isirv
International Society for Influenza and other Respiratory Virus Diseases

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Respiratory Virus Report

fall 2008

International Symposium on Viral Respiratory Disease Surveillance

Seville, Spain will host the first isirv surveillance symposium
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isirv events:

New Cells for New Vaccines III—From Lab Bench to Clinical Trials
Wilmington, Delaware, USA
28 September-02 October 2008

isirv International Symposium on Viral Respiratory Disease Surveillance
Seville, Spain
25-27 March 2009

isirv International Symposium on Respiratory Virus Transmission and Community Mitigation
Vancouver, British Columbia, Canada
20-23 May 2009

Options for the Control of Influenza VII
Hong Kong
03-07 September 2010

isirv International Society for Influenza and other Respiratory Virus Diseases

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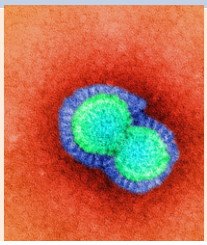


Some New Developments in the Study of Rhinoviruses

by David P Schnurr, PhD **David.Schnurr@cdph.ca.gov**

Rhinoviruses are members of the Picornaviridae family; these viruses have a single-stranded RNA genome of a positive sense polarity, and are unenveloped with icosahaedral symmetry. The Picornaviridae family is composed of 9 genera, including *Enteroviruses* (EVs), *Hepatoviruses*, *Parechoviruses*, and *Rhinoviruses* (RVs) which are known to infect humans. RVs and EVs are closely related, but they differ in several biological traits.

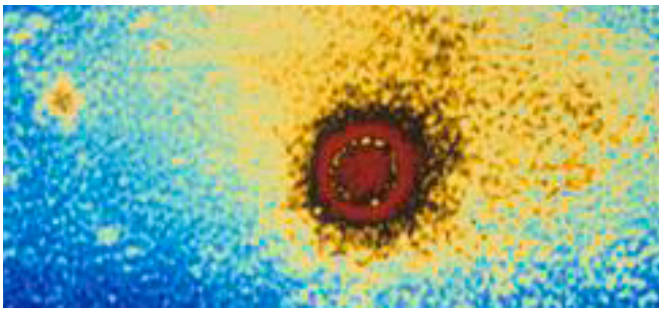
RVs only grow in the respiratory tract and they are acid-labile. EVs grow at multiple sites—the respiratory tract, gut, and systemically—and they are acid-stable. While it was previously thought that rhinoviruses grow better at 33 °C and enteroviruses better at 36 °C, it is now known that at least some RVs may grow equally well at either temperature.

Rhinoviruses were first grown *in vitro* in an attempt to identify agents responsible for the common cold. They grew best at slightly lower temperatures, at a pH of 7.0, with rolling of the culture in human diploid or HeLa cells. A number of serologically distinct rhinoviruses were first described in the 1950s and 1960s when numerous RVs were isolated and subsequently classified into 101 serotypes. Unlike the EVs, where serotyping became a relatively routine laboratory test, typing of RVs has not became a standard test due to the presence of multiple serotypes, the requirement for high-titred neutralizing antibodies, and the technical skill and time required to establish serotype.

A variety of phenotypic assays including serotyping, drug susceptibility, and use of cellular receptors have been used to distinguish or group RVs. More recently, phenotypic assays have been replaced by use of phylogenetic trees to group the RVs into 2 major species, *Human rhinovirus A* (HRV-A) and *Human rhinovirus B* (HRV-B). Genotyping based analysis of sequence data obtained from various subgenomic regions is now available for typing of wild type isolates.

RVs have been established as the most frequent cause of the common cold, accounting for > 50% of infections. Additionally, RVs have been associated with severe lower respiratory infections, asthma exacerbations, and otitis media. RVs have occasionally been associated with outbreaks at long-term care facilities. In 2003 an outbreak involving 67 staff and residents, including the deaths of 12 residents, was attributed to RV.[1] The RV was typed by sequence analysis as RV 82. The role that HRV serotype may play with respect to clinical severity or with particular clinical syndromes remains unresolved; although based on the analogy to EVs, where different serotypes have known epidemiologic and clinical associations, similar associations might also be expected to occur for rhinoviruses.

Rhinoviruses have been associated with severe lower respiratory infections.



Color-enhanced electron photomicrograph of human rhinovirus (Credit: CMSP)

Until recently the study of RVs had been limited to those viruses that could be successfully cultured. Culture is a relatively insensitive method for detection of RVs, as less than 1 $TCID_{50}$ may initiate a human infection.[2] Direct detection by labelled antibodies has not been successful because multiple serotypes do not share a common antigen. The difficulty with direct detection of infected cells may also be due to the limited number of respiratory cells that are actually infected. However, with the advent of direct detection by molecular

detection by molecular sequence-based methods, a better understanding of the diversity, genetics, taxonomy, and prevalence of HRVs has followed.

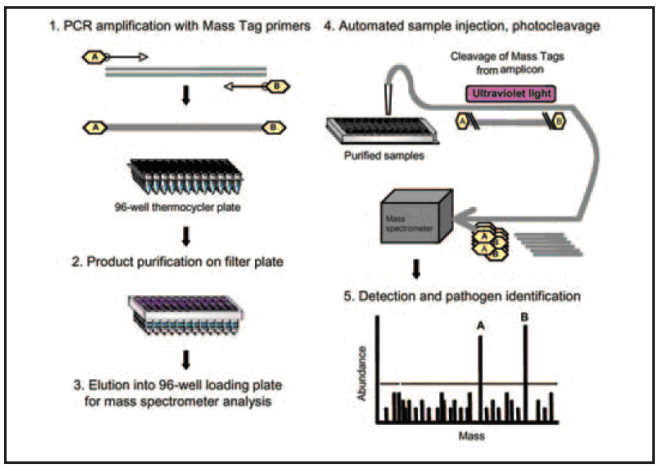
One new insight has been the discovery of a much greater diversity of HRVs than has been recognized by analysis of cultured RVs by use of newer methods such as microarray,[3] MassTag PCR,[4,5] and HRV-specific PCR.[6,7]

For example, microarray has been shown to be much more sensitive than culture for detection of RVs in respiratory tract infections.[3] Sequence analysis has identified a new diverse group, including 5 that were highly divergent in sequence to known HRVs, but more similar to HRV-A than HRV-B; none of these highly divergent RVs could be grown in culture.

Microarray is much more sensitive than culture for detection of rhinoviruses in respiratory tract infections.

MassTag PCR is a method that uses degenerate primers directed at conserved 5′ noncoding sequences. Using this method, RVs were detected in 18 of 79 specimens previously tested for other viruses from cases with influenza-like illness.[4] Further analysis of the capsid-coding region sequences showed that at least 8 of these clustered in a new group related to, but distinct from, HRV-A. In a subsequent report using the MassTag PCR method, 30 additional HRVs that were most closely related to the HRVs discovered by previous use of MassTag PCR technology were identified in respiratory specimens from Germany.[5] It was not reported if culture of virus from clinical specimens was attempted.

PCR methods designed for the specific detection of HRVs have revealed the existence of additional variants, including some not closely related to those described by microarray or MassTag PCR methods. PCR primers directed to the 5′ noncoding HRV region designed specifically for detecting and typing of HRV by sequencing of this region have been demonstrated to successfully serotype cultured HRVs.[6] This PCR assay could also be used for direct detection and sequencing of HRVs from original clinical specimens. In one study, 103 of 108 HRVs detected by PCR were typed. Fifty-four of them did not match known serotypes, and 9 strains representing 17 HRVs formed a new distinct genetic group provisionally named HRV-C. Independently, PCR primers reacting with the 5′ noncoding region were developed for HRV detection and typing at the California Department of Public Health–Viral and Rickettsial Disease Laboratory.[7] The type resulting from sequencing the 5′ region compared to that determined by the sequence of the VP4 and VP2



Schematic representation of MassTag polymerase chain reaction (PCR)

Credit: Briese T, Palacios G, Kokoris M, et al. Diagnostic system for rapid and sensitive differential detection of pathogens. *Emerg Infect Dis*. 2005;11:310-313.

regions[8] agreed for 70 of 71 isolates. The same primers used in direct testing of clinical specimens identified 24 HRVs, including five which belonged to the previously described novel HRV-C genotype. No virus could be cultured from any of the HRV-C specimens described in these two reports.

Use of nucleic acid detection for detection of HRVs in children and their family members[9,10] were recently reported. As suspected, PCR was far more sensitive than culture, allowing for a more comprehensive analysis of HRV prevalence, persistence, and association with symptoms. The prevalence of RV infection was higher in ill compared with healthy asymptomatic subjects (37% vs 22%). Quantitatively, there was no difference in the number of copies of RV RNA between those with or without symptoms, and PCR was able to detect RV for up to 100 days.

In summary, our knowledge on the diversity, prevalence, genetics, and taxonomy of RVs has expanded greatly in recent years. RV infections account for a broad spectrum of clinical illness, and are associated with asymptomatic infection and the common cold, but may also play a role in more severe clinical illness. Use of multiplex detection systems will be important in providing additional information about the prevalence and importance of coinfection with other viral and bacterial pathogens. The potential to identify serotype or genotype by nucleic acid detection methods is exciting, and may help elucidate the association with recently described variant HRVs and particular clinical syndromes or severity of infections. Better knowledge of the role of particular serotypes or genotypes in clinical disease could have important implications for understanding clinical outcomes, prevention strategies with potential vaccines, development of antiviral agents, and the value of typing itself.

Multiplex detection systems will provide information about the prevalence and importance of rhinovirus coinfection with other viral and bacterial pathogens.

Dr Schnurr is Chief, Viral Isolation Section, at the Viral and Rickettsial Disease Laboratory, Division of Communicable Disease Control of the California Department of Public Health in Richmond, California, USA

References

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Molecular diagnosis of ARI from 7 countries by using MassTag PCR and VP4/2 sequencing†

			Picornavirus positive						
Country	Season(s)	Samples	Total	Novel clade	HRV-A	HRV-B	HEV	% Male	Age range (mean/median)
South Africa	2006	58	14	4	6	3	1	71	0.4–30 mo (5.6/3)
Côte d'Ivoire	2006	52	2	0	2	0	0	100	22–28 y (25/25)
Nepal	2005–06	80	17	4	7	5	1	56	0.25–56 y (8.5/3)
India	2007	50	6	3	3	0	0	83	4–36 mo (17.8/18)
Australia	2006	2	2	1	1	0	0	100	4–6 mo (5/5)
Denmark	2007	70	7	5	1	0	1	57	1–8 mo (2.9/2)
Spain	2003–2006	14‡	14	6	5	3	0	86	1–96 mo (23.2/15.5)

†ARI, acute respiratory illness; HRV, human rhinovirus; HEV, human enterovirus.
‡With previous HRV diagnosis.

Distribution of rhinovirus clades by MassTag PCR in selected countries.

Credit: Briese T, Renwick N, Venter M, et al. Global distribution of novel rhinovirus genotype. *Emerg Infect Dis*. 2008;14:944-947.

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In the Loop

Recent publications and news items of special interest to isirv members

by Gregory C Gray, MD, MPH, FIDSA
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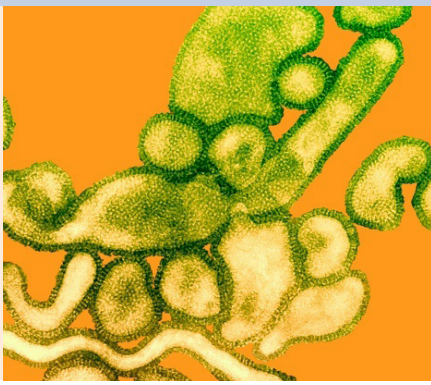

ANTIVIRALS

More case reports describing the use of cidofovir-ribavirin combination therapy against an adenovirus strain.

Source: Darr S, Madisch I, Heim A. Antiviral activity of cidofovir and ribavirin against the new human adenovirus subtype 14a that is associated with severe pneumonia. *Clin Infect Dis*. 2008;47:731-732.

CLINICAL MEDICINE

Key changes in the United States influenza management guidelines include annual seasonal vaccination of all schoolchildren and prioritized use of neuraminidase inhibitors in severely ill patients. Hospitalized patients may have less morbidity and mortality even if treated > 48 hours after onset of symptoms.

Source: Centers for Disease Control and Prevention. Prevention and Control of Influenza. Recommendations of the Advisory Committee on Immunization Practices (ACIP), 2008. *MMWR Recomm Rep*. 2008;57(RR-7). August 8, 2008. Available at: www.cdc.gov/mmwr/PDF/rr/rr5707.pdf.

EMERGING INFECTIOUS DISEASES

Influenza A (H9N2) is transmissible in ferrets: could it be the next pandemic strain?

Source: Wan H, Sorrell EM, Song H, et al. Replication and transmission of H9N2 influenza viruses in ferrets: evaluation of pandemic potential. *PLoS ONE*. 2008;3:e2923.

According to the authors, "HealthMap is a freely accessible, automated real-time system that monitors, organizes, integrates, filters, visualizes, and disseminates online information about emerging diseases."

Source: Brownstein JS, Freifeld CC, Reis BY, Mandl KD. Surveillance Sans Frontières: Internet-based emerging infectious disease intelligence and the HealthMap project. *PLoS Med*. 2008;5:e151. See also: www.healthmap.org.

PANDEMIC PLANNING

Why antibiotics and bacterial vaccines should be part of pandemic stockpiles.

Source: Brundage JF, Shanks GD. Deaths from bacterial pneumonia during 1918-19 influenza pandemic. *Emerg Infect Dis*. 2008;14:1193-1199.

United States Health and Human Services (HHS) report shows wide variations between states in their progress toward building an influenza antiviral stockpile.

Source: US HHS. Antivirals—State Allocations. June 27, 2008. Available at: www.pandemicflu.gov/plan/states/antivirals.html.

VACCINES

New clinical trial data are available for several novel influenza vaccines and administration routes.

Holland D, Booy R, Looze FD, et al. Intradermal influenza vaccine administered using a new microinjection system produces superior immunogenicity in elderly adults: a randomized controlled trial. *J Infect Dis*. 2008;198:650-658.

Lalor PA, Webby RJ, Morrow J, et al. Plasmid DNA-based vaccines protect mice and ferrets against lethal challenge with A/Vietnam/1203/04 (H5N1) influenza virus. *J Infect Dis*. 2008;197:1643-1652.

Halasa NB, Gerber MA, Chen Q, Wright PF, Edwards KM. Safety and immunogenicity of trivalent inactivated influenza vaccine in infants [aged 10-22 weeks]. *J Infect Dis*. 2008;197:1448-1454.

Sugimura T, Ito Y, Tananari Y, et al. Improved antibody responses in infants less than 1 year old using intradermal influenza vaccination. *Vaccine*. 2008;26:2700-2705.

Hoelscher MA, Singh N, Garg S, et al. A broadly protective vaccine against globally dispersed clade 1 and clade 2 H5N1 influenza viruses. *J Infect Dis*. 2008;197:1185-1188.

VIROLOGY

Exposure to the 1918 pandemic strain conferred lifelong immunity among survivors.

Source: Yu X, Tsibane T, McGraw PA, et al. Neutralizing antibodies derived from the B cells of 1918 influenza pandemic survivors. *Nature*. 2008 Aug 17. [Epub ahead of print]

The discovery of neuraminidase inhibitor resistance in H1N1 strains isolated from untreated patients will require vigilant surveillance.

Source: Sheu TG, Deyde VM, Okomo-Adhiambo M, et al. Surveillance for neuraminidase inhibitor resistance among human influenza A and B viruses circulating worldwide in 2004-2008. *Antimicrob Agents Chemother*. 2008 Jul 14. [Epub ahead of print]

Avian influenza gene segments have been found in a novel swine influenza strain.

Source: Ma W, Vincent AL, Gramer MR, et al. Identification of H2N3 influenza A viruses from swine in the United States. *Proc Natl Acad Sci U S A*. 2007;104:20949-20954.

Dr Gray is Director, Center for Emerging Infectious Diseases and Professor, Department of Epidemiology, at the University of Iowa College of Public Health.

Voices of isirv

The **isirv** board would like to broaden the society's reach to be of greatest interest to current and potential **isirv** members, and is keenly interested in your ideas for future events and newsletter articles. Is there a topic you'd like to write about for the newsletter? Do you have an idea for a meeting or satellite symposium? What are the most pressing issues in viral respiratory disease? Please send your thoughts to marge.tamas@intmedpress.com.

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
- Organize 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

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isirv Conference Activities Update

New Cells for New Vaccines III: From Lab Bench to Clinical Trials
28 September-01 October 2008
Wilmington, Delaware, USA

A key aspect of the success and viability of a vaccine development project is the choice of an appropriate cell substrate. The past fifty years have seen a dramatic increase in the types of cells available for vaccine production. Nevertheless, there remains a need for new and innovative approaches to extend the range of vaccines available for the protection of human and animal health.

Recent developments involving cells of insect and plant origin are attracting considerable scientific interest. Presentations at the last two New Cells for New Vaccines workshops included development of influenza vaccines in plants, clinical trials of an HPV vaccine produced with the baculovirus expression vector systems in insect cells and antibody expression in microalgae.

New Cells for New Vaccines III will be of interest to scientists in the biotechnology and pharmaceutical industry involved in vaccine development and production, as well as academics, regulatory and public health authorities, and medical and veterinary experts.

More information about this workshop is available on the **isirv** Web site, www.isirv.org.

International Symposium on Viral Respiratory Disease Surveillance
Seville, Spain
25-27 March 2009

by John Watson
john.watson@hpa.org.uk

Join your peers and global respiratory disease scientists in the quest to forge consensus and foster collaboration on the preferred methodologies, performance characteristics, and outcomes for viral respiratory disease surveillance at the **isirv** International Symposium on Viral Respiratory Disease Surveillance. Following keynote presentations and status reports from global researchers and scientists in viral respiratory disease surveillance, panel discussions and interactive question and answer sessions will be held.

The **isirv** International Symposium on Viral Respiratory Disease Surveillance will discuss various forms of unilateral and multilateral collaboration and assistance, with the goal of bringing developing countries closer to the international surveillance networks. The meeting will emphasize practical implementation of surveillance methods consistent with national and/or regional resources.

Register for the Symposium online at: https://isirv.org/events/surveillance-register.cfm. Registration fees before 31 December 2008 for **isirv** members are only €350. A limited number of scholarships are available. (Proof of financial hardship required. Apply before 31 December 2008.)

For further details, visit https://isirv.org/events/surveillance-intro.cfm or call +1 404 233 6446.

*Dr Watson serves as Chair for the **isirv** International Symposium on Viral Respiratory Disease Surveillance, and Deputy Chair, **isirv**. He is also Director, Respiratory Diseases Department, at the Health Protection Agency Centre for Infections, UK.*

isirv International Symposium on Respiratory Virus Transmission and Community Mitigation Vancouver, British Columbia, Canada 20-23 May 2009

by Lance Jennings, QSO, PhD
lance.jennings@cdhb.govt.nz

The **isirv** board has identified virus transmission as a critical issue in respiratory disease, and has approved a draft proposal for a new meeting on this topic. A logical follow-on to the Surveillance Symposium, this meeting will weigh the evidence supporting various tools and strategies for community mitigation, including nonpharmaceutical interventions, vaccines, and antiviral agents for viral respiratory disease. It will emphasize addressing practical challenges associated with community mitigation actions called for in pandemic response plans to viral respiratory disease outbreaks. Audience participation and panel discussions will be prominent features of the Symposium. Jonathan Van-Tam, MBE, DM, FFPH, FRIPH, Professor of Health Protection at the University of Nottingham, UK, has graciously agreed to chair this new meeting. Further details about the meeting objectives are available at www.isirv.org. Inquiries regarding participation in or support of this Symposium may be directed to Lynne Pryor at lynne.pryor@meetintegress.com.

Day 1	Day 2	Day 3
Practical Challenges in Community Mitigation Actions (dinner and panel discussion)	Tools and Strategies for Community Mitigation: Weighing the Evidence (lectures and panel discussions)	New Developments in Vaccines and Antiviral Agents for Viral Respiratory Diseases Applying Pandemic Influenza Plans to Seasonal Influenza and Other Viral Respiratory Disease Outbreaks

Options for the Control of Influenza VII 3-7 September 2010 Hong Kong

by Lynne Pryor
lynne.pryor@meetintegress.com

Options VII will take place in Hong Kong, 3-7 September 2010. Launched in 1985, *Options for the Control of Influenza* has grown into the largest international conference exclusively devoted to influenza, covering every imaginable topic from basic science to health care policy.

Whatever your domain of expertise – science, human medicine, animal medicine, public health policy, industry or media – *Options for the Control of Influenza VII* will provide comprehensive scientific guidance for all disciplines involved in influenza prevention, control and treatment, including seasonal and pandemic planning.

Save the date! Don't miss this triennial event, mark your calendar and check the **isirv** Web site for updated information as it becomes available.

Other events of interest

Antiviral Therapy for Influenza: A Case-Based Approach for Optimal Management Washington, DC 28 October 2008

See announcement on page 12.

Tell Us How We're Doing!

The Fall 2008 issue marks a full year of publication of *Respiratory Virus Report*. We'd like to get your opinion about the newsletter. Your response to this survey will help us customize the *Report* to better serve you. All survey responses received by 31 October 2008 will be entered in a drawing for a book, courtesy of Blackwell Publishing.

What one thing would you add or change in *Respiratory Virus Report*?

_____

_____

_____

Please provide your name and mailing address to be entered in the drawing.

_____

_____

_____

Please circle the number that best expresses your impressions of the **isirv** newsletter, then fax the completed survey to +1 404 506 9393, attention Marge Tamas. If you prefer, you may scan and e-mail the survey to marge.tamas@intmedpress.com.

5 = strongly agree, 4 = somewhat agree, 3 = neutral, 2 = somewhat disagree, 1 = strongly disagree.

Respiratory Virus Report does a good job keeping me informed of new developments in viral respiratory disease	5	4	3	2	1
Respiratory Virus Report does a good job keeping me informed of upcoming **isirv** events	5	4	3	2	1
I obtained a copy of a report, book, or article after first learning about it in *Respiratory Virus Report*	5	4	3	2	1
I read all or most of the articles in each issue of *Respiratory Virus Report*	5	4	3	2	1
I've recommended downloading a copy of *Respiratory Virus Report* to a colleague	5	4	3	2	1
I keep printed copies of the *Respiratory Virus Report* on file for future reference	5	4	3	2	1
Printing copies of *Respiratory Virus Report* is convenient	5	4	3	2	1
Please rate the overall quality and interest of each section of *Respiratory Virus Report:*					
• Feature articles (research summaries)	5	4	3	2	1
• Feature articles (research summaries)	5	4	3	2	1
• Past event reports	5	4	3	2	1
• Upcoming event news	5	4	3	2	1
• **isirv** membership application	5	4	3	2	1

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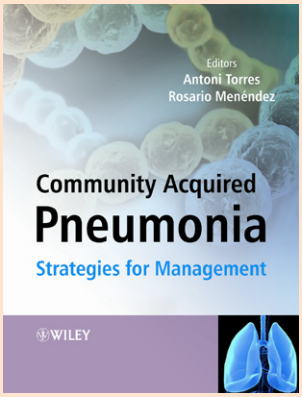
Blackwell Publishing

Return your completed survey by 31 October 2008 to be entered in a drawing for a new Blackwell publication.



Community Acquired Pneumonia: Strategies for Management

Community Acquired Pneumonia: Strategies for Management

Dr Antoni Torres, Hospital Clínic de Barcelona, Spain

Dr Rosario Menéndez, Hospital Clínic de Barcelona, Spain

ISBN 9780470058091. Hardcover. 288 pages. August 2008.

Community Acquired Pneumonia: Strategies for Management is the first book to cover in-depth the management of pneumonia acquired outside of hospitals or extended-care facilities, which is a most common respiratory infection.

Community Acquired Pneumonia: Strategies for Management presents an in-depth review of the important new advances in therapeutics, including drug resistance of the three major classes of antibiotics used for its treatment: beta-lactams, macrolides and quinolones. Guideline recommendations are highlighted and a balanced analysis is presented to help physicians comply with the requirement for the highest standard of care. In addition, the authors provide an insight into the 10% of patients that do not respond to antibiotics and could benefit from adjunctive therapies, some still under review.

This volume will be welcomed by pulmonologists and all clinicians involved in managing community-acquired pneumonia.

isirv Membership Application

First Name

Last Name

Current Position

Academic Title

Institution Name

Institution Type: ☐ Academic ☐ Industry ☐ Public Health ☐ Governmental

Industry

Department

Address 1

Address 2

City

State

Postal Code

Country

Phone

Fax

E-mail Address

Please indicate your five main areas of interest (rate from '1' to '5', with 5 as the highest score):

- ☐ Animal health/disease
- ☐ Human health/disease
- ☐ Zoonoses/ecology
- ☐ Pandemic preparedness
- ☐ Policy for control and prevention
- ☐ Cost benefit and health economics
- ☐ Diagnostics, epidemiology, and surveillance
- ☐ Vaccines
- ☐ Immunology
- ☐ Antivirals
- ☐ Viral structure & replication
- ☐ Other?

Which virus(es) are your main interest?

The Society's members will elect the officers of isirv.

If proposed, would you accept nomination for election? ☐

Please give any general suggestions you have on priorities for **isirv** activities for the first 1-2 years:

Membership fees of €100 may be paid by cheque or bank transfer to the **isirv** account: Barclays Bank, Edgware Branch, 126 Station Road, Edgware, London, HA8 7RY. Sort code 20 29 41. Account #307 876 20. To register for **isirv** and pay online: visit www.**isirv**.org. Payment confirmation will be mailed to the address provided on the membership form.

If using a cheque please print and mail a copy of this form together with payment to:

Dr Geoffrey C Schild
17 Sunnyfield, Mill Hill
London NW7 4RD, UK

Make the cheque payable to **isirv** and write the member's name legibly on the cheque. The amount of the cheque must match the annual membership fee.

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Antiviral Therapy for Influenza

A Case-based Approach for Optimal Management

Tuesday, October 28, 2008
6:00 AM-6:30 AM Breakfast
6:30 AM-8:30 AM Scientific Program

Chair
Frederick G. Hayden, MD
University of Virginia School of Medicine
Charlottesville, Virginia, USA

Faculty
Anthony Fiore, MD, MPH, CAPT, USPHS
Centers for Disease Control and Prevention
Atlanta, Georgia, USA

David S.C. Hui, MBBS, MD, FRACP, FRCP, FCCP, FHKCP, FHKAM
The Chinese University of Hong Kong
Prince of Wales Hospital
Shatin, Hong Kong SAR, China

Renaissance Washington DC Hotel
Grand Ballroom
999 9th Street NW
Washington, DC 20001
USA

Join us for this industry supported CME symposium while attending the 2008 ICAAC/IDSA Joint Meeting

Activity Overview

An increase in pediatric deaths, emergence of influenza strains resistant to current antiviral treatments, and ongoing reports of human cases of highly pathogenic avian influenza have heightened awareness that influenza is not always a mild, self-limiting disease. These developments have renewed interest in better diagnostic tests and treatments for influenza infection. Further, there is great interest among CDC and WHO officials in improving clinical outcomes in patients with severe influenza illness.

This symposium will address the multifaceted challenges of influenza management in view of recent guideline updates. The practical clinical management of severe influenza illness will be emphasized and illustrated through case studies from actual patients. Current thinking on the pandemic potential of different viruses and pandemic planning will be reviewed. Finally, new antiviral agents in development will be discussed in view of the alarming increase in viral resistance to existing neuraminidase inhibitors.

Intended Audience
Infectious disease physicians, researchers, scientists, and other healthcare providers with an interest in infectious diseases

Learning Objectives
At the conclusion of this activity, the participant should be able to:
- Cite the rationale for this year's CDC recommendations for influenza management
- Describe current best practices in influenza diagnosis and treatment
- Discuss treatment options for severe influenza, including human cases of highly pathogenic A(H5N1) avian influenza, in the context of increased resistance to current antiviral agents
- Review the status of current research aimed at developing new influenza antiviral agents
- Summarize the current status of global pandemic planning efforts

Learning Format
This symposium will feature lectures with audiovisual enhancements, case studies, and an Audience Response System that will be used throughout the activity to increase program interactivity. At the conclusion of the symposium, a panel discussion led by the faculty will address questions from the audience.

CME Accreditation and Designation Statements
This activity has been planned and implemented in accordance with the Essential Areas and policies of the Accreditation Council for Continuing Medical Education (ACCME) through the joint sponsorship of the Institute for Medical and Nursing Education (IMNE) and International Medical Press (IMP). IMNE is accredited by the ACCME to provide continuing medical education for physicians.

IMNE designates this educational activity for a maximum of 2.0 *AMA PRA Category 1 Credit(s)*™. Physicians should only claim credit commensurate with the extent of their participation in the activity.

Commercial Support Acknowledgment
This activity is supported by an educational grant from BioCryst Pharmaceuticals, Inc.

Americans with Disabilities Act Compliance
IMNE and IMP fully comply with the legal requirements of the Americans with Disabilities Act and the rules and regulations thereof. If any participant in this educational activity is in need of accommodations, please contact Katie Fidanza at 1 404 443 1511 or katie.fidanza@intmedpress.com by October 21, 2008.

Registration
Registration for this program is available at

https://secure.intmedpress.com/flu2008

Registration is not required, though it is recommended.
Preregistration ensures priority admission to the activity if total registration exceeds room capacity.
No fee is required for this activity.

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