isirv
International Society for Influenza and other Respiratory Virus Diseases

August 2015

Respiratory Virus Report

In this issue

Upcoming meetings.....1
State of MERS coronavirus (MERS-CoV).....2
Update on highly pathogenic H5 influenza in North America.....4
Meet a board member.....4
In the know.....6
Recent meeting reports.....7

Upcoming meetings

1st International Meeting on Respiratory Pathogens (IMRP)
Furama Riverfront, Singapore
2 – 4 September 2015

This isirv conference aims to be the world's premier respiratory pathogens (viruses, bacteria, and others) meeting, covering a range of topics from emerging diseases, epidemiology, immunology, diagnostics, vaccines, and therapeutics, and clinical management.

For more information, click **here**.

Upcoming meetings

Epidemiology Conference

Institut Pasteur, Paris, France
21 – 22 January 2016

This isirv conference aims to promote discussion among international scientists, healthcare professionals, and public health official about the assessment of the impact of epidemics of influenza and other respiratory viruses, including the incidence of infections, the clinical severity of infections, and the consequent burden of morbidity and mortality.

For more information, click **here**.

Visit Twitter on the AVG Homepage

The inaugural 'live' twitter coverage of the 4th isirv-AVG Conference, held at the University of Texas on 2-4 June 2015, was a great success. More than 160 tweets under the hashtag **#isirvAVG2015** were posted and the number of twitter "followers" of isirv-AVG doubled, compared to before the meeting. The 'live' coverage via social media not only enabled us to showcase the quality of speakers presenting at the AVG conference but also allowed us to reach the wider scientific community, beyond members of isirv.

Ding (Thomas) Oh

In the news

State of MERS coronavirus (MERS-CoV)

Middle East Respiratory Syndrome (MERS) is caused by a coronavirus. The first case was reported in Jeddah, Saudi Arabia in June 2012 where a man became sick after rubbing medicine on the noses of his camels (who were having respiratory symptoms themselves). MERS-CoV is a serious respiratory disease. However, symptoms vary widely, from fatal respiratory complications to mild cold-like symptoms to none at all. MERS has mostly been confined to Arabian peninsula but is spreading. Recently there was an outbreak in Korea, with 181 cases and 31 deaths reported as of 25 June 2015. Of the reported cases, ~30-40% of them have been fatal. Two cases have been reported in the United States, one in Indiana and one in Florida. Both patients were healthcare workers from Saudi Arabia who traveled to the US.

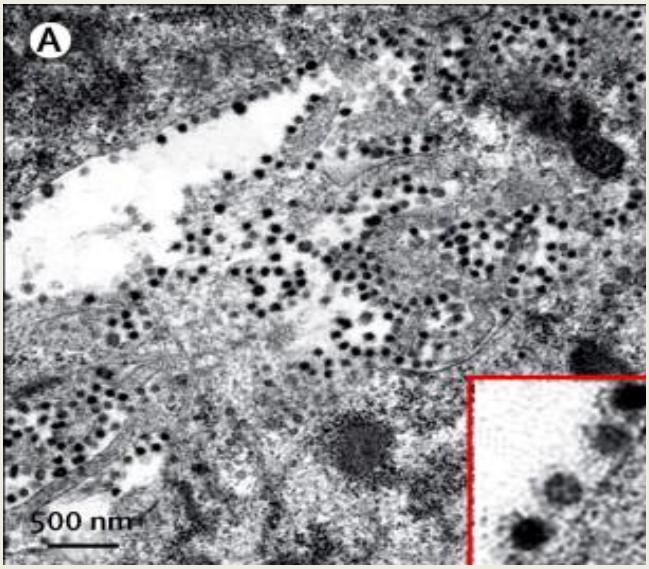
In the news

State of MERS-CoV continued…

MERS is similar to Severe Acute Respiratory Syndrome (SARS), but there are some key differences. While SARS affected the young and healthy, MERS primarily affects older people with underlying conditions, with such comorbidities as diabetes, renal failure, and underlying immunosuppression. Renal dysfunction or failure is common in MERS patients and could be a consequence of either hypoxic damage or direct infection of the kidney. MERS also spreads slower than SARS does but has a higher mortality rate, with 30-40% of cases being fatal compared to 10% of SARS cases. There is currently no vaccine or recommended antiviral to treat MERS, although the virus is inhibited by type I IFNs and ribavirin in pre-clinical models. Current therapies focus on treatment of the acute lung injury and pneumonia that develop as a consequence of infection.

MERS is most likely a zoonotic disease, but the mode of transmission is not yet known. Many camels have been found to be positive for MERS-CoV, but the role of the camel in transmission is not well characterized although there is some evidence of camel to human transmission (reported in *NEJM*). So far only 9 cases have reported definitely history of exposure to camels. However, human-to-human transmission of MERS-CoV has been confirmed by epidemiological and genomic studies of cases associated with hospital and household MERS outbreaks.

Read more here and here.



The Lancet 2015

courtesy of BBC

In the news

Update on highly pathogenic H5 influenza in North America

Highly pathogenic H5 influenza is still circulating in North America. It has made its way from the west coast (British Columbia and Washington) towards the Midwest and therefore poses a real threat for the agricultural industry. H5N2 was even detected in commercial flocks of turkeys in southern Ontario.

So far, there have been no human infections detected with any of these viruses, and there is thought to be very low risk of human infection. However, the CDC has specific testing and prophylaxis recommendations in place.

The United States Department of the Interior (DOI) and the United States Department of Agriculture (USDA) have taken the lead on outbreak investigation and control of highly pathogenic avian influenza in wild birds and commercial flocks.

Meet an isirv board member

Jackie Katz

Deputy Director (acting) Influenza Division
WHO Collaborating Center for Surveillance, Epidemiology, and Control of Influenza
National Center for Immunization and Respiratory Diseases
CDC

How did you get to where you are today?

I studied for my Bachelors of Science degree and PhD in Microbiology at the University of Melbourne in Melbourne, Australia, my home town. Then, I decided to get some experience overseas as was recommended to Australian graduates at the time, and obtained a post-doctoral position in the laboratory of Dr. Robert Webster at St. Jude Children's Research Hospital in Memphis, Tennessee, studying host cell adaptation of seasonal influenza viruses.

Meet an isirv board member

What I thought would be a 2-3 year post-doctoral position turned into a seven year stay at St. Jude as I obtained a junior faculty position, working on both influenza and parainfluenza viruses. For personal reasons, I decided to relocate to Atlanta, Georgia. I was offered an opportunity to join the Centers for Disease Control and Prevention (CDC). My PhD and post-doctoral training had provided me with expertise in influenza virology and immunology; I became Chief of the Immunology and Viral Pathogenesis Section of the Influenza Branch, CDC and later became the Chief of the Immunology and Pathogenesis Branch as Influenza activities at CDC expanded and the Branch became a Division. Since January 2015, I have taken on new leadership roles within the Influenza Division, CDC.

What got you interested in studying influenza?

For my undergraduate degree, I majored in both Microbiology and Biochemistry, but Microbiology always seemed a more interesting science to me, particularly the study of infectious diseases. Therefore, I pursued a one year Honors degree in Microbiology which introduced me to research and allowed me to combine my interest in infectious diseases and immunology. I chose to work with a group of enthusiastic young scientists in the Microbiology department at Melbourne University working on the immune response to influenza. It was an area of research that I could clearly relate to human health and could apply my interest in immunology to a real-life public health threat. Later on, I would realize that due to the ever changing nature of influenza viruses, new research questions and directions would constantly arise. When I made my post-graduate and post-doctoral choices to study influenza, I had little idea that it would lead me to work on pandemic threats like the 1997 emergence and 2003-04 reemergence of highly pathogenic avian influenza H5N1 viruses in humans and the 2009 H1N1 pandemic, the first pandemic of the 21st century.

What is your favorite part about being involved in isirv?

Without doubt my favorite activity within isirv has been my involvement in the University of Siena and isirv Summer School on Influenza. Together with isirv colleagues, Emanuele Montomoli and John Wood, I organized two Summer Schools in 2011 and 2012, hosted by the University of Siena, Italy. The Summer Schools specifically targeted young scientists embarking on a career in influenza and offered a week-long course that provided basic knowledge on the epidemiology, molecular biology, immunology and pathogenesis of influenza viruses, and public health control and prevention strategies. The Summer School gave me the opportunity to share my enthusiasm for influenza, while educating and mentoring young scientists at the beginning of their “influenza careers”. Isirv has taken on the concept of the Summer Schools, now to be called the School of Influenza, as a flagship for isirv education and outreach to young scientists. We are presently organizing a 2016 School of Influenza and a 2017 School is also planned. Watch the website for more details!

In the know

Publications of interest to **isirv** members

Zumla, A, et al. **Middle East respiratory syndrome.** *Lancet*. 2015 Jun 3;S0140-6736(15):60454-8.

Azhar, E, et al. **Evidence for camel-to-human transmission of MERS coronavirus.** *N Engl J Med*. 2014 Jun 26;370(26):2499-505.

Hartmann, BM, et al. **Human dendritic cell response signatures distinguish 1918, pandemic and seasonal H1N1 influenza viruses.** *J Virol*. 2015 Jul 29: [epub ahead of print].

Verhagen, JH, et al. **Wild bird surveillance around outbreaks of highly pathogenic avian influenza A (H5N8) virus in the Netherlands, 2014, within the context of global flyways**. *Eruo Serveill.* 2015 Mar 26;20(12):21069.

Zanin, M, et al. **Pandemic swine H1N1 influenza viruses with almost undetectable neuraminidase activity are not transmitted via aerosols in ferrets and are inhibited by human mucus but not swine mucus**. *J Virol.* 2015 Jun;89(11):5935-48.

Bakre, A, et al. **Respiratory syncytial virus (RSV) non-structural protein-1 modifies miR-24 expression via TGF-beta.** *J Gen Virol.* 2015 Aug 7; [epub ahead of print].

Mifsud, EJ, et al. **Reducing the impact of influenza-associated secondary pneumococcal infections.** *Nature*. 2015 Jul 21: [epub ahead of print].

Reports from recent isirv meetings

© Institut Pasteur

Workshop on Next Generation Sequencing of Viruses

Institut Pasteur, Paris, France
20 – 21 May 2015

The Workshop on *Next Generation Sequencing (NGS) of Viruses* was organised by the isirv-Antiviral Group in conjunction with GISAID and the PREDEMICS E.U. Consortium and held at the Institut Pasteur, Paris on 20-21 May 2015. It was fully subscribed with 117 registered participants from 16 countries, 20% of whom were from outside Europe. Fifteen abstracts were submitted, 8 of which were selected for oral presentation and 7 were presented as posters.
The 2-day expert workshop reflected a timely and urgent need to address the analysis and interpretation of NGS data of viruses, in particular as regards genetic variation in (mixed) virus populations, intra-host diversity, and the significance and potential impact of minor variants emerging in response to immune or antiviral pressure.
The programme included 'state of the art' presentations, reflecting current and future developments. It provided a platform for open discussion and technical exchange relating to sequencing technologies, data processing, assembly and analysis of data for a variety RNA viruses, with a particular focus on quality and interpretation of results and the significance and use of NGS data on different viruses for public and animal health.

Specific aspects addressed included: limitations of NGS in relation to diversity of viruses within a population (including mixed genotypes/subtypes), and of sequences within a virus population; linkage of sequences (markers) within a virus population, especially relevant to segmented viruses; inherent errors in different systems and processes (quality assurance); and quantitative assessment and statistical significance of minority variants.
The success of the workshop was reflected in some excellent feedback, in particular as regards its timeliness, coverage of the different sequencing platforms and analysis pipelines, and variety of RNA viruses discussed. Many participants saw this workshop as a prelude to a subsequent hands-on workshop with more in-depth bioinformatics training.
Generous financial support for the workshop was provided by 4 companies and a grant from the Association of Public Health Laboratories (APHL).

The expert discussion will form the basis of a report, to be submitted to a special issue of *Viruses* devoted to NGS of viruses, providing guidance on the generation and interpretation of NGS data on viruses.

Reports from recent isirv meetings

4th isirv-AVG Conference

The 4th AVG Conference held at the University of Texas on 2-4 June was opened by Professor Dean Appling, Associate Dean of Natural Sciences. It was very successful in attracting a capacity audience of 200 registered participants.

The theme of the conference was effective in bringing together a good mix of scientists from industry, academia, and research and public health organisations, with about half of the participants representing some 45 different companies. While the majority (60%) of participants were from USA, 22 other countries from around the world were represented.
Against a backdrop of resistance to the licensed antivirals against influenza viruses and the lack of effective interventions against other respiratory viruses, the 3-day programme covered the discovery and development of inhibitors of novel virus targets and key host cell factors. While the principal focus was on influenza, presentations also featured development of antivirals against RSV, coronaviruses, in particular MERS-CoV, rhinoviruses and EV-D68, as well as of more broad-spectrum inhibitors.

The ten sessions covered the whole gamut of steps from molecular biology to clinical studies. A wide variety of types of inhibitor were discussed, from small molecules to antibodies and siRNA, targeting various virus-specific activities, in particular of RNA polymerase components and membrane fusion activities of influenza HA and RSV F proteins. The recent *tour de force* of the determination of the crystal structure of the trimeric influenza RNA polymerase emphasised the increasing wealth of structural information available to assist design of novel inhibitors, against both virus and host targets. The established influenza targets NA and M2 were revisited with respect to the potential for development of alternative inhibitors to overcome the limitations of resistance to the licensed agents. Updates on the clinical potential of Favipiravir and DAS-81, and of the merit of different drug combinations were presented. Several presentations described targeting key host factors involved in virus-host interactions, important for virus replication or the inflammatory response and which may influence susceptibility to disease, or repurposing of drugs licensed for other purposes, as a means of mitigating disease severity.

Reports from recent isirv meetings

4th isirv-AVG Conference

In relation to the therapeutic potential of broad-spectrum monoclonal antibodies to influenza and RSV, concerns about antibody-dependent enhancement of disease were discussed. A final session included consideration of clinical trial endpoints and regulatory issues towards licensure. Oral presentations included 36 'overview' presentations from invited specialists, together with 19 research papers selected from submitted abstracts; 40 posters on various themes were presented.

Coverage of the conference on Twitter by some of the Travel Scholars was a successful innovation. More than 160 tweets under the hashtag "#isirvAVG2015" were posted and the number of twitter "followers" of isirv-AVG doubled. The 'live' coverage via social media not only showcased the speakers, but also reached out to the wider scientific community.
Generous financial support for the conference was received from 15 companies, and NIAID and WHO provided support for 12 Travel Scholarships to assist young scientists and scientists from low-resource countries to attend.

An overview of the conference will be published in *Antiviral Research*.

3rd International Symposium on Neglected Influenza Viruses

The Neglected Influenza Virus meetings were instituted to recognize that not only can influenza virus cause disease in avian and human populations, but that it also affects other mammalian species (swine, horses, bovines) including marine mammals! Bat influenza has also been newly characterized. It is crucial we understand these viruses.

Topics covered included surveillance, transmission, clinical virology, and emerging issues associated with these neglected viruses. Merck Pharmaceuticals also sponsored the Junior Investigator Speaker and Poster awards. The outstanding recipients were (left to right) Mario Aramouni, Tavis Anderson, Erik Karlsson, and Sarah Nelson. Wendy Vaala of Merck (center) presented the awards.

About isirv

isirv is a scientific professional society to promote the prevention, detection, treatment, and control of influenza and other respiratory virus diseases. It will:

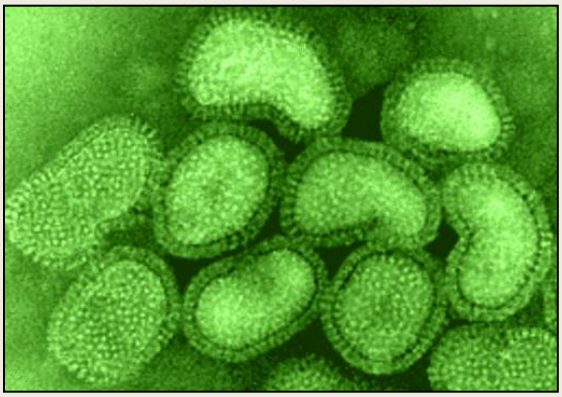
- Provide a forum for the exchange of information and for international collaboration
- Advocate for research and effective public health measures
- Promote relevant scientific and clinical training and education
- Organizes scientific meetings and workshops on key topics and develop international consensus
- Support and develop partnerships with international bodies such as the WHO and other agencies

Membership

Join **isirv!**

Membership is open to scientists, clinicians, public health experts, and others with a direct interest and involvement in the scope of the Society's work.

Membership fee is 85 GBP and is valid for one year from date of submission. To sign up for membership, please click here.



courtesy of University of Cape Town

Submissions welcome

The **isirv** board would like to broaden the society's reach to be of greatest interest to current and/or potential **isirv** members, and we'd like your ideas for future events and newsletter articles. Is there an article you'd like to submit to the newsletter? Do you have an idea for a meeting or satellite symposium? What are the most pressing issues in respiratory viral diseases? Please send your thoughts to contact@isirv.org!