DENGUE VACCINE, A PRIORITY FOR GLOBAL HEALTH

No specific treatment against dengue disease
Over 2.5 billion people at risk in over 100 countries

BACKGROUND INFORMATION ABOUT DENGUE

Dengue fever is a mosquito-borne disease caused by four dengue virus serotypes (1 to 4). Overall, the disease is a potential threat to almost half of the world’s population. It is estimated that up to 100 million people are infected annually. Of these people, 500,000 —mostly children—develop dengue hemorrhagic fever (DHF), a severe form of the disease. DHF is a leading cause of hospitalization, placing tremendous pressure on strained medical resources and having a heavy economic and societal impact.

Parents of a child with dengue fever have to deal with the fear their child developing dengue hemorrhagic fever or dengue shock syndrome, which can sometimes lead to death. Parents also face the economic consequences stemming from high medical costs and lost income due to the time spent caring for their sick child.

Many factors have contributed to the re-emergence and dramatic increase in dengue fever including urbanization and increased travel which facilitate dissemination of all four dengue virus serotypes. Despite continued efforts, it is almost impossible to keep the mosquitoes that transmit dengue under control and interrupt transmission over the long-term. In the absence of a specific treatment, an efficacious vaccine to prevent dengue is the only hope to win the fight against the disease.

DISEASE BURDEN

• Up to 100 million people infected annually
• 500,000 people - mostly children - develop dengue hemorrhagic fever (DHF),
• DHF is a leading cause of hospitalization in endemic countries, placing tremendous pressure on strained medical resources.

DISEASE SYMPTOMS

• Dengue clinical symptoms include high fever, severe headache, with or without rash, and possible bleeding complications
• Dengue fever can progress to dengue hemorrhagic fever which can lead to dengue shock syndrome and death.
DISEASE TRANSMISSION AND EXPANSION

- Dengue is caused by one of four variants, or serotypes, of the dengue virus\(^6\).
- Dengue is transmitted by mosquitoes: \textit{Aedes aegypti, Aedes albopictus}
- 1779: first epidemic in Jakarta, Cairo and Philadelphia\(^4\).
- Early 20th century: epidemics in southeast Asia every 3-5 years\(^4\),
- Dengue has increased 30-fold in the past 50 years\(^6\),
- Expansion of dengue caused by
  - Increased mobility and airplane travel\(^7\),
  - Lack of effective mosquito control and growing presence of the vector\(^7\),
  - Major demographic and social changes with unprecedented population growth and massive unplanned urbanization\(^7\)

DENGUE OUTBREAKS

Dengue is a public health priority in many countries of Latin America and Asia where epidemics occur. Continuous up to date information about dengue fever outbreaks is available at www.denguewatch.org, a news hub reporting worldwide alerts on dengue disease provided by the Pediatric Dengue Vaccine Initiative.

EPIDEMIOLOGY

DENGUE IN LATIN AMERICA\(^8\)

Nineteen Latin American countries were certified as dengue free between 1952 and 1965. The first reappearance of dengue fever was recorded in 1968, and by 2007 the disease had once more taken hold in all those countries. In 2008 and 2009, severe dengue epidemics were reported in Mexico, Paraguay, Brazil, Bolivia and Argentina. Many factors have contributed to the re-emergence and dramatic increase in dengue fever including urbanization and increased travel which facilitate dissemination of dengue and the circulation of all four dengue serotypes in the region. On average, the annual economic burden induced by dengue in the Americas is estimated to exceed $1 billion for the 2000-2007 period, from $0.5 billion in a low incidence year (2004) to $2.1 billion in a high incidence year (2007).

DENGUE IN ASIA\(^9\)

More than 70\% of the population at risk for dengue worldwide – around 1.8 billion people - live in the regions of South-East Asia and the Western Pacific. Dengue has also spread throughout the Pacific Island countries (mostly French Polynesia and New Caledonia). Historically, dengue has been reported predominantly among urban and sub-urban populations where high population density facilitates transmission. However, evidence from recent outbreaks, as seen in Cambodia in 2007, suggests that they are now occurring in rural areas.
DENGUE IN THE U.S.

The recent outbreak in Florida (28 cases of locally transmitted dengue recorded in Key West from September 2009 to April 2010)\(^{10}\) shows that dengue can hit the continental U.S. and not only Hawaii or endemic areas in Puerto Rico. An estimated 170 million Americans currently live in areas where the mosquitoes capable of transmitting the dengue virus can be found.\(^{11}\) U.S. travelers to tropical and subtropical areas are also affected with a sharp increase of dengue cases reported in this population in recent years.\(^{12}\)

DENGUE IN EUROPE

Although the last dengue epidemic in Europe occurred in Greece between 1927 and 1928\(^{13}\), dengue remains a threat to Europeans. Today, an estimated 47 million Europeans\(^{14}\) live in areas where the mosquitoes capable of transmitting the dengue virus can be found.

Dengue cases in Europe have been reported by European Union member states either as incidents in overseas territories or importations of dengue fever by infected travelers returning to the EU from endemic areas. In September 2010, for the first time, two indigenous cases of dengue were reported in the south of France.

 References:


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Updated September 2013