



Overview of the Global Virus Network

“We represent centers of excellence for research in virology from across the globe. Our work is dedicated to understanding, preventing and eradicating viral disease threats to mankind. Today, we affirm the need for new programs to coordinate, support and promote research that bridges the gap between virus surveillance and public health implementation. We gather in Washington, D.C. to support goals and ideals of the Global Virus Network, a new approach to fostering true collaboration among all regions and all peoples of the world. Seeking to improve the immediate responses to emerging viral threats, train future generations of virologists, and advise governments or non-governmental organizations on viral disease threats and their control, the Global Virus Network fills a critical need in international health for today and into the future.”

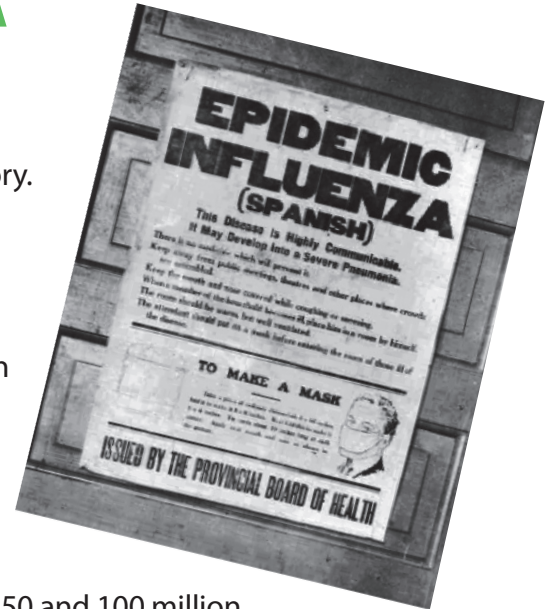
GVN declaration of support was signed
March 3, 2011, Washington, D.C.



"The 1918-1919 influenza pandemic killed more people in absolute numbers than any other disease outbreak in history. A contemporary estimate put the death toll at 21 million, a figure that persists in the media today, but understates the real number. Epidemiologists and scientists have revised that figure several times since then. Each and every revision has been upward. Frank Macfarlane Burnet, who won his Nobel prize for immunology but who spent most of his life studying influenza, estimated the death toll as probably 50 million, and possibly as high as 100 million. A 2002

epidemiologic study also estimates the deaths at between 50 and 100 million (Johnson and Mueller, 2002). The world population in 1918 was only 28 percent of today's population. Adjusting for population, a comparable too today would be 175 to 350 million. By comparison, at this writing [2005] AIDS has killed approximately 25 million, and an estimated 40 million more people are infected with the virus."

[John Barry, "1918 Revisited: Lessons and Suggestions for Further Inquiry." From the 2005 Institute of Medicine Workshop, "The Threat of Pandemic Influenza. Are We Ready?"]



ARE WE READY? NO. NOT YET.

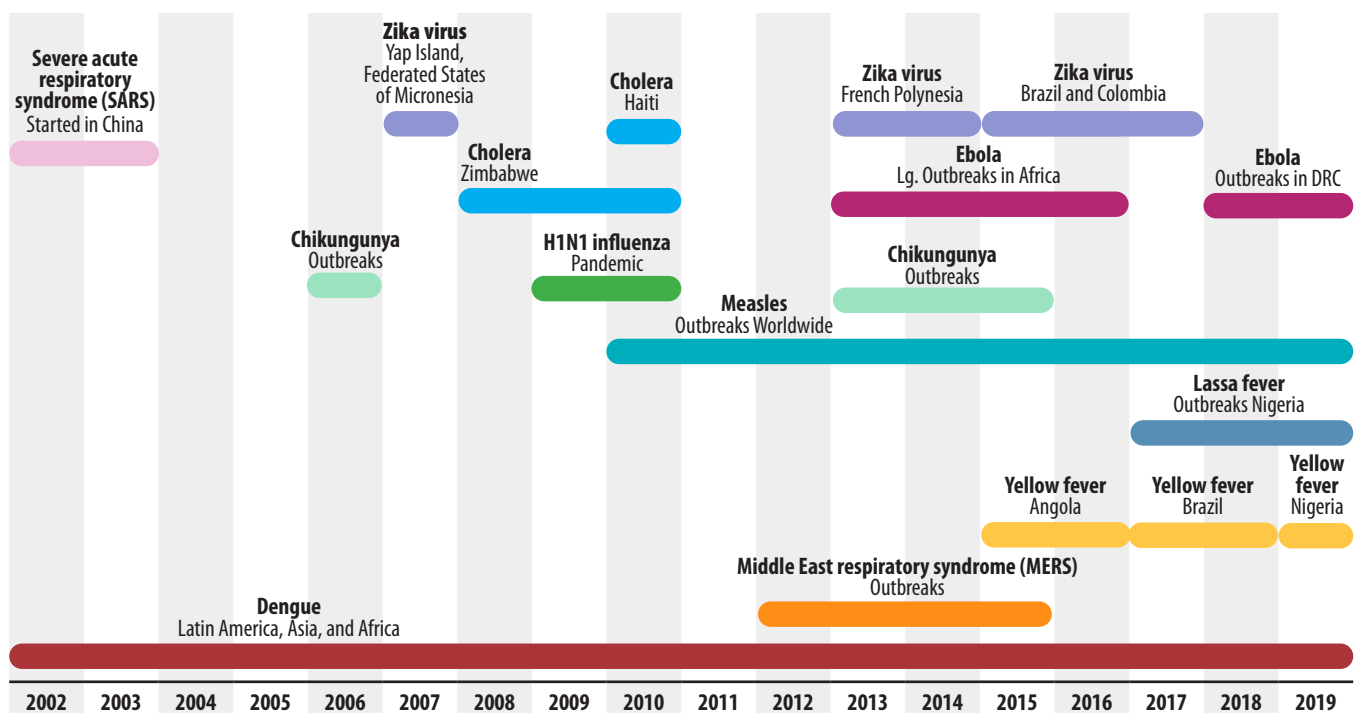
In hindsight, the world of 1918 might be excused for having been so quickly and devastatingly overwhelmed by a new virus emerging from the cauldron of world war. Yet, a century later, nations and global health agencies still are routinely surprised by the sudden emergence of a novel virus from some obscure jungle, pig, chicken, bat, tick or mosquito. It happens with surprising regularity.

Just in the last few years two obscure mosquito-borne viruses (Chikungunya and Zika) have invaded the Western Hemisphere to cause serious chronic arthritis, and microcephaly, respectively. Other newly discovered viruses (MERS, H7N9) have the potential to cause epidemic respiratory illnesses with high mortality. A recent (2016) report from the Commission on Global Health Risk Framework for the Future estimated that the annualized expected loss from potential pandemics is more than \$60 billion, and the Commission proposes an incremental spending of about \$4.5 billion per year to respond to those pandemic risks, only a fraction of what we expend on other risks to humankind.

Emerging and re-emerging viruses and their vectors continue to represent a major national and international security concern. Today, the Ebola virus is spreading within the DRC and is a potential major threat. Although we have a vaccine for Yellow Fever for many years, we are still unable to fully control this infection.

We are still lacking infrastructure for health, research and surveillance. In this context, The Global Virus Network (GVN) has an important role to play in our preparedness and responses to those emerging viral threats, especially in the aspect related to research.

Major Emerging and Reemerging Infectious-Disease Outbreaks, Epidemics, and Pandemics, 2002 through 2019



Adapted from Sands P. et al, *N Engl J Med.* 2016

THE GENESIS OF THE GVN

The concept of a Global Virus Network (GVN) began back in the 1980's when Dr. Robert Gallo realized that virtually no working virologists had a global directive for researching the cause of AIDS during the earliest years of the epidemic. Conversely, important groups such as the World Health Organization which did have a global mandate for combatting the new disease had virtually no resident expertise in the kind of virus that Dr. Gallo and his colleagues subsequently shown to be the cause of AIDS, namely, a retrovirus. Examining the history of other great epidemics of the 20th century, Influenza and Polio, reveals similar disconnects between available expertise and the urgent public need to identify causation and prevention modes.

In March, 2011 thirty of the world's leading virologists gathered in Washington, DC to pledge their support for a coalition of virology institutions worldwide, poised to act in times of viral outbreaks and committed to advancing knowledge on current viral killers. The Global Virus Network is the result.

GVN Centers, with strong working relationships among them, are poised to engage in any outbreak situation by providing the world's only network of top basic virologists from around the globe covering all classes of human viral threats. GVN is also committed to training the next generation of virologists in order to meet the critical need posed by the graying of members of the field's own discipline, and to inform and educate policymakers and members of the public about the role of virologists in mitigating viral illness and preventing infections from taking hold in populations. This is especially important as longtime, expert virologists worldwide have noticed a significant decline in medical students entering the field of virology.

GVN was co-founded by Robert Gallo, MD of the Institute of Human Virology (IHV) at the University of Maryland School of Medicine, William Hall, MD, PhD of University College Dublin and the late Reinhard Kurth, MD, PhD, of the Robert Koch Institut. GVN was "incubated" within the IHV until it became fully organized in 2011. IHV is led by one of the GVN co-founders, Dr. Robert Gallo, who is renowned for his pioneering discoveries of human retroviruses (HTLV-1/HTLV-2) and in particular with his co-discovery of HIV as the cause of AIDS and development of the HIV blood test, which enabled health care workers for the first time to screen and rapidly diagnose for HIV. Dr. Gallo's personal and institutional support for the GVN has allowed the coalition to take shape and to become operational. GVN's mission is also advanced by the commitment and dedication of its Centers of Excellence. Christian Bréchet, MD, PhD, former President of France's internationally renowned Institut Pasteur, assumed the GVN Presidency on October 1, 2017.

THE VISION

The GVN vision is "A world prepared to prevent, contain and control viral epidemic threats, through the collaboration of a global network of expert virus laboratories."

The GVN mission is to strengthen medical research and response to current viral causes of human disease and to prepare for new viral pandemic threats.

The GVN mission is achieved by: (1) Establishing a global network of expert virology laboratories; (2) Promoting research for the development of new tools, including diagnostic test, antiviral medicines and vaccines; (3) Training the next generation of experts in virology; and (4) Advocating for a more comprehensive and inclusive response to viral threats worldwide.

THE NETWORK

The Global Virus Network (GVN) is a coalition top experts in virology in more than 25 countries on six continents, collectively working to advance knowledge about how viruses cause disease, and to develop diagnostics, drugs and vaccines to prevent illness and death. No single institution in the world has expertise in all viral areas that can initiate epidemics. GVN brings the expert virologists together in innovative ways to leverage individual strengths and to focus global teams of scientists on key scientific problems. The power of GVN lies in its global reach, the depth of its science, the speed with which it can tackle new research problems, and its commitment to solving viral challenges facing the human population.

No other entity exists like the GVN. The GVN is a unique non-profit 501(c)3 organization because it is global, science driven, reactive and independent. GVN is integrated by more than 52 Centers of Excellence and 9 Affiliated Institutions in more than 32 countries (*see map on next page*). In addition, the GVN has now initiated Virus Watch Groups and Regional Chapters, reinforcing surveillance and collaboration with existing institutions.

Map of Centers of Excellence and Affiliated Institutions



Centers of Excellence	
Argentina	IBBM—National University of La Plata
Australia	Peter Doherty Institute for Infection & Immunity, University of Melbourne
Belgium	Northern Europe Consortium, Gembloux Agro-Biotech; Rega Institute for Medical Research, University of Leuven
China	Chinese Consortium
Colombia	Universidad nacional de Colombia-Medellin
France	Institut Pasteur (all locations) Mérieux Foundation (all locations)
Germany	Robert Koch Institute Berlin; Technical University of Munich; Philipp University Marburg; University of Veterinary Medicine Hannover
Ghana	West African Centre for Cell Biology of Infectious Pathogens (WACCBIP), Univeristy of Ghana
India	Amrita Institute of Medical Sciences, Kerala; Rajiv Gandhi Biotechnology Centre; Manipal Academy of Higher Education (An Institution of eminence deemed to be University)
Ireland	University College Dublin
Israel	Tel Aviv University
Italy	Italian Consortium
Japan	National Institute of Infectious Diseases (NIID-Tokyo)
Netherlands	Erasmus University Hospital
Peru	The Tropical Medicine Institute “Alexander von Humboldt” of the Universidad Peruana Cayetano Heredia
Russia	Moscow Center for HIV/AIDS Prevention and Treatment; Russian Smorodintsev Research Institute of Influenza (SRII); Smorodintsev Research Institute of Influenza of the Ministry of Health of the Russian Federation
Singapore	Duke-NUS Medical School
South Africa	National Institute for Communicable Diseases, Johannesburg
South Korea	International Vaccine Insitute; Korea National Institute of Health's Center for Infectious Diseases Research
Spain	Centro de Biología Molecular Severo Ochoa (CBMSO), Madrid; Centre de Recerca en Sanitat Animal (CRESA), Barcelona
Sweden	Scandinavian-Baltic Consortium, Karolinska Institute
Uganda	Uganda Virus Research Institute (UVRI)
U.K.	MRC-University of Glasgow, Scotland; The Pirbright Institute, England
USA	University of California San Francisco; Scripps Research Institute; J. Craig Venter Institute; Colorado State University, Fort Collins; University of Miami; Emory University; Tulane University School of Medicine; Institute of Human Virology at the University of Maryland; Johns Hopkins Bloomberg School of Public Health; University of Michigan; Icahn School of Medicine at Mt. Sinai; University of Rochester Medical Center; University of Buffalo; University of Pittsburgh Cancer Institute; UTMB Galveston National Laboratory; University of Nebraska Medical Center; University of Wisconsin-Madison (UW-Madison) Global Health Institute; U.S. Food and Drug Administration/Office of Vaccines Research and Review, FDA/OVRR; Wyss Institute for Biologically Inspired Engineering at Harvard University

Affiliated Institutions	
Estonia	University of Tartu
Grenada, W.I.	St. George's University
India	Molecular Virology Laboratory Rajiv Gandhi Centre for Biotechnology
Jamaica	University of the West Indies, Mona
Nigeria	Institute of Human Virology-Nigeria
Uzbekistan	Research Institute of Virology Ministry of Health of the Republic of Uzbekistan
Vietnam	National Institute of Hygiene and Epidemiology, Hanoi
Zambia	Africa Center of Excellence for Infectious Diseases of Humans and Animals (ACEIDHA), School of Veterinary Medicine, University of Zambia
Zimbabwe	Antiviral Pharmacology Laboratory and Clinical Trials Research Center Virology Program at the University of Zimbabwe

BENEFITS OF MEMBERSHIP

- ➊ **Research Collaboration:** Opportunities to identify new collaborations with leading virologists from around the world. Members of the GVN meet annually to share information and ideas, including pre-publication data, and to work as teams on critical issues. Regional meetings offer additional opportunities for networking and coalition building, in addition to webinars and other Internet-based forums. Joint grant applications involving multiple GVN Centers have been submitted or are on the drawing board. Individual Centers will benefit from working collaboratively through the network on priority programs and projects.
- ➋ **Training Future Virologists:** Intensive Short Course in Virology, one-week course taught by GVN leaders. To be adapted for non-US settings.
- ➌ **New Strategic Partners:** GVN brings new partners and resources into the field, thereby leveraging funds and expanding impact.
- ➍ **Visibility and Impact:** GVN members are associated with a leading scientific brand. GVN outreach activities, including those with the press, receive significant attention.
- ➎ **Participate in joint initiatives:** work in collaboration on grant application, regional unites, joint grant applications, Virus Watch Groups and Task Forces.

Programs

INTERNATIONAL MEETINGS

Fostering global collaborations the GVN scientific leadership meets annually in order to address the Network's priorities. The Global Virus Network (GVN) has convened general meetings of the entire network on eight occasions, including the launch of the GVN in 2011 (2011—DC, USA and Dublin, Ireland; 2012—Naples, Italy and Baltimore, USA; 2013—Munich, Germany and Moscow, Russia; 2015—Beijing, China; 2016—Sapporo, Japan; 2017—Melbourne, Australia; 2018—Annecy, France; 2019—Barcelona, Spain; 2020 (planned)—Medellin, Colombia). It was well-understood from the outset that such a diverse, dispersed international group of virologists would need to hold regular meetings in order to further organize the group, plan for the future and learn about each member's current research and concerns. Since the formal establishment of the non-profit organization, Global Virus Network, Inc., the general meetings have become a critical platform for identification of program priorities and the exchange of ideas. Please check www.gvn.org for upcoming meeting dates and information.



Drs. Bosch, Gallo, and Brechot participating in the press conference during the 2019 GVN meeting in Barcelona, Spain

The main objectives of the GVN annual meetings will include:

1. Present and discuss the most current findings in virology, include expert presentations on cutting-edge research in virology, and a progress report from the Executive Committee, an introduction to new GVN member Centers, selected updates and scientific reports from GVN members and discussion bringing their expertise in order to advance the knowledge to prevent, diagnose and treat viral challenges.
2. Address GVN and future directions: A special Welcome Session for new Centers and Affiliates will be held. New programs are announced and there is an open discussion regarding ways to advance the GVN mission.
3. Provide the framework to increase collaborations between world experts: The meeting fosters collaborations that would not otherwise come to fruition.

ADDRESSING LOCAL PROBLEMS BY THE CREATION OF THE REGIONAL GVN CHAPTERS

The GVN is currently working on the development of Regional GVN Chapters. Although the GVN is headquartered in Baltimore, we believe our presence needs to be truly global and therefore each regional GVN needs to meet specific geographic challenges found particularly in Southeast Asia, South America, Europe, and Africa. The idea is to move towards a more flexible, global organization.

We have recently established the Africa GVN Regional Unit, in a meeting co-Organized by Dr. Pontiano Kaleebu, Director, UVRI and Dr. Glenda Gray, President, MRC South Africa. We strategically outlined the local programs in order to:

1. Build local capacity
2. Identify the local gaps
3. Build consensus with key stakeholders



First Africa GVN meeting, Entebbe, Uganda, May 2019.

ZIKA TASK FORCE

Announced in February 11, 2016, Baltimore, MD the: GVN Zika Task Force's objective is to implement international efforts to catalyze cooperative activities that can make a difference in response to the emergency.

Activities include: development of a FAQ sheet, an electronic survey on Zika and flavivirus research taking place at each institutions and at the GVN centers, as well as unique resources and expertise available. GVN in coordination with Wellcome Trust on Data sharing in public health emergencies. GVN Co-organized with Emory University Bridging the Sciences: Zika Virus Meeting, May 1-3, 2016, and GVN hosted a Webinar with Burson Masteller; Implementation of Zika Serum Bank.

GVN Zika Task Force map



Task Force Co-Chair

- Scott Weaver, PhD, The University of Texas, Medical Branch, USA

Task Force Members

- Sazaly Bin Abu Bakar, PhD, Msc, Bsc, University of Malaya, Malaysia
- Michael Diamond, MD, PhD, Washington University School of Medicine, USA
- Susan J. Fisher, PhD, University of California School of Medicine, USA
- Antoine Gessain, MD, PhD, Institut Pasteur, France
- Xavier Abad Morejón de Girón, PhD, Centre de Recerca en Sanitat Animal, Spain
- Diane Griffin, MD, PhD, Johns Hopkins Bloomberg School of Public Health, USA
- Andrew Haddow, PhD, United States Army Medical Research Institute of Infectious Disease, USA
- Giuseppe Ippolito, MD, National Institute for Infectious Diseases Lazzaro Spallanzani, Italy
- Esper Kallas, MD, PhD, University of Sao Paulo, Brazil
- Albert Ko, MD, Yale School of Public Health, USA
- Alain Kohl, PhD, MRC-University of Glasgow Centre for Virus Research, Scotland
- Marc Lecuit, MD PhD, Institut Pasteur, France
- Eric Leroy, PhD, Institut de Recherche pour le Développement, France
- Julius Lutwama, PhD, Makerere University, Uganda Virus Research Institute, Uganda
- Gene D Morse, PharmD, University at Buffalo HIV and HCV Clinical Pharmacology Laboratory, USA
- John Mackenzie, AO, PhD, FTSE, FASM, FACTM, Curtin University, Australia
- Núria Busquets Martí, PhD, Centre de Recerca en Sanitat Animal, Spain
- Jorge Osorio, PhD, University of Wisconsin, USA and University of Antioquia Medical School and Fundacion Antioqueña de Infectologia, Colombia
- Janusz T. Paweska, PhD, NHLS Johannesburg National Institute for Communicable Diseases, South Africa
- Giovanni Rezza, MD, Istituto Superiore di Sanità, Italy

continued on pg 9

- Amadou Sall, PhD, Institut Pasteur de Dakar, Senegal
- Cameron Simmons, PhD, The Peter Doherty Institute for Infection and Immunity, Australia
- Raymond Schinazi, PhD, Hon DSc, Emory School of Medicine, Atlanta, USA
- Ed Tramont, MD, National Institute of Allergy and Infectious Diseases, USA
- Nikos Vasilakis, PhD, University of Texas Medical Branch, Galveston, USA
- David Watkins, PhD, University of Miami, USA
- Stephen Whitehead, PhD, National Institute of Allergy and Infectious Diseases, USA

HTLV-1 TASK FORCE

The mission of the HTLV Task Force is to speed the pathway to discovery of drugs that will stop virus transmission or progression from infection to disease, in addition to educating the public about the nature of these viruses, the diseases they cause, and how to prevent their spread. Experts from 11 countries, led by Dr. Robert Gallo, GVN co-founder and international scientific advisor and director of the Institute of Human Virology (IHV) at the University of Maryland School of Medicine.

GVN HTLV-1 Task Force Map



Task Force Co-Chairs

- Robert C. Gallo, Institute of Human Virology University of Maryland School of Medicine, USA
- Hideki Hasegawa, National Institute of Infectious Diseases, Japan
- Luc Willems, Research Director, National Fund for Scientific Research at University of Liège, Belgium

Task Force Members

- Roberto Accolla, University of Insubria, Department of Surgical and Morphological Sciences, Italy
- Charles Bangham, Imperial College, United Kingdom, Faculty of Medicine, Department of Medicine, United Kingdom
- Ali Bazarbachi, American University, Lebanon

- Umberto Bertazzoni, University of Verona, Department of Life and Reproduction Sciences, Section of Biology and Genetics, Italy
- Anna Barbara de Freitas Carneiro-Proietti, Fundação Hemominas, Brasil
- Hua Cheng, Institute of Human Virology University of Maryland School of Medicine, USA
- Luigi Chieco-Bianchi, University of Padova, Department of Surgery, Oncology, and Gastroenterology, Italy
- Vincenzo Ciminale, Università Degli Studi di Padova, Department of Surgery, Oncology, and Gastroenterology, Italy
- Lloyd Einsiedel, Baker Institute, Australia

continued on pg 10

HTLV-1 Task Force Members continued

- Antoine Gessain, Institut Pasteur, France
- Eduardo Gotuzzo, Cayetano Heredia National Hospital, Peru
- William Hall, University College Dublin, Centre for Research in Infectious Disease, Ireland
- Joseph Harford, National Cancer Institute, NIH, USA
- Olivier Hermine, Laboratory of molecular mechanisms of hematologic disorders and therapeutic implications, France
- Steven Jacobson, National Institute of Neurological Disorders and Stroke (NINDS), NIH, USA
- John Kaldor, The University of New South Wales, Australia
- Beatrice Macchi, University of Rome "Tor Vergata", and IRCCS—Department of Neuroscience, Italy
- Cal Macperson, St. George's University, West Indies
- Renaud Mahieux, Ecole Normale Supérieure de Lyon, Département de virologie humaine, France
- Fabiola Martin, The University of Queensland, Australia
- Masao Matsuoka, Institute for Virus Research, Kyoto University, Japan
- Edward Murphy, University of California—San Francisco, Departments of Laboratory Medicine and Epidemiology/Biostatistics, USA
- Jean-Marie Peloponese, Centre d'études d'agents Pathogènes et Biotechnologies pour la Santé, France
- Damian Purcell, The Peter Doherty Institute for Infection and Immunity at The University of Melbourne, Australia
- Jordana Reis, René Rachou Research Center, FIOCRUZ, Laboratory of Biomarkers for Diagnosis and Monitorin, Brasil
- Viviana Simon, Mount Sinai Hospital, Department of Microbiology, USA
- Yutaka Tagaya, Institute of Human Virology, University of Maryland School of Medicine, Division of Basic Sciences, Cell Biology Lab, USA
- Graham P. Taylor, Imperial College London, Department of Medicine, Molecular Diagnostics Unit, United Kingdom
- Watanabe, Toshiki, The University of Tokyo, Department of Medical Genome Sciences, Graduate School of Frontier Sciences, Japan
- Yoshiyuki Yamano, St. Marianna University Graduate School of Medicine, Institute of Medical Science, Department of Rare Diseases Research, Japan
- Dr. Mirna Biglione Instituto de Investigaciones Biomédicas en Retrovirus y SIDA (INBIRS), UBA-CONICET, Argentina
- Dr. Carolina Berini Instituto de Investigaciones Biomédicas en Retrovirus y SIDA (INBIRS), UBA-CONICET, Argentina
- Anne Van den Broeke Institut Jules Bordet, ULB, Brussels and GIGA ULiège, Liège, BELGIUM
- Dr. John Kim National Microbiology Laboratory
- Winnipeg, Canada
- Charles Gilks University of Queensland, Australia

Members of the GVN Task Force on HTLV published an opinion piece in the journal, *Blood*, on the need for better screening of transplantation donor organs in order to prevent new cases of HTLV-associated diseases. The commentary—screening transplant donors for HTLV-1 and -2—was published online on November 9, 2016 in *Blood's* First Edition section. Hardcopy publication in the journal and indexing in PubMed will follow shortly.

In addition, members of the GVN Task Force on HTLV also published a review article on November 11, 2016 in *Antiviral Research* entitled, "Reducing the global burden of HTLV-1 infection: An agenda for research and action."



CHIKUNGUNYA TASKFORCE

The GVN Chikungunya Task Force is a group of leading scientists from around the world committed to finding solutions to the growing problem of Chikungunya virus. Activities of the CHIK TF include:

Review the state of the science and potential research opportunities on animal models of infection and disease, candidate vaccine constructs, new anti-viral drugs, and seroepidemiology studies for previously unrecognized cases of CHIK, while including a focus on the Caribbean.

Identify potential funding sources to support international collaborative research and address gaps in knowledge. Train the next generation of researchers to study the interactions between viruses and mosquito vectors. Provide expertise and visibility as GVN speaks about this challenge to a variety of audiences.

Chikungunya Task Force Map



Task Force Co-Chairs

- Marc Lecuit, MD, PhD, Institut Pasteur, France
- Scott Weaver, PhD, The University of Texas Medical Branch, USA

Task Force Members

- Simon Cauchemez, PhD, Institut Pasteur, France
- James Crowe, MD, Vanderbilt University, USA
- John Fazakerley, PhD, Peter Doherty Institute, The University of Melbourne, Australia
- Matthew Frieman, PhD, University Maryland School of Medicine, USA
- Diane Griffin, PhD, Johns Hopkins University, USA
- William Hall, PhD, University College Dublin, Ireland
- William Klimstra, PhD, University of Pittsburgh, USA
- Xavier de Lamballerie, PhD, Aix Marseille Université, France
- Peter Liljestrom, PhD, Karolinska Institutet, Sweden
- Jean Lim, PhD, Mt. Sinai Hospital, USA
- Cal Macpherson, PhD, St. George's University, Grenada
- Andres Merits, PhD, University of Tartu, Estonia
- Lisa Ng, PhD, Singapore Immunology Network, Singapore
- Kenneth Olson, PhD, Colorado State University, USA
- Janusz Paweska, DVM, Johannesburg National Institute for Communicable Diseases, South Africa
- Ann Powers, PhD, Centers for Disease Control and Prevention, USA
- E. Sreekumar, PhD, RG Centre for Biotech, India
- Andreas Suhrbier, PhD, QIMR Berghofer, Australia
- Mary Wilson, MD, Harvard School of Public Health, USA
- Jorge Osorio, DVM, PhD, University of Wisconsin, USA
- In-Kyu Yoon, MD, AFRIMS, Thailand

ANTICIPATION AND PREPAREDNESS TASKFORCE AND VIRUS WATCH GROUPS

To go further into protecting the world from the future infectious threats, and building on past experience, we have recently created the GVN Task force on “Anticipation and Preparedness” (A&P TF) to examine which viruses may be around the corner.

The A&P Taskforce is led by **Dr. Christian Bréchet** and Co-Chaired by **Elodie Ghedin, PhD**, Director of the Center for Genomics and Systems Biology, and Professor of Biology and Global Public Health at New York University, **Giuseppe Ippolito, MD**, the Scientific Director of the National Institute for Infectious Diseases (INMI) “Lazzaro Spallanzani” in Rome, **Marion Koopmans, DVM, PhD**, Department of Virology, Erasmus MC and Director of the **World Health Organization (WHO)** Collaborating Center for clinical care, diagnosis, response and training on Highly Infectious Diseases at INMI. The Taskforce’s biodefense and biosecurity initiative is led by **James LeDuc, PhD**, the director of the Galveston National Laboratory and a professor in the Department of Microbiology and Immunology at the University of Texas Medical Branch in Galveston. The Taskforce is comprised of more than a dozen experts from GVN Centers of Excellence and Affiliates and its mission is to develop and employ innovative and pioneering approaches to identify and elucidate the impact and magnitude of future viral epidemics by coalescing mathematic modelling with epidemiology, genomics, medicine and public health. The Taskforce works closely with public health authorities, existing networks and institutions as well as disseminates vital clinical and scientific information on best practices for the diagnosis and management virus related pathogens.

In 2019, the Global Virus Network (GVN) created international Virus Watch Groups (VWG), comprised of seven highly pathogenic virus categories: respiratory, retroviruses, oncogenic, arbovirology, hemorrhagic fever viruses, gastrointestinal and zoonotic. Group member selection was based upon region, gender-balance, and resource-limited representation. The Anticipation and Preparedness Task Force Leadership. Chairs and Co-Chairs lead the seven respective virus watch groups, with participation the group members.

The Leadership oversees Chairs and team members’ activities, who are responsible for writing detailed summary reports on the state of each virus. These reports include new research findings, as well as current and novel surveillance techniques. Each group focuses on improving upon and filling in research gaps, learning lessons/ improving upon first research response, contributing ideas for new vaccines, therapeutics and diagnostic developments, and methods for the prediction of potential re-emerging or unknown viruses in various hot-zones of the world. VWG research reports will be made available to private/public health institutions (i.e. CEPI, WHO, USAID, CDC, Wellcome Trust) and, during epidemics, presented in the form of health alerts or advisories.

GVN ZIKA SERUM BANK TO SUPPORT DIAGNOSTICS AND VACCINE DEVELOPMENT

A major obstacle to understanding and controlling the Zika epidemic is affordable diagnostics that can be implemented in clinical settings without sophisticated laboratories. Several academic and commercial groups are working to develop better assays to detect the antibodies that are generated after Zika virus infection, but evaluating and optimizing these new diagnostics requires “gold standard” clinical samples of known antibody content. Unfortunately, patients seen in endemic locations or travelers seen here in the United States typically provide only a small quantity of blood that is consumed for their own diagnosis, leaving little or no extra sample for used to evaluate new tests. Another critical need for these clinical samples is to evaluate the immune response to Zika virus infection and compare this response to vaccines that are now beginning human clinical trials.

The Global Virus Network (GVN) has been responding to this need by acquiring blood samples from patients diagnosed in the United States who are willing to donate a relatively large volume a few weeks after their illness. But there are major logistical and scientific challenges, including: Identifying these patients; arranging for the blood donation; confirming that the samples contain Zika antibodies; and determining whether antibodies against related viruses such as dengue are present and likely to cross-react with Zika in diagnostic tests.

The GVN is meeting this critical need by expanding a nascent program to obtain, validate and make available to the research community these “gold standard” sera from a variety of patients. The effort is led by the GVN’s Zika

Task Force Chair, **Dr. Scott Weaver**, at the University of Texas Medical Branch (UTMB) in Galveston, a GVN Center of Excellence, and the site of the World Reference Center for Emerging Viruses and Arboviruses.

The goal is to assemble a collection of at least 50 individual samples of patient sera, each in quantities sufficient to supply 25 or so investigators. Oversight by the GVN leadership and the GVN Zika Task Force members will ensure that these important samples are made available to interested investigators.

Funds for collecting, testing, shipping convalescent Zika blood samples are being provided by a grant from the Allergan Foundation, a U.S.-based, private charitable foundation.

SHORT COURSE FOR EMERGING LEADERS IN VIROLOGY

There is a critical need for highly-skilled, broadly-educated virologists worldwide. This course meets one of GVN's core goals: to ensure emerging leaders in virology receive top flight training and have opportunities to engage with partners globally. It supplements existing skills and provides new knowledge and avenues for broadening expertise and collaborations.

The initiative includes a one-week intensive course on basic, translational, and clinical aspects of viruses of great importance to human health. Lecturers leading virologists drawn from the ranks of GVN Centers of Excellence globally. All didactic courses on state-of-the-art aspects of research on specific viruses. Significant time for discussion and interaction with virology leaders are a hallmark as well as opportunities to meet with policymakers and program officials from funding agencies in Washington, DC.

Leading virologists from across the GVN lecture and participate in this course. Previous speakers include: **Drs. Robert Gallo, Diane Griffin, Robert Redfield, Konstantin Chumakov, Yutaka Tagaya, Shyam Kottitilil, Ken Olson, Scott Weaver, and Ab Osterhaus.** To date, the GVN has trained 90 scientists from around the world.



6th GVN Course participants and speakers

HCV PROVIDER TRAINING IN INDIA

Hepatitis C is a serious liver infection caused by the hepatitis C virus. It is spread person-to-person through contact with blood. Most people who are infected with it do not experience any symptoms for years. India has a high prevalence of Hepatitis C Virus (HCV), but limited public health knowledge of the disease. India also is host to a large network of community-based practitioners with limited specialist training but extensive experience in the primary management of front-line patients.

The purpose of this collaborative project between India and the Institute of Human Virology at the University of Maryland School of Medicine (IHV/UMB) is to develop an HCV training model for medical providers in India that can be duplicated and applied to other areas of South Asia. Generic medications are available and approved to use in India, but only a few providers have any experience in the management of HCV with interferon/ribavirin, and there are no infectious disease specialists in country with experience using new oral agents. Similar to when antiretroviral therapy was rolled out in the mid-2000s, India now has an acute need for providers to be trained in the management of HCV.

The collaboration with India utilizes a decentralized mentorship plan to build local capacity through high-level clinical mentoring to 50 physician and nurse mentors who will then be responsible for mentoring an average of 10 health care workers at each health facility, reaching more than 500 health care workers throughout the country. The project focuses on building specific training for specialized populations (private patients vs community clinic patients) and settings (urban versus rural) in multiple sites in India will be performed.

IHV/UMB, a Global Virus Network (GVN) Center of Excellence, serves as the primary clinical partner for clinical and operational research activities with Indian trainees. The project is managed by IHV/UMB professor, Shyam Kottlil, MBBS, PhD.

This collaborative effort is expected to have a major impact on efforts to eradicate hepatitis C in India.

HEPATITIS B: A PILOT STUDY TO DEVELOP AN INTEGRATED CLINICAL DATABASE TO SUPPORT CURRENT AND FUTURE COMMUNITY-BASED CLINICAL PROJECT

This is a pilot study to develop an integrated clinical database to support an ongoing project in Arunachal Pradesh, India. GVN assists in developing, maintaining and facilitating collection of data, assimilation and provide expertise in evaluating outcomes. Briefly, Dr. Abhijit Chowdhury, the principal investigator of the parent project will screen 30,000 marginalized population for hepatitis B serologies:

1. Provide HBV vaccinations for those who are not exposed to HBV.
2. Develop a longitudinal cohort of patients with chronic HBV for linkage evaluation and care.

Investigators who are assisting with the study at the Global Virus Network are faculty within the Division of Clinical Care and Research at the Institute of Human Virology (IHV) at the University of Maryland School of Medicine. The program implementing this grant is unique in that it combines community-based clinical care and academic research. Since 1996, the IHV in Baltimore has had a long-standing history of pioneering research in human virology. The HCV Clinical Research Program has conducted several landmark clinical trials using novel therapeutics. The DC-PFAP is a partnership for community-based clinical care and research whose aim is to reduce the incidence and prevalence of HIV/AIDS and its comorbidities. Since its inception, this program has established itself as a global leader in novel therapeutics for HCV, HIV and HVB. The investigations within this program were the first in the world to utilize IFN-free HCV regimens, demonstrate efficacy of novel combination DAA therapy, and use IFN- and RBV-free regimens in a HIV/HCV co-infected population. This project is supported by the John C. Martin Foundation.

UPCOMING PROGRAMS

GVN Academy

The GVN “Academy” initiative is an investment in a small group of outstanding mid-career virologists. For the pilot program, the GVN will match a selected number of outstanding mid-career LMIC virology researchers with GVN’s senior leaders in the field to provide a series of mentoring and networking opportunities. In addition, a small grant will be awarded to attend key meeting, supplies or travel funds to visit another GVN institution. We will also ensure that the members of the GVN Academy have the opportunity to meet face to face at least once for the duration of the program. The objective of this project is to build local capacity and to ensure we nurture and mentor the next generation of leaders in virology. After evaluating the success of this pilot program, we hope to expand to virologists from all regions.

GVN A&P TF Research Fellowships

The GVN Anticipation and Preparedness Task Force (A&P TF) announced a call for proposals for GVN A&P TF Research Fellowships. The identification of emerging and re-emerging viruses, and the surveillance of novel viral pathogens in humans and wildlife, is critical for early prediction of future disease outbreaks and epidemics. Analyzing viral pathogens, as well as host responses to these pathogens, will enable us to build models for rapid diagnosis, provide early identification and enable clinical management of suspected cases. The Taskforce will also facilitate and expedite the development of critical epidemiological protocols and guidelines for diagnosis, treatment and prevention, in addition to the training of healthcare professionals in all geographical areas to address infectious diseases caused by such viruses. The Task Force is science-driven and works in close collaboration with other organizations on this major issue.

The GVN A&P TF Research Fellowships support young investigators at the post-doctoral level and assistant professors who are looking to gain new virology expertise or to tackle a new research question on emerging viruses, and who want to develop a collaborative research proposal across GVN Institutions.

ADVOCACY AND PUBLIC EDUCATION

The GVN serves as a resource to government and international organizations seeking advice about viral disease threats, prevention or response strategies, and advocates for research and training on virus infections and their many disease manifestations, and disseminates information to authorities and scientific communities throughout the world, including conducting workshops and webinars for journalists and the business community, providing Congressional testimony, opinion pieces, journal articles, etc.





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