

# Dhaka, Bangladesh

## Dengue Outbreak

Anticipatory Briefing Note – 27 April, 2020

### Crisis impact overview

- Dengue fever is an infectious, viral disease that has been reported to be the **fastest growing mosquito borne disease** in the world.
- The recovery period is less than a week; however, in a relatively small proportion of cases the fever develops into severe dengue fever which can then exacerbate the health condition of the infected person to the point of being fatal.
- In Asia, Philippines, Vietnam, Malaysia, Sri Lanka and Bangladesh alone officially reported a total of 603,005 cases, with **Bangladesh showing the highest rate of increase from 2018 to 2019**.
- Bangladesh becomes most vulnerable to dengue during the monsoon season.
- Bangladesh saw its worst year of dengue outbreak in 2019 with **101,354 cases** according to the **official report** by Directorate General of Health Services (DGHS) in 2019 and **156 confirmed deaths** resulting from the disease.
- 61 out of the country's 64 districts have reported cases of dengue. However, **more than 50% of the cases reported were in Dhaka city**. This is especially true for its capital Dhaka which has widespread sources of stagnant water sources in the form of unrecycled plastic wastes, poor drainage systems and poorly managed construction sites.
- In 2020 alone, **292 dengue cases have been reported** so far (Newage Article, April 2020). In the same period last year, the total was 131 cases, signifying **122% increase this year**

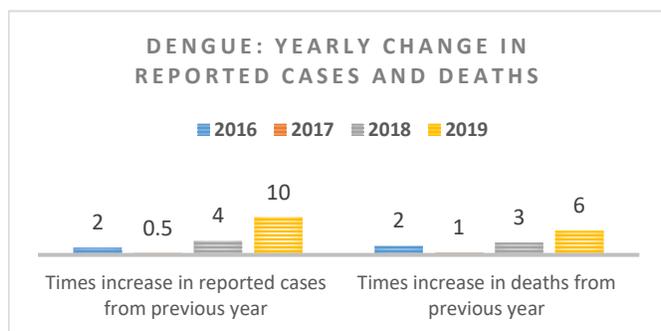


Figure 1 Multiplying factor: Year to year dengue increase

### Key Priorities



#### HEALTH:

- Dengue in COVID 19 context
- Need for awareness
- Need for policy & advocacy



#### LIVELIHOOD

- Financial pressure on HH under poverty for prevention and treatment

### Response Capacity: Government

Following measures have been adopted for prevention:

- Spreading awareness on dengue control mechanisms using news/print media as well as employing volunteers (doctors and medical students) to visit households and educational institutions
- Creating information booklets for Dengue case management and disseminating them amongst key stakeholders
- Conducting surveys to identify wards that have higher risks of becoming breeding grounds
- Identifying and act against misleading viral posts in social media that can spread panic
- Advocating for stronger cleanliness programs in all government offices
- Seeking technical assistance from global experts

Following measures have been adopted for treatment:

- Distribution of dengue kits in all districts
- Extending dengue service/beds in all hospitals
- Instructing all hospitals to open one-stop dengue help desk
- Conducting workshops on dengue management to train doctors, ensuring participation from all districts; Additionally, conducting special trainings for child health care providers (pediatricians and specialists)
- Collaboration with WHO to organize a training session for all entomologists of DGHS

### Anticipated scope and scale

With the outbreak alarmingly on the increase, since 2019, there is scope for a lot of work to be done to provide protection, prevention and treatment against Dengue, in complement to government efforts

### Start Fund Bangladesh

Status of disbursement pot	Updated on
GBP 1,250,067	27 April, 2020

### Humanitarian constraints

This year Dengue outbreak coincides with COVID-19 outbreak. This means the response will be bound by restrictions and safety measures. Additionally, the monsoon season may also hinder movement, especially in urban slums.

## Anticipated Impact

### 1. Health

Health implications of dengue start with the infected person experiencing flu-like symptoms, ranging from mild to moderate. According to World Health Organization (WHO), the disease can be classified into two categories: **Dengue and Severe Dengue**. An infected individual suffering from dengue usually recovers in a week. However severe dengue can exacerbate health conditions to the point of being fatal. **Being exposed to dengue multiple times can increase the risk of developing severe dengue disease<sup>1</sup>.**

For majority, either type of dengue starts with a high fever (40°C/104°F) accompanied by other symptoms such as severe headache, pain behind the eyes, muscle and joint pains, nausea, vomiting, swollen glands and rash. The critical stage usually occurs after 3-7 days of the illness' onset, when infected individual's increased body temperature is coming down. With development of warning signs, severe dengue can then become a potentially fatal complication. Bangladesh saw its worst year of dengue outbreak in 2019 with **101,354 cases** reported officially by Directorate General of Health Services (DGHS) in 2019 and **156 confirmed deaths** resulting from the disease.

Area	Cases reported	Percentage of total
Dhaka city	51,810	51%
Khulna	11,975	12%
Dhaka division (without Dhaka city)	11,743	12%
Chattogram	8,359	8%
Barisal	7,086	7%
Rajshahi	4,814	5%
Mymensingh	2,381	2%
Rangpur	2,175	2%
Sylhet	1,011	1%
<b>Total</b>	<b>101,354</b>	

Table 1 Cases by division DGHS, Bangladesh

### 2. Livelihood

According to leading newspapers such as Prothom Alo and The Daily Star, authorities of the country spent more than half a billion Bangladeshi Taka in 2019 on preventive measures such as fogging and buying insecticides. Yet 2019 saw the worst number of dengue cases as reported by DGHS.

For households, preventive measures are limited to using typical insect repellents such as mosquito coils and aerosols, and the use of mosquito nets during night time. An estimation of the average cost per

household to prevent dengue has been summarized in table 2, using minimum cost figures.

Minimum expenditure to prevent Dengue in a household					
Cost	Minimum Cost	Minimum Quantity needed per HH	Minimum Cost Per Month	Minimum Cost in 6 months (May to October)	% of income for urban HH under poverty (income ≤ 5000)
<b>Aerosol (A)</b>	185	2	370	2220	7%
<b>Mosquito Coil (B)</b>	50	6	300	1800	6%
<b>Mosquito Net (C)</b>	400	1	400	2400	8%
<b>Total (A+C)</b>	*mosquito net has to be a common product in addition to either coil or spraying aerosol		770	4620	15%
<b>Total B+C)</b>			700	4200	14%

Table 2 Analyzing Dengue preventive cost for urban HH under poverty

For households living under poverty in urban areas such as Dhaka, the proportion of income spent on these measures can be financially burdensome. This will especially be observable in slums or informal settlements where majority of the urban poor reside, comprising 34% of urban national population (Floating and Urban slum population, 2005, BBS). Additionally, the dependency ratio in such households is 72.1% (Water and Sanitation in Dhaka Slums, 2018, World Bank) which can further increase financial pressure during the months between May to October, when risks of being infected increases.

Once infected, the impact on livelihood can further magnify as additional expenditures from income will be needed for accommodating medical treatments. For patients who are hospitalized, although government owned hospitals provide free services, additional tests and medication can amount to **BDT 5000 per patient**; other related costs will include transportation cost and food cost. Moreover, government owned hospitals can quickly become overcrowded when infected Dengue people peak, making it inevitable for patients to seek treatment at private hospitals. Here, bills can range from BDT 50,000 to BDT 150,000 for an average Dengue infected individual. (Independent Study by Professor Syed Abdul Hamid, former director of the Institute of Health Economics, published by Prothom Alo).

<sup>1</sup> Halstead, S. B. Dengue hemorrhagic fever: Two infections and antibody dependent enhancement, a brief history and personal memoir. Revista Cubana de Medicina Tropical 54, 171–179 (2002).

3. **Education**

Children and youth affected by dengue will need to stay indoors until they are completely healed in order to avoid spreading the disease, and also to reduce risk of developing severe dengue. During the days up to recovery, absence from educational institutions may hamper the individual’s progress in academia.

**Vulnerable groups affected**

The most vulnerable groups include:

1. Urban population residing in informal settlements where majority live under poverty and in environments that can easily become breeding grounds for Aedes mosquitoes; Slums have poor WASH facilities which means water from Monsoon rainfall can easily accumulate in the form of puddles and around poorly maintained latrines. Additionally, since these settlements are over-crowded, transmission of the disease can occur quite rapidly from household to household.
2. Dependents, comprising of children below the age of 15 and adults above the age of 65, will need additional care when suffering from the disease due to their weaker immune systems. Since this is a non-income generating group, financial responsibility can become a burden for the household
3. Previously infected individuals who have countered the disease once, are at higher risk of developing severe dengue<sup>2</sup>

**Aggravating factors**

1. **Environmental challenges**

Multiple studies now indicate that climate change, specifically rainfall, humidity and temperature are linked to higher occurrences of Dengue outbreaks. The climatic conditions bring about longer breeding spells for the mosquito species that carries the virus, shortening disease incubation times.

- Higher temperatures has been associated with increasing rate of larval development and shortening the emergence of adult mosquitoes; Moreover, it even increases the biting rate of mosquito and reduces the time required for virus replication within the mosquito.
- Relative humidity is also another factor that stimulates different stages of mosquitoes’ life. Also known as vapour pressure, this refers to a combination of rainfall and temperature. Annual average relative humidity has been found to be the

most influential in predicting global dengue occurrence.

Together, temperature, relative humidity and rainfall have a direct effect on the survival rate of the mosquito, and the probability that it will become infected and be able to then transmit the disease. Similarly, as indicated by Figure 2, highest number of dengue cases were reported a month after the country experienced the highest amount of rainfall. This trend can also be observed for the previous 4 years.

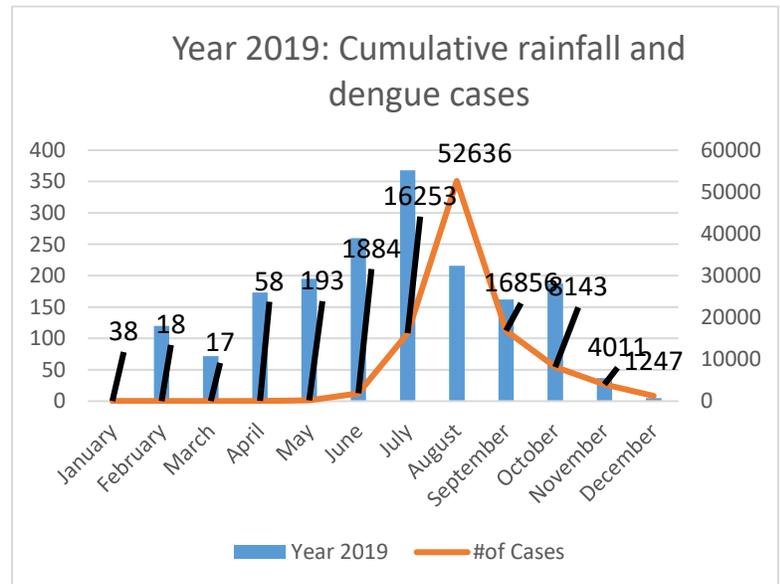


Figure 2 Rainfall against reported dengue cases; developed by Forewarn Bangladesh, Start Network

2. **Unplanned urbanization leading to poor WASH facilities**

- Waste management

The need for proper waste management has been echoed repeatedly by multiple stakeholders from multiple sectors. In addition to imposing various health hazards, unrecycled waste is also linked to dengue outbreak as these become breeding grounds for Aedes mosquitoes after rainfall.

The Monsoon Aedes Survey 2019 conducted by DGHS identified different types of unrecycled containers that hold stagnant water and become responsible for the proliferation of Aedes mosquitoes. **Among the containers, 22.90% were tires where larvae of Aedes mosquito were found in large numbers**, and 11.29% were flooded floors (basements or otherwise) that were the next most common breeding grounds for the vector.

<sup>2</sup> IgG antibodies to dengue enhanced for FcγRIIIA binding determine disease severity. *Science*, 2017; 355 (6323): 395 DOI: 10.1126/science.aai8128



- Over-populated cities

Bangladesh is the eighth most populated country in the world, with its capital being the sixth most densely populated city globally. Dhaka’s overcrowded population tied with unplanned urbanization, including poor waste management and inadequate drainage system, has resulted in making the city an easy means of spreading vector borne diseases, including Dengue. **According to DGHS health bulletin, a survey conducted found overcrowded places such as government medical institutions, bus terminals and informal settlements to have a Breteau Index > 80,** meaning there were more than 80% of these areas have tested positively for presence of breeding grounds.

- Construction sites

Construction sites are very widespread in urban cities of Dhaka and Chattogram. These sites, however, are poorly maintained with authorities taking little responsibility in ensuring safety and cleanliness until the completion of the projects. As a result, open areas that can easily store stagnant water, especially during monsoon, become prominent. Subsequently these become breeding grounds for Aedes mosquitoes, increasing the risk of massive dengue outbreak following periods of prolonged rainfall.

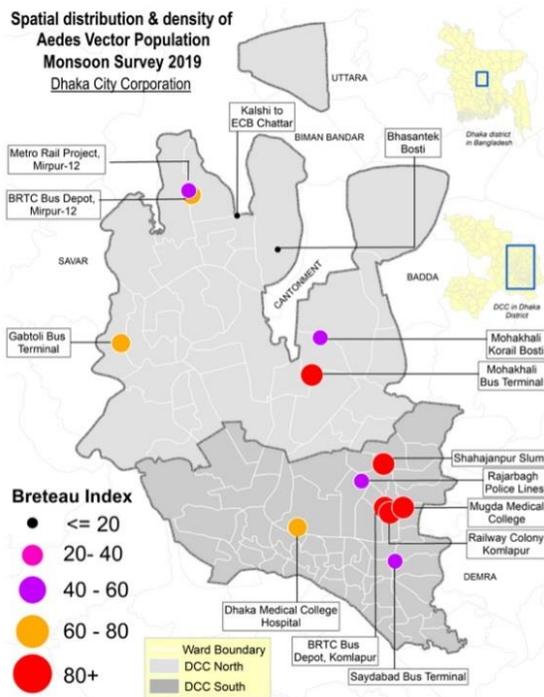


Figure 3 DGHS Findings on August 2019

Accordingly, a survey conducted by DGHS found that buildings that are under construction are increasingly becoming nesting sites for mosquitoes.

The survey was conducted in 100 neighborhoods in 98 wards under the two city corporations, taking into account a thousand households and structures in Dhaka.

The report’s findings showed that 36% of residences in Dhaka South City Corporation (DSCC) and 32 percent in Dhaka North City Corporation (DNCC) had a ‘house index’ rating of 10, with the rating likely to become applicable for more proportion of houses (up to 80% of houses) during monsoon season. The study found that more than 40% of these houses had ongoing construction work where water-filled barrels, lying around unattended, posed the most risk of becoming breeding grounds for mosquitoes.

On the other hand, the mega metro-rail project that is currently under construction on the main street from Dhaka’s main airport to business hub Motijheel also showed similarly poor maintenance. Parts on the street that have already been dug for this project are vulnerable as rainwater is stagnated in many holes in these sites (News article on Bangladesh Dengue, 2019, Anadulo Agency).

### Lessons learnt

- Dengue surveillance has been vital for successfully controlling the outbreak. According to a (CDC report, August 2019)
- Redirecting public health resources from vector control campaigns, which had repeatedly been shown to be ineffective, and instead using those to conduct nationwide clinical trainings have been seen to be more effective in other countries that have successfully reduced the deaths by dengue every year. (Lessons learned from dengue surveillance and research, CDC, 2019)
- Both the mosquito species and infected people are necessary for continued transmission. Areas with dense populations near breeding sites require interventions to minimize transmission (The American journal of tropical medicine and hygiene, January 2004)
- Piped water supply, drainage and adequate sewage disposal are unevenly distributed throughout Dhaka city, all of which can have an effect on dengue transmission. (PLOS Research Article on Dengue, March 2017). These can be solved through simple coordinated interventions by DGHS and city corporations, complemented by other CSOs.
- Communities can also play a major role in ensuring the control and prevention of the outbreak. (The Daily Star, August, 2019)