VECTOR BORNE DISEASES AND CLIMATIC CHANGES

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PREVENTION AND CONTROL OF VECTOR BORNE DISEASES IN INDIA

NATIONAL VECTOR BORNE DISEASES CONTROL PROGRAMME (NVBDCP)
- Under Ministry of Health & Family Welfare, Government of India deals with following vector borne diseases
  - Malaria
  - Dengue
  - Chikunguniya
  - Japanese Encephilitis
  - Kala- azar
  - Filairiasis
  - Zika Virus

Website: www.ndvbcp.gov.in
MOH website: www.mohfw.gov.in
MALARIA IN INDIA

Conserving Now, Preserving Future
Malaria mostly concentrated in eastern & NE parts of India

- Northern States and southern states—nearly on elimination phase
- Malaria mostly concentrated in eastern & NE parts of India
DENGUE IN INDIA (2010-2017)

- CFR brought down from 3.3% (1996) to 0.2% in 2016
- States reporting most number of Dengue cases in 2017:
DENGUE IN INDIA (SEASONAL TREND)

No. of Cases

January, February, March, April, May, June, July, August, September, October, November, December

2014, 2015, 2016, 2017
CHIKUNGUNYA IN INDIA

No. of cases

<table>
<thead>
<tr>
<th>Year</th>
<th>Cases</th>
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<tbody>
<tr>
<td>2014</td>
<td>16049</td>
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<tr>
<td>2015</td>
<td>27553</td>
</tr>
<tr>
<td>2016</td>
<td>64057</td>
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<td>2017</td>
<td>18805</td>
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CLIMATIC CHANGES AND VECTOR BORNE DISEASE TRANSMISSION

VBD transmission is dependent upon

- Sufficient numbers of *Anopheline, Culex or Aedes* mosquitoes
- Large enough reservoir of pool of infection in humans and animals

Mosquitoes proliferation strongly influenced by:

- Temperature
- Rainfall
- Humidity
- Wind
- Sunlight
CLIMATIC CHANGES WHICH IMPACT VBD

- Increase in temperature
- Increase in humidity
- Flooding
  - INCREASED MOSQUITOGENIC POTENTIAL
- INFECTON RESERVOIR PRESENT
- FREQUENT OUTBREAKS (Malaria, Dengue, chikunguniya)

Targeted for Malaria Elimination by 2027 GAINS MADE TILL NOW MAY BE REVESRED
CLIMATIC CHANGES IN INDIA

• Melting glaciers-
  Flooding in rivers, valleys followed by diminished flow and droughts

• General warming in mean annual temperature with decreased range of diurnal temperature variation
  Warming of 0.5°C by 2030
  Maximum increase in northern areas of India

• Increased precipitation- including monsoons
  Fewer rainy days but more days of extreme rainfall events
IMPACT OF CLIMATIC CHANGES ON VBD IN INDIA

• Increased number of months of high humidity, precipitation and increased temperature and pooling of water would lead to:
  - Seasonality of VBD may change - Early onset of diseases or maybe through out the year
  - Disease burden may change - Likely higher transmission rates for VBD – severe forms of disease would increase – more Pf malaria
  - Typical preventive measures like LLIN may not work- people may not sleep under them
  - Health services capacities to deal with this increase
  - Quicker onset of drug and insecticide resistance

• Socioeconomic impact
  - Health inequity – poorer more affected
  - Longer duration of hospitalization – out of pocket expenses would increase
  - Impact on tourism
  - Refugees- move towards larger inhabitations – urbanization – poor infrastructure- more Culex mosquitoes– Lymphatic filariasis
  - Deforestation, etc
MITIGATING EFFECT OF CLIMATIC CHANGES ON VBD

1. **Adaptability to adjust to climatic changes**
   - No prediction models available - research needed
   - Longitudinal Studies – changes in VBD based on climatic studies - multi-disciplinary studies
   - Response mechanisms weaker in less endemic areas as of now
   - Shifting of human infrastructure based on endemicity
   - Adding newer skilled staff on environment management in the health programmes
   - Capacity building and sensitization
   - Increased resources – budget and manpower
MITIGATING EFFECT OF CLIMATIC CHANGES ON VBD

2. Monitoring of climatic changes in co-relation to VBD
   - Mapping the present landscape in terms water collections, rivers, lakes, etc.
   - Information exchange on climatic changes – rainfall, humidity, floods, glacier melting, etc. with health programmes especially VBD
   - GIS/spatial maps with climatic changes/water pooling at local levels
   - Monitoring the VBD incidence in northern areas of India – track of any slight increase - involve all facilities government, private, NGOs, etc.
   - Mapping/Monitoring the mobility - intrastate, interstate, etc.
Transmission Windows of malaria based on T & RH (A1B Scenario, by 2030)

By 2030s - Few foci in Himalayan region are likely to open; intensity of transmission more in NE states; reduction in east-coast projected
Transmission Windows of dengue (A1B Scenario)

TW criteria: 20-32°C
Inconclusive, no matching with current distribution
MITIGATING EFFECT OF CLIMATIC CHANGES ON VBD

3. Changes in the approaches to VBD

– Highly skilled manpower in the NVBDCP – capacity to predict changes in climate and VBD
– Enhancement of staff at State/regional/district levels
– Very strong and institutional mechanisms of inter-sectoral coordination
– Newer researches on diagnostics, drug and insecticides and better methods to detect resistance
– Sensitization and capacity building of northern states
– Highly flexible structure – decision making and resource allocation may change from year to year or with an year as well
MALARIA KEEPS COMING BACK – BE PREPARED