

Workshop: AAAS-ACC Cooperation on Science-Addressing shared challenges on communicable & non communicable diseases



Dengue & other emergent arbovirosis

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- National Reference Center for infectious diseases
- Provides highly specialized services in medical care, diagnosis, reference & surveillance on Infectious diseases
- Develops basic & implementation research
- Offers high level teaching activities
- Three Centers: a hospital, a center for medical surveillance & center for research and diagnosis (CIDR)







DENGUE, CHIKUNGUNYA, ZIKA:

ARBOVIRUSES OF MAJOR IMPORTANCE IN THE AMERICAN REGION

YELLOW FEVER URBANIZATION THREAT

Arboviruses:

- Transmitted by blood-feeding arthropods
- Maintained in nature in transmission cycles including replicating in blood-feeding arthropods that transmit virus in their saliva to vertebrates
- Replicates in vertebrates where become accessible to other arthropods completing the cycle





Alphavirus



IPK DENGUE/ ARBOVIRUS GROUP

- Multidisciplinary group of virologists, immunologists, epidemiologists, clinicians, entomologists, economists, mathematicians, sociologists, pharmacologists etc, working in dengue & other arbovirus
- In charge of the epidemiological, entomological & virological surveillance under the direction of the MOH
- Conduct research activities in diagnostic, vaccine, pathogenesis, immunology, omics (molecular epidemiology, human genetic), clinic, epidemiology, entomology & vector control, social, economic, climate research, etc through research projects with national & international institutions
- Close activity with PAHO/WHO/TDR as part of the Dengue WHO collaborating Center



ARBOVIRUS SURVEILLANCE & CONTROL

- Based on the Primary Health Care of Attention (APS). Clinical, epidemiological, entomological, environmental & lab surveillance
- Lab surveillance with two lab networks for molecular diagnosis & serology using a Cuban system for IgM detection (CIE-IPK). CIDR-IPK as the reference center
- Entomological surveillance (lab network). CIDR-IPK as the reference center
- CIDR-IPK: in charge of evaluations of diagnostic kits, insecticides & technologies
- Strong activity facing arbovirus emergencies
- IPK, reference center for the clinical management, epidemiological surveillance, vector control etc



MAIN CUBAN TOPICS OF INVESTIGATIONS IN DENGUE & OTHER ARBOVIRUSES

- Dengue & Zika clinical features
- Zika impact in pregnant woman
- Epidemiological factors for dengue transmission & DHF development
- Host risk factors for DHF & clinical overt
- Pathogenic mechanisms
- Host genetic, epigenetic & transcriptomic
- Immune response
- Virus evolution & molecular epidemiology
- Vaccine & antiviral investigations
- Entomological research & Mosquito control.
- Community participation & social studies
- Economic studies
- Prediction model development
- Climate, Environment & dengue
- Diagnosis & surveillance

MINSAP CIGB CIE **Finlay Institute** INHEM Labiofam **PAHO/WHO** IMT, Belgium **Amberes Univ., Belgium PI** France. **PI Guadeloupe** Heidelberg Univ. **OIEA** Others institutions



Research activities in diagnostic, vaccine, pathogenesis, clinic, epidemiology, entomology & vector control, social & economic research

- More than 400 papers published in High impact journals & several book chapters
- Dengue book for the Spanish community (2016)

Proce di Inglementati Sano pana 1191 poi namenano enversa Implementation Science						Sem	inar 📕	f Anb Yori Det HUBINGOUS-04-208-y ORIGINAL ARTICLE				EN @ ACCESS Freely availa	ble coline	
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health interventions				Contraction	n the past few decades, resulting in an nano-non- try of multiple denate virus seron-nes in Series	la l	Maria G. Guzman		152	hereider institutes for Health Pol	ky, Heler School, Brandeis University, Waltham, Massachavette, United States of Americ	za, 2 Carlos Sim Health Institute, Mexico City,		
Dennis Pérez ¹⁹ , Patrick Van der Stad ²³ , Mariadel Carmen Zahala ⁴ , Marta Castro ¹ and Firme Leffwer			chi-last famil	rity during a Danous Virus Type 2 Color		USA. Today, dengare is regarded as the same an beings. Importantly, the part decade ad immunology and in development of init		16120	BMC Infectious Diseases		Set.	nity, California, United States of	America, 6 Ministry of Health, Putrajaya, Malaysia, 7 Euyler College of Medicine and Tem	au Childen's Houpital, Houston, Texas, United
Increasing Clinical Seve Inidamic Data Canna		Deen Section	cing of Evolving Viral Populations					324	States of America, B Date HUS Goodsate Westcal School, Singapore					
Abstract			cing or neoroning viral ropulations		act dengue control and prevention. Autorities						Abstract			
Background: One of the major debates in implementation research turns around fidelity and adapts Feisbase Souther [®] Hered Base		-Roche, [®] Hervé Blanc, [®] Anto [®] Mawling Alvarez, [®] Osvaldo I	c, ⁹ Antonio V. Borderia, ^{9,47} Gisail Diaz, ⁸ Rasmus Henningsson, ^{9,4,47} Daniel Goruzáez, ⁹ Oscaldo Castra, ⁶ Macenes Fontes, ⁶ Marco Vicnuzzk, ⁹ María G. Guernan ⁶		s a high economic burden on both Note of individuals. Denome illness in the	STUDY PROTOCOL		Open Access			Dengue presents a for	Ass. J. Trop. Mid. Jtpg, 10(7), 2014, pp. 423–454 doi:10.038/spin0.23.9070		
is the degree to which an intervention is implemented as intended by its developers. It is meant to a intervention maintains its intended effects. Adaptation is the process of implementers or users bringing the second and the second as a second a		is des Kouri Institute of Tropical Modi absopremit Unit, CNIS UMR 1540; P	al Medicine, PN KOPBIO Coldenating Center for the Study of Dangae and In Vestor, Hawan, Coluit, Institut Pannar, 2000, Part, Tunnel "Jostinal Pannar, Johannational Gauge for Data Anders, Part, Tunnel", Land University, Control for		US\$2-1 billion per year on average, Ave	Clinical evaluation	on of dengue and	CreatMark			estimated to be at rist disease burden and, c	Coppight 0:2011 by The American Society of Tropical Medicine and Egginee		
to the o	iginal design of an intervention. Depending on the nature of the modifications brought, ada	Mathematical Sciences, I	land, Sweden ⁴ , Department of Me	dicine, Pedro Kour Institute of Tropical West	che Hanana, Cabat	control, exceeding costs of other vital Gase	Hantification of	rick factors for sour	8	dengue infections per year, of which	ich 96 million	persons affected. Varia immune status, age, pr	Comparing the Usefulness of the 1997 an	d 2009 WHO Dengue Case Classification:
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even e adapt a	Evaluation of Commercially Available Diac	valuation of Commercially Available Diagnostic Tests 💦 🧑					lisease: protoco	ol for a multicentre s		Journs	al of Medical Virology 86:1576-1	estimating total episor	Olaf Horstick,* Thomas Jaenisch, Eric Martinez, Axel Krooger,	Lucy Lum Chai See, Jeremy Farrar, and Silvia Runge Ranzinger
Discus	for the Detection of Dengue Virus NS1 Antigen and Anti-		Anti-			PRIMER	h 8 countries					A combination of imr consequently, of econ currently available da	Instatue of Public Health, Convenity of Instactivery, Healethery, Cerman Heidelberg University Hospital, Heidelberg, Germany, Instituto de I	ty: Department of Infectious Diseases, Section Cancel Tropical Medicine, Medicina Tropical, Pedro Kuori, La Hahana, Cahu, Lirerpool School
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nature	The Blackth A Humpsrger 5 State 7 Sta		ekaran", _{Kaso}				meela Sathar ¹⁰ , Emesto Pleités Sandoval ¹¹ , Gabriela Maria Marón Alfaro ¹¹²⁵ , Ic de Mahandrodhota ¹² , Maldalla Sadar ¹³ , Emar Alemat ¹⁴ , Andrea Comerci ¹⁵ , Bri		Primary and Secondary Dengue 4 Infected		A Infected	accuracy of reporting n to locations with no	studies (4 prospective). Ten expert opinion articles were used for discussion. For the 2009 WHO classification studies	
compo			ead ¹¹ , ini		Dengue infection		nesto T. A. Marques ¹⁶ , Tereza Mag	alhaes ¹⁶ , Patricia Brasil ¹⁷ , Marco Netto ¹⁸ , Adria	Salvadorian Children		e i mecieu	transmission using sero diagnosis, vaccination, objective, systematic m	show when distributing source damps tensitivity maps betwinn 59-49% (60%-50%) propagative studies), specificly between 41-49% (99%): proparitive study) - comparing the 1997 WHO classification, sumitivity 324-8499% (245%) 76%; prospecifive studies), specificity: 25%/109% (100%): prospecifive study). The application of the 2009 WHO classifi- cation is one, however (6 engos were) degrage there may be an information princesod case turnbers. Warning sign	
modifi empirie			ing in the local division of the local divis		Maria G. Guzman ¹ , Duane J. Gubier ² , Alieny	is izquierdo ¹ , Eric Martinez ¹ and	rah E. Bethencourt ²⁰ , Maria Guzm	an ²¹ , Cameron Simmons ²²² , Nguyen Thanh H						
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Summ	Neckina Tapical "Helm Kani," Henna, Gala, R.Zonnoli: Disease and Special Pathogen, Public Hobb Agency of Canada, Wanipeg, Ganada, WINICO/MID/World Real/Weld Hobb Consultation Social Passament for Network and Spiniss in Special Disease. (1986, General, Statement & Machine et al. 1987)		UNDERWOOD	Absense: Dengue is widespread throughout the tropics and local special variation in dengue virus transmission is promoly influenced by minfell, temperature, withorization and distribution of the				Naili Calzada,' and Maria Guadatupe Guzmán' ¹⁴ Pedro Kour?' Tropical Medicine Institute, PAHO/WHO Collaborating Centre for the Study of Dengue and		t Centre for the Study of Dentue and	sanomics of Dengue, PLoS No	geous; 3 severe dengue criteria (severe plasma leakage, sev endpoints. The 2009 WHO classification has clear advant	ere bleeding, severe organ manifestation) are useful research tages for clinical use, use in epidemiology is promising and	
implen	province, Hankard, 11Fredatric Dengaer Kassine Initiation, Sensi, Korea Peter Peter		principal mosquito vector Addes capyosi. Currently, andamic dangue virus transmission is reported in			Ubstract		Havana City, Caba ⁹ National Institute of Public Health "Max Block", Son Salvador, Ki Salvador		loador	sillor: Bidget Will, Hospital I Incoived January 31, 2014; Ar	research use may at least not be a disadvantage.		
Keywo	Abstract	Abstract		the Eastern Mediterrarean, American, South-East Asian, Western Ruckie and African regions, whereas appredic local stansmission has been reported in Europe and the United States as the result of virus			lackground: The burden of dengu	tackground: The burden of dengue continues to increase globally, with an estimate				apyright: © 2014 Shepard e		
Transla	Commercially available diagnostic test kits for detection of dengue virus (DEM/) non-structural protein 1 (NS1) and anti-		d anti- for		introduction to areas where Az degrypi and Aedes	alteriorus, a secondary-vector, occur. The global	nfections occurring each year. Althor pectrum of clinical symptoms ranging	agh most dengue infections are asymptomatic, p na from mild febrile illness through to severe ma				unding: This study was suppr	INTRODUCTION	It halve to same resources and contributes to a reduction of
	bow in the constant is the statistic and specific and the period of the period of the period of the statistic of the statisti	World Bank/WHO Sp	pecial tion		health and the global economy: Dengue has been it	identified as a disease of the future owing to trends	mpairment, and hypovolaemic shock	k due to a systemic vascular leak syndrome. Cini	El Salvador is a Central Am	nerican country that	INTRODUCTION	competing interests: This st	The World Health Oreanization (WHO), with its See-	dengue mortality.
	requiring to research and intenting in respirate because youry and the research being evolution instance group, but in network laboratory contributed characterized serum speciments for the panels used in the evolution. Microplate enzyme- fielded immemory and an evolution of an evolution of the panels used in the evolution. Microplate enzyme-		zymo-		toward increased urbanization, scarce water suppl to the WHO, denous control is technically feasible	, lies and, possibly, environmental change. According is with coordinated international technical and	lagnosis and clinical management t	through approaches designed a) to differentiate ?	has been affected by several dengue o breaks. This study investigated the levels	overal dengue out- gated the levels of Dengue	is one of the most importan	dherence to all PLOS NIDs po Timait chesant/Humdeis.edu	cial Program for Research and Training in Tropical Diseases (NUIC/TTR), issued over descene midelines in 2000 ¹ indust	Dengue and Control (DENCO) study, ⁴ DSD describes den-
	evaluated by 2 laboratories and RDTs were evaluated by at least 3 laboratories. The reference tests for IgM artis OBW were laboratories developed accuracy environment for the developed accuracy (MRMK) and the		fwere still	Rearcial support for rational programmes. This Primer provides a general overview on dengue,		common febrile illness within 72 h of fever onset, and b) among patients with dengu redictive of the likelihood of evolving to a more severe disease course.		IgM, IgA, and IgE anti-den serum samples from childr	ngue antibodies in ity, causin	infections in terms of morbidity ar		(which they, based new deligite gladents in 2009, inclu- ing the 2009 WHO dengue case classification: dengue and	gue as it currently occurs globally, focusing on severe dengue, defined as plasma leakage (shock or fluid accumulation with	
* Common	Controls for Dissuits (control and Provention ECC), and the NN reference to the wave revue transcriptions polynomiae chain meeting (PL-VD). Brooth wave stranged to discontrols examining, specifying, the behaviory and a three reacher approach, the behaviories and conservations. NN EDEA metricity areas 60-706 and specificity 7-706 NN 1007 controlsity was 50- 707 km discontrolsity 7-80 MH et also also (DN MN DISC) seconds was a stranged and the PLAs, and plat arti- 171 km discontrolsity 7-80 MH et also (DN MN DISC) seconds was a stranged and the PLAs, and plat arti-		chain of		covering epidemiology, corerol, disease mechanian	rs, diagnosis, treatment and research priorities.	Aethod/Design: This is a prospective	alti-centre observational study airring to enrol	with a clinical and serolo denous infection during th	ogical diagnosis of dengue few myalgia, a	over (DF) characterized by fever, and arthraigia to the more sew int	Introduction	severe dengue (D/SD). Warning signs (WS) have been estab- lished for triage to help clinicians with symptomatic cases	respiratory distress, which includes the former DSS), severe blanding or proper organization with the improved
¹ Epidemica Nivio del N			n 38- tim		Dengue is currently one of the world's most imper- trait analytical functional and the text forces have	classification, patients were designated as having other	i years presenting with a tebrile lines ind Latin America. Patients presenting	s consistent with dengue to outpatient health fac a within 72 h of fever onset who do not exhibit si	break in 2002-2003. Sevent	ty one serum sam dongue he syndrome	emorrhagic fover (DHF) and den : (DSS) (Guaman and Kouri, 20 1	Dengue presents a form	in need of closer surveillance and/or hospitalization (dengae with warning signs [D+WS]).	description of dengue cases, case reporting is facilitated.
Caba Full let of a	EDW ILISA sensitivity was 56-54% and specificity 78-91%. NS1 tests were generally more sensitive in specimens from the acute phase of demane and in primary DBW infection, whereas IaM anti-DBW tests were less sensitive in secondary DBW			terrased >30-fold in recent decades alongs for the common manifestation of DENV infection – or denges		or the study. A broad range of clinical and laboratory parameters are assessed daily for iness, and also at a follow up visit 1 week later.		classified in three groups: 1	13 primary dengue of the clini	nical descriptions of DHF refer to but considering that since its receipt at a	iden with around half th risk of infection 11.21. D	Historically, the 1997 WHO dengue case classification	DENCO study. A larger study is currently under way to	
()в	infections. The reproducibility of the INST RDTs ranged from 92-99% and the IgM anti-DDW RDTs from 88-94%.		ally	geographical expansion of the Adds vector mesophoes and denges wruses (DENVS ²⁰ , Transmission of DENVs		DSS) — a combination of plasma leakage and congu- loosthy computing accompanied by blocking that can	Continued on next page)		and 37 secondary dengue hemorrhagic fever		is, it was observed mainly in the DBF in the American region he	past docades, with o	dengae shock syndrome (DSS) was developed in 1975 by	evaluate and define the predictive value of WS in outpatients (for the need of hospitalization) and inpatients (for severe
<i>V</i> -	Citation: Harsperger 14, Yolam 5, Bachy P, Ngayen VC, Selaran 32), et al. (2014) Industries of Commercially Available Elegendic Texts for the Detection of Charges Hars NSI: Antigen and Anti-Designer View byll Antibody. PLoS Reg Eleg Dir. (b):101(2):journal.putil.0001071			Astan, Western Pactic and African regions, with new load to a modified in blood pressure and consequently to		1		IgM for the different seroty	pes was tested. No Frequently	y both children and adults [Gua act	uss time and age of pers	expert consensus based on studies on Thai children in the 1950s and :60s, with modifications in 1986 and 1997. ⁷ In the	disease). ⁵ Purthermore, D/SD is based on best available evi- dence (evidence atade 1/2) ⁴ on each step of the development	
	Hiller Any C. Hurisen, University of California, Davis, United States of America Research Intel 2011: Research America 2016 Published Division 16, 2016			the Vertical States and Europe. Dergos epidemics arous it This Perture provide Induced to handle control of the Perture provide to handle control of the Perture provide Induced to handle contr		1		significant differences in t were found between PDF a	the IgM response El Salva and SDF, but these El Salva	ador is a Contral American countr des	m the transmission of for sity, the host's immun	last modification in 1997, four grades of DHF were defined (DHF), -2, -3, and -4), with DHF1 and -2 being DHF and	from basic to implementation research.7	
	This is an agen access article, feer of all experiptic, and may be feely reproduced, doublend, transmitted, wordfield, built spon, or otherwise used by anyone for any head for the work is many address of the transmitted for the transmitted of the transmitted o			inger costs in neuron services, to terminos area to the eco- nomic systems of affected countries?		1		were detected between (P-0.0053) and between	PDF and SDHF country re	reported its first dengue epidemi	elitions and other facto a measured in terms of	DHF3 and -4 being DSS ³ In this work we will refer to the denme over chariften	and applicability of D/SD compared with DF/DHF/DSS,	
	Funding: This study was supported financially and coordinated by the UNCLI/UNEP/Mold Res/UNC Special Programme Present 2014 and Profession Desame Research indicated BY The Landers of this particular to the Annual Study Stu	e for Research and Training in Te	lopical (1)		and antigenically related viruses that are known as sero-	er en un elle.			(P-0.0003). The IgA and IgI statistically significant differ	gE values showed a with 2,060 arence between pri-	e cases, cutee then dengue epide rved in cycles of increasing and c hea	alth metrics, such as di	tion recommended by the WHO in 2009 as the DSD clas-	and in a relatively short period of time, numerous studies have been published by many independent research groups.
	manaccipt. Committee interests: Unique nature pure, see nature pure, see nature or one projett with invested in the staty	a weeks and and hadrographic i			types 1-1, each of them grouped into genorypes. Infection by any of the four scrotypes can result in a range of clin-	eproemicogy Transmission	prespondence: bwlis@curu.org doel University Cleace Research Unit, 764 Volt	in Get Sirvet, District 5,	mary and secondary gro	oups. The highest number of and 9,658	f cases. In 1993 and 1995, there v [7,4 8 notified cases, respectively. In to	there we use the term the amount of clinical	sitication and the WHO 1997 classification as the DFIDHF/ DSS classification.	The objective of this study is to provide a systematic litera- ture review of the studies rublished connectes DSD and
	* issak exhibition				san manuslations for which the training or sequence of infections can be an important determinant of disease	treeves are maintained in an endemic-optionalic cycle involving humans and mesquitoes in crowded trop-	Ch Mith City, Wetson entre for Topical Medicine and Global Health,	Nuffeid Department of	(SDF) and 100% (SDHF) t	towards day 7 of largest der	e etiological agent (PAHO, 200	posed by dengue in a pop	The reasons for developing DSD were the shortcomings of DFDHFDSS, which were established in many studies	DPDHF/DSS to facilitate the discussion about the usefulness
					seventy and course. Dengue illness is clinically classified as other dengue with or without warning signs or severe	scar urban centres. These wruses are fully adapted to humans, and the highly domesticated principal vector	let of author information is available at the en	d of the article	positive for IgE antibodies.	The specificity of denote 4	33. Two years later, at the end of virus was isolated in patients me.	5 Neglected Tropical Dive	and furthermore, summarized in a systematic review. ² DEDUEEDXSS (1) is needy related to diverge constitu-	or the university cannet.acout systems,
	Introduction makeia, lepterpirois, meades, (JEV), West Nile forer (WNV),	s, influenza, Japanese en , ytikow feurr virus (YFV)	norphalitis (): Henor,		dengeer UKL 11. This classification was launched by the WHO in 2009 for the purpose of improving clinical man-	mosquito Andes negypti emerged long ago from syl- vatic cycles involving non-human primates and cano-	BioMed Central	ntich et al. Open Access This article is distributed under the terms of al License Depublicanitesconomous.org/Ricense/My/NJR, which pennit	IgM was determined for primary and secondary DF (groups. This is the Salvador	(Virology Laboratory, National		(2) misdirects clinicians identifying severe discase, (3) is	METHODS
	Dengue is a major public health problem with more than 2.5 billion people at risk for DE2IV infection and an estimated 96 Timely and accurate laborate	carate dengue diagnostics. Iory diagnosis of dengue p	n. performed	Delate of Depical Medicine Testin Koorf, (1996) Medicine	agement. The assessment of warning signs is designed to permit the early identification of patients with more-se-	py-dwelling Anles species mesonations in the rainforests of Asia and Africa ⁴ . Although these cycles still exist, their	repolat the Crati Database	on in any medium, provident you give appropriate condit to the origina e Commons Recesse, and indicate If changes were made. The Costine altercommons.org/public/consist/eres/1.07 apples to the data made a	first study on dengue cas children related to the imm	ses in Salvadorian imune response of Cueffiit of	of interest statement: none.		difficult to use (tests required are often not availabloidifficult to apply), (4) does not help for triage in outbreaks, and	Reporting items for systematic reviews and meta-analyses
	mitten care occer annually in over 100 trepical and tub-trepical countries [1–3]. Infection with each of the four DENV (DENV or NS1 antigen during the period	st rely on detection of DE2 icel from fever onset until	INV RNA 8 5-6 days	Collaborating Contor for the Study of Deepar and Br	were disease manifestations who require supportive ther- apy. Dengue filness can also be divided into three separate	public health importance is uncertain. An argypti was introduced to the Americas during the slaw trade in the	(4)		different immunoglobulins to tion and the clinical picture.	to the type of infec- Further prospective ethical stand	onsideration: The protonil was in accordance with the ndards of the Institutional Ethics Committee, the		(5) leads to different reporting globally as a result of the difficulties in using the classification for reporting clinicians.	(PRISMA) Statement for systematic reviews and meta- analyses ⁸ were followed. This study defines (1) case definition
	stronges 1-4) is capable of causing dengae fewer as well as sovern later, or detection of anti-DES dengae. Currently three are no vaccines or drugs available to fever orast until 6 weeks later	NV IgM beginning 3-5 d [4-6]. DENV can be det	days after intected by	Vector, Antopieta Novie del Madinde, Kan 6 1/2, Disease 11/20 Coles	phases the acute lifetile) phase, the critical (plasma leak- age) phase and the convoluscent or reabsorption phase	1600s and spread worldwide as the shipping industry expanded. This species lives in intimate association with	1		studies are needed to defin immunoolobulins can deter	ne if the pattern of Itelsieki Dec mine early denoue "Correspon	education and the CIOMS international guidelines. ordence to: Susana Vangues, "Pedro Kouri" Tropical		The main emphasis of D/SD is, therefore, to help clini- tion to identify and remean once of event downs timely	as the description of clinical and laboratory parameters to define a densue case command with other febrile illusors
	present or treat dengue. However, early laboratory diagnosis can ensure timely initiation of appropriate clinical management or PCR and immuncanony to de	fileation of DENV RNA letret DENV NS1 antig	h by RT- gm. As a	bpotkipt.ald.co	ECX 11. The 2009 classification replaced the previous 1997 WHO system that addressed and underscored the	and feeds on humans, rests in their homes and lays its eggs in man-made water containers. The average female	1		infection and/or severity. J.	J. Med. Virol. 86: Medicine Ins 17100, La Li	utitate, Antepista Nevia del Mediadia, km 6 1/2, P.O. Jisa, Ciudad de la Habana, Cuba.		cans to mentry and manage cash or severe delight titlery.	and (2) case classification as the different stages of the spec-
	anticipatory guidance in the outpatient setting. Accurate diagnosis diagnostic technique, virus is of dengue is an important component of public health surveillance requires cell culture facilities, ha	solation is not practical as a long turn around time	d since it re and has	Atomisanden 19265 die 10.1055/hdp.2016.55 Published unline 20 Mann-2016	two pathological phenomena associated with the disease plasma leakage and abnormal haera-astasis. Under this	mosquito lives for approximately 1 week, but some females can live for >2 weeks".	1		KEY WORDS: InM: InA: Inf	E-mail: over E: dengue infection; Accepted 3	apen@pk.at.co 37 September 2013		*Address correspondence to Olaf Hennick, INF 365. Institute of	Eligibility criteria included (1) research on dengue case
	since clinical diagnosis does not differentiate despot from other diseases that present with despot-like signs and symptoms (e.g., [7], In low resource settions, and	nolecular or innonnoansy ic of molecular tests is area	y methods nerally not				1		Salvadoriar	in children DOI 10.10 Published	003/jmv.25833 d online 19 November 2013 in Wiley Online Library		Public Health, University of Heidelberg, 69120 Heidelberg, Germany. E-mail: oluf.berstick@uni-heidelberg.de	 classification and/or dengue case definition, (2) comparison of D/SD and DF/DHF/DSS, (3) any comparative/analytical
	· · · · · · · · · · · · · · · · · · ·			NATURE REVIEWS DISEA	SE PRIMERS	VOLUNE 2 2005 1	1		0	(wikyodi)	indlewy.com).		6	21
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PARTICIPATION AT INTERNATIONAL DENGUE EXPERT GROUPS





ARBOVIRUSES

Virology/Immunology: Risk factors for DHF

□Confirmation of secondary infection as the main risk factor for DHF, identification of the importance of interval time between infections in the disease severity, the importance of the viral sequence of infections & the inherent age specific susceptibility to DHF during second DENV infections.

□Escape Mutant Hypothesis: first demonstration in three different dengue epidemics in a same population that disease severity accompanying secondary DENV infections increased month to month. Unique observation.

□Identification of HLA-A, -B, -C, and -DRB1 allele frequencies in Cuban individuals with antecedents of dengue 2 disease in collaboration with Harvard School of Public Health, Boston. First study with the highest significant association HLA genesdengue



Beatriz Sierra^a.*, Roberto Alegre^a, Ana B. Pérez^a, Gissel Garcia^a, Katharina Sturn-Ramirez^b, Olugbenga Obasanjo^b, Eglys Aguirre^a, Mayling Alvarez^a, Rosmari Rodriguez-Roche^a, Luis Valdés^a, Phyllis Kanki^b, Maria G. Guzmán^a



Laboratory & dengue genomic surveillance

- Reagent donation & training for dengue & other arboviruses through RELDA/PAHO
- Reagent donation for SARS CoV-2 nucleotidic sequence (genomic surveillance)

CDC of Puerto Rico

Berkeley University





Entomology

- Insecticide resistance, Florida & Notredame Universities
- Training in molecular entomology, J. Hopkins University
- Collaboration with UTMB in a TDR/WHO project



Epidemiology

- Identification of early warning indicators to identify dengue epidemics
- Methodology for identification of dengue hot spots, Mexico, Colombia, Cuba
- Evaluation of control methods and residual insecticides in Mexico
- Studies of population mobility in the spread of epidemics
- Organization of the network DENTARGET In collaboration with Emory University



Community participation for dengue control

Development of several symposia:

- Adaptation of COMBI Guidelines in Cuba. National workshop with further replication at regional and PHC levels.
- Knowledge translation research on empowerment strategies. In collaboration with Colorado School of Public Health
- Panel "Communication, participation, equity and SDH: synergies and contributions to integrated vector management, 2022. In collaboration with Universidad George Washington

Perspective Piece Why Did Zika Not Explode in Cuba? The Role of Active Community Participation to Systain Control of Vector-Rome Diseases

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> Marta Castro, ¹⁺ Dennis Pérez,¹ Maria G. Guzman,¹ and Clare Barington² ¹Petro Kou Tispical Medicine Institute, Haura, Cube, ¹Sillings: School of Octoal Public Health, University of North Caraina, Chagel HRI, Moht Caraina

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Biosafety trainings in collaboration with UTMB, 2017

- Course/ Training for Biosafety Level 3 in International Biosafety Training Center (5 participants)
- Course/Training in Animal Biosafety Level 3
- BSL-3 Biocontainment Operations Training (1 participant)
- Course on Clinical Containment (1 participant)
- BSL-2 Training Course at IPK (Theoretical class, 53 participants & Practical course, 14 participants).







Training & Building capacity

- Dengue International course: participation of prestigious professors from NIH, CDC Puerto Rico & Atlanta & J. Hopkins, Berkeley, Emory Texas Medical Branch, North Caroline, Notredame, New York Sate, Wisconsin, Harvard, California Davis, Ohio State, Pennsylvania State Universities, in the topics of vaccine, pathogenesis, diagnostic, entomology & vector control, epidemiology, social communication etc
- Symposium: New Advances in our knowledge of the *Aedes aegypti* biology and its control *Organized by AAAS, JHMRI, ACC & IPK, 2017*









Scientific collaboration IPK, Havana, Cuba- State University of Ohio (OSU), USA

- Symposium "Infectious Diseases: New approaches in Immunology and Therapies" First Edition. November 12 to 14, 2018, Pedro Kourí Institute of Tropical Medicine (IPK), Havana, Cuba.
- Advances in Immunology and Therapy of infectious diseases: From Bench to Bed, 2nd Edition. 2019, Hotel Meliá Habana, Cuba
- Previously, two courses on Immunology of Infectious diseases with Harvard University











FOUR RESEARCH PROJECTS APPROVED BY CRDF GLOBAL AWARDS, NIH. CRDF GLOBAL – US-CUBA

Collaborative Arbovirus Research Initiative 2017 & pending of execution

- Wolbachia studies as a new tool to control residual Ae. aegypti
 & Ae. Albopictus populations in Cuba in collaboration with Kentuchy University
- Exploring Cuban Ae. aegypti vector competence in collaboration with J. Hopkins University
- "Control Control Co
- □ Study the influence of the time of the properties of antibodies after a primary dengue infection in Cuban individuals. In collaboration with the University of North Caroline



IPK CURRENT MAJOR INVESTIGATIONS

- Clinic cohorts of children & adults with dengue after COVID-19
 pandemic (new epidemiological situation). Minsap
- Zika impact in pregnant woman, zikalliance-EU project
- OMICs Sciences & Artificial Intelligence applied to human virus Research in collaboration with Amberes & Brussels universities
- Vaccine development in collaboration with CIGB-Cuba
- Evaluation of SIT for Ae. aegypti control in a Havana municipality, Minsap-OIEA
- National Map of Aedes insecticide resistance, Minsap
- Development of an integrated dengue surveillance model including alert/action system, viral-entomological surveillance, hot spots, human motility etc. in collaboration with PAHO
- Health related social vulnerability and arbovirosis outcomes (morbidity, severity and mortality) in the context of syndemic interactions.

OVERALL INTERESTS OF COLLABORATION

- Development of joint research projects on dengue & other arboviruses focused on epidemiology, entomology/vector control, virology & immunology, social investigations....
- Scientific Exchange, teaching activities & capacity building
- Transference of technologies (NGS, Bioinformatics, Molecular Diagnostics, biomarkers validation & others)



INSTITUTO DE MEDICINA TROPICAL "PEDRO KOURÍ" "PEDRO KOURÍ" TROPICAL MEDICINE INSTITUTE XIII CURSO INTERNACIONAL DE DENGUE XIII INTERNATIONAL DENGUE COURSE

XVIII International Course on Dengue & other arboviruses August 14- 25, 2023 "85 Anniversary of IPK foundation"



Haroldo Bezerra, OPS/OMS George Dimopoulos, Johns Hopkins, EUA Anna Durbin, Johns Hopkins Bloomberg School of Public Health, EUA

Pierre Echaubard, SOAS, Universidad de Londres, Reino Unido Florence Fouque, TDR/OMS Leticia Franco, OPS/OMS Lionel Gresh, OPS/OMS Nildimar Honorio, FIOCRUZ, Brasil Olaf Horstick, Universidad de Heidelberg, Alemania Thomas Jaenisch, Universidad de Heidelberg, Alemania Linda Lloyd, GT-arbovirus internacional, USA

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