Climate and Health – an on the ground perspective

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Health and the UN Millennium Development Goals

1. Eradicate extreme poverty and hunger
2. Achieve universal primary education
3. Promote gender equality and empower women
4. Reduce child mortality
5. Improve maternal health
6. Combat HIV/AIDS, malaria and other diseases
7. Ensure environmental sustainability
8. Global partnership for development
“Protecting Health from Climate Change”

“Climate change will affect, in profoundly adverse ways, some of the most fundamental determinants of health: food, air, water”.

Dr. Margaret Chan
Director-General of the World Health Organization (2008)
What impacts can be expected?

Pathways by which climate change may impact health and concurrent direct-acting and modifying influences of environmental, social and health-system factors.
Disproportionate global health impacts of Climate Change (Data from WHO 2004)

Climate sensitive diseases

**Vector-borne**
- Malaria
- Dengue fever
- Lyme disease
- Rocky Mountain spotted fever
- Encephalitis: St. Louis, Murray Valley, Western Equine
- Rift Valley fever
- Ross River fever
- Ehrlichiosis
- Hantavirus pulmonary syndrome
- Leishmaniasis
- African trypanosomiasis
- Tularemia
- Plague
- Onchoceriasis (river blindness)

**Water and Foodborne**
- Cholera
- Other non-cholera *Vibrio* spp. (i.e., *V. vulnificus*, *V. parahaemolyticus*)
- Leptospirosis
- Schistosomiasis
- Sea bather's eruption
- Giardiasis
- Cryptosporidiosis
- Human enteric viruses (Enteroviruses, Norwalk and Norwalk-like viruses)
- Campylobacteriosis
- *Cyclospora cayetanensis*
- *Salmonella enteritidis*

**Airborne (and others)**
- Meningococcal meningitis
- Coccidioidomycosis
- Respiratory syncytial virus (colds)
- Legionnaires' disease
- Influenza
A changing epidemiology of malaria infections and regional disease burden

Malaria persists in the tropics and sub-tropics despite efforts to control it. Climate is a major factor in its persistence.
Current and future distribution based on climatic constraints

The present-day malaria distribution is described well by contemporary climate variables (upper panel). The same variables, projected into the future, will cause relatively few changes on a global scale (lower panel), but significant local changes (next slide).

Observed (yellow) and predicted global malaria distribution, using 1960-90 climate data

Predicted global malaria distribution, HadCM2 2050 High scenario

Predicted shift in global malaria by 2050

This map shows the future changes in the global malaria situation by 2050. Malaria disappears from the red areas (which in general become too hot and dry) but newly appears in the green areas. A total of c. 800 million people live in these areas. Malaria in previously unexposed adults is particularly severe.

Trends in Global January Land-Ocean Temperature Index (1880-2008)

Variability in different time scales needs to be incorporated in decision making for climate-sensitive diseases.
Trends in African rainfall (1900-2010)

Rainfall over the Sahel region from the last century to present.
Climate variability poses a different set of challenges to creating effective health sector responses

- Spatial risk of disease
- Seasonality
- Year to year variability
- Trends
- Assessment of the impacts of interventions
Season Smart-understanding interactions and targeting interventions

Climate suitability for endemic malaria
= 18-32ºC + 80mm + RH>60%

http://www.malariajournal.com/content/5/1/38
Inter-annual variability – intervention impact assessments

DEMETER Forecasts

Probability distribution of high and low malaria years in Botswana

Thomson et al., 2006
Accounting for rainfall in assessment of the impact of interventions against malaria
Trends

Short term
• Methodologies and tools to assess near-term climate change 2-10 years are critical

Long term:
• Longer timeframes may be outside the decision-making and policy environment.
Filling the data gap

- Surveillance systems to track key indicators of both exposure and health
- Expanded empirical research to better understand climate-health mechanisms
- Expanded research to link climate change scenarios to health outcome models
Gaps in climate data in space and time?
Linking data needs to goals for disease control

Elimination - interruption of transmission to create local zero incidence.

Eradication - permanent reduction of incidence to zero.

Control - to achieve low transmission and mortality in high burden countries.
Target countries for eradication, elimination or control

Feachem R.G.A. and the Malaria Elimination Group
Silent stations – improving the observing systems for poorly represented areas

Recommended actions

1. Invest in the observations

2. Focus on relevant timeframes for decision-making (emphasis on days to decades, including seasonal and inter-annual variability, but also including long-term climate change).

3. Strengthen health surveillance and response systems.

4. Use knowledge management systems to facilitate the capture and sharing of climate risk management knowledge to the concerned communities.

5. Create a public service platform within WMO member institutions to encourage cross-sectoral interaction.
Developing a “Climate Smart” health sector
and a climate community that an active participant in public health processes.