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Climate Change and Health (Part II)

This is the second in a series of two articles on the effects of climate change on health

Vector-borne diseases

The geographical and temporal distributions as well as the incidence of many vector borne diseases such as malaria and dengue are sensitive to temperature and rainfall. The vector itself, or the pathogen (virus, bacteria) replication rates can be sensitive to temperature. Changes in precipitation patterns can alter the number of breeding sites available or the way people store water – again creating breeding sites. Climate factors may however not be equally important determinants of disease rates in all regions. There is still considerable uncertainty with regard to how climate change may change the temporal and spatial patterns of many vector borne diseases.

Distributions of these diseases are influenced by other factors too, such as urbanization, land use, socio-economic development, population movement and levels of immunity within the population.

In some areas, drought may reduce the transmission of some mosquito borne diseases, leading to reduction in the proportion of immune persons and therefore a larger amount of susceptible people are available once the drought breaks.

After a flood event, rates of vector borne diseases such as malaria can increase as mosquitoes breed in stagnant or slow moving collections of water. However the relationship is complex, as flood events can also wash away breeding sites. Outbreaks of various rodent-borne diseases, like leptospirosis, are commonly reported in the aftermath of flooding.

There are few early warning systems for vector borne diseases in operational use. One example includes southern Africa where malaria is sensitive to rainfall and where there is an early warning system in place that puts together seasonal rainfall forecasts with data on population vulnerability and coverage of prevention activities. An early warning system needs to be coupled with an action plan to be effective.

Even if no early warning system exists, the health sector still needs to be prepared for the distribution of vector borne diseases to change. These changes may occur in terms of intensity of transmission, geographical distribution or temporal distribution. In order for health authorities to be aware of these changes, it is crucial that good surveillance systems are in place. To ensure this, a good public health infrastructure with access to primary health care and adequate laboratory facilities and reporting systems are required. Diagnosis and reporting should be standardized, to be able to use and compare data between different locations and over time. Existing surveillance systems should be reviewed in order to identify indicators that could be used for identifying and assessing climate-related health risks and the effectiveness of actions. Vector surveillance should also be carried out. Authorities and humanitarian organizations need to know when diseases re-emerge, emerge in new places, at higher rates or at different times of the year. Plans must be in place, outlining what to do if patterns are changing, such as alerting health service engaging in vector control measures and providing education and awareness around how to prevent exposure to the vector and when to seek care. Many humanitarian and nongovernmental organizations rely on government data to plan their activities, which means that good surveillance systems will have benefits beyond the state sector. Long term climate projections should guide where surveillance systems as well as communities need to be particularly prepared for changing risks. This may include for example putting particular attention to dengue surveillance in urban areas in Southeast Asia. Potential changes in other climate-sensitive sectors that may influence disease transmission should also be monitored to guide prioritization of the placement of surveillance systems.

The above action needs to take place at national level, but integrated within regional systems. These steps of integration will serve, among other things,

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to ensure that early warning is given to neighbouring countries of emerging diseases. Still, the building blocks of a functioning surveillance system, primary health care, laboratories and reporting systems, need to be at national level.

Health effects of air quality

The formation of many air-pollutants is determined in part by climate factors such as temperature and humidity. In addition, the transport and dispersion of air pollutants away from source regions are strongly affected by weather factors. Climate change may therefore influence pollutant concentrations, which in turn may affect health as air pollution is related to cardio-respiratory health.

Exposure to high levels of ground-level ozone, for example, which is formed from the exhaust of transport vehicles, increases the risk of exacerbations of respiratory diseases such as chronic obstructive airways disease and asthma, leading to hospital admissions or increased mortality. The number of forest and bush fires may increase as certain regions face longer periods of extreme dry conditions and such fires can contribute to air-pollution. The direction and magnitude of the effects of climate change on air pollution levels are however highly uncertain and there will be regional variations.

Meningitis

The spatial distribution, intensity of transmission and seasonality of meningococcal meningitis in the semi-arid areas of sub-Saharan Africa have been linked to climatic factors, particularly drought and hot, dry and dusty conditions, although the causal mechanism is not clear. An early warning system is under development.

Food security and malnutrition

The relationships between climate change and food security are complex and climate is seldom the only factor at play. High temperatures, lack of rain or low river flows can put harvests at risk. Salinization of agricultural land due to sea levels rise can decrease yields and flood events or heavy rainfall can also destroy harvests. These effects of climate change together with other factors can have consequences for food security.
As rates of malnutrition increase, populations may also become more susceptible to other diseases. Climate change is in this way affecting the underlying vulnerability of populations to other effects of climate change.

Climate stress may play a part in population movement, including rural to urban migration. Population displacement carries its own health risks, including malnutrition and increased risks of communicable diseases. Vector borne diseases can spread as people from an affected area move into new areas. If non-immune populations enter an endemic area they are at higher risk of being infected and can contribute to the spread of disease.

Health systems

Adequate health infrastructure with universal access to primary health is crucial to reducing a population's vulnerability to the impact of changing patterns of diseases due to climate change. A well functioning health system not only provides treatment, but together with laboratory services and standardized diagnosis and reporting systems, is a crucial component of a national surveillance system. Health professionals must be better trained to understand the potential impacts of climate change on health. One of the main challenges that health systems face in many developing countries today is that qualified health professionals leave developing countries to work abroad. Improving health systems is another clear 'no-regrets' option for adaptation, and should include particular efforts to extend services to the most vulnerable populations. Climate change must also be taken into account when designing health systems, such as for example ensuring that health stations are built in areas that are accessible even during floods

Health effects of adaptation and mitigation activities

Health effects of adaptation activities

Activities carried out in order to adapt to climate change can in some cases lead to additional health risks. Examples include the construction of dams for water storage, which may provide breeding sites for disease-transmitting mosquitoes. Irrigation of land currently contributes to the spread of malaria and schistosomiasis. The practice of using wastewater for agricultural irrigation may also become increasingly common in times of water scarcity, leading to increased risks of diarrhoeal diseases and intestinal worms for populations living in close proximity to irrigated land. These risks highlight the need for an integrated risk assessment during the development of new policies at national level or local level, taking into account the possible health effects and how to reduce these risks.

Co-benefits of mitigation activities

There are several potential co-benefits for health of some of the policies that seek to reduce greenhouse gas emissions. It is very likely that efforts to reduce emissions of greenhouse gases will have substantial co-benefits for health in terms of reducing pollutants that contribute to cardio-respiratory diseases. Transport policies that promote cycling and walking have the potential to both reduce greenhouse gas emissions and also have health benefits through reductions in air pollution, accident risk and increased levels of physical inactivity. Better insulation of houses in cold climates is likely to reduce both energy consumption and cold-related morbidity and mortality.

In low-income countries, many people rely on biomass fuels to a high degree, and as a proportion of these are harvested non-renewably, this contributes to carbon emissions. In terms of health, the resulting indoor air pollution is a significant cause of morbidity and mortality in many developing countries and the disease burden is estimated to be in the order of 0.7 to 2.1 million premature deaths in low- income countries annually, two-thirds of which occur in children under five.

Summary

Actions that can be taken to minimize the effect of climate change can be divided broadly into two. One is the traditional method, building resilience and strengthening public health systems at all levels while paying particular attention to the most vulnerable in society. The other is doing things differently, such as developing more user-friendly early warning systems, using information at multiple timescales, strengthen the health sectors involvement in planning in other sectors and look for win-win solutions that benefit health and reduce greenhouse gas emissions.

Source

Climate change and Health, available from
www.ccdcommission.org/Filer/commissioners/Health.pdf

Compiled by Dr. Madhava Gunasekera of the Epidemiology Unit

Table 1: Vaccine-preventable Diseases & AFP

22nd – 28th September 2012 (39th Week)

Disease	No. of Cases by Province									Number of cases during current week in 2012	Number of cases during same week in 2011	Total number of cases to date in 2012	Total number of cases to date in 2011	Difference between the number of cases to date in 2012 & 2011
	W	C	S	N	E	NW	NC	U	Sab					
Acute Flaccid Paralysis	00	00	00	00	00	00	00	00	00	00	02	60	70	- 14.3 %
Diphtheria	00	00	00	00	00	00	00	00	00	-	-	-	-	-
Measles	00	00	00	00	00	00	00	00	00	00	01	47	108	- 56.5 %
Tetanus	00	00	00	00	00	00	00	00	00	00	00	09	20	- 55.0 %
Whooping Cough	01	00	01	00	00	00	02	00	01	05	01	81	43	+ 88.4 %
Tuberculosis	02	00	00	00	00	09	00	00	00	11	178	6414	7051	- 09.0 %

Table 2: Newly Introduced Notifiable Disease

22nd – 28th September 2012 (39th Week)

Disease	No. of Cases by Province									Number of cases during current week in 2012	Number of cases during same week in 2011	Total number of cases to date in 2012	Total number of cases to date in 2011	Difference between the number of cases to date in 2012 & 2011
	W	C	S	N	E	NW	NC	U	Sab					
Chickenpox	25	06	12	05	03	05	07	03	04	73	91	3460	3352	+ 03.2 %
Meningitis	04 CB=2 GM=1 KL=1	05 ML=5	02 HB=1 MT=1	00	00	02 KR=2	00	00	04 KG=2 RP=2	12	09	625	682	- 08.3 %
Mumps	07	03	11	03	01	06	06	01	08	46	14	3721	2459	+ 51.3 %
Leishmaniasis	00	00	04 HB=3 MT=1	00	01 TR=1	02 KR=2	02 AP=2	00	00	09	08	803	609	+ 31.5 %

Key to Table 1 & 2

Provinces: **W**: Western, **C**: Central, **S**: Southern, **N**: North, **E**: East, **NC**: North Central, **NW**: North Western, **U**: Uva, **Sab**: Sabaragamuwa.

DPDHS Divisions: **CB**: Colombo, **GM**: Gampaha, **KL**: Kalutara, **KD**: Kandy, **ML**: Matale, **NE**: Nuwara Eliya, **GL**: Galle, **HB**: Hambantota, **MT**: Matara, **JF**: Jaffna, **KN**: Killinochchi, **MN**: Mannar, **VA**: Vavuniya, **MU**: Mullaitivu, **BT**: Batticaloa, **AM**: Ampara, **TR**: Trincomalee, **KM**: Kalmunai, **KR**: Kurunegala, **PU**: Puttalam, **AP**: Anuradhapura, **PO**: Polonnaruwa, **BD**: Badulla, **MO**: Moneragala, **RP**: Ratnapura, **KG**: Kegalle.

Data Sources:
Weekly Return of Communicable Diseases: Diphtheria, Measles, Tetanus, Whooping Cough, Chickenpox, Meningitis, Mumps.
Special Surveillance: Acute Flaccid Paralysis.
Leishmaniasis is notifiable only after the General Circular No: 02/102/2008 issued on 23 September 2008.

Dengue Prevention and Control Health Messages

Reduce, Reuse or Recycle the plastic and polythene collected in your home and help to minimize dengue mosquito breeding.

Table 4: Selected notifiable diseases reported by Medical Officers of Health

22nd – 28nd September 2012 (39th Week)

DPDHS Division	Dengue Fever / DHF*		Dysentery		Encephalitis		Enteric Fever		Food Poisoning		Leptospirosis		Typhus Fever		Viral Hepatitis		Human Rabies		Returns Received
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	%
Colombo	126	7703	3	118	0	8	6	178	2	43	5	158	1	4	0	99	0	5	100
Gampaha	103	6106	0	72	1	13	1	53	13	38	5	195	2	19	5	263	0	0	87
Kalutara	53	2193	3	85	0	4	0	41	0	28	5	200	0	3	0	30	0	2	69
Kandy	27	1949	5	101	0	2	0	20	0	56	1	59	2	101	2	88	0	0	78
Matale	7	426	1	75	0	5	0	9	0	7	0	33	0	3	0	32	0	0	67
Nuwara	9	281	1	161	0	3	0	25	0	8	0	31	1	59	0	18	0	1	77
Galle	8	1242	1	106	0	6	0	12	0	17	1	102	0	61	0	2	0	0	74
Hambantota	7	454	7	37	0	2	0	6	0	30	0	64	2	47	0	19	0	0	75
Matara	42	1362	1	67	0	8	0	19	0	21	6	142	0	68	2	114	0	0	100
Jaffna	17	362	9	157	0	14	2	308	10	81	0	2	0	251	1	16	0	1	92
Kilinochchi	0	69	0	12	0	2	0	28	0	43	0	4	0	29	0	4	0	1	25
Mannar	0	126	5	64	0	4	1	24	0	16	0	22	0	42	0	2	0	0	40
Vavuniya	3	71	0	27	0	21	0	9	2	17	0	18	0	3	0	1	0	0	75
Mullaitivu	0	21	0	16	0	1	0	9	0	3	0	3	0	5	0	1	0	0	20
Batticaloa	5	608	3	200	0	2	0	15	0	307	0	8	0	0	0	7	0	4	71
Ampara	0	122	0	75	0	2	0	6	1	10	0	27	0	0	0	3	0	0	43
Trincomalee	3	128	3	159	0	2	0	16	1	13	0	37	0	17	0	4	0	0	92
Kurunegala	44	1945	5	160	1	15	1	80	2	35	2	124	0	27	2	122	0	4	81
Puttalam	27	1095	0	74	0	7	0	12	0	10	2	36	0	15	0	5		2	67
Anuradhapu	3	304	1	68	0	7	0	13	0	18	0	75	1	23	0	55	0	1	53
Polonnaruw	3	196	2	52	0	2	1	3	0	3	1	44	0	3	0	36	0	1	71
Badulla	11	284	3	102	0	4	0	49	0	3	1	36	2	98	2	40	0	0	82
Monaragala	2	220	3	54	0	4	0	21	0	7	0	60	1	70	3	163	0	2	55
Ratnapura	20	3277	7	187	0	5	0	44	0	12	3	248	0	37	4	99	1	2	72
Kegalle	35	2209	1	54	0	25	0	21	0	10	2	144	1	54	10	479	0	0	91
Kalmune	1	173	3	223	0	9	0	6	0	85	0	8	1	1	3	10	0	3	62
SRI LANKA	**556**	**32926**	**67**	**2506**	**02**	**174**	**12**	**1027**	**31**	**921**	**34**	**1880**	**14**	**1040**	**34**	**1712**	**01**	**29**	**74**

Source: Weekly Returns of Communicable Diseases WRCD).
***Dengue Fever / DHF** refers to Dengue Fever / Dengue Haemorrhagic Fever.
****Timely** refers to returns received on or before 28th September , 2012 Total number of reporting units 329. Number of reporting units data provided for the current week: 248
A = Cases reported during the current week. **B** = Cumulative cases for the year.

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Comments and contributions for publication in the WER Sri Lanka are welcome. However, the editor reserves the right to accept or reject items for publication. All correspondence should be mailed to The Editor, WER Sri Lanka, Epidemiological Unit, P.O. Box 1567, Colombo or sent by E-mail to **chepid@sltnet.lk.**

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