16th International Course on Dengue, Zika and other Emergent Arboviruses
12 - 23 August 2019
Institute of Tropical Medicine “Pedro Kouri”, Havana, Cuba

COURSE SUMMARY

The geographical expansion of *Aedes aegypti* and *Aedes albopictus* preceded dengue emergence due to the impact of increasing urbanization of the human population and climate, social and environmental changes. These conditions not only favored dengue expansion but also the emergence of chikungunya and Zika, as well as the re-emergence of yellow fever. The co-circulation of these arboviruses poses new challenges to global public health.

The PAHO/WHO Collaborating Center for the Study of Dengue and its Control of the Institute of Tropical Medicine “Pedro Kouri”/MINSAP, the Cuban Society of Microbiology and Parasitology, the Cuban Ministry of Public Health and PAHO/WHO among other institutions, organizations and scientific societies organized from 12 – 23 August 2019, the 16th International Course on Dengue, Zika and Other Emergent Arboviruses. As in previous occasions, the course was developed at the facilities of the Institute of Tropical Medicine “Pedro Kouri”.

Participants were updated on the regional and global arbovirus epidemiological situation, the clinic, laboratory diagnostic, vaccine development, the new tools for vector control, the surveillance, the emergency response, the new international initiatives among other interesting and important topics.

The course was a forum for the discussion and exchange of ideas and experiences on the most update information on Dengue, Zika, Chikungunya and Yellow fever including the new challenges and strategies for its control.

In this occasion, the course was organized in the framework of the 500th Anniversary of the ¨Villa San Cristobal de la Habana¨.

The current edition was organized under the auspices of the Cuban Ministry of Health, the Cuban Society of Microbiology and Parasitology (SCMP), Pan American Health Organization (PAHO)/ World Health Organization (WHO), Cuban Academy of Sciences (ACC), American Society of Microbiology (ASM), American Society of Tropical Medicine and Hygiene (ASTMH), Asociación Latinoamericana de Inmunología (ALAI), Atlantic Philanthropies, Centro de Ingeniería Genética y Biotecnología (CIGB), European Society of Clinical Microbiology and Infectious Diseases (ESCMID), Fundación Mundo Sano, Institute of Tropical Medicine, Belgium, Labiofam, MedicubaEuropa, Neglected Tropical Disease Program (NTDP-WHO), Organización Internacional de Energía Atómica(OIEA), Special Programme for Research and Training in Tropical Diseases, TDR, and the research projects ZIKAlliance and ZikaPLAN.
During the theoretical course (12-16 August), 25 lectures, 3 round tables, 7 symposia and 1 panel were developed (tables 1 and 2) updating the participants among the most important aspects on these arboviruses.

The practical course (August 19 to 23) allowed participants to debate important aspects on the clinic and pathology, diagnostic-immunology, vector-entomology, epidemiology, social determinants-community participation and for the first time in the course the use of SIT. Participants were grouped in six.

The practical group of epidemiology worked on the modeling of the dynamic of dengue (and other flaviviruses) transmission, the usefulness of Alert and Early response systems as well as the Cost Effectiveness estimations of the interventions against flaviviruses/arboviruses and vector control among other topics.

During the virology-immunology practices, the molecular diagnosis of arboviruses, the detection of dengue virus in several clinical samples including tissues as well as mosquito pools, the complexity of flavivirus serology and the usefulness of NGS for the genetic characterization of isolates were updated. Other topics were the study of activation markers expression of human monocytes for flavivirus pathogenesis research as well as the gene cloning.

The clinic of dengue, zika and chikungunya, the differential diagnosis, the usefulness of the warning signs for dengue, chronic chikungunya, the implications of the arbovirus infections during pregnancy were updated through presentations and case discussions at the clinic-pathology group.

The practices at the Entomology-vector control group included the identification of bacteria entomopathogens for the quality control of biolavicides, Detinova technique (to determine the physiologic age of *Aedes aegypti*, and its relationship to dengue transmission and the effectivity of the vector control methods), the determination of *Aedes* vector competence for dengue viruses, *Ae. Aegypti* insecticide resistance and the use of MALDI-TOF for the identification of mosquito species.

Social determinants-community participation practices addressed on the methodological aspects to approach social determinants within the prevention and control strategies for dengue and other arboviruses. Practical examples were discussed.

A theoretical and practical course was developed under the auspices of the OIEA, with experts from de Italy, Brazil and Cuba as well as participants from Chile, Turkey, Mauritius, Greece, Sudafrica, Brazil and Cuba. The technological process was afforded with experiences exchange and equipment and procedures achievements. IPK labs for SIT were visited as well as the irradiation plant of the Centro de aplicaciones tecnológicas y desarrollo nuclear (Ceaden).

Also for the first time, a Videoconference on Clinical Dengue Management to clinicians of the Cuban Health System was developed on Thursday 15 at the HQ facilities of the Ministry of Health.

Finally, a poster session on August 14 and 15 allowed participants to share their results and experiences. In total, 36 posters were presented by participants from 12 countries (Austria, Belgium, Brazil, Canada, Colombia, Congo, Cuba, Germany, Mexico, Peru, Poland and USA).
In the framework of the course, 2 expert meetings were organized:

- **TDR-CARPHA-IPK Workshop on Multisectoral approaches for prevention and control of Vector-Borne diseases in the Caribbean**, on August 8-9 with 21 participants from 16 Caribbean countries. The need and usefulness of the introduction of a multisectoral approaches on VBDs prevention and control and the best way to implement in the Caribbean countries were discussed.

- **Dentarget meeting**, on 17, 19 and 20 of August with 27 participants from 6 countries. Results from multicountries research focused on the identification of hot spots of arbovirus transmission for the design and evaluation of more efficient control interventions and early response were discussed.

### Participants

**240 participants, 128 from Cuba and 112 from 39 countries from the Americas, SEA, Europe and Africa.** The biggest delegations were from Colombia (14), Argentine (9), USA (8), Aruba (8), Chile (7), Mexico (7) and Brazil and Peru with 6 students each. 50% of foreigner participants and the total Cubans attended both the theoretical and the practical courses.

Professors and speakers from prestigious institutions dedicated to Dengue, Zika, Chik and YF study attended the course, 51 from 14 countries and organizations and 77 professors and collaborators from Cuban institutions (see below).

In total, **368 specialists** participated in some of the course and side activities, from them, 163 foreigners from 40 countries (Americas, Europe, South East Asia and Africa) and 205 Cubans.

Aliam labs solutions, Altona Diagnostics (GmbH), Bayer, Bio Lab International, Chemikon, Fitogranos (Ltda), Mikrogen and Takeda, collaborated for the well execution of the course.

Figure records the number of participants (**3186** participants, **1533** Cubans and **1653** foreigners) and countries (79) since the first dengue international course edition in 1987 (1987-2019).

The Organizer Committee of the 16th edition of the Dengue International Course thanks all participants, professors, institutions, scientific societies and organizations for their collaboration in the well execution of the course. The 17th edition will be held on August 2021.

PROFESSORS & FOREIGN SPEAKERS

Mayra Aguiar, Universidad Trento
Sylvain Aldighieri, OPS/OMS
Kevin Arien, Instituto de Medicina Tropical de Amberes, Bélgica
Fabrizio Ballestrino, OIEA, Italia
Koen Barrholomeeusan, Instituto de Medicina Tropical de Amberes, Bélgica
Gilberto Beitia, BioLab SA
Haroldo Bezerra, OPS/OMS
Mabel Carabali, Universidad de McGill, Canadá
Fabio Castello Branco, FIOCRUZ, Brasil
Azael Che, UADY, México
Chong Chee Seng, NEA, Singapur
Kay Choi, UTMB, EUA
Alex Cook, NUS, Singapur
Mustapha Debboun, Harris County Public Health, EUA
Delia Enria, Argentina
Florence Fouque, TDR-WHO
Leticia Franco, OPS/OMS
Mariano A. García-Blanco, UTMB, EUA
Maylen Gómez, Brazil
Luis Gutiérrez, OPS/OMS
Lee Han-Jung, TAMU, EUA
Nildimar Honorio, Instituto FioCruz, Brazil
Olaff Horstick, Heidelberg University, Germany
Hans Kuhn, Altona Diagnostics, Alemania
Xavier de Lamballerie, Universidad de Aix-Marsella, Francia
Linda Lloyd, EUA
Felipe Lorenzato, Takeda
Kleber Luz, Universidad Federal Rio Grande Du Norte, Brasil
Pablo Manrique, UADY, México
Jairo Méndez, OPS/OMS
José Moya, OPS, Cuba
Jorge Osorio, Universidad Wisconsin, EUA
Christopher Oxenford, OMS
Carlos Pardo, Johns Hopkins Neurology, EUA
Andre Rivas, Facultad Medicina Campinas, Brasil
Raúl Rojo, Secretaría Salud, Medellín, Colombia
Karen Rottengatter, Altona Diagnostics, Alemania
Guillermo Rua, Universidad Antioquia, Colombia
Philippe Selhorst, Instituto de Medicina Tropical de Amberes, Bélgica
Aravinda de Silva, Universidad Carolina del Norte, EUA
Fabrice Simon, Laveran Military Teaching Hospital, Francia
Jiaren Sun, UTMB, EUA
Veerle Vanlerbergue, Instituto de Medicina Tropical de Amberes, Bélgica
16vo Curso Internacional de Dengue, Zika y otros Arbovirus Emergentes
12 al 23 de Agosto de 2018
IPK, La Habana, Cuba

Xaveer Van Ostade, University of Antwerp, Bélgica
Wim Vanden Berghe, University of Antwerp, Bélgica
Nikos Vasilakis, UTMB, EUA
Gonzalo M. Vazquez-Prokopec, Emory University, EUA
Anubis Vega, Instituto Pasteur, Guadalupe
Raman Velayudhan, NTDP, OMS
Tian Wang, UTMB, EUA
Scott Weaver, UTMB, EUA
Ping Wu, UTMB, EUA

CUBANS PROFESSORS AND SPEAKERS

María G. Guzmán, Eric Martínez, María E. Toledo, Juan Bisset, Susana Vázquez, Mayling Alvarez, Ana B. Pérez, Beatriz Sierra, Rosa Ramírez, Didye Ruiz, Daniel González, Omar Fuentes, María Magdalena Rodríguez, Alberto Baly, Francisco Zamora, María del C. Marquetti, Dennys Pérez, Martha Castro, Osvaldo Castro, Manuel Romero, Pedro MÁs, Domingo Montada, Lázaro Gil, Alicia Reyes, Aileen Gonzalez, Ariamys Companioni, Maureen Leyva, Rene Gato, Roberto A. Fumero, Natividad Hernández, Yisel Hernández, Gladys Gutierrez, José Luis Pelegrino, Lizette Gil, Mayra Muné, Mislady Rodríguez, Emidalsy Santana, Dailín Medero, María Karla Martínez, Aina Méndez, Claudia Bracho, Naífi Calzada, Narciso A. Jiménez, Jenny Peraza, Luis Augusto Piedra, Armando Esquivel, Yanet Martínez, Yanisley Martínez, Jorge Anaya, María del Carmen Zabala, Waldemar Baldoquin, Angel German, Dayana Rodríguez, Héctor Cruz, Ariel Palenzuela, Adolfo Álvarez, Mayelin Mirabal, Reinaldo López Barroso, Ana M. Ibarra, Gilberto Zamora, Iris Valdés, Carlida Peña, Francisco Duran, Araíza Consuegra, Olivia Tejeda, José F. Sabatier, Sonia González, Carlos Sebrango, Vivian Huerta entre otros prestigiosos profesores y colaboradores del Instituto de Medicina Tropical “Pedro Kouri” (IPK), Centro de Ingeniería Genética y Biotecnología (CIGB), Universidad de la Habana, Universidad Martha Abreu de Villa Clara, Universidad de Sanctí Spiritus, Centro de Inmunoensayo (CIE), Instituto Nacional de Higiene Epidemiología y Microbiología (INHEM), Hospital Hermanos Ameijeiras, Flacso, Instituto Finlay de Vacunas, Hospital Aballi, Ministerio de Salud Cuba.
Figure. Total of participants at the dengue international course by year (1987-2019)

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79 países/countries
Table 1. Round tables and panel, dengue course, 12-23 August 2019.

| The clinic of dengue, zika & chikungunya. | Daniel González, IPK, Cuba, Kleber Luz, Federal RGN University, Brazil, Fabrice Simon, Hospital Militar, Marseille |
| Dengue, chikungunya & zika. Lessons | Osvaldo Castro, IPK, Cuba, Carlos Pardo-Villamizar, J. Hopkins University, USA, André Rivas, Facultad Medicina, Campinas, Brazil |
| Consequences of zika & chikungunya infections. | Xavier Lamballerie, University of Aix-Marseille, France, Carlos Pardo-Villamizar, J. Hopkins University, USA, Fabrice Simon, Hospital Militar, Marseille, France |
| Social determinants of diseases transmitted by Aedes aegypti (panel) | Moderators: Dennis Pérez, IPK, Cuba, Linda Lloyd, USA |

Table 2. Symposia at the dengue course, 12-23, August, 2019.

| Aspects of dengue & Zika pathogenesis | Chairs: Ana B. Pérez, IPK, Cuba and Xavier Lamballerie, University of Aix-Marseille, France |
| Advances in vaccines for dengue, zika & chikungunya | Chairs: María G. Guzmán, IPK, Cuba and Scott Weaver, UTMB, USA |
| Vectors of emergent arboviruses & their control | Chairs: María del Carmen Marquetti, IPK, Cuba and Haroldo Bezerra, PAHO |
| National and International initiatives for facing arbovirosis | Chairs: José L. Pelegrino, IPK, Cuba and Jairo Méndez, PAHO |
| Advances and challenges of the diagnosis of emergent arboviruses (under the auspicious of ASM) | Chairs: Mayling Alvarez, IPK, Cuba and Leticia Franco, PAHO |
| OMICS approaches to host flavivirus interaction | Chairs: Beatriz Sierra, IPK, Cuba and Xaveer Van Ostade, University of Amberes (UA), Belgium |
| Innovative strategies for arbovirus control | Chair: María E. Toledo, IPK, Cuba |
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AUSPICIES

Instituto de Medicina Tropical, “Pedro Kouri”, IPK, La Habana

Sociedad Cubana de Microbiología y Parasitología (SCMP)

Ministerio de Salud Pública de la República de Cuba (MINSAP)

Organización Panamericana de la Salud (OPS)/Organización Mundial de la Salud (OMS)

Academia de Ciencias de Cuba, ACC

Instituto de Tropical Medicine, Belgium

American Society of Microbiology, ASM

Labiofam

American Society of Tropical Medicine and Hygiene, ASTMH

MedicubaEuropa

Asociación Latinoamericana de Inmunología, ALAI

Neglected Tropical Disease Program, NTDP, WHO

AtlanticPhilanthropies

Organización Internacional de Energía Atómica (OIEA)

Centro de Ingeniería Genética y Biotecnología, CIGB

Special Programme for Research and Training in Tropical Diseases, TDR

European Society of Clinical Microbiology and Infectious Diseases, ESCMID

ZIKAlliance

Fundación Mundo Sano

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Collaborators

Aliam, labs solutions
AltonaDiagnostics (GmbH)

Bayer
BioLab International
Chemikon
Fitogranos (Ltda)
Mikrogen
Takeda
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