Addressing climate change driven health challenges in Africa

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Outline

- The impact of climate change in Africa with respect to public health and disease prevalence
- How is the continent coping with this impact?
- Key Research priorities and the emerging stories
• Health is sensitive to Climate Change.
• Climate change and climate variability will alter temperature, air movements and precipitation
• important consequences for human health, the environment and on the economies of African countries, likely to impede development.
• African countries are more vulnerable to climatic change in the world poverty, weak institutions and armed conflict.
• limiting the capacity of African countries to deal with the additional health challenges posed by climate change. (Huge cost of Adaptation).
• The type and magnitude of the health impacts of Climate change geographic and micro-climate differences, socio-economic conditions, the quality of existing health infrastructure, communication capacity, and underlying epidemiology.
• Good news- Africa has already begun to address climate and health issues.
• It is important to determine what we can do differently to Adapt
CONTINENTAL SURFACE TEMPERATURE ANOMALIES: OBSERVATIONS AND PROJECTIONS

North America

Europe

Asia

Africa

Australia

Temperature anomaly (°C)

Year

1900 1950 2000 2050

1900 1950 2000 2050

1900 1950 2000 2050

1900 1950 2000 2050

models using natural forcing only

models using both anthropogenic and natural forcings

projected changes (A1B scenario)

range of anomalies with natural forcing only in 20th century simulations

observations

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• The severity of droughts is increasing throughout the African continent resulting in hunger, famines, malnutrition and under nutrition.

• Droughts are affecting both livestock and food production in many regions in the continent, and this is expected to worsen as the continent becomes hotter and drier.

• Water conservation and irrigation for drought management (Leads to other problems of habitats for vectors)

• However these efforts have not adequately addressed the current food production and future demands.

• Droughts have been known to affect mental health due to anxiety, depression and suicide, particularly in farming and pastoralist communities.
Vector Borne infections
Evolution of epidemics

- Anomalous temperatures
- Heats permanent breeding habitats
- Accelerated mosquito development

- Accelerated parasite development in mosquitoes

- Rainfall expands breeding habitats
- Mosquito population amplification

- Transmission amplification

Months
1 2 3 4

Epidemic
Malaria

- Over 90% of the global malaria burden occurs in Africa and is associated with considerable mortality and morbidity
- Climate scenario indicates that the disease geographic range may contract in some areas and expand in others especially in the African Highlands
- Prior to the ongoing malaria control efforts severe epidemics occurred in the East African highlands during El Nino years and resulting in 100% increase in the number of hospital admissions
- Due to global efforts to control malaria, malaria prevalence has dropped by 40% between 2000 and 2015 (WHO, roll back malaria, global funds and presidential fund by the US government)
- An increase in temperature and Precipitation results to an increase in vector abundance and an increase in the rate of malaria transmission
- Future projections show that due to future expected temperature and rainfall increases, more malaria cases will be reported.
- Control measures such as LLINS, IRS, early diagnosis and treatment are effective in malaria control
- Development of Effective vaccines is underway
- Early warning systems, Bio larvicides are other strategies to control malaria
Malaria
A preventable and treatable mosquito-borne illness

Global burden
3.2 billion people at risk
214 million cases in 2015

An estimated 438,000 people died in 2015
About 66% were children under five

Artemisinin resistance
A growing problem in southeast Asian countries

91% of all malaria deaths occur in sub-Saharan Africa

Improvements since 2000
60% fewer deaths from 1 billion insecticide-treated nets distributed in Africa, giving protection to 68% of under-fives
MALARIA IS 100% TREATABLE AND PREVENTABLE

Each year
655,000 people die from MALARIA
200,000 NEWBORNs
10,000 MOTHERs DIE

SIMPLE INTERVENTIONS can save LIVES

- PREVENTIVE MALARIA MEDICINE & ANEMIA SCREENING DURING PREGNATAL CARE
- USE OF BED NETS
- PROMPT DIAGNOSIS, TREATMENT AND COUNSELING FOR MALARIA ILLNESS & ANEMIA

INVEST IN THE FUTURE
DEFEAT MALARIA

Rift Valley Fever

- Rift Valley fever (RVF) is a viral zoonosis that primarily affects animals but can also infect humans.
- The majority of human infections result from contact with the blood or organs of infected animals.
- Human infections have also resulted from the bites of infected mosquitoes.
- To date, no human-to-human transmission of RVF virus has been documented.
- The incubation period (the interval from infection to onset of symptoms) for RVF varies from 2 to 6 days.
- Outbreaks of RVF in animals can be prevented by a sustained programme of animal vaccination.
Outbreaks of RVF in Africa since 2000

- **2016, Republic of Niger**: As of 11 October 2016, Ministry of Health reported 105 suspected cases including 28 deaths in humans.

- **2012 Republic of Mauritania**: The Ministry of Health in Mauritania declared an outbreak of RVF on 4 October 2012. From 16 September 2012 (the date of onset of the index case) to 13 November 2012, a total of 36 cases, including 18 deaths were reported from 6 regions.

- **2010, Republic of South Africa**: From February to July 2010, the Government of South Africa reported 237 confirmed cases of RVF in humans, including 26 deaths from 9 provinces.

- **2008–2009, Madagascar**: From December 2008 to May 2009, the Ministry of Health, Madagascar reported 236 suspected cases including 7 deaths.

- **2008, Madagascar**: The Ministry of Health, Madagascar reported an outbreak of RVF on 17 April 2008. From January to June 2008, a total of 476 suspected cases of RVF including 19 deaths were reported from 4 provinces.

- **2007, Sudan**: The Federal Ministry of Health, Sudan, reported an outbreak of RVF on 28 October 2008. A total of 738 cases, including 230 deaths, were reported in Sudan between November 2007 and January 2008.

- **2006, Kenya, Somalia and Tanzania**: From 30 November 2006 to 12 March 2007, a total of 684 cases including 234 deaths from RVF was reported in Kenya. From 19 December 2006 to 20 February 2007, a total of 114 cases including 51 deaths was reported in Somalia. From 13 January to 3rd May 2007, a total of 264 cases including 109 deaths was reported in Tanzania.

- **2003, Egypt**: In 2003 there were 148 cases including 27 deaths of RVF reported by the Ministry of Health of Egypt.
Chikungunya, Dengue, Yellow fever

- Arboviruses transmitted by the Aedes mosquito
- Occur both during drought and rainy seasons
- Mosquitoes breed in discarded containers and water drums
- The Chikungunya and Dengue viruses are sensitive to temperatures, short incubation period
- Yellow Fever has a vaccine and it is also water and temperature dependent.
- Transmission of Yellow fever can be maintained by the Animal sylvatic cycles (the wild Type).
The Meningitis belt consists part of or all of Gambia, Senegal, Guinea-Bissau, Guinea, Mali, Burkina Faso, Ghana, Niger, Nigeria, Cameroon, Chad, Central African Republic, Sudan, South Sudan, Uganda, Kenya, Ethiopia, Eritrea.

The largest epidemic recorded to date occurred in 1996–1997, causing over 250,000 cases and 25,000 deaths.

The region continues to experience outbreaks of various scales, with 2009 being particularly severe in Nigeria and Niger.

Future temperature increases due to climate change have the potential to significantly increase meningitis cases.

The major control strategy has been based on the development of effective and affordable vaccine.
Pathways for Weather to Affect Health: Example = Diarrheal Disease

Distal Causes
- Temperature
- Humidity
- Precipitation
- Living conditions (water supply and sanitation)
- Food sources and hygiene practices

Proximal Causes
- Survival/replication of pathogens in the environment
- Contamination of water sources
- Contamination of food sources
- Rate of person to person contact

Infection Hazards
- Consumption of contaminated water
- Consumption of contaminated food
- Contact with infected persons

Health Outcome
- Incidence of mortality and morbidity attributable to diarrhea
- Vulnerability (e.g. age and nutrition)

Source: WHO
Cholera

- Dependent on level of sanitation and availability and use of improved drinking water (increased sea levels)
- Dose dependent
- During droughts, infected people do not wash their hands hence contaminating few sources of water
- Increase in temp causes algae bloom that increases zooplanktons which are the natural reservoirs of the vibrio cholera
- Extreme weather conditions such as El Nino break down latrines and contaminate water sources
- Most affected are countries around the great lakes, poor and lacking in sanitation
How the continent is coping with this Climate Change impact

- Control and prevention (New Strategies, For some diseases eg malaria sustained and increased control)
- Development and use of Vaccines
- Improved Health systems
- Improved primary health care and prevention
- Collaboration with international partners (Research, prevention and treatment of infectious diseases)
- Research and development- new drugs, epidemiological research, surveillance
- Improved health information systems
- Early warning systems for all the diseases – eg RVF using NDVI and sea surface temperatures
- Dissemination of Climate information for Early warning
- Development of Climate Change policies
Investigate how climate change modifies human security and the risk of conflict through changes in resource scarcity, likelihood of migration, capacity of the government to respond and frequency and intensity of extreme weather events.

Investigations on the costs of the projected health impacts of climate change; effectiveness of adaptation; and the limiting forces, major drivers and costs of adaptation.

Long-term health impacts of extreme climate events.

Development of proper longitudinal Health data collection and data storage systems.

Development of methods to quantify the current impacts of climate and weather on a range of health outcomes, particularly in low- and middle-income countries.

Assessing climate impacts on health of vulnerable groups inclusive of Gender issues.

Identifying vulnerabilities of displaced populations.

Addressing loss of access to critical services including medical care and education for marginalized groups.
Thank You