Unprecedented Activities and Thumping Achievements of the Health Department of Kolkata Municipal Corporation in Terms of Prevention and Control of Malaria and Dengue (During June 2010 to May 2014)

MALARIA and DENGUE are age-old public health problems in Kolkata. Anopheles stephensi is the principal transmitter of malaria here and dengue is spread by Aedes aegypti and Aedes albopictus. For successful prevention and control of these mosquito-borne diseases, the Health Department of KMC undertook various unprecedented initiatives during June 2010 to May 2014 and successfully implemented them under the stewardship of SHRI ATIN GHOSH, Honourable Member of the Mayor-in-Council (Health & Engineering). A brief overview of the activities carried out by the department and achievements made so far is here:

A. UNPRECEDENTED ACTIVITIES: The following initiatives were undertaken and successfully implemented under the stewardship of the Hon’ble Member of the Mayor-in-Council (Health & Engineering), SHRI ATIN GHOSH.

1. Establishment of a Mosquito Research Laboratory: In August 2011, a Mosquito Research Laboratory was set up at the Vector Control Department on 149 AJC Bose Road in Kolkata-700014 (PIX 1). This is a first-of-its-kind laboratory in Eastern India.

2. Establishment of Five Dengue Detection Centres: Blood-test done at a private pathological laboratory in Kolkata City for dengue NS1 antigen or dengue IgM antibody costs Rs. 700 to Rs. 1200. For many people, the rate is unaffordable. To help financially weaker section of the city, people get their blood-test done free of cost, Mr Ghosh established 5 dengue detection centres (DDCs) in different areas of the city back in March 2011 (PIX 2). In each DDC, blood-test for dengue is done by a most reliable method called ELISA (Enzyme-linked Immunosorbent Assay). Pertinently, people of Kolkata have been getting free facilities for platelet count too from different malaria clinics of KMC (140 in all) since March 2011.

3. Dissemination of Dengue-report Through SMS Alert: Since 12 September 2013, each Dengue Detection Centre of KMC has been sending blood-test reports to the patients and concerned health officials of KMC through an SMS alert whenever the test results are available. Relevant software has been installed in all the five DDCs to provide this service to the people of Kolkata free of cost. This information-disseminating system of KMC is comparable with the SMS info in case of bank transaction. This is a HISTORIC INITIATIVE in the field of Dengue Prevention programme in India and many other countries around the world.

4. Disease Surveillance System Strengthened: In March 2014, one person in each ward of KMC was designated to collect daily report on malaria/dengue from different non-KMC sources such as hospitals, nursing homes and pathological laboratories located in the ward. Introduced by Shri Atin Ghosh, this information-collecting mechanism is help the department in making assessment of the city’s actual burdens of malaria and dengue; besides aiding the KMC’s vector control squads undertake preventive measures soon after the occurrence of a case of malaria/dengue anywhere in the city of Kolkata.
5. **Plying of Speedboats along Canals for Destruction of Mosquito Larvae:** From November 2010 to April 2012, a programme of plying speedboats along the canals was undertaken to prevent breeding of *Culex* mosquito (PIX 3). Two speedboats plied the Beliaghata Canal (up to 3 km) and two Tolly’s Nullah (up to 4 km) for 6 days a week. The drive yielded commendable results. Before the commencement of the programme, the average larval count of *Culex* mosquito per dip in both the canals varied from 293 to 2942. Within one month after the beginning of the programme, the larval count slumped to 4-75 per dip. Similarly, the average count of *Culex* pupae per dip before the programme was 107 to 1457; the figure came down to zero to 15 after the beginning of the programme.

6. **Larvicidal Spray along Canals by Using Rowing-Boats as Transport:** To prevent breeding of *Culex* mosquito, the department has been carrying out larvicidal spray along different sewerage canals since March 2011 by using small rowing-boats as transport (PIX 4). Results obtained so far are highly intriguing.

7. **Formation of 21 Rapid Action Teams for Vector Control:** To monitor vector control activities in different wards of KMC and undertake contingency measures for prevention of mosquito-borne diseases, the health department has formed 6 Central Rapid Action Teams (CRATs) — 4 CRATs were formed in December 2010 and 2 CRATs in September 2011. Each CRAT comprises 10-12 trained field workers (PIX 5). In March 2013, fifteen (15) Borough Rapid Action Teams (BRATs) comprising 6 trained field workers each were formed and placed at different boroughs @ 1 BRAT per borough (PIX 6). A hired vehicle has been provided to each of these **21 Rapid Action Teams** for its mobility.

8. **Drive for Destruction of Mosquito Larvae Undertaken since January:** During the dry winter season (November-February) — when the city’s environment remains less conducive to the breeding of vector mosquitoes — uncovered overhead water tanks, accumulated seepage water on rooftops, water storage containers at construction sites, sumps and other such places act as the main breeding sources of *Anopheles stephensi* and *Aedes aegypti* (vectors of malaria and dengue respectively). These sources are called **Mother Foci** of these vector mosquitoes. The drive for destruction of the **Mother Foci** begins in January every year and this has been the practice since January 2011 throughout the year. The Hon’ble MMIC (Health & Engineering), Shri Atin Ghosh, himself has joined such drive many a time accompanied by the officials of different concerned departments of KMC, including the Health Department (PIX 7).

9. **Borough-level Review Meeting on Vector Control Held During 2013:** To review vector control activities in different wards of KMC, the Hon’ble MMIC (Health & Engineering) held meeting in each borough involving borough chairman/chairperson, ward councillors, ward Medical Officers, Consultant Entomologist, borough VCI, ward VCIs and staff of other concerned departments such as Building, Solid Waste Management, Water Supply and Engineering. These borough-level meetings were held during June to August 2013.

10. **Efficient Non-medical Staff Assigned with Vector Control Responsibilities:** To step up vector control activities in all the 144 wards of KMC, one staff at ward level and one staff at borough level were designated to work as the ward Vector Control Incharge (Ward VCI) and borough Vector Control Incharge (Borough VCI) respectively. This infrastructural changes were
made by the department in March 2013, following the instructions of the Hon’ble MMIC (Health & Engineering).

11. **Ward Medical Officers are Looking After Mainly the Clinical Aspects of Mosquito-borne Diseases:** The ward Medical Officers — who had been overseeing vector control activities in different wards of KMC since 1997 — have been looking after only the clinical aspects of malaria/dengue — including collection of reports on malaria/dengue from non-KMC health establishments such as hospitals, nursing homes and private pathological laboratories located their wards.

12. **Data on Mosquito Breeding Sources is Now Recorded on a daily basis in Each Ward:** Information regarding mosquito breeding sources — including their type, addresses, type of mosquito larvae detected in them (*Anopheles/Aedes/Culex*), measures undertaken by the field workers for destruction of mosquito larvae, etc — is now recorded in each and every ward of KMC on a daily basis, as per the **FORMAT** prepared by Entomologists of the department. Field workers apart, 15 Borough RATs and 6 Central RATs too record the findings of their inspection/field visits as per the entomological **FORMATS** provided by the Vector Control Department.

13. **A 9048-page Data Bank on Permanent Potential Mosquito Breeding Sources Prepared in June 2014:** A first-of-its-kind **data bank** on permanent potential mosquito breeding sources has been prepared by the Vector Control Department to streamline the activities for detection and destruction of mosquito larvae all across the KMC area. The **DATA BANK** consists of 9048 pages containing information regarding prevalence of different kinds of potential mosquito breeding sources in all the 144 wards of KMC together with their addresses. These data were collected during 2013 by using a format prepared by Entomologists of the department. This is a historic initiative and no other municipal corporation in India has created such **data bank** yet. This **data bank** will help streamline source elimination drive in each and every ward of KMC. The **data bank** was released by the Hon’ble city Mayor, Shri Sovan Chatterjee, on 17 July 2014 in presence of media persons in the conference room no 1 of KMC. The press-release programme was convened by the Hon’ble Member of the Mayor-in-Council (Health & Engineering), Shri Atin Ghosh (**PIX 8**).

### B. AWARENESS-RAISING ACTIVITIES

- **A Musical Audio CD** containing a song on prevention of mosquito-borne diseases was prepared by the health department in August 2010 and played on 9 FM channels for 1-2 months each year. **A Video CD** containing the same educative song was played on 10-11 popular TV channels for 2 months in 2011 — one month in 2012 and one month in 2013.

- **Campaign by using Audio and Video Mobile Vans:** 6 Audio and Video Mobile Vans were plied around the city for two consecutive months in 2010 — October and November — covering almost all the wards of KMC.

- **Flex-Boards** specifying **do’s** and **don’ts** for prevention of mosquito-borne diseases were put up on 4000-5000 hired auto-rickshaws and they plied on different routes of the city in September-October every year during 2010, 2011 and 2012, covering almost all the wards of KMC.
Multilingual Leaflets — 500,000 leaflets on malaria and 400,000 on dengue — were distributed among the citydwellers each year during 2010-2013. Distribution of such leaflets is still going on. Before 2010, the health department of KMC used to print black-and-white leaflets — either in Bengali or in Hindi or in English — and distribute them at random. People whose mother tongue is English could not read the leaflets printed in Bengali. Similarly, the Bengali-knowing people could not read the leaflets printed in English. To resolve the problem, multicoloured and multilingual leaflets carrying the same 2-3 messages printed in four different languages — Bengali, English, Hindi and Urdu — were printed and distributed by the health department at the behest of MMIC (Health & Engineering). The leaflets proved immensely helpful (PIX 9 and PIX 10).

In 2011, as many as 3 lakh 25 thousand copies of a Multicoloured Booklet on mosquito-borne diseases of Kolkata and their prevention — Bengali-1 lakh 50 thousand copies, English-1 lakh, Hindi-50 thousand and Urdu-25 thousand) — were distributed among the students of 701 schools of the city (PIX 11). This sort of booklet has not been brought out by any Municipal Corporation around the world.

Multicoloured Flex-Banners — 40 banners per KMC ward during 2012 and 140 banners per ward during 2013 — were put up around the city to let the fellow-citizens know about the preventive measures against mosquito-borne diseases and the addresses of the KMC-run malaria clinics/health centres in their wards (PIX 12). In 2012 and 2013, in all 6,000 and 20,000 such banners were put up in different wards of KMC to increase people’s awareness. To help people understand the messages, the banners were prepared in three different languages — Bengali, Hindi and Urdu.

3500 Colourful Banners containing do’s and don’ts for prevention and control of malaria and dengue were put up at several Durga Puja Pandals around the city. This apart, 1500 educative audio CDs on mosquito-borne diseases were sent to the secretaries of different Durga Puja Committees to play them on Puja Pandals during the Puja Days.

780 Multicoloured Hoardings (8 ft x 6 ft each) were put up around the city during March to August 2013. Earlier, the KMC would put up 10-15 hoardings every year for publicity campaign (PIX 13).

500 Awareness Meeting involving ward councillors and local people were organised during 2013 (@ 3-5 meetings per ward).

A Comprehensive Booklet containing information about the measures needed to prevent mosquito-bites, mosquito breeding and spread of mosquito-borne ailments — together with the addresses of KMC-run malaria clinics and dengue detection centres — was brought out in April-May 2013 in 3 different languages (Bengali, Hindi and Urdu). In all 3,00,000 copies of the booklet were distributed among the city-dwellers through ward councillors (PIX 14).

Auto-miking was done for 2-3 months in each ward every year (PIX 15).
In July and August 2013, antimalaria and antidengue messages were disseminated through Electricity Consumption Bills issued by the Calcutta Electric Supply Corporation Limited. Around 5,00,000 people received the bills in each month.

A first-of-its-kind Documentary Film of 17-minute duration, prepared on prevention of mosquito-borne diseases by the department in June 2013, was shown around the city for two months — August and September — using two publicity vans each fitted with a mobile LED Digital Screen (PIX 16).

Nineteen Awareness Camps were organised for 1 month during September-October in 2010. In 2012, twelve camps were organised for 3 months from August to October. In 2013, seventy-six awareness camps were organised for one month in September, 16 of them were service-oriented health camps and 60 were awareness kiosks.

Workshops for Practising Primary Care Physicians: To help them brush up their knowledge-base regarding the national guidelines on diagnosis, treatment and case management of malaria and dengue, two workshops were organised for the primary care physicians of the city of Kolkata. One workshop was organised on 13 January 2013 at Rabindra Sadan (PIX 17) and one workshop at Uttam mancha on 18 January 2014 (PIX 18). Experts from both the Directorate of NVBDCP and state health department were the main speakers in these workshops. On 18 January 2014, Dr. AC Dhariwal, Director of NVBDCP, was the main speaker in the workshop. He talked about diagnosis, treatment and prevention of dengue and malaria. On an average, 400 physicians participated in each workshop.

Workshops for Ward Councillors and Ward MOs: To trigger interests among the ward councillors about vector control, two workshops were organised for ward councillors and ward MOs of KMC — one on 14 January 2013 at Swabhumi (PIX 19) and one on 11 January 2014 at Town Hall in Kolkata (PIX 20). Higher health officials from the Directorate of National Vector Borne Disease Control Programme, Government of India, were present in the workshop as resource persons. Measures needed to prevent mosquito breeding in urban areas were discussed in the workshop.

Honorary Health Workers — 5 to 6 health workers per ward — made house visits to collect information about fever cases and spread IEC materials among the people. In 2012, house visits by honorary health workers continued from September to December. In 2013, the visits began in February and continued till December. In 2013, instructions to start house visits from February came from the Hon’ble chief minister of the state of West Bengal.

House Visits were made by 100 days workers deployed by ward councillors under the West Bengal Urban Employment Scheme (12 workers per ward) to step up awareness campaign. The campaign by 100 days workers began in March 2013 and continued till December.

C. ACHIEVEMENTS AT A GLANCE

Appraisal from the World Health Organization: The sparkling success of KMC in terms of malaria prevention has lapped up commendable appraisal from the World Health Organization.
In an alert issued to travellers through its bulletin “International Travel and Health 2012 (PDF format)” (vide WHO-OMS-.htm; p. 219-20), the WHO has said: “Risk of falciparum malaria and drug resistance in Kolkata is relatively lower than in the other places of the state of West Bengal.”

- **Appraisal from the Directorate of NVBDCP, Government of India:** The Hon’ble MMIC (Health & Engineering), Shri Atin Ghosh, was invited by the Director of NVBDCP to deliver a speech on activities of the health department of KMC with regard to malaria control at a National Review Meeting on Malaria organised by the Directorate of NVBDCP, Govt. of India, located on 22 Sham Nath Marg in Delhi-110054 on 28 and 29 June 2012 (PIX 22).

- **Global recognition for mosquito research:**

  1. **Publication of a paper in the Journal of Queen Elizabeth II:** Turbulent waves generated by plying two speedboats each along the Beliaghata Canal and Tolly’s Nullah during November 2010 to April 2012 helped reduce both the larval and pupal densities of Culex mosquito. This is a first-of-its-kind work in the world. Findings of the study were published in the March 2013 issue of the “Transactions of the Royal Society of Tropical Medicine and Hygiene” (Volume 107; Page No. 147-151) — a journal of international repute published from London, United Kingdom, under the chief patronship of Queen Elizabeth II (PIX 23).

  2. **Publication of a paper in the Journal of World Health Organization:** In a study involving 414 students of class X belonging to 14-16 years age group, a questionnaire containing 28 questions on mosquitoes and mosquito-borne diseases, having three options for each, was circulated. Based on the answers given by the students, their perception about the subject was evaluated. Findings of the study were accepted and published by the World Health Organization in its journal Dengue Bulletin in December 2011 (Volume 35, P. 223-230).

  3. **Publication of a research paper in a USA-based journal:** In the past, the dengue-bearing mosquito Aedes aegypti used to breed more indoors — mostly in small uncovered masonry tanks used for water storage indoors. It now breeds more outdoors. Ecological compulsion created by the city-dwellers through periodic emptying and cleaning of their masonry tanks and other indoor water storage containers following the KMC’s intensive mass awareness campaigns over the past several years, seemed to have compelled Aedes aegypti to shift its breeding sites from indoors to outdoors for its better survival in the city’s environment. Finding of the study have been published in the March 2014 issue of the Current Urban Studies — an internationally famous journal published online from the USA (Volume 2, P. 57-61, http://dx.doi.org/10.4236/cus.2014.21006) (PIX 24).

  4. **Publication of a research paper in a journal of the Indian Council of Medical Research:** In a study done by the Entomologists of KMC, Anopheles stephensi (city’s prime vector of malaria) was found to breed more in rainwater containers than in chlorinated water containers. Findings of the study were published in the March 2011 issue Journal of Vector Borne Diseases (PIX 25).
Notable impact of larvicidal spray along sewerage canals using rowing-boats as transport: Impact of the larvicidal spray is great. The densities of *Culex quinquefasciatus* larvae in all the canals, expressed in terms of the number of larvae per dip, have decreased considerably. People living in these 43 wards by and large are getting benefits of the programme: Ward 12, 13, 14, 15, 28, 29, 33, 34, 35, 36, 57, 58, 74, 79, 80, 81, 82, 89, 97, 98, 100, 101, 102, 103, 104, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 123, 124, 132, 140, 143 and 144. According to Dr. GS Sonal, Additional Director of NVBDCP, the mosquito control programme of KMC involving larvicidal spray along canals by using rowing-boats as transport is brilliant and it’s unquestionably a first-of-its-kind project in the country.

Phenomenal achievement in terms of malaria containment: Going by reports of both KMC and non-KMC sources, as many as 103236 cases of malaria were reported from the city in 2010. In 2011, the figure came down to 44011, suggesting 57.4% decline in the number of malaria cases in a span of only one year. The number of PF cases came down to 4507 in 2011 from 15120 in 2010 (reduction by a margin of 70.2% (Table 1). The story of success continued down the years. In 2012, altogether 31772 cases of malaria — including 3242 PF cases — were detected by KMC and non-KMC clinics. In 2013, the figure came down to 15656 — including 926 PF cases.

Events of death due to malaria have stopped in our KMC area. In 2010, one person died of falciparum malaria in the city. But, in the past three years — i.e. in 2011, 2012 and 2013 — there has been no death here due to malaria.

Commendable success in terms of dengue prevention: Achievement in terms of dengue prevention too is highly commendable. In 2012 — due to some unprecedented changes in the breeding habits of the dengue-bearing mosquito *Aedes aegypti* — an outbreak of dengue involving 1852 cases with 2 deaths had occurred in the city. In 2013, the number of dengue cases came down to a mere 238 with no death.
Table 1: Malaria scenario in KMC area during 2010-2013

<table>
<thead>
<tr>
<th>Year</th>
<th>Detection of malaria cases at KMC and non-KMC health establishments such as hospitals, private pathological laboratories</th>
<th>SPR (%)</th>
<th>No. of malaria cases per 1000 people</th>
<th>Death</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Malaria clinics of KMC</td>
<td>Hospitals and private pathological laboratories</td>
<td>Grand total</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PV</td>
<td>PF</td>
<td>PV</td>
<td>PF</td>
</tr>
<tr>
<td>2010</td>
<td>82467</td>
<td>14226</td>
<td>5649</td>
<td>894</td>
</tr>
<tr>
<td>2011</td>
<td>37442</td>
<td>4200</td>
<td>2062</td>
<td>307</td>
</tr>
<tr>
<td>2012</td>
<td>26172</td>
<td>2772</td>
<td>2358</td>
<td>470</td>
</tr>
<tr>
<td>2013</td>
<td>12882</td>
<td>684</td>
<td>1848</td>
<td>242</td>
</tr>
</tbody>
</table>