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Berjaya Times Square Hotel, Kuala Lumpur, Malaysia

PROGRAMME BOOK



www.asiadenguesummit.org

TAKE A CLOSER LOOK AT THE IMPACT OF THE DENGUE VIRUS

DENGUE IS AN UNPREDICTABLE AND POTENTIALLY SEVERE DISEASE

For more information on dengue prevention in Asia, watch the medical education program released in 2018: www.medscape.org/commentary/ dengue-prevention-asia

This program includes a presentation and Q&A with Hoe Nam Leong, MD, PhD and Susan Mayor, Medical Journalist



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WELCOME MESSAGE

Dear Colleagues,

On behalf of the Asia Dengue Summit Organising Committee, we are pleased to welcome you to the 3rd Asia Dengue Summit to be held from 5th to 6th July 2018 in Kuala Lumpur, Malaysia.

Riding on the overwhelming success of the past two Asia Dengue Summits, the organising committee is geared for the 3rd Asia Dengue Summit. The summit will provide a unique opportunity for everyone in the dengue community (clinicians, researchers, government public health leaders and policymakers) to come together to exchange ideas, updates and achievements on dengue management strategies for the region.

The 3rd Asia Dengue Summit is co-convened by Asian Dengue Vaccination Advocacy (ADVA), Global Dengue and Aedes transmitted Diseases Consortium (GDAC), Southeast Asian Ministers of Education Tropical Medicine and Public Health Network (SEAMEO TROPMED) and Fondation Merieux. The Summit is supported locally by the Malaysian Society of Infectious Diseases and Chemotherapy and the Malaysian Paediatric Association. Along with dengue experts from academies and research institutions, representatives from the Ministries of Health, the regional and global World Health Organization (WHO), the Asian Dengue Vaccination Advocacy (ADVA), the Southeast Asian Ministers of Education Organization Tropical Medicine and Public Health Network (SEAMEO TROPMED), Global Dengue and Aedes transmitted Diseases Consortium (GDAC), the International Vaccine Institute (IVI), the Fondation Mérieux (FMx) and others will participate to provide a broad overview of the current status of dengue and its management across Asia.

Dengue has gripped our region for many decades and it continues to remain a global threat. Concerted efforts on educating the public, implementing vector control and advocacy for dengue vaccination are important means of dealing with this mammoth problem. At the Asia Dengue Summit, dengue experts from across the region (and worldwide) have been invited to participate and discuss about the current issues that surround dengue disease management and propose strategies that can enhance dengue control. Such a wide representation of key stakeholders will help throw light on the burden of dengue, its management, new vector control strategies and successful vaccine introduction across the region.

The local organizing committee is working relentlessly to make this summit a fruitful platform of learning and collaboration. We hope you will take home with you valuable insights on dengue management and the many wonderful sights, sounds and experiences from this scenic country!

Warmest Regards,

Datuk Prof. Zulkifli Ismail

Organizing Chairperson 3rd Asia Dengue Summit

Dr Maria Rosario Capeding

Chairperson Asian Dengue Vaccination Advocacy



The Asian Dengue Vaccination Advocacy (ADVA) Group consists of a group of paediatricians and other healthcare workers who are passionate about vaccination. They advocate and educate about the dengue vaccine regardless of manufacturer.



The Global Dengue & Aedes-Transmitted Diseases Consortium (GDAC) is a consortium composed of the Partnership for Dengue Control (PDC), the International Vaccine Institute (IVI), the International Vaccine Access Center (IVAC) at the Johns Hopkins Bloomberg School of Public Health and the Sabin Vaccine Institute. The World Health Organization advises and collaborates with GDAC.



The Southeast Asian Ministers of Education Organization (SEAMEO) is a regional intergovernmental organization established in 1965 among governments of Southeast Asian countries to promote regional cooperation in education, science and culture in the region.



Fondation Mérieux's mission is to fight the infectious diseases that affect vulnerable populations in developing countries, especially mothers and children, by building local capacities. They work in over 20 countries worldwide, in regions prone to infectious outbreaks, and mount their own projects, working closely with local and international partners.

SCIENTIFIC COMMITTEE:

Maria Rosario Capeding (Chairperson) Zulkifli Ismail (Co-Chair) Lulu Bravo Daniel YT Goh Duane Gubler Sri Rezeki Hadinegoro Yasmin A Malik Tikki Pangestu Valentina Picot Zamberi Sekawi Pratap Singhasivanon Terapong Tantawichien Usa Thisyarkorn Sutee Yoksan In-Kyu Yoon

LOCAL ORGANISING COMMITTEE:

Zulkifli Ismail *(Chair)* Yasmin A Malik Rose Nani Mudin Mahiran Mustafa Thiyagar Nadarajaw Zamberi Sekawi Asrul Akmal Shafie Syed Sharizman b. Syed Abdul Rahim Siti Zubaidah Rahmat bin Dapari

ADVA STEERING COMMITTEE:

Maria Rosario Capeding (Chairperson) Usa Thisyakorn Daniel YT Goh Sri Rezeki Hadinegoro Zulkifli Ismail Terapong Tantawichien Sutee Yoksan

ADVA INTERNATIONAL ADVISORS:

Lulu Bravo Sally Gatchalian Duane Gubler Tikki Pangestu Pre-Summit Workshops Wednesday 4th July 2018 Venue: Berjaya Times Square Hotel Time: 9am – 1pm Workshop 1 (Cost effectiveness) Time: 1:30pm – 5pm Workshop 2 (Immunology)

Pre Summit Workshops 1

Time	Programme	Coordinator / Speaker
9:00 – 13:00	Vaccine Cost Effectiveness Measures – Basics and Mathematics	Asrul Akmal Shafie (Malaysia)
9:00 – 9:15	Workshop Overview and Rationale	Asrul Akmal Shafie (Malaysia)
9:15 – 10:15	Importance and Challenges of Determining Cost Effectiveness for Vaccine	Hilton Lam (Philippines)
10:15 – 10:45	Tea break	
10:45 – 11:15	Exercise	Asrul Akmal Shafie (Malaysia)
11:15 – 12:00	Modelling in Economic Evaluation of Vaccine (Why, What, How)	Hilton Lam (Philippines)
12:00 – 12:30	Q&A and Wrap Up	All

Pre Summit Workshops 2

Time	Programme	Coordinator / Speaker
14:00-17:00	Immunology of Dengue Infections and Characteristics of the Immune Response – Implications for Vaccines and Therapeutics	Shamala Devi (Malaysia)
14:00-14:15	Workshop Overview	Shamala Devi (Malaysia)
14:15-14:45	A Health Economist's Perspective on Dengue Burden, Costs and Research	Donald S. Shepard (USA)
14:45-15:15	Cross-reactive Immunity Amongst Flaviviruses and Its Implications for Vaccines	Ashley St John (Singapore)
15:15-15:45	ТВС	Maria Rosario Capeding (Philippines)
15:45-16:00	Proteomics Studies Related to Dengue – the Use of Biomarkers As A Tool.	Raul Destura (Philippines)
16:00-17:30	Panel Discussion	All

*The organisation of the workshops are supported in part by Takeda Pharmaceuticals.

Faculty Dinner

Time: 18:00 - 21:00

For invitees only, please meet at Hotel Lobby at 6pm for transfer to dinner venue

Day 1 - Thursday 5th July 2018

Time	Topics	Speakers/Moderators
8:45 – 9:00	Welcome Address	Zulkifli Ismail (Malaysia) Maria Rosario Capeding (Philippines)
9:00 – 9:30	Opening Address	YBhg Dato' Dr Hj Azman Bin Hj. Abu Bakar (Deputy Director General of Health, Ministry of Health Malaysia)
Session 1: Moderators:	Dengue Disease Burden and Surveillance Duane Gubler, Rose Capeding	
9:30 – 10:00	Plenary Lecture P1.1: Dengue Disease Burden in the Young and Old: Updates on Population-Based Disease Burden of Dengue	Donald S. Shepard (USA)
10:00 – 10:30	Plenary Lecture P1.2: Addressing the Issue of Asymptomatic Dengue: How Can We Bridge the Gap?	Anavaj Sakuntabhai (France)
10:30 – 10:45	Tea Break	
Symposium S1:Dengue SurveillanceModerators:Fadzilah Kamaludin, Sri Rezeki Hadinegoro		
10:45 – 11:00	S1.1 Dengue Surveillance: Where Do We Stand in Asia?	Hashitha Tissera (Sri Lanka)
11:00 – 11:15	S1.2 How Can We Achieve an Integrated Surveillance System Across Asia?	In-KyuYoon (South Korea)
11:15 – 11:30	S1.3 Digital Surveillance: Is It Feasible In Asia?	Syed Sharizman (Malaysia)
11:30 – 11:45	S1.4 Dengue Surveillance – Pakistan Experience	Somia Iqtadar (Pakistan)
11:45 – 12:00	Discussion	
12:00 – 12:05	Industry Lunch Symposium - Sanofi Opening remarks by chair, Usa Thisyakorn	
12:05-12:25	Update on CYD-TDV Dengue Vaccine	Anh Wartel (Sanofi Pasteur, Singapore)
12:25-12:40	Assessment of Benefits and Risks Associated with Dengue Vaccination, a Dynamic Modeling Approach	Laurent Coudeville (Sanofi Pasteur, France)
12:40-13:00	New Paradigms of Dengue Vaccination for Public Program Implementation	Tikki Pang (Lee Kuan Yew School of Public Policy, NUS, Singapore)
13:00-13:15	Q&A	

Session 2:	Diagnostics and Dengue Management	
13:30 – 14:00	Plenary Lecture P2: Evolution of Dengue Viruses through the Annual Outbreaks Moderator: Zulkifli Ismail	Duane Gubler (USA)
Symposium 2: Moderators:	Diagnostics and Dengue Management Rahmat bin Dapari, Daniel Goh	
14:00 – 14:20	S2.1 Dilemmas in Dengue Diagnosis - Clinical	Usa Thisyakorn (Thailand)
14:20 – 14:40	S2.2 Update of Dengue Case Classification	Olaf Horstick (Germany)
14:40 – 15:10	S2.3 Proactive Management of the Dynamic Phases of Dengue	Lucy Lum (Malaysia)
15:10 – 15:30	S2.4 Herd Immunity in Recurring Dengue Outbreaks?	Sazaly bin Abu Bakar (Malaysia)
15:30 – 15:45	Q&A	·
15:45 – 16:00	Tea Break	
Symposium 3: Moderators:	Laboratory Diagnosis of Dengue Yasmin Malik, Lulu Brovo	
16:00 – 16:20	S3.1 How Reliable Are Laboratory Diagnosis Methods for Arboviral Diseases?	ButsayaThaisomboonsuk (Thailand)
16:20 – 16:40	S3.2 Study on Markers of Severe Dengue	Ravindran Thayan (Malaysia)
16:40 – 17:00	S3.3 Pre-vaccination Testing - Reliability and Practicality	Chukiat Sirivichayakul (Thailand)
17:00 – 17:15	Q&A	
17:15	Closing of Day 1	Zulkifli Ismail (Malaysia)
19:00 – 22:00	Summit Dinner – Manhattan Room V, Level 14, Berjaya Times Sc	uare Hotel

Day 2 - Friday 6th July 2018

Time	Topics	Speakers/Moderators
08:00 - 08:30	Registration	
08:30 – 08:40	Welcome back!	Zulkifli Ismail (Malaysia) Maria Rosario Capeding (Philippines)
08:40 – 09:10	Plenary Lecture P4: Overview of Dengue in Adults Moderators: Zulkifli Ismail, Rose Capeding	Terapong Tantawichien (Thailand)
Session 4		
Symposium 4: Moderators:	Critical Care Management of Dengue in Adults Terapong Tantawichien, Mahiran Mustafa	
09:10 – 09:25	4.1 Thailand Experience	Nattachai Srisawat (Thailand)
09:25 – 09:40	4.2 Malaysia Experience	Shanthi Ratnam (Malaysia)
09:40 – 09:55	4.3 Philippines Experience	Edsel Maurice Salvana (Philippines)
09:55 – 10:10	4.4 Indonesia Experience	Erni Juwita Nelwan (Indonesia)
10:10 – 10:30	Q&A	
10:30 – 10:45	Tea Break	
Session 5:	Dengue Vector Control Strategies	
10:45 – 11:15	Plenary Lecture P5: Review on the Global Vector Control Strategies – The Good the Bad and the Ugly Moderator: Lee Han Lim	Olaf Horstick (Germany)
Symposium 5: Moderators:	Dengue Vector Control Strategies Duane Gubler, Syed Sharizman	
11:15 – 11:35	S5.1 Breakthroughs in Dengue Vector Control	Lee Han Lim (Malaysia)
	S5.2 Wolbachia - The Asian Experience	
11:35 – 11:45	a. Singapore	Chong Chee Seng (Singapore)
11:45: – 11:55	b. Malaysia	Fadzilah Kamaludin (Malaysia)
11:55 – 12:05	c. Indonesia	Adi Utarini (Indonesia)
12:05 – 12:25	S5.3 Sterile Insect Technique – Repurposing for Aedes Control	Nazni Bt Wasi Ahmad (Malaysia)
12:25 – 12:35	Q&A	

12:45 – 13:35	ADVA Lunch Symposium Moderators: Lucy Lum, Sally Gatchalian	
	1. Communication and Advocacy Take Priority in Dengue Vaccination Programs	Lulu Bravo (Philippines)
	2. Mobilizing Resources and Political Support for Dengue Control - Lessons from Malaria	Benjamin Rolfe (Singapore)
13:35 – 14:00	Friday Prayer	
Session 6:	Dengue Vaccines and Their Future	
14:00 – 14:30	Plenary Lecture P6. Current Status of Dengue Vaccines – Challenges and Opportunities Moderators: Tikki Pangestu, Zulkifli Ismail	Donald S. Shepard (USA)
Symposium 6: Moderators:	Dengue Vaccines and Their Future Tikki Pangestu, Zulkifli Issmail	
14:30 – 15:30	S6.1 Dengue Vaccines – Update of Vaccine Pipelines	
	Representatives from:	
	1. Sanofi	Alain Bouckenooghe
	2. Takeda	Gary Dubin
	3. MSD	Cathy Hoath
15:30 – 15:50	S6.2 Update on Dengue Vaccination from the Philippines	Juliet Sio-Aguilar (Philippines)
15:50 – 16:10	S6.3 Guideline for Dengue Vaccination	Sri Rezeki Hadinegoro (Indonesia)
16:10 – 16:40	Plenary 6.2 Road Map to Freedom from Dengue Moderator: Zulkifli Ismail, Maria Rosario Capeding	Pratap Singhasivanon (Thailand)
16:40 – 17:00	Closing and Tea	Zulkifli Ismail (Malaysia) Maria Rosario Capeding (Philippines)

SPEAKERS' BIOGRAPHIES



PROF. ZULKIFLI ISMAIL

Clinical Professor, KPJ Healthcare University College, Malaysia

Prof. Zulkifli Ismail is a consultant paediatrician and paediatric cardiologist at a private hospital and Clinical Professor at the KPJ Healthcare University College. He was formerly a professor of paediatrics and paediatric cardiology in the Universiti Kebangsaan Malaysia (UKM). Dr. Ismail has served as the head of the paediatric department and the director of Hospital Universiti Kebangsaan Malaysia (HUKM) as well as the medical director of its private wing, UKM Specialist Centre.

Prof. Zulkifli also served as a past president of the Malaysian Paediatric Association (MPA) and is currently the editor of Berita MPA, a quarterly newsletter publication distributed to fellow members of the Association. He chairs the Positive Parenting Management Committee (www.mypositiveparenting.org) and serves as the chief editor of the Positive Parenting Guide, a quarterly publication aimed to equip Malaysian parents with reliable and practical local information on maternal, child and family care since 2002. He is the Technical Chairman of Immunise4Life (www.ifl. my), a vaccination advocacy program of the Ministry of Health Malaysia.

Prof. Zulkifli is currently the secretary general of the Asia Pacific Pediatric Association (APPA) and current chairman of the Asian Strategic Alliance for Pneumococcal disease prevention (ASAP). He also serves as a board member of the National Population and Family Development Board (LPPKN), a member of the Ministry of Health Unrelated Transplant Approval Committee (UTAC) and in the editorial board of the Malaysian Journal of Paediatrics & Child Health (MJPCH). He has also served as a reviewer for the Medical Journal of Malaysia and the Philippines Paediatric Infectious Disease Journal.

Prof. Zulkifli has more than 35 publications in peer-reviewed international and local journals in addition to numerous abstracts and articles for the lay-public on various issues involving child health, paediatrics and vaccinology. He has authored or co-authored two books for parents, one for medical students and one for nurses. In 2008, he was conferred the Darjah Panglima Mahkota Wilayah by the Malaysian King that carries the honorific title of 'Datuk'.



PROF. DONALD S. SHEPARD

Schneider Institutes for Health Policy, Heller School, Brandeis University, Waltham, MA. USA

Professor Donald S. Shepard, Ph.D., is Professor at the Schneider Institutes for Health Policy at the Heller School, Brandeis University, near Boston, MA, USA. Director of the Institute's Cost and Value Group, he is a health economist concerned with health problems of both the United States and low- and middle-income countries. His research focuses on performance incentives, cost of illness, and cost-effectiveness, with special applications to dengue, malaria, HIV/AIDS, cardiovascular disease, and substance abuse, and homelessness. His 200 scientific publications include the widely-cited paper that coined the QALY, for Quality-Adjusted Life Year, which became a central concept in cost-effectiveness analysis. He was elected Fellow of the American Society of Tropical Medicine and Hygiene and received the Albert Nelson Marquis Lifetime Achievement Award. His degrees (BA, magna cum laude with highest honors, MPP, and PhD) are all from Harvard University.



A/PROF. ASRUL AKMAL SHAFIE

Associate Professor in Discipline of Social and Administrative Pharmacy, School of Pharmaceutical Science, Universiti Sains Malaysia, and

Adjunct Associate Professor in Health Economics, School of Pharmacy, Monash University, Australia

Asrul Akmal Shafie is a registered pharmacist in Malaysia since 2001. His research interests are in the application of economic evaluation in pharmaceutical services and product, and pharmacy practice. He is now leading and co-investigating a number of researches in pharmacy practice, PRO instrument validation and valuation, and health technology assessment, and he has published peer-reviewed journal articles/abstracts in various international journals including Value in Health, Social Science & Medicine, Quality of Life Research, BMC Public Health and Pharmacoeconomics, and six books/monographs. He regularly reviews manuscripts for international and local publications including British Medical Journal, Bulletin WHO and Value in Health.

He is the Editor-in-Chief for the Malaysian Journal of Pharmacy, and a member of the editorial board for Pharmacoeconomics and Value in Health Asian Region journal. He was invited to speak in various international and domestic scientific events in UK, US, South Korea, Indonesia, Japan, China, Thailand and Singapore.

He is also an appointed expert member for the UK National Institute for Health Research Committee, Malaysia Health Technology Assessment Agency (MaHTAS), Malaysia Pharmacoeconomic Guidelines Development Committee, Malaysia National Medicine Policy Steering Committee, Ministry of Health's Quality Use of Medicine Committee, Malaysia Health Promotion Board, Institute of Health Service Research, Malaysia Pharmacoeconomic Technical Committee.

He plays an active and vital role in professional societies and previously served as the Chair-Elect for ISPOR Good Outcomes Research Practices & Publications Committee, Co-editor for ISPOR News Across Asia, and Chairman for Malaysian Pharmaceutical Society (Penang Branch). He is currently the Board Member for HTAsiaLink Network, core member of ISPOR Code of Ethics Task Force and Co-Chair for the Science Leadership Committee in Young Scientist Network – Academy of Sciences Malaysia. He is the recipient of the prestigious International Fellowship for International Society of Pharmacoeconomics and Outcomes Research, Young Scientists for the Academy of Sciences Malaysia and Cancer Research Award by the Cancer Council Malaysia. At present, Dr. Asrul is an Associate Professor in social and administrative pharmacy in Universiti Sains Malaysia, where he teaches pharmacoeconomic, statistic and Shafie Asrul Akmal's Curriculum Vitae epidemiology to both undergraduates and postgraduates in the university and four other local institutions.

SPEAKERS' BIOGRAPHIES



A/PROF. ANAVAJ SAKUNTABHAI

Honorary Assistant Professor, Department of Medicine, Faculty of Medicine Ramathibodi Hospital, Mahidol Univesity, Bangkok, Thailand

Associate Professor Sakuntabhai obtained his PhD in Molecular Genetics in 1999 from The Wellcome Trust Centre for Human Genetics, Nuffield Department of Clinical Medicine, University of Oxford, UK, and his MD (Dermatology) from University of Newcastle upon Tyne, UK in 1992, and Chulalongkorn University, Bangkok, Thailand in 1986. He currently serves as head of laboratory at Laboratoire de Génétique de la réponse aux infections chez l'homme, Institut Pasteur, Paris, where he has been since 2007, specialising in human genetics of infectious diseases, notably malaria and dengue.

He began his career as a medical doctor. In 2000 he joined the Institut Pasteur as a senior scientist and in 2007 became the leader of the laboratory of Genetics of Human Response to Infections. In 2010 he created and became a head of the Functional Genetics of Infectious Diseases Unit.

For several years, he was a principal investigator of one of the four consortial projects of the MalariaGEN consortium, a global community of researchers working together to integrate epidemiology with genome science financed by the Bill & Melinda Gates Foundation.

He is a partner of a Wellcome Trust financed project on the human genome wide screening for dengue susceptible genes. His laboratory is a principal investigator of a French initiative to tackle the disease burden under changing environments. He is a coordinator of the European FP7 project on Dengue Framework for Resisting Epidemics in Europe (DENFREE). The project aims to find key factors determining dengue transmission and dengue epidemics in order to develop new tools and strategies for controlling dengue transmission. The project also estimates the risk of spreading DENV to uninfected areas, especially in Southern Europe where susceptible vectors exist.

Sakuntabhai coordinates a global network for dengue research in the Institut Pasteur International Network.

In 1999 Sakuntabhai discovered a gene responsible for Darrier disease, a monogenic skin disorder. In 2005 he discovered a variant on a promoter of DC-SIGN associated with gene expression and outcome of dengue infection. Since its discovery this variant has been shown to be associated with other infectious diseases including tuberculosis and HIV, amongst others. It has been confirmed in a replicated study.

In 2009, together with other researchers, he participated in the finding of positive selection of G6PD (glucose 6 phosphate dehydrogenase) and its effect on Plasmodium vivax (one of the six species of malaria parasites that commonly infect humans) density. The work challenges the former belief that G6PD mutations were selected by P. falciparum and highlights the significant effect of P. vivax on human health, one hitherto neglected.

His recent research has shown that both gene-gene and gene-environmental interactions play a significant role in susceptibility to malaria and dengue.



DR. HASITHA TISSERA

Consultant Epidemiologist, National Coordinator for Dengue Prevention and Control, Ministry of Health, Sri Lanka

Dr. Hasitha Tissera is a Medical Epidemiologist leading the National Dengue Control Programme of the Ministry of Health, Sri Lanka. He joined the Central Epidemiology Unit in 2002 after serving as a Regional Epidemiologist in the then war-torn Eastern Province of Sri Lanka. His responsibilities at the Epidemiology Unit encompass national surveillance of dengue, coordination of dengue case management based on National Guidelines and training of all levels of clinical and public health staff. Heading the National Dengue Control Programme since 2013 he is involved in planning, implementation and evaluation of all dengue control activities at national and sub-national levels. Dr. Tissera is responsible for the technical evaluation of dengue vaccines registration in Sri Lanka. He is also the Principal Investigator of a number of International Research Projects on Dengue including vaccine studies and has authored a number of original publications in peer-reviewed journals. He serves as an expert on dengue prevention and control internationally. He received his Post-doctoral training in public health both at the Health Protection Agency – Centre for Infections (former Public Health Laboratory Services) and the Department of Health, London during 2006/08. Dr. Tissera has also been a researcher at the London School of Hygiene and Tropical Medicine, University of London.



DR. IN-KYU YOON

Director, Deputy Director General of Science, Global Dengue & Aedes-Transmitted Diseases Consortium (GDAC)

Dr. In-Kyu Yoon is the Deputy Director General of Science and the Director of the Global Dengue & Aedes-Transmitted Diseases Consortium (GDAC).

He was the former Chief of Virology, Armed Forces Research Institute of Medical Sciences in Bangkok, Thailand. In his previous position, Dr. Yoon investigated arbovirus and respiratory virus infections to include clinical trials of candidate vaccines. He has conducted research on the epidemiology, pathophysiology and immunology of dengue virus and other emerging pathogens, and has authored over 90 publications.

Dr. Yoon has provided medical care in a variety of civilian and military healthcare settings internationally, and served as a faculty member of the Uniformed Services University of the Health Sciences, USA. He is a Fellow of the American College of Physicians.

He graduated magna cum laude with a Bachelor of Science degree in Paleobiology from Yale University, and received his Doctorate in Medicine from the New York University School of Medicine. He performed his residency in Internal Medicine and completed a fellowship in Allergy/Immunology at the Walter Reed Army Medical Center, USA.



A/PROF. SYED SHARIZMAN BIN SYED ABDUL RAHIM

Community Health (Epidemiology), Faculty Of Medicine & Health Sciences, Universiti Malaysia Sabah, Malaysia; and

Senior Principal Assistant Director, Vector Borne Disease Sector, Dengue Epidemiology Unit, Ministry of Health, Malaysia

Associate Professor Syed Sharizman Syed Abdul Rahim teaches Community Health (Epidemiology) at the Faculty Of Medicine & Health Sciences in Universiti Malaysia Sabah, where he is an expert in Infectious Diseases, Epidemiology, and Cancer Research.

He has published extensively in regional and international journals, is a frequent guest speaker at international and local conferences, and is a regular contributor in national forums, TV and radio shows on the topic of infectious diseases.

In addition to these, he is a member of the Technical committee in UNITEDengue, Working committee in ASEAN Health Cluster meetings, an expert technical contributor for China-ASEAN Health Cooperation Forum and Regional Consultation Towards Southeast Asia Framework For Zika Virus Preparedness and Response, a reviewer for International Journal of Public Health Research (IJPHR) and has presented his research at ASEAN Dengue Conference.

He holds research interests in epidemiology and infectious diseases, as well as usage of spatial analysis and statistics.

He obtained his Bacherlor of Medicine from Penang Medical College & Royal College of Surgeons in Ireland, and his Masters and Doctor of Public Health from Universiti Kebangsaan Malaysia.



A/PROF. DR. SOMIA IQTADAR

Department of Medicine, King Edward Medical University, Lahore, Pakistan

A Fellow in Medicine and Associate Professor of Medicine at King Edward Medical University, Dr. Somia graduated from Kinnaird College in 1998. She received her bachelor's degree in sciences in 2001 and completed her bachelor's in medicine & surgery in 2004 from her country's top medical institution, King Edward Medical University. Dr. Somia completed her post graduation in internal medicine in 2010 and is one of the youngest medical fellows in her faculty at King Edward Medical University.

She is the focal person for infectious diseases and epidemic control and has prepared guidelines and teaching modules for medical students and doctors. She is also trained at Asian Institute of Technology Thailand, Sri Lanka and WHO Singapore in Dengue fever and is currently working as a Master Trainer of Dengue Fever for the government of Punjab, and for WHO for the Asia Pacific. She is the Associate Secretary of Dengue Expert Advisory Group (DEAG), which provides national guidelines on clinical management of Dengue infection and imparts training to doctors and paramedical staff nationally.

Dr. Somia has also been very actively involved in research, infectious diseases being her prime focus. She has numerous publications to her name in indexed journals. She has also contributed three chapters on Dengue, Ebola and Chickungunya in Kumar and the latest edition of Clark Textbook of Medicines. She has authored an information booklet on Dengue for public awareness, and represented Pakistan in numerous international infectious disease conferences, presenting her research and experiences.



PROF. USA THISYAKORN

Chairman Asian Dengue Vaccination Advocacy

Professor of Pediatrics Chulalongkorn University, Thailand

Dr. Usa Thisyakorn is a Professor of Pediatrics at Chulalongkorn University, Bangkok, Thailand. She received her M.D. from Chiangmai University, Chiangmai, Thailand and had her Pediatric residency training at Children's Hospital, Bangkok, Thailand. She was trained in Pediatric Infectious diseases in the U.S.A., at Yale University and University of Texas Health Science Center at Dallas in 1983, Centers for Diseases Control in 1989 and National Institutes of Health in 1994.

Her positions at national and international levels include Immediate Past President Pediatric Society of Thailand, President Pediatric Infectious Diseases Society of Thailand, Secretary General Asian Society for Pediatric Infectious Diseases, Board member World Society for Pediatric Infectious Diseases, Executive committee International Society of Tropical Pediatrics, Council member Asia Pacific Pediatric Association, Council member ASEAN Pediatric Federation, President 9th International Congress of Tropical Pediatrics to be held in Bangkok, Thailand in October, 2011

Under her guidance, the project "Save a child's life from AIDS", was selected as one of the UNAIDS best practices in the year 2000. She has served as the editorial board of several medical journals and has contributed over 100 indexed publications to date. She has received several awards including Scientific Awards from Pediatric AIDS Foundation, AmFAR, U.S.A., and Outstanding Asian Paediatrician Award 2009 from Asia Pacific Pediatric Association.

SPEAKERS' BIOGRAPHIES



DR. T. ANH WARTEL

Regional Medical Expert E&NT, ASIA PACIFIC &JPAC Sanofi Pasteur

Dr T. Anh Wartel has close to 20 years of experience in epidemiological and clinical research from phase I to phase IV studies. She earned her MD from the Paris XII Medical School in France and has years of relevant experiences on the field of epidemiological and clinical research with Academia and Pharmaceutical Industry. Having started her research career as a co-investigator in drugs and therapeutic vaccine trials in HIV infected patients with Academia (French National Agency of Research on AIDS (ANRS)) at KB University Hospital in Paris, she then joined Sanofi Pasteur in 2004 and has been appointed to handle multiple increasing responsibilities in Epidemiology and Clinical R&D activities (e.g., JE, Pneumococcal disease, Dengue), and she is now working in Sanofi's Medical Affairs as the Regional Medical Expert for enteric, endemic and travelers vaccines.



PROF. TIKKI PANG

Visiting Professor, Lee Kuan Yew School of Public Policy, National University of Singapore, Singapore

Prof. Pang joined the Lee Kuan Yew (LKY) School of Public Policy after 13 years at the World Health Organisation (WHO) in Geneva, Switzerland as Director of its Research Policy & Cooperation department. In this capacity he worked with countries to strengthen their national health research systems, developed mechanisms and initiatives to improve the efficiency and transparency of global health research, and helped formulate an Organisation-wide research policy. Prior to his WHO career, Prof. Pang was the Professor of Biomedical Sciences at the Institute of Postgraduate Studies & Research, and Associate Professor/Lecturer at the Faculty of Medicine, the University of Malaya, Kuala Lumpur. He was previously Co-Director of the WHO Collaborating Centre for Dengue & Dengue Haemorrhagic Fever at the University of Malaya, Kuala Lumpur, Malaysia (1982-1995), and a member of the WHO Technical Advisory Group which developed the guideline Dengue Haemorrhagic Fever: Diagnosis, Treatment and Control (1986).

Prof. Pang's main research and academic interests lie in the area of infectious diseases, the impact of genomics on public health, global health governance, national health research systems, knowledge translation, research transparency and accountability, and the use of evidence in health policy development. In these areas, he has published more than 200 scientific articles and 12 books, edited volumes and reports, which includes several major WHO reports, including Genomics and World Health (2002), the World Report on Knowledge for Better Health (2004) and a History of Research in WHO (2010). Prof. Pang's involvement with the LKY School of Public Policy began in 2009 through the ST Lee Project on Global Health Governance.

Prof. Pang is a Fellow of the Royal College of Pathologists (UK), American Academy of Microbiology (USA), Institute of Biology (UK) and the Academy of Medicine of Malaysia. He was the Founding Editor of Health Research Policy & Systems and the Asia-Pacific Journal of Molecular Biology and Biotechnology.



DR. OLAF HORSTICK

Director, Teaching Unit, Institute of Public Health, University of Heidelberg, Germany

Dr. Olaf Horstick is a consultant in public health medicine, as a Medical Doctor with a main interest in public health in low and middle income countries, with over 25 years of work experience in public health at local, national and international level as well as clinical medicine. He went through postgraduate academic training as a Fellow of the Faculty of Public Health, London, as a Doctor of Tropical Medicine at University of Heidelberg, Germany, as well as a MA in Public Health and Science in Public Health in Developing Countries. He is currently Director of the Teaching Unit at the Institute of Public Health at the University Hospital, Heidelberg, Germany.



PROF. DR. LUCY LUM CHAI SEE

Department of Paediatrics, Faculty of Medicine, University of Malaya, Malaysia

Professor Dr. Lucy Lum Chai See obtained her medical degree from the University Of Malaya in 1981, and became a member of the Royal College Of Physicians, United Kingdom in 1987. She joined the University of Malaya, Department of Paediatrics in 1990, and underwent clinical-fellowship training in paediatric intensive care in The Hospital for Sick Children, in 1996. She later became the first Malaysian to complete the Paediatric examination for the European Diploma in Intensive Care.

Her clinical expertise was sought after by WHO, and regional offices in the Western-Pacific Region where she has been to China, Laos, the Solomon Islands and Africa. She was invited by WHO/TDR to be the lead author of the handbook on clinical case management of dengue and by WPRO to design a training curriculum of dengue management.

She collaborated with the various hospitals in Ministry of Health and WHO, Geneva, Oxford University, Brandeis University, and other universities in Singapore, SEAsia, Latin America and European Union. In the field of paediatric intensive care, she collaborates with colleagues in North America and around the world in pediatric sepsis, congenital diaphragmatic hernia and neonatal hypoxic ischemic encephalopathy.

SPEAKERS' BIOGRAPHIES



PROF. SAZALY BIN ABU BAKAR

Department of Medical Microbiology, Faculty of Medicine, University of Malaya, Malaysia

Dr. Sazaly Abu Bakar is a professor and Director of the Tropical Infectious Diseases Research and Education Center (TIDREC) and WHO Collaborating Center for Arbovirus Research and Reference (Dengue Fever and Severe Dengue) at University of Malaya in Kuala Lumpur, Malaysia. He received his PhD and post-doctoral training in virology at the University of Texas Medical Branch, Galveston, Texas, USA.

Dr. Sazaly has been involved with dengue research for over 20 years and has also maintained strong research interest in emerging infectious diseases. His research interests include biorisk management, semiochemicals, traditional medicine and natural products (prostate cancer, lung cancer, trace metals, zinc, gene expression, eurycoma), bacteriology (infectious diseases, acinetobacter), and virology (arboviruses, emerging infectious diseases, antivirals, vaccines).



DR. BUTSAYA THAISOMBOONSUK

Head, Virology and Serology Section, Department of Virology, Armed Forces Research Institute of Medical Sciences (AFRIMS), Bangkok, Thailand

Dr. Thaisomboonsuk received his doctorate and masters in microbiology from Mahidol University, Thailand, after graduating from Chulalongkorn University with a degree in microbiology in 1982.

As a Medical Research Scientist, he has published papers in over 20 local, regional and international journals, as well as presented in numerous symposia and international workshops. His research interests include enzyme immunoassays, plaque reduction neutralization testing, mosquito inoculation, hemagglutination inhibition testing, tissue and viral cultures (dengue, chikungunya zika), respiratory viruses, monoclonal antibody production, ascite production in mice, radioimmunoassays, and cell binding assays using H³-leucine.



A/PROF. CHUKIAT SIRIVICHAYAKUL

Head, Department of Tropical Pediatrics, Faculty of Tropical Medicine, Mahidol University, Thailand

Associate Professor Sirivichayakul is currently Head of the Department of Tropical Pediatrics, Faculty of Tropical Medicine, Mahidol University, Bangkok Thailand, where he had previously served as Deputy Dean for Educational Affairs. He obtained his medical degree from Chulalongkorn University in 1985, and completed his Diploma of Tropical Medicine and Hygiene at the Faculty of Tropical Medicine at Mahidol University in 1997.

His research interests lie in paediatrics, tropical parasitic diseases, vaccine trials, and dengue infection. He has published extensively about infectious diseases and vaccines in children, having co-authored or authored over 50 papers on paediatric immunology and paediatric vaccinology.



PROF. TERAPONG TANTAWICHIEN

Head of Division of Infectious Diseases and Deputy Chairman, Department of Medicine, Faculty of Medicine, Chulalongkorn University Thailand

Prof. Terapong Tantawichien is Professor in the Division of Infectious Diseases, Department of Medicine, Faculty of Medicine at Chulalongkorn University, Thailand, and has previously held positions at King Chulalongkorn Memorial Hospital and Kuzell Institute, California Pacific Medical Centre, San Francisco, USA. He received his medical degree from Chulalongkorn University in 1987 and is board certified in internal medicine and infectious diseases (Thailand).

Prof. Terapong began his teaching career in 1993 when he started teaching infectious diseases at Department of Medicine, Faculty of Medicine, Chulalongkorn University. He is a member of the Royal College of Physicians (Thailand) and the Infectious Diseases Association of Thailand. He was also Secretary-General of the Infectious Diseases Association of Thailand (2002-3, 2004-5) and Deputy Chairman of Scientific Committee, The Royal College of Physician of Physician of Thailand (2009-10). Presently he is President of the Infectious Diseases Association of Thailand (2014-15, 2015-2017) and Head of Division of Infectious Diseases and has played an active part in infectious disease activities in Thailand.

Prof. Terapong occasionally gives special lectures at several other universities and institutions. He regularly attends academic conferences and seminars both in and outside the country. In addition to teaching, he is a regular contributor to medical researchers in Thailand and collaborated on many manuscripts with his student and colleague. He had more 60 international medical publications and was awarded the 1st Young Investigator Award from the Infectious Diseases Association of Thailand in 2001 and the Research Award from the Royal College of Physician of Thailand in 2014. His main scientific interests are rabies vaccination, adolescent and adult immunisation, dengue in adult, nosocomial infections and infections in immune-compromised hosts.



ASST.PROF. NATTACHAI SRISAWAT

Director, Excellence Center for Critical Care Nephrology, King Chulalongkorn Memorial Hospital, Thai Red Cross, Division of Nephrology, Department of Medicine, Chulalongkorn University, Thailand & Collaborating CRISMA faculty member Department of Critical Care Medicine, University of Pittsburgh School of Medicine, USA

After finishing Nephrology training from Thailand in 2007, Assistant Professor Srisawat became a CRISMA research fellow for 2 years and a clinical fellow of Critical Care Medicine for 1 year under mentorship by Professor John A. Kellum at the Department of Critical Care Medicine, University of Pittsburgh School of Medicine, Pennsylvania, USA. His main research focused on AKI epidemiology in resource limited settings, novel biomarkers of AKI, tropical infections causing AKI such as leptospirosis, and dengue infection.

He is currently appointed as Clinical Instructor, Department of Medicine, Faculty of Medicine, Chulalongkorn University, Bangkok, Thailand and has published in international journals on a first author basis and is also a reviewer for reputed professional journals. He has an active association with many international societies and academies and received several awards for his contributions to the scientific community.

His research interests include critical care nephrology, renal replacement therapy in the ICU, septic acute kidney injury, and urinary and plasma biomarkers.



DR. SHANTHI RATNAM

Consultant Physician and Intensivist, Clinical Head of Intensive Care Unit, Department of Anaesthesia and Intensive Care, Hospital Sungai Buloh, Selangor, Malaysia

In addition to his appointments at Hospital Sungai Buloh, Dr. Ratnam is also Honorary Lecturer (Intensive Care) Taylor's University Malaysia, Honorary Lecturer (Intensive Care) UiTM (University Technology Mara), Secretary of the Malaysian Society of Intensive Care (MSIC), Ministry of Health Malaysia (MOH) representative in the National Accreditation Board for Intensivist in Malaysia, Panel member in the Dengue Selangor state Mortality review Board, Committee member of the Sungai Buloh Hospital trauma team, and member of Hospital Antibiotic Committee Hospital Sungai Buloh.

He obtained his MBBS from Kasturba Medical College, University Mangalore, India in 1995, MRCP from the UK in 2000, and was made a Fellow of Joint Faculty of Intensive Care Medicine Australia New Zealand College of Anaesthetists in 2009 and Fellow of College of Intensive Care Medicine Australia and New Zealand in 2010. His clinical interests include septic shock, Dengue Shock Syndrome, Nosocomial Infections in ICU and Traumatic Brain Injury. He has co-authored or authored over 10 papers or posters and served as reviewer in review panels for several clinical practice guidelines.



A/PROF. EDSEL MAURICE T. SALVANA

Director, National Institute of Molecular Biology and Biotechnology, National Institutes of Health, University of the Philippines Manila, Republic of the Philippines

Clinical Associate Professor of Medicine, Infectious Diseases Section, Department of Medicine, University of the Philippines College of Medicine

Adjunct Professor for Global Health, Division of General Internal Medicine, Department of Medicine, University of Pittsburgh, USA

A/Prof. Edsel Maurice T. Salvana is the Director of the Institute of Molecular Biology and Biotechnology at the Philippines' National Institutes of Health and is associate professor of medicine at the University of the Philippines College of Medicine. He is also adjunct faculty for Global Health at the University of Pittsburgh. He is an infectious diseases specialist, a molecular biologist, and an HIV advocate. He was recently chosen as a TED Fellow and is passionate about proper science communication especially in the wake of the recent dengue vaccine controversy in the Philippines, writing several mass media articles and serving as a resource person in Congress to help understand the way forward.

He received his medical degree from the University of the Philippines College of Medicine in 2001. He trained in internal medicine at the Medical College of Wisconsin in Milwaukee, and did his fellowship in Infectious Diseases and Tropical Medicine at the Case Western Reserve University in Cleveland. He returned in 2008 as a Balik Scientist of the Department of Science and Technology.

He is the Director of the Institute of Molecular Biology and Biotechnology at the National Institutes of Health and is an associate professor of medicine at the Philippine General Hospital. He is also adjunct faculty for Global Health at the University of Pittsburgh. He has been selected as an Outstanding Young Scientist by the National Academy of Science and Technology and has been awarded "The Outstanding Young Men" (TOYM) Philippines award in for medicine and social activism in HIV.

He has also been selected as one of the Ten Outstanding Young Persons of the World, and a Young Physician Leader of the Interacademy Medical Panel of the World Academy of Sciences.

Most recently, he was chosen as a TED Fellow for TED Global 2017 and spoke about the global implication of the emerging HIV epidemic in the Philippines at his TED Talk in Arusha, Tanzania.



DR. ERNI JUWITA NELWAN

Consultant, Tropical and Infectious Diseases, Division of Tropical and Infectious Disease, Department of Internal Medicine, Faculty of Medicine, University of Indonesia, Jakarta Indonesia

Erni Juwita Nelwan was born in Jakarta, Indonesia (1977). She obtained her medical degree from the University of Indonesia. She also completed her internal medicine and infectious disease training at the University of Indonesia. Since 2007, she has worked at the Department of Internal Medicine, within the Faculty of Medicine of the University of Indonesia where she was appointed a lecturer. In addition to training in Switzerland and Thailand, she joined the IMPACT programme in 2007, focusing on HIV/AIDS care in one of the prisons in Bandung, West Java. She conducted her PhD research at the General Internal Medicine department within the Radboud Institute for Health Sciences (RIHS) of Radboud University Medical Center. In 2017 she finished her doctoral degree at Radboud University Nijmegen, Netherlands and was awarded her PhD.

She has authored and co-authored numerous books and papers in international journals, national journals, and symposiums, served as principal investigator and co-investigator in ongoing and completed medical trials, and is currently still involved in some prison studies in Jakarta.



DR. LEE HAN LIM

Head & Medical Entomologist (Research Officer), Unit of Medical Entomology, Institute for Medical Research, Malaysia; and

Head, WHO Collaborating Centre for Vectors

Dr. Lee Han Lim first started as a Medical Entomologist (Research Officer) in the Unit of Medical Entomology, Institute for Medical Research (IMR) in 1978 before being appointed Head of the Unit in 1993 and Head of WHO Collaborating Centre for Vectors, where he conducts research in vector biology and control. He obtained a Masters of Science (Medical Entomology) from Universiti Sains Malaysia before graduating with a PhD in this field. Dr. Lee is also a former Dean of School of Diploma in Applied Parasitology & Entomology from 2004 to 2011. He retired in 2011 and was re-employed under contract between 2011 and 2016.

His main research is in vector biology and control, with a research interest in Dengue, Zika and Chikungunya vectors, re-emerging and exotic vectors, microbial control agents, insecticide resistance, forensic entomology, maggot debridement therapy, transgenic mosquito, Wolbachia and sterile insect technique. He has a list of major achievements during his tenure at IMR with a long list of "Firsts" in research accomplishments. To date, he has a total of 315 scientific publications, 159 theses/reports/proceedings/guidelines, 512 paper presentations in seminars, 64 major research grants, 19 patents filed/granted and 9 commercialised/pre-commercialised products.



DATO' DR. FADZILAH KAMALUDIN

Director, Institute For Medical Research, Ministry of Health, Malaysia

Dato' Dr Fadzilah Kamaludin is a Public Health Medicine Specialist with MBBS (UM), and holds a Masters in Public Health Medicine (NUS), Diploma in Laboratory Research (Tokyo) and Certificate in International Field Epidemiology Training Program (Thailand). She specialises in field epidemiology and has spearheaded the Field Epidemiology Training Program (EIP Malaysia) since its inception in 2002. She was the pioneering mind behind the Public Health Laboratories and was advisor to the newly approved CDC Malaysia. She was the ex-chairman of the Malaysian National Specialist Register (Public Health Chapter) and is still a current member of the committee. She is the first Asian Woman to chair the TEPHINET Advisory Board based at US CDC, a WHO Member of the International Health Regulation Roster of Expert since 2008 and is a current member of the WHO Expert Committee for MersCoV and WHO Technical Advisor for Asia Pacific Strategy for Emerging Diseases (APSED).

She is a member of the Women Board of Directors Malaysia. Her major accomplishments include consultancies in developing the Joint Jordan, Israel and Palestine Standard Operating Procedure for Avian Influenza, Joint Evaluation for Field Training Program for Laos PRD, Mongolia and Cambodia, Accreditation Working Group for TEPHINET and Facilitator for the Applied Management Training Program USCDC. She was invited by Google. Inc to Google HQ, Palo Alto, California as an expert to develop digital disease detection and epidemiologist mapping. She is currently the editor for OSIR e-journal and a book reviewer. In addition to her current task as the Director of the Institute for Medical Research since 1st June 2016, she is also the Centre Director for SEAMEO TROPMED and Committee Member for Research Development Ministry of Science, Technology and Innovation and Committee Member of National Science Council.



PROF. DR. ADI UTARINI

Department of Health Policy and Management, Faculty of Medicine, Universitas Gadjah Mada, Yogyakarta, Indonesia

Formerly the Vice Dean for Research, community service and collaboration at the Faculty of Medicine, Universitas Gadjah Mada (2012-2016), she has been active in strengthening institutional programs to improve research atmosphere and international journal publications. Ranked 311 best Indonesian researchers in all subjects published by Webometrics 2017, she has published her work in more than 25 international health journals. Her research focuses on dengue control, public private mix in Tuberculosis control, malaria control and strengthening quality of care.

She is also currently the Project Leader for Eliminate Dengue Project-Yogyakarta (2013-2019), a project applying Wolbachia Aedes Aegypti intervention to reduce dengue cases in Yogyakarta, funded by the Tahija Foundation, Indonesia. This project (currently introduced as the World Mosquito Program) is a multi-country project coordinated globally by Monash University, Australia. She provides the overall leadership in all aspects of planning and implementation of the research as well as stakeholder engagement with key national and provincial level stakeholders. She completed her Masters degree at the Institute of Child Health, London UK and continued her PhD at the Department of Public Health and Epidemiology, Umea University Sweden.



DR. NAZNI WASI AHMAD

Senior Research Officer, Ministry of Health, Malaysia

Nazni Wasi Ahmad (PhD) is a Senior Research Officer in the Ministry of Health. She started her career as a researcher in the Medical Entomology Unit, Institute for Medical Research (IMR), Kuala Lumpur after completion of her Masters in Science from the University of Malaya Kuala Lumpur. She earned her Philosophy of Doctorate also from University of Malaya. Nazni at her earlier career pathway had great interest in fly control. She then developed her skill in forensic entomology and also in maggot debridement therapy.

Currently she is involved in dengue research where she is conducting several projects on the control of dengue vectors using novel technology. To date, she has published 127 papers in local and international peer-reviewed journals and presented more than 200 papers in scientific meetings locally and internationally. Presently, she has obtained and filed 9 patents.



PROF. LULU BRAVO

Pediatric Infectious and Tropical Diseases, College of Medicine, University of the Philippines Manila, Republic of the Philippines

Lulu Bravo is Professor of Pediatric Infectious and Tropical Diseases at the College of Medicine, University of the Philippines Manila. She is the former Vice Chancellor for Research and Executive Director of the National Institutes of Health, University of the Philippines Manila.

She has served as World Health Organization (WHO) temporary adviser and member of the WHO Technical Steering Committee of the Child and Adolescent Health Department raising awareness on the Control of Diarrheal Disease program (CDD) since 1985, followed by the WHO Integrated Management of Childhood Illness (ICMI) in recent years. She has organized and conducted hundreds of training seminars for pre-service and in-service on the WHO Case management for Diarrheal Diseases as well as on the IMCI. She has conducted clinical trials on oral rehydration solution (ORS) in the 1990s and vaccine trials in the last 15 years, and has published more than 75 papers and abstracts, locally and internationally, on various infectious diseases topics.

At present, she is President of the Immunization Partners in Asia Pacific (IPAP) and current Executive Director and immediate past President of the International Society of Tropical Pediatrics, past Chair of the Asian Strategic Alliance for Pneumococcal Disease Prevention (ASAP), and former president of the Asian Society for Pediatric Infectious Disease (ASPID).She has served in various capacities in many other Asian medical and professional societies as well as in Philippine health associations including the Philippine Foundation for Vaccination (PFV) of which she is the founding President. She is also a member of the Pneumococcal Awareness Council of Experts (PACE) and member of the TWG of the Dengue Vaccine Initiative (DVI). Her work has earned for her various honors and awards in the academic and research fields, including the Dr. Jose P. Rizal Memorial Award for Academe and the 2012 Asian Outstanding Pediatrician Award given by the Asia Pacific Pediatric Association.

Dr. Lulu Bravo completed her MD, pediatric residency and subspecialty training in infectious disease at Philippine General Hospital-College of Medicine of the University of the Philippines Manila. She completed her fellowship in paediatric infectious disease at the University of Texas Southwestern Health Science Center in Dallas, USA in 1986.



DR. BEN ROLFE

CEO, Asia Pacific Leaders Malaria Alliance

Dr. Ben Rolfe is CEO of the Asia Pacific Leaders Malaria Alliance, the secretariat of which is located in Singapore. Formerly Pacific Lead Health Advisor at the Australian Department of Foreign Affairs and Trade, Dr. Rolfe has more than twenty years experience in supporting health initiatives across 30 countries. His expertise focuses on health policy, systems strengthening and financing. Dr. Rolfe is currently based in Singapore, having previously lived and worked for long periods in the Phillipines, Cambodia, Nepal, India, Tanzania, Australia, Nigeria and Eritrea. Dr. Rolfe holds an MPH and PhD from the University of Wales, and is a Fellow of the UK Faculty of Public Health Medicine.



DR. ALAIN BOUCKENOOGHE

Associate VP and Regional Head Clinical R&D, Sanofi Pasteur, Asia Pacific hub

Dr. Alain Bouckenooghe obtained his Medical Degree at the Catholic University of Leuven, Belgium. Upon graduation as MD he worked for several years in a rural assignment as a District Medical Officer under the Ministry of Health of Zambia.

Subsequently, Dr. Bouckenooghe moved to the US and completed his residency in Internal Medicine at the University of Texas, Houston. He obtained his Master of Public Health degree at the UT School of Public Health and completed a fellowship in adult Infectious Diseases at Baylor College of Medicine. He held several academic positions during this time in the Department of Medicine at Baylor College. After initial industry experience with MSD and GlaxoSmithKline Biologicals, he joined Sanofi Pasteur in December 2006 in Swiftwater, PA, USA.

Dr. Bouckenooghe is currently located in Singapore as Associate VP and Regional Head of Clinical R&D Sanofi Pasteur, Asia Pacific hub.

SPEAKERS' BIOGRAPHIES



DR. GARY DUBIN

Senior Vice President & Head Global Medical Office Takeda Vaccine Business Unit

Dr. Gary Dubin, is Senior Vice President and Head of the Global Medical Office in the Takeda Vaccine Business Unit (VBU) and leads the Medical Affairs and Policy and Pharmacovigilance functions for vaccines.

Dr Dubin joined Takeda in September of 2015 has more than 31 years of experience in vaccine research. Prior to joining Takeda, he spent 20 years at GlaxoSmithKline (GSK) Biologicals (now GSK Vaccines) where, since 2010 he held the role of Vice President and Head, Global Late Clinical Development. During his career at GSK, he led global teams responsible for the clinical development and licensure of a broad range of vaccines addressing important unmet medical needs, including seasonal influenza (Fluarix Quadravalent and FluLaval Quadravalent), pandemic influenza (Pandemrix and Aprepandrix), meningococcal meningitis (Menhibrix and Nimenrix); human papilloma virus (Cervarix), rotavirus (Rotarix), strep pneumonia (Synflorix and protein-based vaccine in phase II development), malaria (RTS,S vaccine; submitted for licensure), herpes zoster (phase III); measles/mumps/rubella (US development program, phase III); tuberculosis (phase II), and others. He also supported Medical Affairs activities for these development programs and served as a core member of all major medical governance committees at GSK, including their Vaccines Medical Governance Board and the Vaccines Safety Board.

Dr Dubin holds a medical degree from the University of Pennsylvania and completed his Adult Internal Medicine residence training at the University of Colorado. He completed a fellowship in Clinical Infectious Disease and a postdoctoral research fellowship in Molecular Virology at the University of Pennsylvania. Prior to joining GSK, Dr Dubin served as Assistant Professor of Medicine in the Infectious Disease Division at the University of Pennsylvania and currently serves as Adjunct Associate Professor of Medicine at the same institution. He holds numerous patents in the vaccine field and has co-authored more than 85 scientific publications.



PROF. JULIET SIO AGUILAR

Professor XII, UP College of Medicine

Chair, Department of Pediatrics, UP College of Medicine, Philippine General Hospital

Head, Pediatric Clinical Nutrition Division, St. Luke's Medical Center Quezon City

Consultant, Section of Pediatric Gastroenterology, St. Luke's Medical Center Quezon City Republic of the Philippines

Professor Aguilar is chairperson of the Dengue Investigative Task Force (DITF) formed by the Department of Health (DOH) of the Philippines, a 10 member expert panel tasked to review dengue vaccine-related deaths. She obtained her Master of Science in Paediatrics and Child Health (Gastroenterology), University of Birmingham, United Kingdom, in 1988. She is a board certified fellow of the Philippine Pediatric Society and Philippine Society of Pediatric Gastroenterology and Nutrition, and International Council Member, Asian Pan-Pacific Society for Pediatric Gastroenterology, Hepatology, and Nutrition, Past President and Founding Member, Philippine Society for Pediatric Gastroenterology, and Nutrition (PSPGHAN), and Associate of Wellstart International, World Health Organization Breastfeeding Collaborating Agency.

She has received numerous awards for her work in pediatrics, including:

- One UP Professorial Chair in Pediatrics for 2016–2018, awarded by the University of the Philippines System
- The 2015 International Publication Award, given on December 16, 2015 by the University of the Philippines
- UK Education Ambassador for 2014/2015, awarded by the British Embassy in Manila, presented by Her Majesty's Ambassador Asif Ahmad
- Dr. Luis M. Mabilangan Outstanding Leadership Award, University of the Philippines Manila College of Medicine presented on December 2, 2014
- Philippine Association of Nutrition (PAN) Fellow for Outstanding Performance in Clinical Nutrition, July 2013

She has authored or co-authored 20 original research works, 13 books and book chapters, and numerous scientific papers and short articles on pediatric gastroenterology, nutrition and general pediatrics.



PROF. SRI REZEKI HADINEGORO

Professor of Paediatric Infectious Disease; Senior Lecturer at Division of Infectious and Tropical Diseases, Department of Child Health, Faculty of Medicine, University of Indonesia, Indonesia

Professor Sri Rezeki Hadinegoro MD, PhD is a paediatrician, who graduated from the Faculty of Medicine University of Indonesia, Jakarta. She has been working at the Department of Child Health in the same university since 1983. In 1986 she was certified as an Infection and Tropical Paediatric consultant. She obtained a Fellowship from the Japan Society on Promoting of Sciences (JSPS), in Kobe University and Iwate Medical University, Japan from 1993 to 1995. She graduated with her PhD in medicine from the Faculty of Medical University of Indonesia in 1996.

Prof. Hadinegoro is active in several organisations and conducts research in the field of infection and tropical paediatrics, especially in dengue and immunisation. Over the past fourteen years she has held a position in the Immunisation Committee, Indonesian Paediatric Society (IPS). Currently, she is chairman of the Indonesian Technical Advisory Group on Immunisation (ITAGI), Indonesian Ministry of Health (2007); and member of National Adverse Event Following Immunisation Committee, Indonesian Ministry of Health (past chairman 1999-2012).

Regional and internationally, Prof. Hadinegoro was appointed as a board member of Asian Society of Paediatric Infectious Disease (ASPID, past president in 2008-2010), member of the Asian Strategy Alliance of Pneumococcal Diseases Prevention (ASAP) since 2007, board member of World Society of Paediatric Infectious Disease (WSPID, 2009-2013), member of Asia Pacific Dengue Prevention Board (APDPB) since 2012, steering committee of Asian Dengue Vaccination Advocacy (ADVA) since 2012, and president elect of International Society of Tropical Paediatrics in 2015.

Prof. Hadinegoro has authored papers in scientific journals and several books. She has also been a recipient of medical awards for her strong support and participation in those activities.



DR. PRATAP SINGHASIVANON

Dean, Faculty of Tropical Medicine, Mahidol University, Thailand

Dr. Pratap Singhasivanon became Dean of the Faculty in 2016. He previously held this position from 2004 to 2012. Alongside this role he is also the Secretary General and Coordinator of the SEAMEO TROPMED Network and a researcher and lecturer in the Department of Tropical Hygiene.

He is currently Work Package leader for the Southeast Asia component of the DENFREE project (Dengue Research Framework for Resisting Epidemics in Europe) collaborating with researchers from Cambodia and France. He has much experience in cooperative international research and capacity building, including the recently completed TRANSEPI project which looked at the comparative epidemiology of P. falciparum and P. vivax transmission in Papua New Guinea, Thailand, and Brazil.

Dr. Pratap Singhasivanon's primary research area is malaria epidemiology, but he has an interest in many of the other vector-borne diseases that affect populations in Southeast Asia.

Dr. Pratap Singhasivanon's current research, as part of the EU funded DENFREE project, involves the collection of retrospective and prospective data concerning dengue in Thailand and Cambodia. The project aims to use this data to identify key factors determining dengue transmission, the outcome of infection and the spread of epidemics.

Between 2011 and 2015, he was the Thailand PI on the Bill and Melinda Gates Foundation funded project 'Longterm Continuous Culture of Plasmodium vivax Blood Stages'. This project, involving research institutions in the USA, Australia and Japan as well as Thailand, aimed to establish an easy protocol for the continuous culture of P.vivax blood-stage parasites producing infective gametocytes.

The TRANSEPI project, for which Dr. Pratap Singhasivanon's was also the Thailand PI, set out to determine the dynamics of malaria transmission stages in hosts and vectors in three non-African settings (Brazil, Papua New Guinea, and Thailand) and to determine bottlenecks and their impact on transmission and parasite population diversity.

In his role as Secretary General and Coordinator of the SEAMEO TROPMED Network, Dr. Pratap Singhasivanon has supported the research of other Southeast Asian academics through the organization of training, publishing of The Southeast Asian Journal of Tropical Medicine and Public Health and providing scholarships.

DELEGATES' ABSTRACTS

Epidemiology of dengue fever in Taiz, Yemen during war

Khairallah A. Alghazaly, Boon-Teong Teoh, Mohammed A. K. Mahdy, and Sazaly AbuBakar

Institutions and Country TIDREC, University of Malaya, Malaysia

Abstract: The association between wars and the dengue transmission has long been well-recognized. Recently, the current civil war in Yemen which started in March 2015, caused widespread destruction of the country's infrastructures and displaced more than 2.2 million people into living in cramp shelters with inadequate healthcare support. Taiz, a southwestern governorate in Yemen experienced among the fiercest fighting. In Taiz governorate an extreme spike in dengue cases was recorded since August 2015, soon after the start of the current civil war. A total of 1,178 cases were reported between week-32 to week-36 of 2015, in comparison to only 54 dengue-suspected cases during the same period in 2013. In this study, the laboratory diagnosis of dengue, the isolation of dengue virus (DENV) as well as a cross-sectional questionnaire survey about the knowledge, attitude and practices (KAP) towards dengue were conducted among febrile patients seen in the few surviving healthcare facilities within Taiz-city during the period between July and October 2016 at the height of the war. Dengue was laboratory confirmed in ~51% of the clinically suspected dengue patients seen in Taiz, Yemen in 2016. DENV-2 Cosmopolitan genotype is the pre-dominant causative virus. Also, people in Taiz city of Yemen have a vague understanding of the transmission of DF, their attitudes towards various aspects of the disease were weak and they rarely undertook preventive practices against the disease. Therefore, it is expected that the public health problems associated with dengue will worsen with the continuing civil war in Yemen.

Standardization in Operationalized Maps: Essential Element in Monitoring the Annual Trend of Dengue Morbidity and Mortality

JRC Medina¹, S Kawamura², KE Hung², F Furukawa², KI Tiu³, D Nonaka¹, PMR Hernandez¹, FB Garcia⁴, M Kaneko², J Kobayashi²

Institutions and Country:

1 Department of Global Health, Graduate School of Health Sciences, University of the Ryukyus, Okinawa, Japan

2 Department of Environmental and Symbiotic Science, Rakuno Gakuen University, Hokkaido, Japan

3 Office of Technical Services, Department of Health, Philippines

4 College of Public Health, University of the Philippines Manila, Manila, Philippines

Abstract:

Background: Data visualization with maps is useful for dengue surveillance and monitoring the effectiveness of control strategies. However, variations in interpretation may arise depending on how variables are defined and operationalized. This study aimed to spatially and temporally describe dengue morbidities and mortalities across three map transformations.

Methods: Aggregated regional data of dengue cases from 2012 to 2017 in the Philippines was obtained from the Department of Health for a mixed-typed ecologic study. Annual cumulative incidence and mortality rates (both per 100,000) were estimated and indirectly standardized in each region. Choropleth maps were created using ArcGIS 10.5.1 (ESRI, 2016) to compare the variation across the transformations. To operationalize the maps, natural breaks were used for classification into five classes.

Results: Regions III, IVA, and NCR had the highest morbidity counts across years. However, incidence maps showed temporal persistence in CAR (2012- 2016) and Regions VI and VII (2016-2017). Visualizing the standardized morbidity rates validates the incidence maps. Most fatalities were reported almost consistently from Regions IVA, VI, VII, and XI, but the mortality rate maps excluded Region IVA. Mapping the standardized mortality rates supported the spatial distribution in the latter one.

Conclusion: The spatial distribution of dengue cases and mortalities across years varies depending on the operationalization of maps. Integration of standardization in disease mapping is essential to validate the interpretation of count and rate maps. This will be helpful in identifying and prioritizing foci where control efforts are mostly needed.

DELEGATES' ABSTRACTS

Dynamic modulation of DC-SIGN receptor expression on platelets in dengue

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Abstract:

Background: Platelet activation and Cells expressing DC-SIGN receptors have been reported to play a major role in dengue infection. The present study is designed to assess the expression of the receptor on platelet surface collected from dengue patients and to study its association of platelet RNA positive for dengue virus.

Methods:This was an analytical cross-sectional study carried out in JIPMER hospital, Puducherry. 44 patients with dengue infection (cases) and 44 patients with non dengue acute other febrile illness(controls) were recruited. Venous blood was collected on :admission day, day 3 and on discharge. Platelet rich plasma extracted was assessed for DC-SIGN levels using BD FACS Calibur[™]. Platelets separated from cases were subjected to RNA extraction and detected the presence of viral RNA.

Results: The study observed a decreased expression of DC-SIGN on platelets in cases compared to controls on all the time points. An increasing trend of expression of DC-SIGN on platelets in cases during the course of infection with decrease in expression in cases who were positive for NS1 antigen was observed. Dengue viral RNA was detected only in 16 cases out of 30 cases. DC-SIGN expression was found to be decreased in patients positive for platelet DENV RNA when compared with patients negative for platelet DENV RNA.

Conclusion: Our results suggest that DC-SIGN which is a receptor for viral capture, might be down regulated on platelets in patients with dengue infection. This could be part of protective response from the host to prevent platelets from taking part in the ongoing conflict between immune system and dengue virus.

Therapeutic potential of mushroom extracts in in vitro dengue virus infection

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Abstract:

Background: Dengue disease is a mosquito-borne viral infection that has become a major public health concern worldwide. At present, no effective anti-dengue agents available for treatment of dengue infection. In this study, culinary and medicinal mushrooms were selected to evaluate their anti-dengue activity as they possess a wide range of pharmacological properties.

Method: Mushrooms selected for this study were Cordyceps militaris, Lignosus rhinocerotis, Pleurotus giganteus, Hericium erinaceus, Schizophyllum commune and Ganoderma lucidium. Hot aqueous extract (HAE), ethanol extracts (EE) and its fractions, hexane soluble (HSE), ethyl acetate soluble (ESE) and aqueous soluble (ASE) extracts were prepared from selected mushrooms. Cytotoxic effect of extracts was evaluated by MTT assay. The antiviral effect against DENV2 in Vero cells was evaluated by plaque reduction assay and real-time RT-PCR. The anti-inflammatory effect of extracts was studied using human monocytes infected with DENV-2 by measuring the cytokine coincide with dengue infection, IFN- γ , TNF- α , IL-1 β , IL-6, IL-8 and IL-10.

Results: HAE and ASE of L. rhinocerotis, P. giganteus, H. erinaceus and S. commune were least toxic to Vero cells and showed very prominent anti-dengue activities during simultaneous and post internalization treatment. They also showed broad spectrum of anti-dengue activity by inhibiting all other dengue serotypes. Chemical composition analysis showed that the major components in mushroom HAE and AF were glucan and proteins. Mushroom extracts also showed prominent anti-inflammatory effect towards IFN- γ , IL-10, TNF- α , IL-6 and IL-1 β .

Conclusion: The anti-viral and anti-inflammatory activity showed by mushroom extracts had proven that mushroom extracts have a great potential to develop as a therapeutic agent for treatment of dengue infection.

DELEGATES' ABSTRACTS

An insight of an outbreak investigation report of Dengue in Samdrup Jongkhar, Bhutan, 2017

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- 3 Royal Centre for Disease Control, Serbithang, Thimphu, Bhutan

Abstract:

Background: Dengue was first identified in Phuntsholing, Bhutan in 2004, since then, it has spread throughout its neighbouring southern district towns causing large outbreaks. We conducted an epidemiological, socio-demographic and entomological survey to determine the causes of outbreak and to provide preventive and control measures to the administration.

Methods: All confirmed cases of dengue fever diagnosed on basis of NS1 Ag and IgM rapid test kits at Samdrup Jongkhar District hospital were studied for their socio-demographic profile. An entomological survey was done for vector identification and control measures. A total of 187 confirmed cases were studied.

Results: Demographically, Dengue affected maximum number of Businessmen followed by Civil servants between 20-40 years of age with male predominance. The cases peaked during the monsoon and post monsoon season. The patients invariably presented with fever followed by headache, retro-orbital pain, myalgia and rash and very few had bleeding manifestations. House Index was recorded high in all areas of the town. The species identified was mainly Ae.aegyptii. > 60% of the population were aware about Dengue but unaware about preventive measures. >70% of the population stored water at home and <10% of the population changed the stored water.

Conclusion: The 2017 outbreak was exacerbated drinking water shortage, where the tenants had to store water in buckets and containers indoor for weeks or more. Community collaboration and support is crucial for prevention of future outbreaks, particularly through the elimination of breeding places for Aedes aegypti.

Risk and prognostic factors for severe dengue in adult population in Intensive Care Unit, Hospital Raja Perempuan Zainab II, Kota Bharu, Kelantan

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Abstract:

Background: The understanding of the associated risk and prognostic factor for development of severe dengue is fundamental to improved clinical outcome of the patient. This study was initiated to identify risk and prognostic factor severe dengue in adult patient admitted into Intensive Care Unit.

Method: This was a retrospective cross-sectional study involved 129 adult patients with laboratory-confirmed dengue fever infection who were admitted in the intensive care unit, Hospital Raja Perempuan Zainab 11 from 1 January 2014 till 31 December 2015. The patients were categorized into two groups. "World Health Organization 1997, 2009 criteria for dengue severity was applied to defined severe and non-severe group. The medical record of the entire recruited patient was recorded for the following information; demographic factor, clinical manifestation, laboratory examination, the complication in intensive care unit and the clinical outcome. Logistic regression modeling was performed to determine factor independently associated with dengue severity and poor outcome.

Result: Data of 129 patients were analyzed. Seventy-four patients were enrolled in severe group and another fifty-five patients were enrolled in non-severe group. Mean age of the patient is 36.2[33.32-39.08] and 59% are females and another 40.3% are males. The most common comorbidities included hypertension (24%), diabetes mellitus (11.6%) and ischemic heart disease (2.3%). Seven variables were significantly associated with severity of dengue fever at univariable level. However, only two variables were significance after multivariable analysis, namely aspartate aminotransferase (AST) (OR: 1.001[1.00, 1.00], P=0.021); and creatinine (OR: 1.014[1.00, 1.03], P= 0.019) Seven variables were significant after multivariable analysis, namely the SOFA score (OR: 1.94 [1.35, 2.77], P < 0.001)

Conclusion: In this study, an elevated aspartate aminotransferase (AST) and creatinine level increase the risk of development of severe dengue. Patient with higher SOFA score was associated with poor dengue outcome.

A Health Economist's Perspective on Dengue Burden, Costs and Research

Donald S. Shepard

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Trends show an increase in global dengue burden in contrast with improvements for most infectious diseases. A combination of rising incidence and updated data generated a global cost for 2016 of \$18 billion, twice the published value for 2016. Symptomatic dengue illness is not only an acute illness but also a chronic one. A systematic literature review suggests that 34% of dengue patients are still experiencing symptoms 20 days after onset, primarily fatigue and depression. While these symptoms' prevalence gradually subsides, they do not disappear until, on average 11 months after onset. The median DALY burden of a hospitalized episode (0.0351 DALYs) was only 14% above that of an ambulatory episode (0.0307). Combining both hospitalized and ambulatory cases, the median burden in Disability Adjusted Life Years (DALYs) from a dengue episode was 0.0315 DALYs (95% certainty interval: 0.0178 to 0.0925). Surprisingly, 63% of this DALY burden came from the chronic or persistent phase of dengue, with only 37% from the more widely studied acute phase. Dengue patients, particularly children, appear to be hospitalized often as a precaution in case the disease were to get suddenly worse. Research that could better predict the course of a dengue episode and/or suggest treatment that would mitigate its uncomfortable and potentially debilitating complications represent important improvements to the health and the economies of affected countries.

Dengue Disease Burden in the Young and Old: Updates on Population-Based Disease Burden of Dengue

Donald S. Shepard

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Background: Dengue is endemic in 141 countries and territories. Using data from 2013, my colleagues and I published the first empirically-based global estimate of the economic costs of symptomatic dengue illness. This presentation seeks to review and update the results of that study. As new technologies for dengue prevention and control are developed and tested, such as vaccines, and several innovative vector control initiatives (sterile insect techniques, community control, and Wolbachia), these economic data can inform about the levels of investment that would be economically justified.

Methods: We conceptualize dengue cases based on four categories of setting (hospitalized, ambulatory, and nonmedical) and outcome (fatal cases). The cost of dengue cases for each category were conceptualized as the product of quantity (number of cases in that category) times the unit cost of that category. The quantities are epidemiologic data. As with the 2013 study, the epidemiological study relies heavily on Global Disease Burden (GBD) study published by the Institute of Health Metrics and Evaluation for epidemiological data. That study has generated estimates of the numbers of symptomatic dengue cases and deaths globally and by country since 1990. The latest data are for the year 2016. The study uses epidemiological models to adjust for gaps and possible misclassifications in data. Each update not only adds more recent years, but also uses the newest data and methodologies to update estimates for all previous years. We had three sets of data: 2013 original, 2013 updated, and 2016.

The unit cost is the sum of so-called direct costs (medical care) and indirect costs (the value of lost productivity). In the 2013 study these were based on literature with models calibrated to existing data to adjust for the year and location in which data were collected. We updated the direct cost of each category of dengue case based on per capita health expenditures in US dollars. This measure, which combines general medical inflation, changes in technology and intensity of care, and the exchange rate between local currency and the US dollar, was reported for most countries by the online data aggregator knoema. Indirect costs were adjusted based on changes in per capita GNI, available for most countries from the World Bank. These data were obtained by country for the 10 countries with the highest aggregate costs. Rates of change in unit costs for countries 2 through 10 were used to project changes for the remaining countries.

Results: The number of symptomatic dengue cases has increased from 23 million in 1990 to 101 million in 2016, while dengue deaths grew from 8974 in in 1990 to 37,780 in 2016. Comparing symptomatic cases in the three latest periods, the 2013 original number was 58.4 million; the 2013 updated number 89.4 million, and the 2016 number was 101.1 million. The corresponding numbers of fatal cases were 11.586, 44,483, and 37,780, respectively. Aggregate global dengue costs in US dollars grew from \$8.89 to \$15.48 and then to \$18.42 billion. The cost per case rose from \$152.25 in 2013 to \$173.30 with 2013 updated to \$274.40 in 2016.

Discussion: The difference in IHME estimates of dengue cases for 2013 represents an 53% increase from original to updated values. The upgraded 2016 level represents a more modest an increase of 11%. The breakdown by category of countries shows that all 3 groups increased, with the smallest countries (in urban) being the largest increase. In summary, updated methods and data sources are respesented the most important factor.

Next Generation Dengue Vaccine

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The major obstacle of dengue vaccine development is the cross-reactivity among antibodies against the different DENV serotypes (designed as DENV1-4) that are 67-75% identical at the amino acid level. All four DENV serotypes can cause a large spectrum of disease, from dengue fever to more severe and potentially lethal disease. Strikingly, while a primary infection by one DENV serotype induces a lifelong immunity against re-infection by the same serotype, subsequent infections by heterologous serotypes can increase the risk of developing severe dengue, a phenomenon due to non-neutralizing or sub-neutralizing antibodies and called antibody-dependent enhancement (ADE). Thus, a dengue virus vaccine must induce simultaneously protective immunity against the four serotypes. Strikingly, vaccine candidates have focused on induction of serotype specific neutralizing antibodies, with no cross reactivity, to avoid the ADE.

Recently, Sanofi Pasteur has announced that the current dengue vaccine (Dengvaxia[®]) is not suitable for individuals without prior exposure to dengue virus (DENV). New analysis from six years of clinical data of Dengvaxia[®] showed that the vaccine provides persistent protective benefit against dengue fever in those who had prior infection. However, for those who have not been previously infected by the virus, more cases of severe disease could occur in the long term following vaccination upon a subsequent DENV infection. The enhanced risk of severe dengue in seronegative individuals suggested vaccine-induced ADE phenomenon.

We and others have demonstrated that T cell immunity play an important role in protection against symptomatic and severe dengue (Simon-Loriere 2017; Weiskopf, et al. 2013). The T cell epitopes are lacking in most dengue vaccine candidates and the recently licensed dengue vaccine (Dengvaxia[®]). We propose here a new concept of dengue vaccine development. We believe that the more efficient dengue vaccine should contain both B (Envelop protein) and T cell antigens (Non-structural proteins). The better animal model for prediction of vaccine efficacy should demonstrate its protection against the effect of ADE, not only primary infection. In addition, recent evidence suggested that ADE could create problem for Zika viral infection. Is it possible to create a single component penta-valent dengue & Zika vaccine that could protect against the four dengue serotypes and ZIKV infection? A single component vaccine is likely to overcome the problem of imbalanced immunity against all four DENV serotypes of the tetravalent dengue vaccines.

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Dengue Surveillance – Pakistan Experience

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Dengue has emerged in Pakistan over the last decade as an important public health problem and has attracted public and political opinion alike making it one of the most heavily budgeted disease. The first confirmed outbreak of Dengue in Karachi, Pakistan occurred in 1994 with 145 cases and 1 fatality. The second outbreak was reported from southern Balochistan where 57 cases were detected. In 2003, 1000 cases with 7 deaths were reported from Haripur district of KPK. During 2005-2006, more than 3,640 patients were reported with 40 deaths, of which 37 were from the province of Sindh. In 2011, world's so far biggest Dengue epidemic occurred in Lahore, capital of Punjab province with 0.6 million suspected and 21685 lab confirmed cases with 350 deaths in a span of four months. To combat this unprecedented Dengue Epidemic, government mobilized all its resources and eventually succeeded in minimizing the disease incidence. Strategies adopted under the guidance of national and international public health experts proved effective and resulted in curtailing the disease to a minimal level in subsequent years.

IT expertise laid the basis for modernization of data consolidation and reporting methodologies. Development of online databases for disease and vector surveillance has revolutionized the way public health was being dealt within the region. Vector Surveillance System, Dengue Tracking System and Dengue Patient Portal were launched and all the data related to dengue surveillance is now reported through these systems, which is reviewed on almost daily basis.

Disease surveillance includes case reporting in the form of suspect, probable and confirmed cases (criteria devised by Dengue Expert Advisory Group DEAG). The information is entered on a preset template available on Dengue dashboard within 24 hours of presentation from health care facilities/providers in both public & private sector. (This involved extensive training of data entry operators).

Only Designated health care providers (public & private) are responsible for case management and referral of Dengue cases as per DEAG guidelines. All reported cases undergo case response, which includes submission of duly filled Case Investigation Forms, complete vector survey, mechanical/chemical elimination of all breeding sites, IRS & Indoor fogging of all houses in a radius of 100 meters (approximately 12 houses on each side of suspected incidence site/ sites). Geotagging is done using android devices and health education sessions are conducted with family members/ co-workers.

Integrated Vector Surveillance (IVS) which includes indoor and outdoor surveillance and calculation of Breateau Index is based on real time monitoring of the vector population. This data is closely associated with the daily mean temperature including both min & max together with relative humidity % (RH) along with rainfall (critical 10 mm or more). GIS analysis, hotspot identifications and SatScan are used for alert generation and future planning on weekly basis during peak season and biweekly basis during off-peak season. Data is also published in a weekly Bulletin form and analysis of this data helps authorities to plan and take strategic decisions and review performance from centralized interface.

Update on CYD-TDV Dengue Vaccine – Sanofi Lunch Symposium, 5th July 2018

Anh Wartel

Sanofi Pasteur, Regional Medical Affairs, Asia JPAC

The CYD-TDV dengue vaccine developed by Sanofi Pasteur has been granted a license in 20 countries following 20 years of research and scientific evaluation in accordance with the WHO and EMA Guidelines for dengue vaccine development using the gold-standard assay, PRNT50 assay showing a continued reduction of hospitalized dengue cases up to 5 years after the 1st injection in the indicated age of 9 years from the pivotal efficacy studies conducted in Asia and Latin America regions.

As part of Sanofi Pasteur's ongoing commitment to evaluate the long-term impact of the dengue vaccine consistent with WHO Position paper issued in July 2016, additional supplementary analysis of the 3 CYD-TDV efficacy studies' samples were subsequently conducted to further characterize the vaccine performance in people with or without prior dengue infection and the results confirmed the clear benefit of the vaccine in people who had had past dengue infection prior to vaccination, including persistent protective benefit against dengue, hospitalized dengue and severe dengue up to 5 years after the 1rst vaccination. This translates over a 5 year-period to a reduction of 15 hospitalizations or 4 severe episodes due to dengue per 1000 vaccinees with previous dengue infection.

In light of the new findings, an assessment of Benefits and Risks Associated with Dengue Vaccination using a Dynamic Modeling Approach will be presented as well as the recent SAGE working group recommendations on the use of the CYD-TDV dengue vaccine in endemic countries, which would trigger new paradigms of dengue vaccination for public program implementation.

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How Reliable Are Laboratory Diagnosis Methods For Arboviral Diseases

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With regards to the WHO guidelines 2009 for Dengue virus infection with and without warning sign (DF/DHF/DSS), clinical manifestations of plasma leakage are not obvious until almost the day before defervescence day, at the point of which is the critical life threatening period when patients require immediate clinical intervention or are at risk. During the first 2-5 days of acute febrile illness, virus particles NS1 protein are secreted in the circulation, meanwhile specific IgM and IgG start to rise during late acute and convalescent phases. The kinetics of these dengue specific biological markers are well determined and documented. Conventional lab diagnosis including nucleic acid amplification and identification (RT-PCR based technology), virus isolation, NS1 ELISA, IgM/IgG ELISA, Hemagglutination inhibition (HAI), Plaque Reduction Neutralization Test (PRNT) are available and widely used successfully especially in health center and research institutes. These assays are time consumed, and require well-equipped laboratories, with highly experienced personnel. In regions where more than 2 arthropod borne viruses co-circulate, assays with high sensitivity and specificity are especially needed. Development of rapid tests are essential for patients not only at public health centers but also in remote poor resource-setting points of care as patients can be diagnosed and sent home under close observation and follow-up guidelines upon disease progression. Physicians can provide clinical management plans including reduced cost for other differential diagnosis. It is our intent to discuss how these rapid tests were developed and evaluated.

Pre-dengue-vaccination Testing- Reliability and Practicality

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Dengue is one of the most common mosquito-borne diseases causing expanding morbidity and mortality in tropical and subtropical regions of the world. Currently, there is only one licensed dengue vaccine. This chimeric yellow feverdengue vaccine (Dengvaxia) contains surface proteins of all 4 serotypes of dengue virus but non-structural proteins of yellow fever virus. The vaccine efficacy in a phase 3 clinical trial was 65.6% in children aged 9-16 years. However, the vaccine provided lower efficacy but higher hospitalization rate due to dengue in children who were seronegative at baseline. This issue raises the question on pre-vaccination testing for dengue serostatus.

There are many methods to assess the dengue serostatus. However, there have been relatively few data on the sensitivity and specificity of each test. Plaque reduction neutralization test is currently the most specific test and has been used as a gold standard but is expensive and laborious. Other tests including IgG-enzyme linked immunosorbent assay (IgG-ELISA) and hemagglutination inhibition test (HAI) are cheaper but less specific.

The factors that should be considered regarding the practicality of pre-vaccination testing such as dengue seroprevalence, accuracy and cost-benefit of the test, and feasibility of blood testing will be also presented and discussed.

Critical Care In Dengue Management - Country Experience: Thailand

Nattachai Srisawat

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Dengue is one of the re-emerging infections in the Tropics. There is no specific drug to treat this condition. Supportive treatment including hemodynamic optimization, fever control, and prevention end organ injury is the only available treatment. Therefore, every suspected/confirmed dengue patients should be assessed for fluid status. Lactate and bedside ultrasound has been applied to detect plasma leakage early in severe dengue infection. Currently, dynamic parameters (stroke volume variation, pulse pressure variation, inferior vena cava (IVC) collapsibility index, passive leg raising test, and end expiratory occlusion test) predict the fluid responsiveness better than static parameters (central venous pressure, pulmonary capillary wedge pressure). If the patient shows signs of dehydration, the fluid of choice is still crystalloid rather than colloid. Norepinephrine is still the vasopressor of choice. Finally, the target mean arterial pressure (MAP) should be at least 65 mmHg except in chronic hypertension patients who required a MAP of at least 80 mmHg.

Management Of Dengue In Adults - Country Experience: Philippines

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The Philippines remains hyperendemic for dengue 65 years after the first ever severe case of dengue was described here. In the wake of the recent mass dengue vaccination controversy, proper management of dengue fever remains the most effective means of preventing deaths from severe dengue. We examine local trends of dengue cases and fatality rates among adults, and describe country-specific management guidelines patterned after the 2009 WHO Dengue Guidelines.

Diagnosis And Treatment Of Dengue Fever In Indonesia

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The first dengue cases in Indonesia were reported in 1968, and since the last 45 years, dengue hemorrhagic fever has spread to 33 provinces and to almost all districts in the country.¹ In 2015, there were 126.675 dengue hemorrhagic fever patients in all over Indonesia, with case fatality rate was 1.229.²

In term of clinical diagnosis and management for dengue virus infection in adults, we use the WHO guidelines 2011 with the classification of: dengue fever, dengue hemorrhagic fever (DHF) grade I, II, and dengue shock syndrome (DHF grade III, IV).3 In addition to that, the presence of preceding warning signs, such as: persistent vomiting, abdominal pain, lethargy or restlessness or irritability, postural hypotension, and oliguria are observed during hospital care.³

The NS-1 dengue protein and serology of dengue (IgG, IgM) are measured to confirm the diagnosis of dengue virus infection. Serial complete blood count, initial ALT/AST, and chest X-ray are performed as a baseline evaluation. Additional laboratory tests will be performed as indicated.

The management of dengue hemorrhagic fever follows the algorithm provided by the ministry of health of Republic of Indonesia. The algorithm accommodates the four stage of WHO clinical classification of dengue virus infection.⁴

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New Initiatives in Managing Dengue Vectors

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Dengue is a serious Aedes borne disease common in tropical and sub-tropical countries including Malaysia. Presently, dengue control depends solely on the control of the two most important vectors, Aedes aegypti and Ae albopictus. Despite intensive and extensive control efforts by health agencies using conventional vector control measures, the disease continues to spread unabated. Innovative and effective dengue vector control tools and concepts are urgently needed. New insecticide-based tools include outdoor residual spraying whereby deltamethrin is deposited onto spravable surfaces to kill adult mosquitoes and initial large scale field evaluation indicated promising results. An insecticide impregnated paint is now available for indoor residual treatment. Other insecticide-based innovations include: autodissemination ovitrap which uses Aedes adults as a transporting vehicle to disseminate pyriproxifen to breeding containers, and application of insecticide exhibiting simultaneous adulticiding and larviciding; both methods showed very encouraging results. Control based on biological agents includes use of Bacillus thuringiensis israelensis (Bti) and Wolbachia bacterium. Regular mass space application of Bti suppressed dengue, while Wolbachiainfected Ae aegypti are incapable of supporting development of dengue virus, and suppression of vector population via cyptoplasmic incompatibility. Gene-based sterile insect technique using the RIDL technology and gamma ray sterilisation for both Aedes aegypti & Ae albopictus control has now been actively researched and field trials are pursed to evaluate the effectiveness of the technology. Mechanical autocidal trap is also developed to trap both adult & larva and mass scale field evaluation indicated impact on dengue transmission. In other innovations, dengue outbreak prediction capability is enhanced by developing mathematical models based on environmental data and analyses utilising neural networks. A multi-pronged approach integrating these new tools would further enhance and optimise effectiveness of dengue control.

Eliminate Dengue Program (EDP) Yogyakarta: The Pathway to apply Wolbachia technology as an alternative strategy to control dengue.

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Introduction: Dengue remains as a public health threat, where effective interventions are limited. Wolbachia is a potential vector control technology in which WHO has recommended carefully planned pilot deployment under operational conditions accompanied by rigorous independent monitoring and evaluation that builds entomological capacity to support operational use. This presentation explores the implementation challenges faced by Eliminate Dengue Program-EDP (or currently World Mosquito Program-WMP) to introduce this technology and strategies to measure its impact on dengue transmission.

Methods: EDP is a multi-phase research study conducted in Yogyakarta Special Province which consists of 4 phases: Assessing safety and feasibility of the technology (Phase 1); Small scale release to assess the feasibility of Wolbachia infected mosquitos to establish in natural environment (Phase 2); Assessing the impact of Wolbachia deployment using cluster RCT (known as the AWED-Application of Wolbachia to Eliminate Dengue in Phase 3); and Policy adoption and scale up (Phase 4).

Results: Aedes aegypti was the main vector responsible for Dengue in Yogyakarta. Wolbachia was commonly found among insects in the study area and genetically identical with Wolbachia used in the study. Wolbachia infected mosquito used in the study has strong vector competence capacity, and has similar genetical and behavior characteristics with local mosquitoes. With these findings from phase 1, a pilot release was conducted in four hamlets of Sleman and Bantul Districts. After four years of monitoring, Wolbachia was successfully established in the mosquito natural environment and Wolbachia infected mosquito in the field retained similar vector competence capacity. Based on active surveillance system, no dengue local transmission was found in the area with Wolbachia establishment (Phase 2). Prior to large scale implementation in the City of Yogyakarta, an independent risk assessment was carried out and concluded that the risk of Wolbachia technology was negligible. An impact study (Phase 3) was then initiated and is currently still ongoing (the AWED study). Twenty four clusters were randomized in public, with 12 clusters selected as the intervention areas. We assume that there will be a 50% decrease of dengue cases in the intervention areas.

Conclusion: Wolbachia is a potential technology for dengue control strategy. Initial results show Wolbachia capacity to prevent dengue transmission. The AWED Study to assess the impact of a wide scale Wolbachia release on dengue transmission is still on progress.

Sterile Insect Technique – Repurposing for Aedes Control

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Both species of Aedes aegypti and Aedes albopictus are geographically widespread in Malaysia and are prolific breeders in artificial/natural containers. These two species are vectors of human arboviruses of dengue, Zika and chikungunya, with Ae. aegypti being the primary vector for dengue. Despite intensive and extensive control efforts by health agencies, these diseases continue to spread unabated. WHO has recommended the use of Sterile Insect Technique (SIT) as an innovative tool in the Global Vector Control Response 2017–2030 (GVCR), which provides a new strategy to strengthen vector control worldwide through increased capacity, improved surveillance, better coordination and integrated action across sectors and diseases. Hence, SIT has emerged as an potential control tool in managing Aedes vector population. SIT application against agricultural pest has been very successful for eradication as well as elimination of certain pests. SIT application in public health has been studied intensively for the past decades, however, implementation of SIT on Aedes mosquitoes, particularly Ae. aegypti is limited to date. SIT relies on the production and sustained release of sufficient sterile males to induce sterility in the wild females which, over time, causes the target population to crush. The use of SIT has no regulatory requirements in Malaysia. This study served as a preliminary investigation in exploring the possible application of SIT as one of the dengue control strategies. The

study aimed at determining the optimum sterilizing dose rate from Caesium 137 (137Cs) gamma irradiation and to observe the life stage parameters of gamma ray irradiated wild-type and laboratory Aedes aegypti male. This serves as a first attempt in comparing the differences between lab strain versus wild strain in terms of emergence rate, longevity and mating ability. Laboratory and wild strain pupae were exposed to six different dosages (5 Gy - 100 Gy) of 137Cs gamma irradiation. The results indicated that the effective and optimum irradiation dose was 50 Gy and complete sterility was achieved, without adversely affecting the male mating competitiveness of Ae aegypti. Field evaluation of radiation-sterilised Ae aegypti in dengue hotspots is now being planned.

Communication and Advocacy Take Priority in Dengue Vaccination Programs

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The first Dengue vaccine to be licensed for use in the country that became the first one to put it in a national immunization program is now in the midst of a huge controversy that has created panic . hysteria and immeasurable anguish to about 800,000 vaccinated children and their families in the Philippines. Consequently, a devastating impact has come upon not just on the dengue vaccine itself but on the country's national immunization program (NIP) as a whole, resulting in a significant reduction in childhood vaccine coverage. Disease outbreaks and epidemics are to be expected in the near future with possible catastrophic effects if nothing is done to restore vaccine confidence among the people.

What or who is to blame? The answers may not be easy but for decision- and policymakers, there are some lessons to be learned that can prove beneficial in the introduction of a dengue vaccination program and may prevent some of the unfortunate, related events that occurred in the Philippines. Besides the standard requirements for the introduction of new vaccines in the NIP, which include among others; surveillance for Disease Burden, Health Economics and funding issues, as well as Health System infrastructure incorporation and logistical concerns, the following items are deemed essential before a mass dengue vaccination program is conducted.

Lesson no.1: Establish a Good Communication and Advocacy Plan that addresses the rationale for the Dengue vaccination – Create Simple and Clear messages

Lesson no. 2 : Engage Partners and other Stakeholders including Patient Groups and Media - Know the Target Groups

Lesson No.3 : Conduct research and pilot projects first prior to a large-scale national or sub-national introduction- Be familiar with potential problems, issues and concerns.

Last but not least, 4. Consider vaccines as an Investment in Health and Not as Weapons for political gains or self-aggrandisement.

Countries need to share experiences and lessons in new vaccine introduction to ensure the success of any immunization programs.

LECTURE SYNOPSES

Current Status of Dengue Vaccines – Challenges and Opportunities

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The development of dengue vaccines represents a spectrum of stages of development and promising options. Currently, one vaccine is licensed; two are in Phase 3 trials, and several are in Phase 1 and 2 trials. As a health economist and policy analyst, these perspectives guide this presentation.

The licensed vaccine was developed by Sanofi Pasteur and trademarked Dengvaxia. Following the successful completion of two Phase 3 clinical trials across 10 countries in Asia and the Americas, Dengvaxia was first licensed in 2015 and as of early 2018, was licensed in 19 countries around the world for use in endemic countries, generally in persons aged 9 to 60 years of age. Its administration, based on the clinical trial, requires 3 doses spaced 6 months apart. Dengvaxia had been in use in two public programs, one in schools in the Manila region of the Philippines and the other in the Brazilian state of Parana. In November 2017, Sanofi released new results of 61 months of follow up. Using a specially developed NS1 assay, Sanofi separated results by sero-status at first vaccination. The results showed that the vaccine continued to provide high protection in seropositive vaccinees, but increased the risk of hospitalization for dengue in seronegative vaccine recipients compared to controls. Seizing on this safety signal, the Philippines discontinued its program and the state of Parana suspended future use of Dengvaxia. In a June 2018 report, the World Health Organization recommended that the vaccine be administered only to persons who have had a prior dengue infection, based on clinical history or individual sero testing, and Sanofi is changing the vaccine label. The development of an appropriate diagnostic test is underway.

Takeda Vaccines and Butantan are conducting the two Phase 3 trials underway. The Takeda trial, underway in 8 countries in Latin America and Asia, has completed its target vaccinations of about 20,000 children. It has an easier administration schedule than Dengvaxia, requiring only two doses 3 months apart. Preliminary outcomes are expected at the end of 2019, though follow up may continue. The Butantan trial, underway in Brazil, involves a vaccine licensed from the US National Institutes of Health and requires only one dose. Merck has licensed the NIH vaccine for the US and Europe and is currently conducting Phase 1 and 2 studies. Indian vaccine companies have licensed the NIH vaccine for their country and are currently in early testing.

As the public health community awaits trial results, experience with Dengvaxia and other vaccines and mathematical models can inform policy. While several economic analyses, including ones by my colleagues and me, show that Dengvaxia would be cost-effective, the current absence of public programs shows that affordability and safety perceptions are critical. In Mexico, for example, despite thorough preparations for dengue vaccination and early licensure, concerns about safety and financial constraints likely prevented any public programs there. Similarly, despite Brazil having the world's highest number of reported dengue cases (over one million per year) and the country's outstanding tradition in vaccine introduction, the Brazil's economic crisis meant that the national government could not introduce the vaccine. Experience with another vaccine, the first rotavirus vaccine, showed that a visible complication, intussusception, precluded the use of the vaccine even if benefits had outweighed risks. Experience with pneumococcal vaccines showed that two competing vaccines (from Pfizer and GSK) can coexist, with countries balancing Pfizer's greater effectiveness against its higher price.

If a point-of-care test for prior infection were developed and the other vaccines proved effective, WHO's recommended strategy of individual sero-testing could prove a promising strategy for all dengue vaccines. This might allow quicker licensure and public introduction where the anticipated benefits are great and risks are small. If dengue vaccine prices were comparable to those of other recently introduced vaccines, such as those for pneumonia and human papilloma virus, they would likely be affordable. Follow up for 61 months and beyond, as with Dengvaxia, could then determine whether vaccination could be extended to those who are seronegative when vaccinated. If that proved true, then dengue vaccination could be a valuable complement to innovative vector control strategies which would reduce dengue seroprevalence over time.

Dengue Vaccines – Update of Vaccine Pipelines

Cathy Hoath

Director, Global Regulatory Affairs and Clinical Safety, MSD

Abstract: Dengue disease is caused by any 1 of 4 related single-stranded RNA viruses (types 1, 2, 3, and 4) transmitted by mosquitoes. A tetravalent vaccine that durably protects against all 4 viruses is needed to address an important unmet medical need and to mitigate against the risk of vaccine-induced sensitization for Dengue Hemorrhagic Fever/ Dengue Shock Syndrome (DHF/DSS). A live attenuated tetravalent vaccine (LATV) has been developed by the United States National Institutes of Health (NIH) and has been licensed to multiple companies for further development and commercialization, with Merck & Co., Inc., Kenilworth, New Jersey, U.S.A. (MSD) being one of those companies. In a small Phase I clinical trial conducted by NIH with the LATV, there was a robust response to all 4 virus types following administration of a single dose, which persisted for 1 year. In addition, the vaccine had 100% effect in a small controlled human infection model. The vaccine was generally well tolerated, with the most common adverse effect being a rash. MSD has now begun Phase I trials with two LATV formulations. The study design, patient population, and objectives will be reviewed.

Update On Dengue Vaccination From the Philippines

Prof. Juliet Sio Aguilar

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Abstract: As the world grapples with the ravages of the dengue virus, the Philippines joins the mission of targeting dengue control through immunization. With the availability of the vaccine Dengvaxia[®] that could potentially decrease the incidence of dengue infection in the country that has a high mortality rate from dengue of 0.52%, the Department of Health (DOH) embarked on the program introducing the vaccine in dengue prevalent regions of the country – Regions 3, 4A, and the National Capital Region (NCR) in April 2016, and subsequently in June 2017 in Region 7.

Targeting public school children aged 9 years old and older, 830,000 children were immunized with 1-3 doses until its termination in November 2017. The premature termination was sparked by the release by the manufacturers of the greater risk for severe dengue infections among dengue-naive vaccinees, while confirming protective benefit among those with past dengue infection. A technical committee, the Dengue Task Force, was created, which examined the technical and operational concerns related to the vaccine.

Deaths among Dengvaxia[®] vaccinees were subsequently reported and, as of this writing, 81 fatal cases have been chronicled. Because of the alarm generated in the public sector, an independent group of expert physicians from the University of the Philippines Manila – Philippine General Hospital, the Dengue Investigative Task Force (PGH-DITF), was organized under the directive by the DOH Secretary and the PGH Director to evaluate these fatal cases. The World Health Organization Causality Assessment of Adverse Effects Following Immunization (AEFI) was utilized in the undertaking. Of the 31 cases thus far submitted for review, 6 cases identified were either laboratory-confirmed (4) cases or dengue suspects (2), but with only one of these cases observed to be causally associated with the vaccine, i.e., death occurring within a month after vaccination.

Because no diagnostic marker exists as yet to determine the dengue status of the vaccinees, a dengue surveillance program was instituted to monitor and treat all possible adverse events related to the vaccination. As there is no set time frame for the development of secondary dengue infection among the Dengvaxia[®] vaccinees, DOH has committed to monitor the course of these vaccinees for the duration of 6 years.

Comprehensive CYD-TDV Clinical Development Plan

Alain Bouckenooghe

Sanofi Pasteur, Clinical Sciences, Asia

CYD-TDV is the first dengue vaccine to be approved for the prevention of dengue in endemic countries with high burden. This new vaccine was evaluated in 25 studies from Phase I to III, involving more than 40,000 children, adolescents and adults, from 15 countries around the world. Vaccine efficacy was assessed in 2 parallel Phase III efficacy trials, conducted in 5 countries in Asia (CYD14) and 5 countries in Latin America (CYD 15). The pooled analysis of both trials have shown in children aged from 9 years and above, vaccine efficacy (VE) against hospitalized dengue cases was 80.8%, VE against severe dengue was 93.2%, and VE against symptomatic dengue due to any serotypes regardless of severity was 65.6%, over the 25-month surveillance period. Long term follow up data also showed a continued reduction of hospitalized and/or severe dengue cases until Year 5 of pivotal efficacy studies.

Recently more data became available looking at vaccine efficacy and safety in dengue seronegative subjects versus seropositive subjects, based on an innovative dengue anti-NS1 IgG ELISA analysis. This showed that CYD-TDV protected against severe VCD and hospitalization for VCD for 5 years in persons who had exposure to dengue before vaccination, and there was evidence of a higher risk of these outcomes in vaccinated persons who had not been exposed to dengue. These new findings have an impact on further recommendations on use of the vaccine.

The data will be briefly presented and discussed.

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Building upon two centuries of healthcare experience in Japan, Takeda's world-class vaccine team is demonstrating leadership in global vaccine development and delivery. Substantial investments in vaccine R&D aim to tackle challenging health problems for which there is currently an unmet need.

With our breadth of expertise and our collective experience, Takeda will always be committed to addressing pressing public health issues.

¹ WHO Immunization Coverage Fact Sheet http://www.who.int/mediacentre/factsheets/fs378/en/