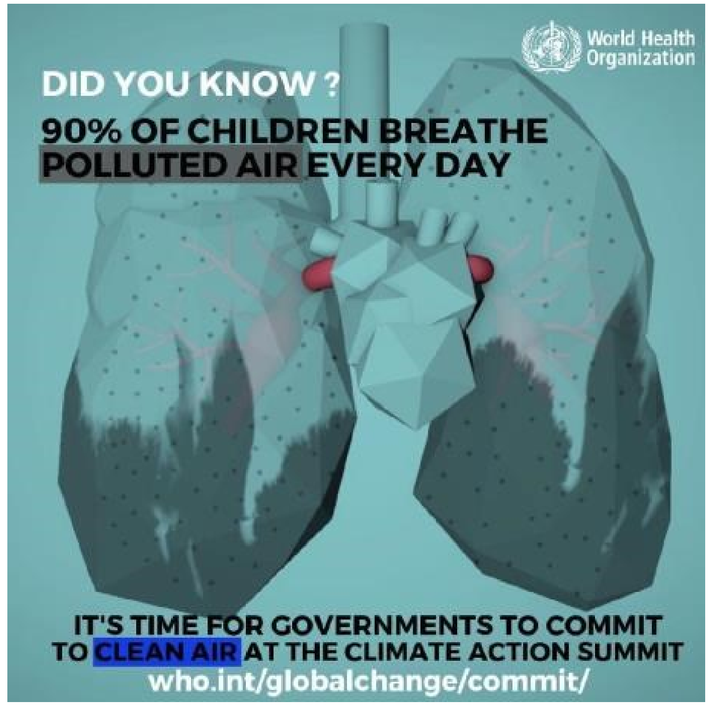
Global advocacy movement of health and medical professionals



Allergy & Asthma Network

American Academy of Pediatrics
DEDICATED TO THE HEALTH OF ALL CHILDREN™

AMERICAN LUNG ASSOCIATION.

ATS

APHA
AMERICAN PUBLIC HEALTH ASSOCIATION
For science. For action. For health.

National Medical Association

ACPM
American College of Preventive Medicine
physicians dedicated to prevention

National Environmental Health Association

NACCHO
National Association of County & City Health Officials

PSR
PHYSICIANS FOR SOCIAL RESPONSIBILITY

US Climate and Health Alliance

Health Care Without Harm

Trust for America's Health
WWW.HEALTHYAMERICANS.ORG

PUBLIC HEALTH INSTITUTE®

CHILDREN'S ENVIRONMENTAL HEALTH NETWORK

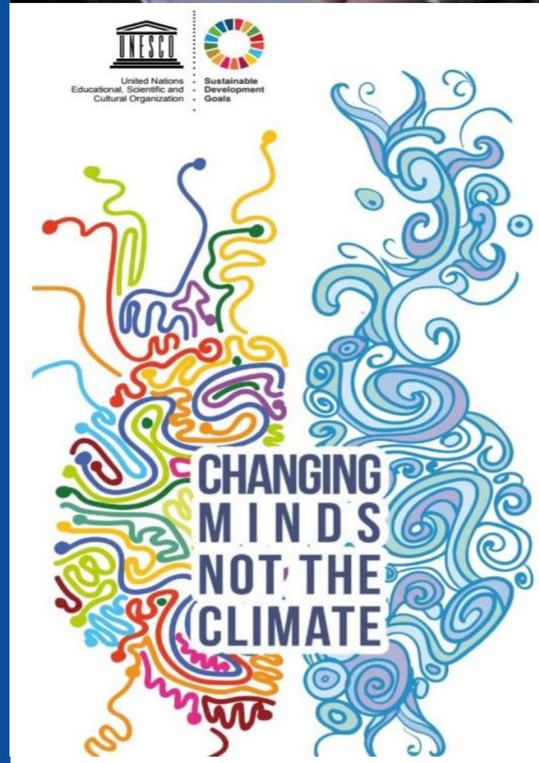
aafa
Asthma and Allergy Foundation of America

American Psychological Association

1

Empower

Educate and Inform people



We should all be concerned citizens using science for climate action

- ***Training***
- ***Impact assessments***
- ***Translation***
- ***Communicating to the public***

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WHO/UNFCCC Climate & Health Country Profiles

1 CURRENT AND FUTURE CLIMATE HAZARDS

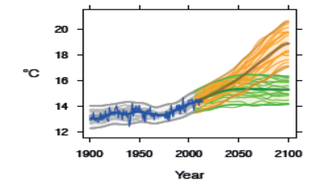
Due to climate change, many climate hazards and extreme weather events, such as heat waves, heavy rainfall droughts, could become more frequent and more intense in many parts of the world.

Outlined here are country-specific projections up to the year 2100 for climate hazards under a 'business as usu emissions scenario compared to projections under a 'two-degree' scenario with rapidly decreasing global emis Most hazards caused by climate change will persist for many centuries.

COUNTRY-SPECIFIC CLIMATE HAZARD PROJECTIONS

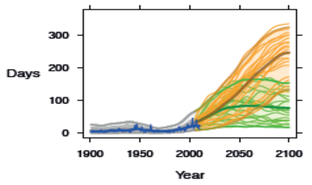
The model projections below present climate hazards under a high emissions scenario, Representative Concentration Pathway 8.5 [RCP8.5] (in orange) and a low emissions scenario, [RCP2.6] (in green).[1] The boxes describe the projected changes averaged across about 20 models (thick line). The figures also sho model individually as well as the 90% model range (shaded) as a measure of uncertainty and, where avai the annual and smoothed observed record (in blue).[2,3]

MEAN ANNUAL TEMPERATURE



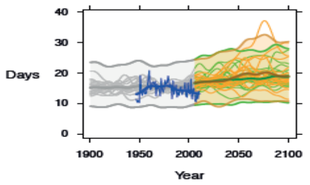
Under a high emissions scenario, mean annual temperature is projected to rise by about 5.1°C on average from 1990 to 2100. If global emissions decrease rapidly, the temperature rise is limited to about 1.6°C.

DAYS OF WARM SPELL ('HEAT WAVES')



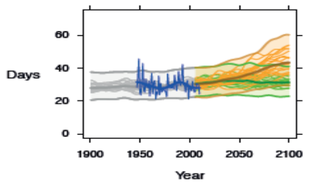
Under a high emissions scenario, the number of warm spell [4] is projected to increase from 10 days in 1990 to about 250 days on average If global emissions decrease rapidly, the days spell are limited to about 75 on average.

DAYS WITH EXTREME RAINFALL ('FLOOD RISK')



Under a high emissions scenario, the number of days with very heavy precipitation [20 mm or more] could increase by about 4 days on average from 1990 to 2100, increasing the risk of floods. Some models indicate increases outside the range of historical variability, implying even greater risk. If global emissions decrease rapidly, the risk is slightly reduced.

CONSECUTIVE DRY DAYS ('DROUGHT')



Under a high emissions scenario, the longest d is indicated to increase from an average of abo days to just under 45 days, with continuing lar to-year variability. If global emissions decrease there is little change in the length of dry spells

2 CURRENT AND FUTURE HEALTH RISKS DUE TO CLIMATE CHANGE

Human health is profoundly affected by weather and climate. Climate change threatens to health problems – deaths from extreme weather events, cardiovascular and respiratory dis diseases and malnutrition – whilst undermining water and food supplies, infrastructure, he social protection systems.

HEAT-RELATED MORTALITY

In the international context, Italy has the highest heat-related effects on daily mortality considering both hot temperatures (from 90th to 99th percentile, 4 degrees on average) and overall summer temperatures (from minimum mortality temperature (MMT) to 99th percentile) [1]. However, there is heterogeneity among Italian cities both in the heat effect and in the MMT. Heat effects are greater in larger urban areas (Turin, Milan, Bologna, Florence, Rome, Naples) and a progressive increase in MMT levels can be observed from North to South of Italy and throughout summer, thus accounting for local climate and population physiological adaptation. A decreasing trend in heat related mortality risk was observed in Italian cities after the introduction of the national heat prevention plan. In particular the reduction was shown for extreme temperatures when warnings were issued and prevention measures were activated [2]. The increase in frequency and intensity of heat waves together with population ageing will have a significant impact on health in the future. Summer 2015 was associated with a 13% increase in deaths attributable to heat among the population aged 65+ [3].

Fig 2.1. Pooled relative risks for the association of hot temperatures with deaths cumulated over lags of 0–21 days in 12 countries/regions

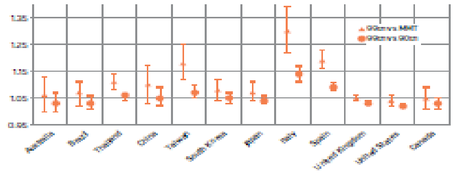


Figure adapted from: Guo, Yuming, et al. "Global variation in the effects of ambient temperature on mortality: a systematic evaluation." *Epidemiology* (Cambridge, Mass.) 25.6 (2014): 781.

KEY IMPLICAT

The greatest contribution effects is in terms of card diseases on both fatal an High risk subgroups more of heat comprise the elde alone, residents of low-in those affected by chronic diabetes, COPD, mental d diseases, or those taking diseases [4]. Seasonal exp spells, air pollution and cl viruses, in particular influ on heat susceptible subje mortality [3].

STRATEGY FOR PRE RELATED EFFECTS I

Since 2004, the Departmer the Ministry of Health, have program for the prevention focused on the elderly and capitals and cities with mor [5]. Starting from the larges was gradually extended to reached national coverage, and 93% of urban residents

The national program inclu as also indicated by WHO g

- identification of lead bod
- city-specific warning syst
- national prevention guide campaign [7];
- preparedness and emerg and social care systems;
- registries for the identific subgroups;
- local prevention plans targeted to susceptible subgroups during heat waves a rapid "real time" mortality and morbidity surveillance;
- evaluation of warning systems and prevention programs introduced.

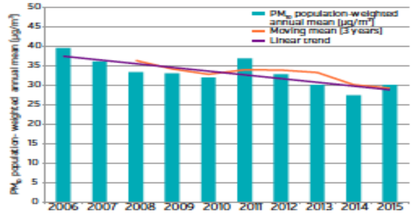
3 CURRENT EXPOSURES AND HEALTH RISKS DUE TO AIR POLLUTION

Many of the drivers of climate change, such as inefficient and polluting forms of energy and transport systems, also contribute to air pollution. Air pollution is now one of the largest global health risks, causing approximately seven million deaths every year. There is an important opportunity to promote policies that both protect the climate at a global level, and also have large and immediate health benefits at a local level.

OUTDOOR AIR POLLUTION: RECENT TRENDS IN EXPOSURE

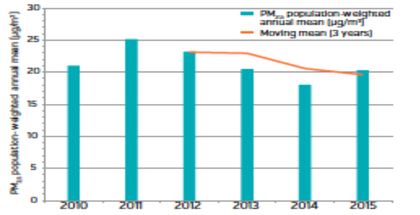
In Italy, significant progress has been achieved during the last decades in improving outdoor air quality. The adoption of specific measures and regulations, as in the rest of Europe, allowed a significant reduction of main pollutants emissions, determining, therefore, a coherent decrease in the measured concentration of primary pollutants (i.e. SO_2, CO, C_6H_6).

Fig 3.1. PM_{10} exposure at national level, population-weighted annual mean (µg/m³).



Source: Environmental Data Yearbook (SPRA (2018). Data from urban background monitoring stations.

Fig 3.2. $PM_{2.5}$ exposure at national level, population-weighted annual mean (µg/m³).



Source: Environmental Data Yearbook (SPRA (2018). Data from urban background monitoring stations.

KEY IMPLICATIONS FOR HEALTH

Both short- and long-term exposure to air pollution can have direct and sometimes severe consequences for health. Air pollutants, especially fine particulate matter, which penetrate deep into the respiratory tract subsequently increase risk of ischemic heart disease, stroke, chronic obstructive pulmonary disease, (COPD) and other respiratory diseases such as asthma in adults, and poses a considerable health threat to future generations. Outdoor air pollution is carcinogenic to humans, with the PM component of air pollution most closely associated with increased cancer incidence, especially lung cancer.

The health impacts of air pollution can be amplified in urban environments, where most of the Italian population lives. The population is exposed to a mix of chemical pollutants and physical stressors dangerous for health, mainly produced by traffic, domestic heating and, in some areas, by closeness to industrial plants.

The chemical composition of particulate matter, due to the spatial distribution of different sources in Italy (industrial, heating, transport, natural, etc), could lead to differences in the incidence of specific pathologies in the exposed population.

PM_{10} population weighted concentrations from 2006 to 2015, show a overall reduction trend at national level, (fig 3.1), while for $PM_{2.5}$, there is a lack of sufficient years available to evidence a statistically significant trend. In data observed by monitoring stations (Fig. 3.2). However it is evident that annual means at national level, in both PM_{10} and $PM_{2.5}$, are above WHO guidelines values.

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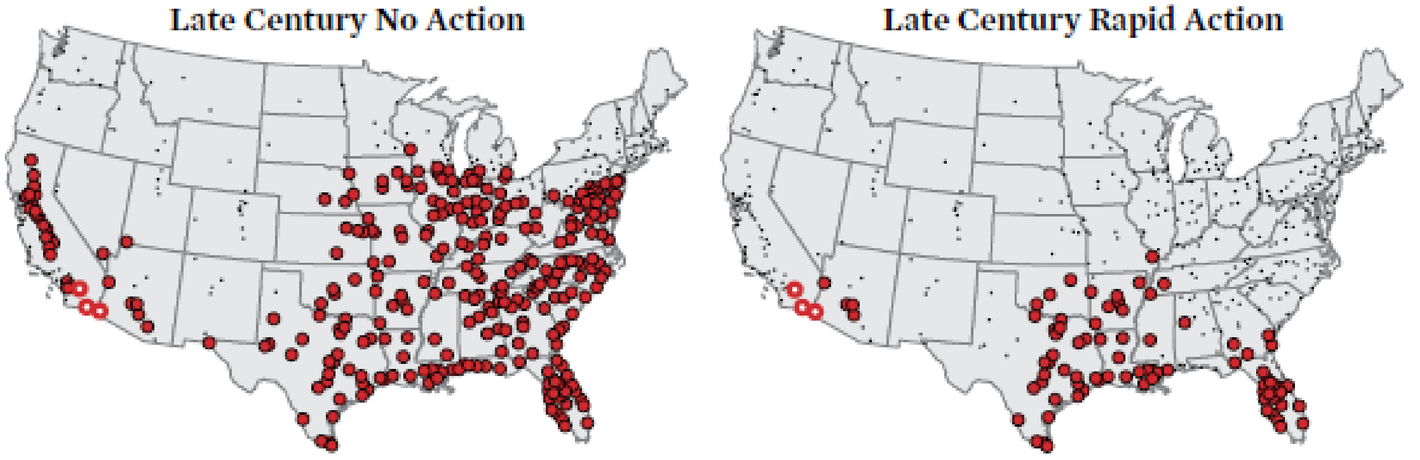
[Found at: http://www.who.int/globalchange/resources/countries/en](http://www.who.int/globalchange/resources/countries/en)

Killer Heat in the United States

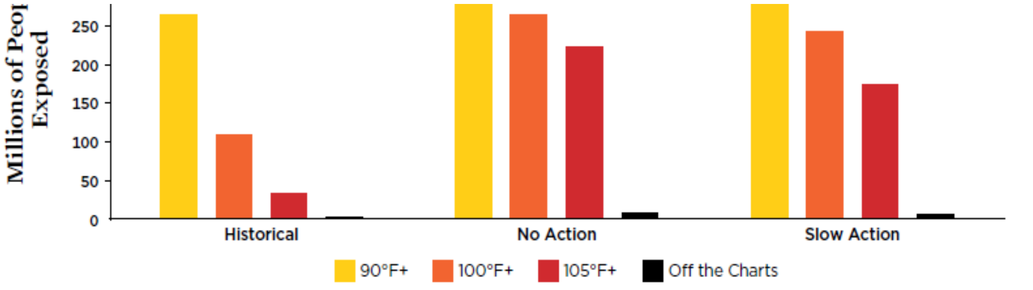
Climate Choices and the Future of Dangerously Hot Days

FIGURE 10. Urban Areas Face Frequent, Extreme Heat by Late Century



Cities Experiencing Heat Index >105°F

- More than 30 Days per Year
- More than 30 Days per Year, Historically
- Fewer than 30 Days per Year



Taking no action or slow action to reduce global heat-trapping emissions would expose millions more US residents to an average of seven or more days per year of extreme heat index conditions by midcentury, even when assuming no changes in population.

www.ucsusa.org/sites/default/files/attach/2019/07/killer-heat-analysis-full-report.pdf

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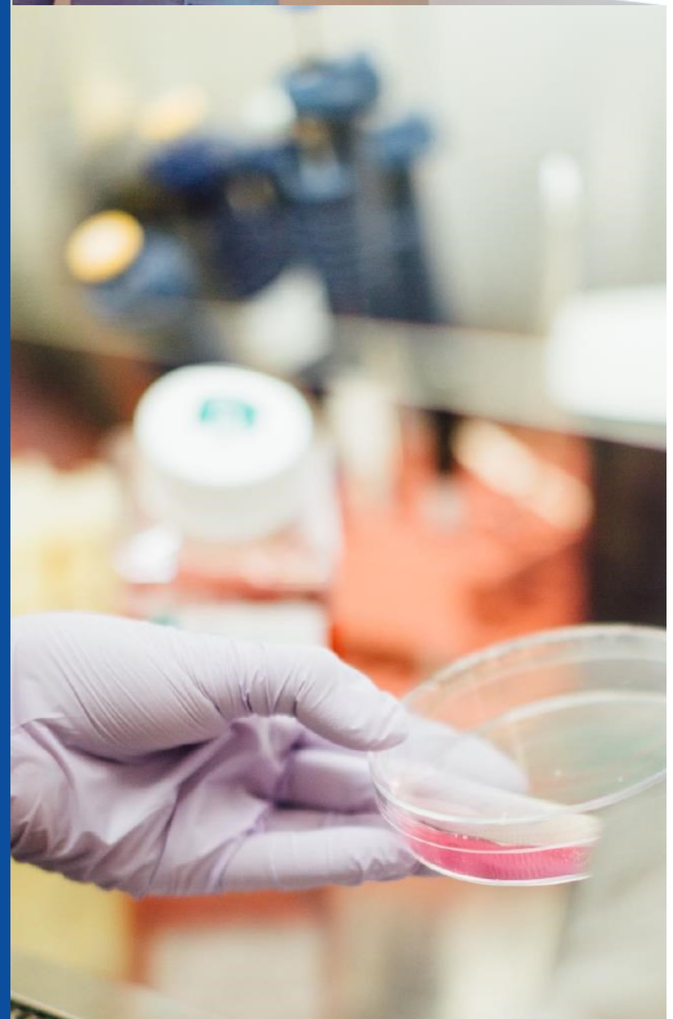
2

Discover
potential



Myth 1

"Health people don’t know what climate information they want "

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Understand
the mission and methods of public health

Preventing people from getting sick

- Prevent epidemics and spread of disease
- Protect against environmental hazards
- Prevent injuries
- Promote and encourage healthy behaviours
- Respond to disasters and assist communities in recovery
- Assure the quality and accessibility of services

Source: www.health.gov/phfunctions/public.htm

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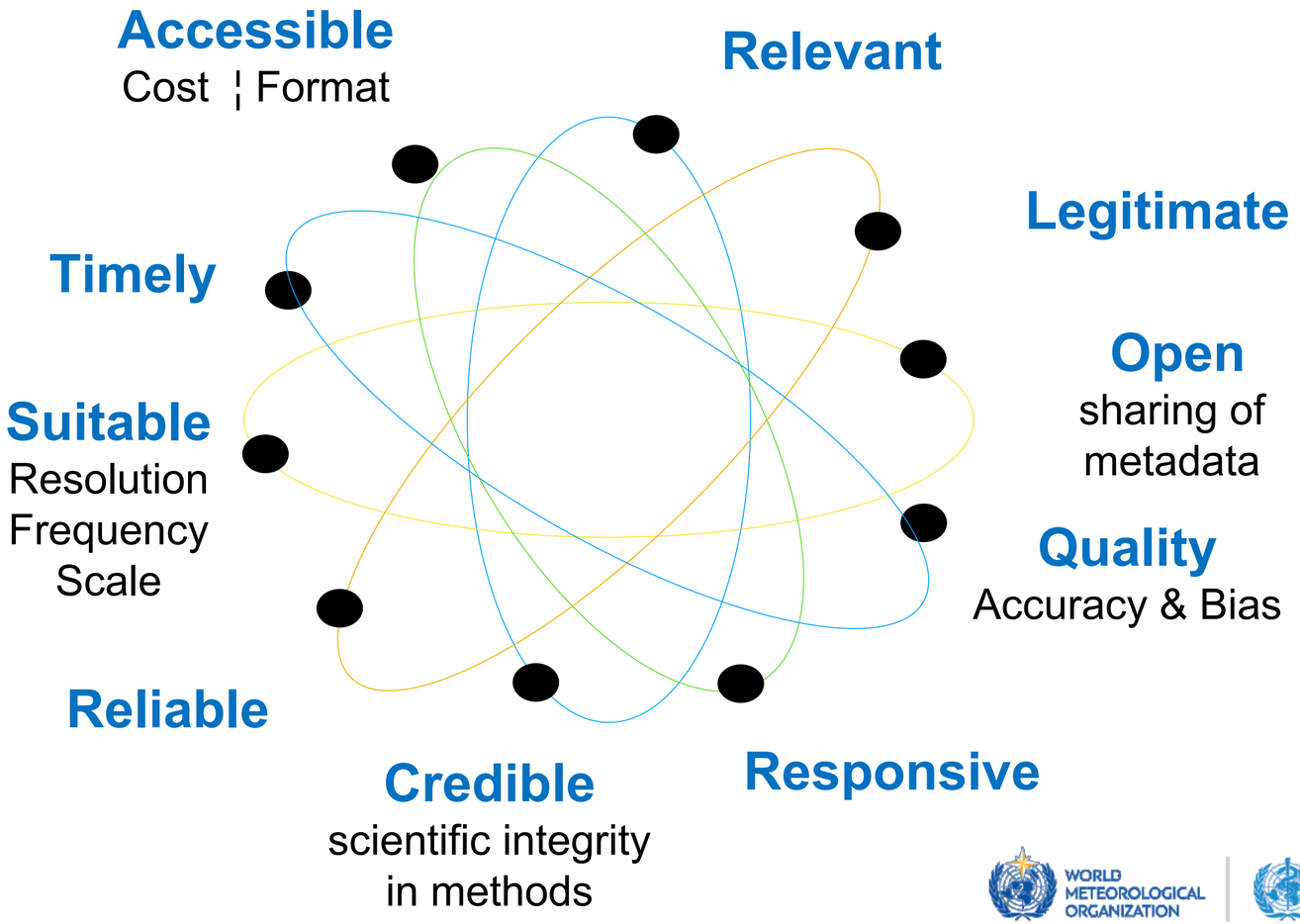
	Toolbox	Requirements	Examples
Past UNDERSTAND	• Descriptive baselines of health outcomes and risks • Descriptive analyses of local climate conditions (climatology/seasonality, ENSO influence) • Spatial and temporal epidemiological analyses of sensitivity: mechanistic and ecological impact studies • Analysis of population exposure and vulnerability	✓ Climate Services to provide historical Climate Data ✓ Sufficient historical Epidemiological Data ✓ Analytical Capacity	› V&A Assessment › Climate Profiles › Scientific Literature
Present MONITOR	• Indicators, Indices, Thresholds • Risk Assessments • Seasonal Climate Bulletins • Risk monitoring • Integrated surveillance systems	✓ Consistent Climate Data Access ✓ Systems based data collection ✓ Decision process to feed into	› Meningitis Bulletin › Air Quality and UV Indices › Outbreak Monitor
Future ANTICIPATE	• Disease Modeling and Mapping • Environmental Suitability Modeling and Mapping • Severe Weather Alerts • Early Warning Systems • Seasonal Forecasts and Impact Calendars • ENSO prediction and Monitoring • Climate Projections • Climate Scenarios	✓ Weather and Climate Services to provide SW Alerts, forecasts, projections, scenarios ✓ Partnerships	› Weather and Emergency Advisories › Seasonal Disease Calendar › ENSO Profiles
Future PREPARE	✓ Action Plans ✓ Adaptation Plans ✓ Risk Management ✓ Resilience Building ✓ Awareness, Communications, and Mobilization	✓ Sufficient evidence and understanding ✓ Political and social will ✓ Resources	› Heat Action Plans › Safe Hospitals › H-National Adaptation Plans

Understand expectations of climate information

Health professionals are held to high ethical and professional standards to avoid malpractice and harm.



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Frontiers in health technology
Global Risk Detection & Early Warning

https://www.youtube.com/watch?v=SYK-TLb-bXI&feature=youtu.be

A unique collaboration between WHO and various stakeholders to create a unified **all-hazards, One Health approach to early detection, verification and assessment of public health risks and threats**, using open source information.

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Frontiers in health technology

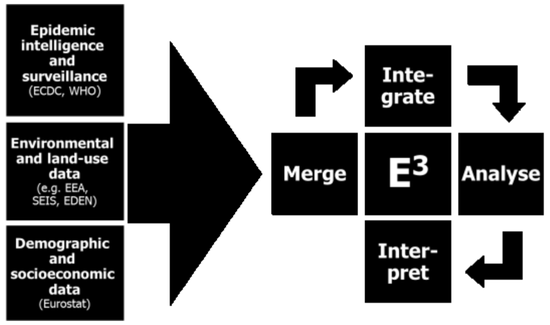
Integrated data management systems

Risk Monitoring and Early Warning Tools

- interoperable
- real-time analytical tools,
- for integrated spatial and temporal analyses

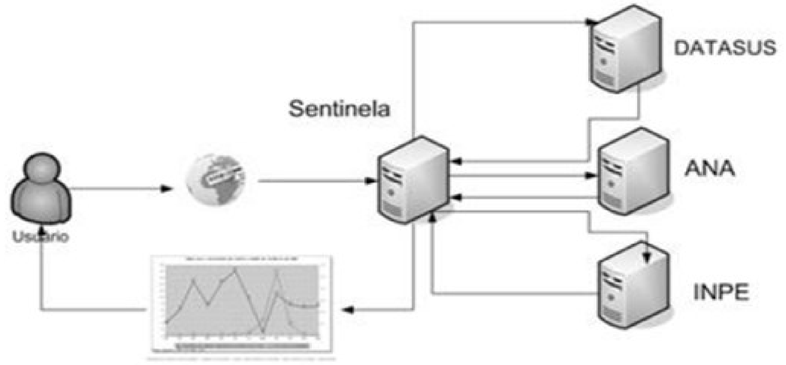
ecdc EUROPEAN CENTRE FOR DISEASE PREVENTION AND CONTROL

European Environment and Epidemiology (E3) Network



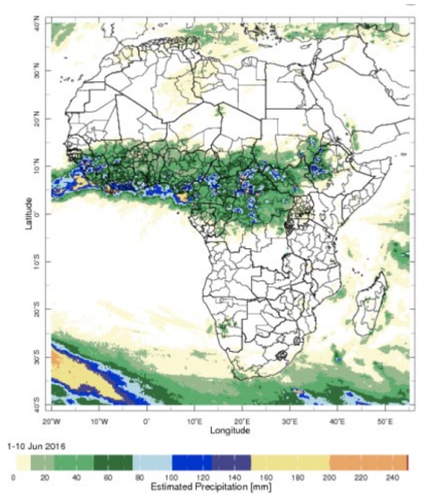
FIOCRUZ

Brazil Climate and Health Observatory

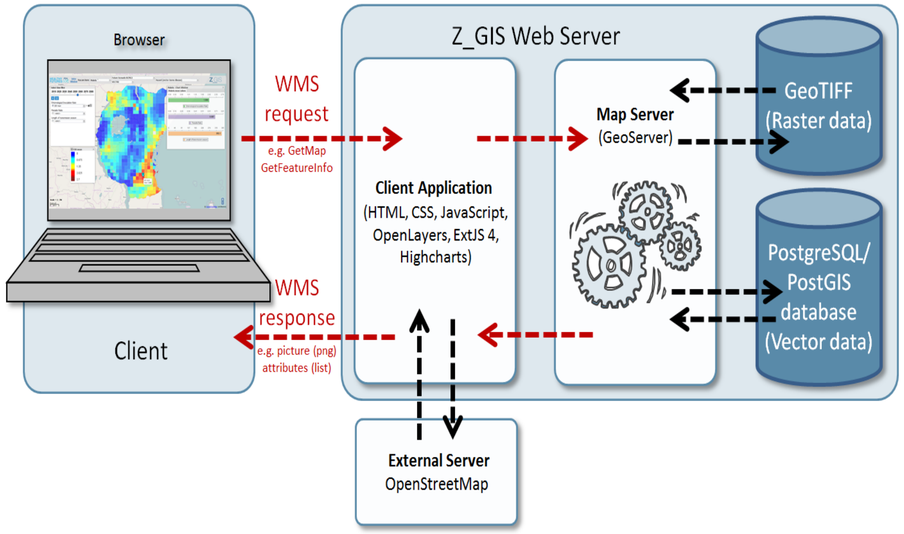


IRI

Maprooms Climate Library



HEALTHY FUTURES



Frontiers in health technology

(Mobile) M-Health

Today,

- **6 billion** mobile broadband subscriptions
- Mobile phone internet user penetration worldwide grew from 49 to **61%** between 2014 to 2018.

Mobile technology changes how we provide health care and changes how we can use climate information

Inexpensive phones bring access to information to all.

Source: Statistica.com & Ericsson Mobility Report, June 2019

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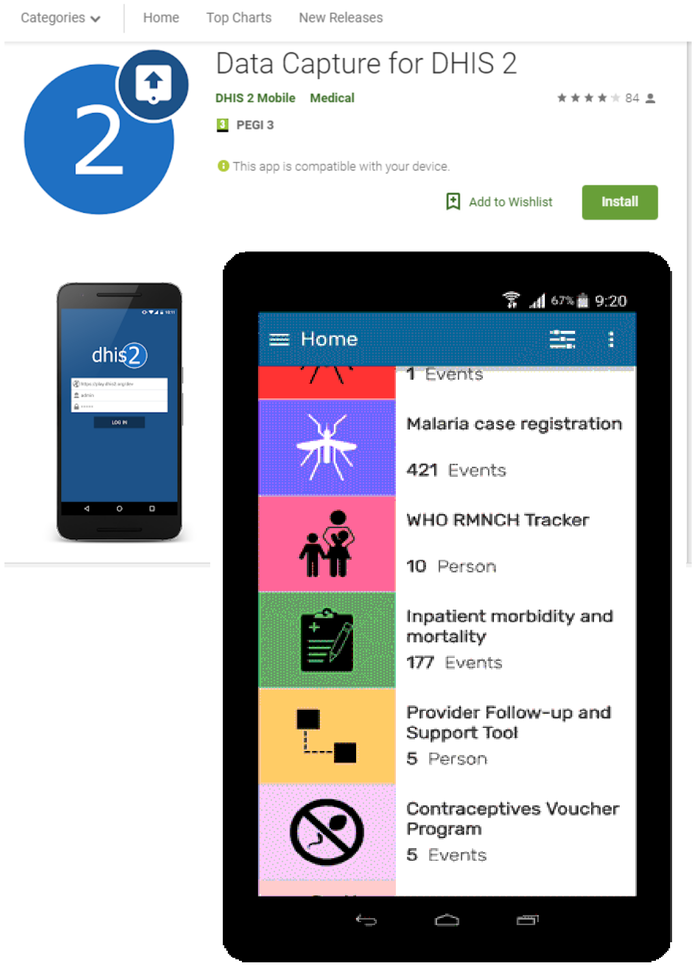
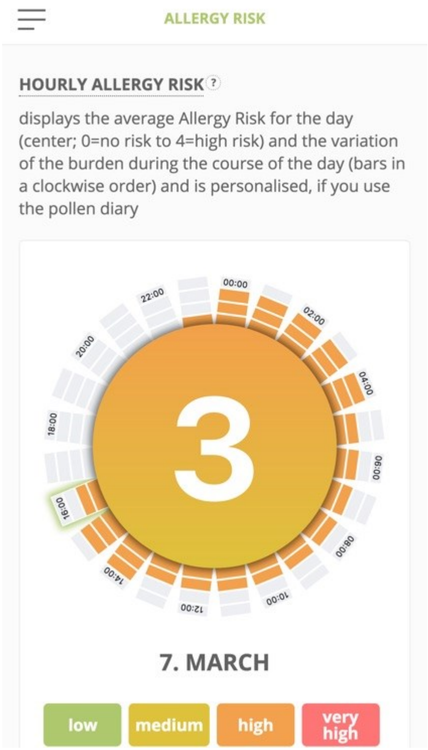
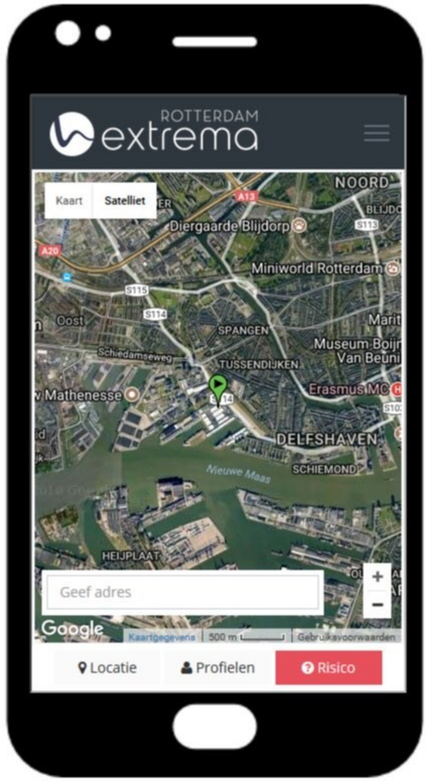
Data Collection Service Management

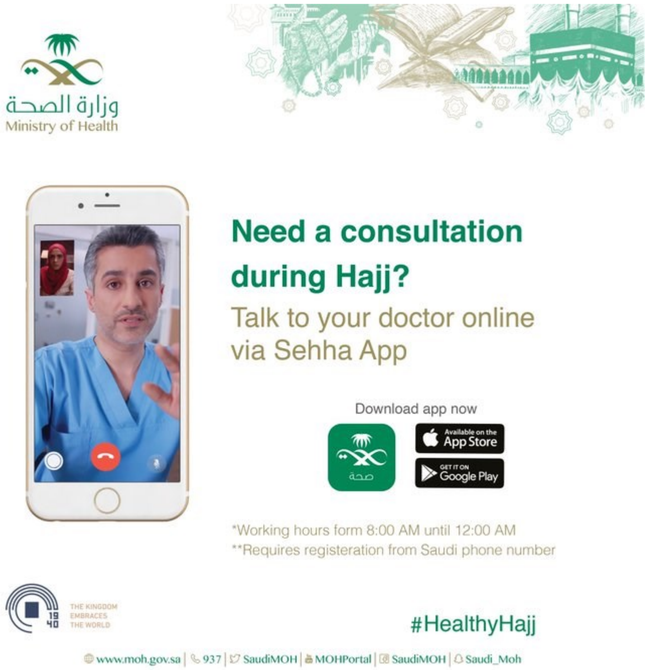


Risk Advisory Apps





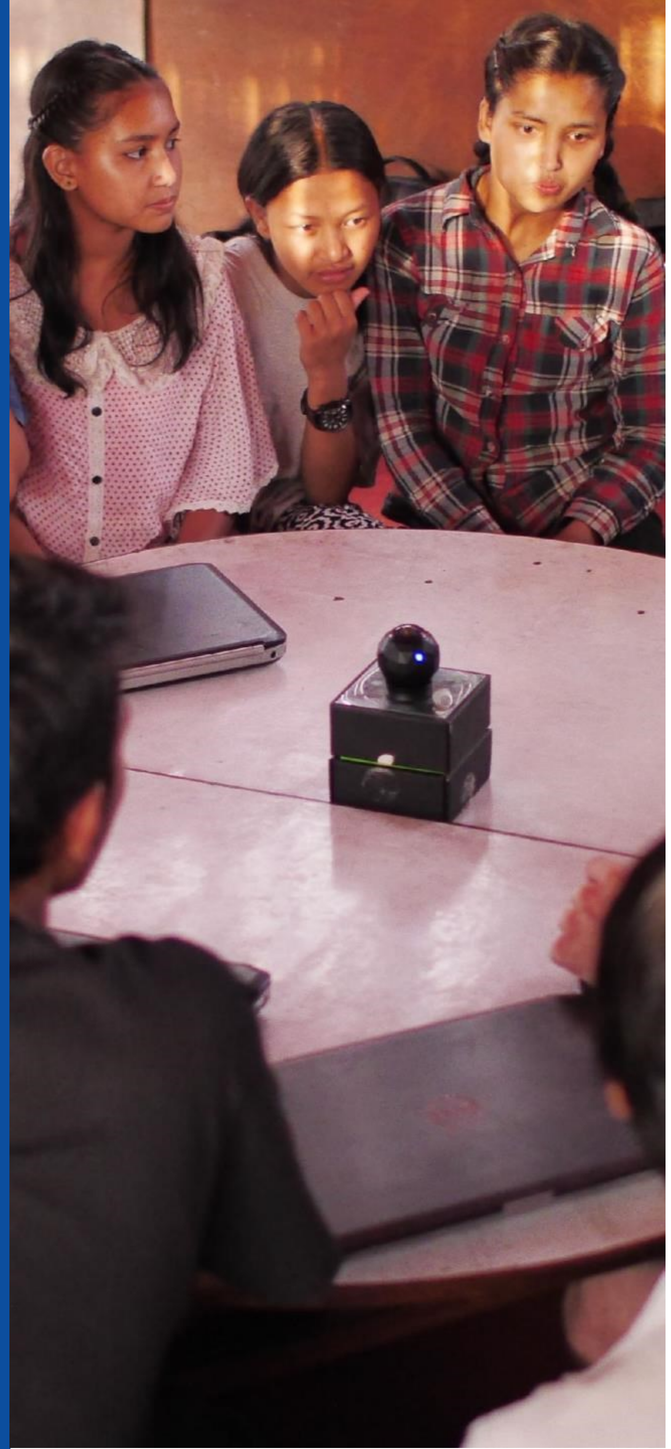
Virtual Medicine & Biosensors



Millions of health workers with trusted voices are now connected and accessible

3

Co-design
services to meet needs



Myth 2

“Producers and users”

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What are climate services?






mission-oriented **partnerships** driven by societal needs, which result in the **production and delivery of fit-for-purpose relevant, authoritative, timely and usable information about climate change, climate variability, trends, and impacts** to improve decision-making in climate sensitive sectors.

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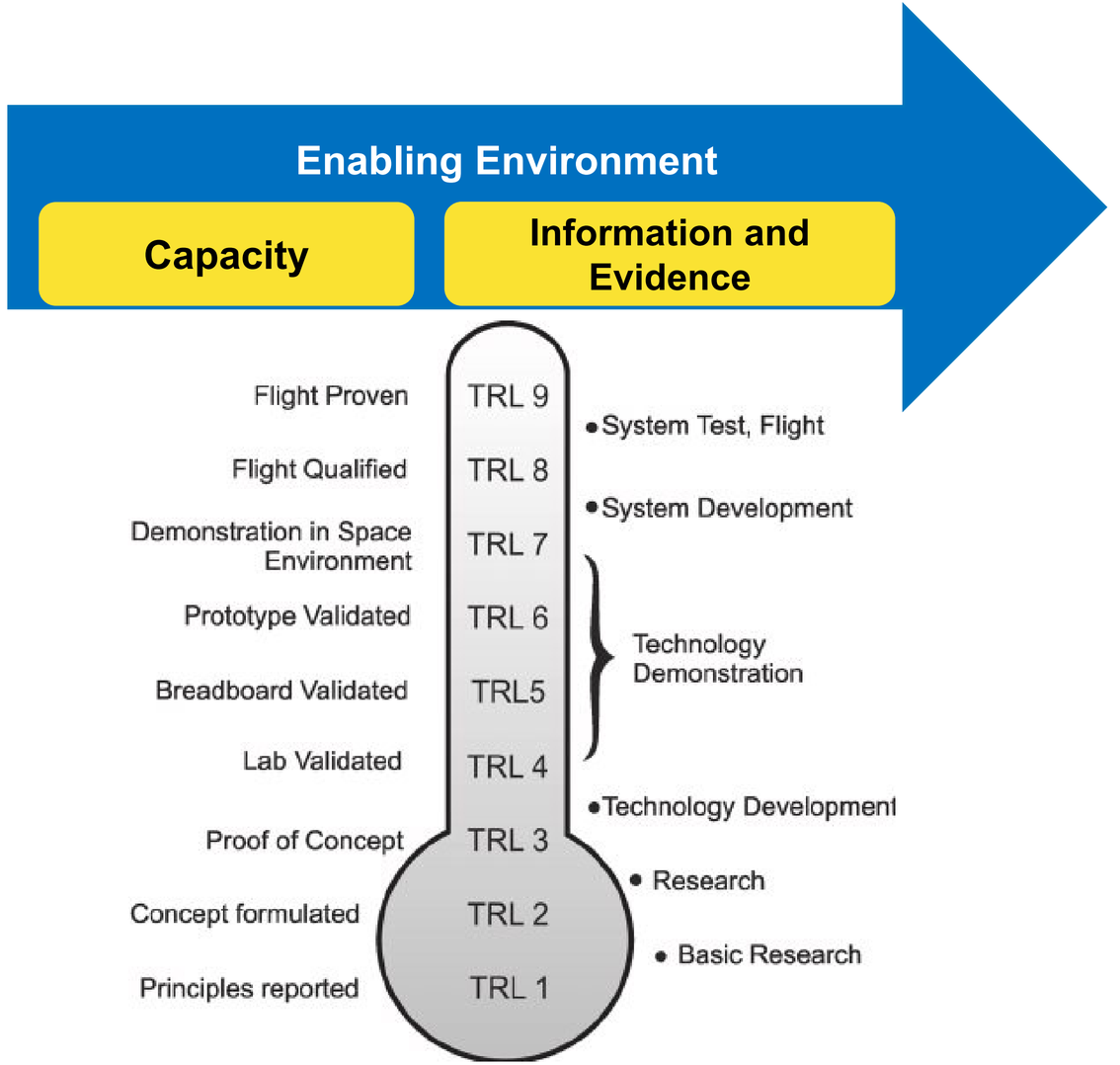
Identify Readiness to develop and use climate knowledge



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See what's Working

- Guidance
- Examples
- Solutions to bottlenecks
- Good practices

Diseases

- Vector-bourne disease
- Water-bourne disease
- Hepatitis
- Meningitis

Hazards

- Heat stress
- Air quality
- Extreme events

Download at:
bit.ly/climateservicesforhealth

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4

Integrate

All sectors are “health” sectors

Water **Energy** **Cities** **Food**

Climate Services for **all sectors** can help improve health.

Break the silos of sector-specific products/services

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New frontier of climate services is “integrated”

Integration of what?

- Risk across time-scales
- Continual evaluation throughout the science to service process
- Multi-hazard
- Multi-sectoral integrated knowledge
- Multi-disciplinary and cross-trained people

Portfolio

SCIENCE	SERVICES	APPLICATIONS	OUTREACH
Impact Research Product R&D Evaluation	Data Services Early Warning Systems Interpretation & Advisory	Air Quality (sand and dust, pollen, pollution) Climate UV Extreme Weather	Education & Training Awareness Advisories Policy Advising

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Caribbean Integrated Health Services

Health Priorities

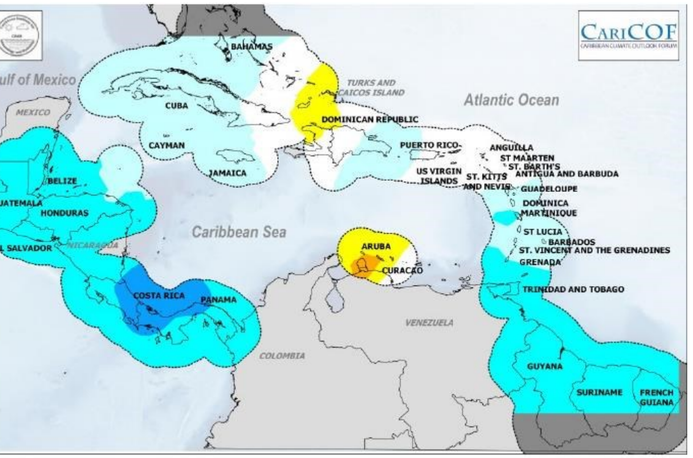
- Aedes Aegypti borne diseases including the dengue, Zika and Chikungunya viruses.
- Dust concentrations and air quality.
- Heat outlooks as a proxy for heat stress levels, particularly during heatwaves.
- Climate watch implications for strategic and operational decisions related to the management of healthcare systems.

Quarterly Health-Climatic Bulletin for the Caribbean
http://rcc.cimh.edu.bb/caribbean-health-climatic-bulletin/

7-day dust and air quality forecasts and targeted health alerts
http://sds-was.cimh.edu.bb/

Heat outlooks (seasonal/monthly)
http://rcc.cimh.edu.bb/heat-outlook-experimental

Health Research Advisory



Dominica Health Research presented at CariCOF May 2016

Multi-disciplinary team

(including health and social scientists)

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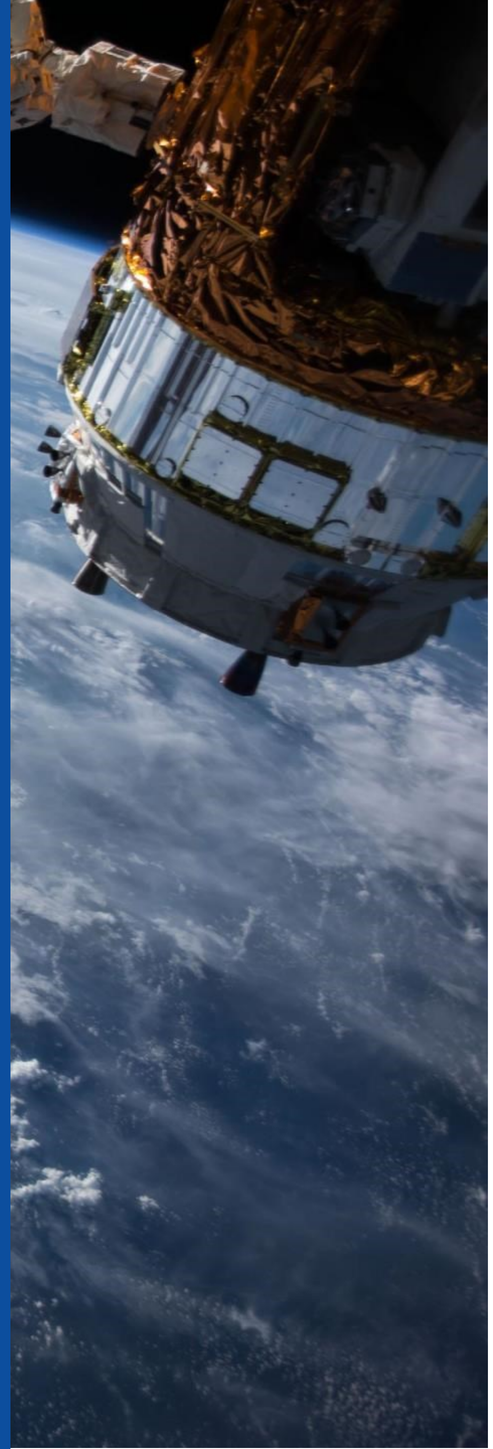
Benefits of Integration



- Cost-efficient
- Identify potential maladaptation
- New insights through cross-fertilization and shared climate knowledge
- Builds inter-sectoral relations
- Benefits from health sector outreach and communication capacity
- Greater impact

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WMO Health Services

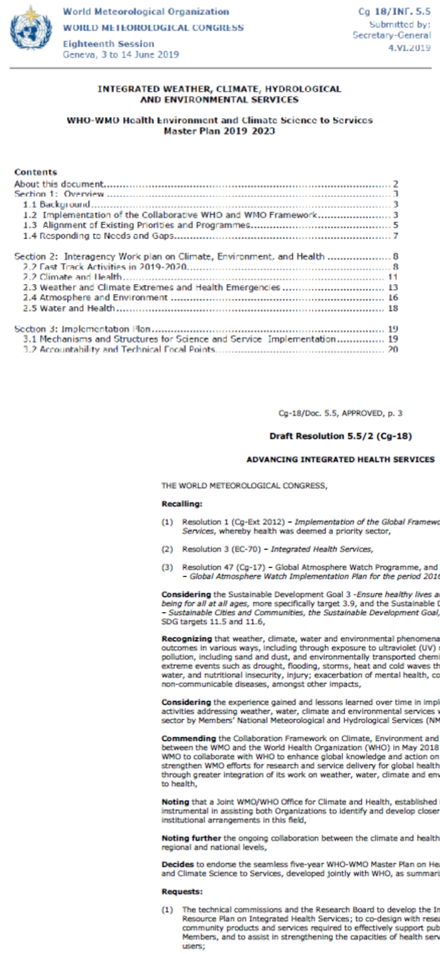
WMO recognizes the potential and need to strengthen capacity of NMHS and other actors to better work with the health sector

- Cg-18 Res. 33 (2019)

Advancing Integrated Health Services

- WHO/WMO Joint Office
- National and Regional Focal points
- New Expert Team
- Implementation Plan (EC-72)
- Online Climate and Health Portal (2020)
- UNSG Climate Action Summit

WHO-WMO Supporting Coalition on Social and Political Drivers



World Meteorological Organization
WORLD METEOROLOGICAL CONGRESS
Eighteenth Session
Geneva, 3 to 14 June 2019

Cg 18/INF. 5.5
Submitted by:
Secretary-General
4.VI.2019

INTEGRATED WEATHER, CLIMATE, HYDROLOGICAL AND ENVIRONMENTAL SERVICES

WHO-WMO Health Environment and Climate Science to Services Master Plan 2019 2023

Contents

Draft Resolution 5.5/2 (Cg-18)

ADVANCING INTEGRATED HEALTH SERVICES

THE WORLD METEOROLOGICAL CONGRESS,

Recalling:

(1) Resolution 1 (Cg-Ext 2012) – *Implementation of the Global Framework for Climate Services*, whereby health was deemed a priority sector,

(2) Resolution 3 (EC-70) – *Integrated Health Services*,

(3) Resolution 47 (Cg-17) – Global Atmosphere Watch Programme, and Decision 62 (EC-68) – *Global Atmosphere Watch Implementation Plan for the period 2016-2023*,

Considering the Sustainable Development Goal 3 -*Ensure healthy lives and promote well-being for all at all ages*, more specifically target 3.9, and the Sustainable Development Goal 11 – *Sustainable Cities and Communities, the Sustainable Development Goal*, more specifically SDG targets 11.5 and 11.6,

Recognizing that weather, climate, water and environmental phenomena affect human health outcomes in various ways, including through exposure to ultraviolet (UV) radiation, air pollution, including sand and dust, and environmentally transported chemicals, as well as to extreme events such as drought, flooding, storms, heat and cold waves that result in food, water, and nutritional insecurity, injury; exacerbation of mental health, communicable and non-communicable diseases, amongst other impacts,

Considering the experience gained and lessons learned over time in implementing WMO activities addressing weather, water, climate and environmental services within the health sector by Members' National Meteorological and Hydrological Services (NMHSs),

Commending the Collaboration Framework on Climate, Environment and Health agreed between the WMO and the World Health Organization (WHO) in May 2018 and commitments of WMO to collaborate with WHO to enhance global knowledge and action on air quality and to strengthen WMO efforts for research and service delivery for global health applications, through greater integration of its work on weather, water, climate and environment as related to health,

Noting that a Joint WMO/WHO Office for Climate and Health, established in 2014, is instrumental in assisting both Organizations to identify and develop closer collaboration and institutional arrangements in this field,

Noting further the ongoing collaboration between the climate and health sector at both regional and national levels,

Decides to endorse the seamless five-year WHO-WMO Master Plan on Health, Environment, and Climate Science to Services, developed jointly with WHO, as summarized in the Annex;

Requests:

(1) The technical commissions and the Research Board to develop the Implementation and Resource Plan on Integrated Health Services; to co-design with research and health community products and services required to effectively support public health by all Members, and to assist in strengthening the capacities of health service providers and users;

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2019-2023 Joint WHO and WMO Health, Environment, and Climate Action Plan

4 themes

- Air Quality
- Climate & Climate Services
- Water
- Extremes & Health Emergencies

2 geographic foci

- Small Island Developing States
- Urban Areas

10 Fast-track activities

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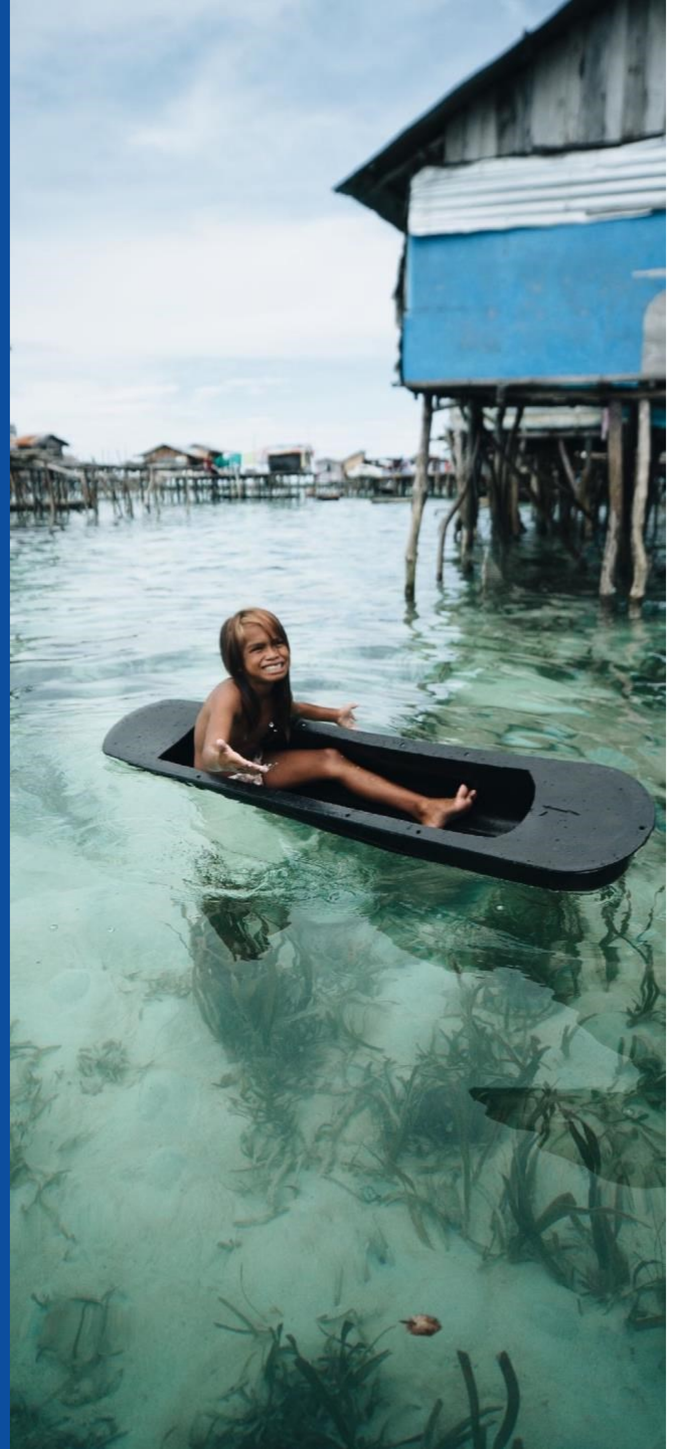
Where can you bring solutions to address global health challenges?



- Climate change
- Air quality risks
- Extreme heat and cold
- Sufficient and safe water
- Impacts research on infectious diseases
- Health equity
- Mental health

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How can you make social impact through climate services for health?

Empower
Discover
Co-Design
Integrate

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Connect
to learn more.

jshumake-guillemot@wmo.int

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