

19 January 2010

This supplement has been prepared to present scientific and technical news items that may be of more interest to technical personnel at RDT&E activities and the labs, or the medics rather than the broader readership of the basic CB Daily. Due to the nature of the material, the articles, if available online, are usually only available through subscription services thus making specific links generally unavailable. Thus, usually only the bibliographic citation is available for use by an activity's technical library.

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Chem-Bio News - Pandemic Influenza Edition #95

1. SEASONAL INFLUENZA RISK IN HOSPITAL HEALTHCARE WORKERS IS MORE STRONGLY ASSOCIATED WITH HOUSEHOLD THAN OCCUPATIONAL EXPOSURES: RESULTS FROM A PROSPECTIVE COHORT STUDY IN BERLIN, GERMANY, 2006/07: *"Our results suggest that healthcare workers in hospitals do not have a higher risk of influenza than non-healthcare workers, although their risk of any respiratory infection is slightly raised."*

2. SWITCHING GEARS FOR AN INFLUENZA PANDEMIC: VALIDATION OF A DUPLEX REVERSE TRANSCRIPTASE PCR ASSAY FOR SIMULTANEOUS DETECTION AND CONFIRMATORY IDENTIFICATION OF PANDEMIC (H1N1) 2009 INFLUENZA VIRUS: *"Overall, the duplex RT-PCR assay is a reliable method for the simultaneous detection and confirmatory identification of pandemic (H1N1) 2009 influenza virus and would be particularly attractive to laboratories without real-time RT-PCR capabilities."*

3. A SERINE12STOP MUTATION IN PB1-F2 OF THE 2009 PANDEMIC (H1N1) INFLUENZA A: A POSSIBLE REASON FOR ITS ENHANCED TRANSMISSION AND PATHOGENICITY TO HUMANS: *"Genome annotations of this virus identified a stop mutation replacing serine at codon 12 (S12Stop) of the PB1-F2 protein, a virulence factor in influenza A viruses."*

4. CLINICAL AND EPIDEMIOLOGIC CHARACTERISTICS OF AN OUTBREAK OF NOVEL H1N1 (SWINE ORIGIN) INFLUENZA A VIRUS AMONG UNITED STATES MILITARY BENEFICIARIES: *"The outbreak described here primarily affected adolescents and young adults and resulted in a febrile illness without sequelae."*

5. WHO, VACCINE GROUP DENY PANDEMIC SCARE CHARGES: *"The World Health Organization (WHO) and vaccine makers from Europe today defended themselves against the charges of some European officials that the agency was improperly influenced by vaccine companies and exaggerated the threat of the pandemic H1N1 virus."*

6. EXTENSIVE MAMMALIAN ANCESTRY OF PANDEMIC (H1N1) 2009 VIRUS: *"We demonstrate that the novel pandemic influenza (H1N1) viruses have human virus-like receptor specificity and can no longer replicate in aquatic waterfowl, their historic natural reservoir. The biological properties of these viruses are consistent with those of their phylogenetic progenitors, indicating longstanding adaptation to mammals."*

CB Daily Report

Chem-Bio News

SEASONAL INFLUENZA RISK IN HOSPITAL HEALTHCARE WORKERS IS MORE STRONGLY ASSOCIATED WITH HOUSEHOLD THAN OCCUPATIONAL EXPOSURES: RESULTS FROM A PROSPECTIVE COHORT STUDY IN BERLIN, GERMANY, 2006/07

By Chris J Williams, Brunhilde Schweiger, Genia Diner, Frank Gerlach, Frank Haaman, Gerard Krause, Albert Nienhaus and Udo Buchholz
BMC Infectious Diseases

January 12, 2010

“Methods

We conducted a prospective, multicentre cohort study during the 2006/07 influenza season in Berlin, Germany. Recruited participants gave serum samples before and after the season, and completed questionnaires to determine their relevant exposures and possible confounding factors. The main outcome measure was serologically confirmed influenza infection (SCII), defined as a fourfold or greater rise in haemagglutination inhibition antibody titres to a circulating strain of influenza (with post-season titre at least 1:40). Weekly mobile phone text messages were used to prompt participants to report respiratory illnesses during the influenza season. A logistic regression model was used to assess the influence of potential risk factors.

Results

We recruited 250 hospital healthcare workers (mean age 35.7 years) and 486 non-healthcare workers (mean age 39.2 years) from administrative centres, blood donors and colleges. Overall SCII attack rate was 10.6%. Being a healthcare worker was not a risk factor for SCII (relative risk 1.1, $p=0.70$). The final multivariate model had three significant factors: living with children (odds ratio [OR] 3.7, $p=0.005$), immunization (OR 0.50, $p=0.02$), and - among persons living in households without children - ownership of a car (OR 3.0, $p=0.02$). Living with three or more children (OR 13.8, $p<0.01$) was a greater risk than living with one or two children (OR 5.3, $p=0.02$). 30% of participants with SCII reported no respiratory illness. Healthcare workers were at slightly higher risk of reporting any respiratory infection than controls (adjusted OR 1.3, $p=0.04$, $n=850$).

Conclusions

Our results suggest that healthcare workers in hospitals do not have a higher risk of influenza than non-healthcare workers, although their risk of any respiratory infection is slightly raised. Household contacts seem to be more important than exposure to patients. Car ownership is a surprise finding which needs further exploration. Asymptomatic infections are common, accounting for around a third of serologically confirmed infections.”

The full article can be found at: <http://www.biomedcentral.com/1471-2334/10/8/abstract>

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SWITCHING GEARS FOR AN INFLUENZA PANDEMIC: VALIDATION OF A DUPLEX REVERSE TRANSCRIPTASE PCR ASSAY FOR SIMULTANEOUS DETECTION AND CONFIRMATORY IDENTIFICATION OF PANDEMIC (H1N1) 2009 INFLUENZA VIRUS

Biotech Week

January 20, 2010

“Nucleic acids were extracted from 198 consecutive nasopharyngeal, nasal, or throat swab specimens collected early in the outbreak (127 negative specimens, 66 specimens with pandemic [H1N1] 2009 influenza virus, 3 specimens with seasonal [H1N1] influenza A virus, and 2 specimens with seasonal [H3N2] influenza A virus). The performance characteristics of the duplex RT-PCR assay were assessed and compared to those of various detection methods: a monoplex RT-PCR assay at the National Microbiology Laboratory, a real-time RT-PCR assay using a Centers for Disease Control and Prevention protocol, an in-house multiplex RT-PCR assay (targeting influenza A virus, influenza B virus, and respiratory syncytial virus), and a rapid antigen test (the Binax Now Influenza A & B assay). The sensitivity of the duplex RT-PCR assay for influenza A virus detection was 97.2%, whereas the sensitivities were 74.6%, 71.8%, 47.8%, and 12.7% for the other four assays, respectively. The duplex RT-PCR assay was also able to identify swH1 in 94% of the cases, thereby reducing the number of specimens forwarded to reference laboratories for confirmatory identification. Only a limited number of specimens that contained influenza A virus had amounts of virus that fell below the limit of detection of the assay with the swH1 primers.”

"Overall, the duplex RT-PCR assay is a reliable method for the simultaneous detection and confirmatory identification of pandemic (H1N1) 2009 influenza virus and would be particularly attractive to laboratories without real-time RT-PCR capabilities."

The full article can be found at: (J.J. Leblanc, et. al., "Switching Gears for an Influenza Pandemic: Validation of a Duplex Reverse Transcriptase PCR Assay for Simultaneous Detection and Confirmatory Identification of Pandemic (H1N1) 2009 Influenza Virus". Journal of Clinical Microbiology, 2009;47(12):3805-3813). Link not available.

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A SERINE12STOP MUTATION IN PB1-F2 OF THE 2009 PANDEMIC (H1N1) INFLUENZA A: A POSSIBLE REASON FOR ITS ENHANCED TRANSMISSION AND PATHOGENICITY TO HUMANS

Journal of Farming

January 21, 2010

"Genome annotations of this virus identified a stop mutation replacing serine at codon 12 (S12Stop) of the PB1-F2 protein, a virulence factor in influenza A viruses. Here, we discuss the significance of this finding and how it may contribute to host specialization, explaining the virtual absence of the H1N1 influenza A virus strain in pig populations."

The full article can be found at: (M.A. Ramakrishnan, et. al., "A Serine12Stop mutation in PB1-F2 of the 2009 pandemic (H1N1) influenza A: a possible reason for its enhanced transmission and pathogenicity to humans". Journal of Veterinary Science, 2009;10(4):349-351). Link not available.

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CLINICAL AND EPIDEMIOLOGIC CHARACTERISTICS OF AN OUTBREAK OF NOVEL H1N1 (SWINE ORIGIN) INFLUENZA A VIRUS AMONG UNITED STATES MILITARY BENEFICIARIES

Biotech Week

January 13, 2010

"We describe the clinical and epidemiologic characteristics of this novel strain in a military population to assist in future outbreak prevention and control efforts. We performed an epidemiologic evaluation of novel H1N1 virus infections diagnosed in San Diego County among 96,258 local US military beneficiaries. The structured military medical system afforded the ability to obtain precise epidemiologic information on the impact on H1N1 virus infection in a population. The novel H1N1 virus was confirmed using real-time reverse transcriptase polymerase chain reaction (rRT-PCR). From 21 April through 8 May 2009, 761 patients presented with influenza-like illness and underwent rRT-PCR testing. Of these patients, 97 had confirmed novel H1N1 virus infection, with an incidence rate of 101 cases per 100,000 persons. The median age of H1N1 patients with H1N1 virus infection was 21 years (interquartile range, 15-25 years). Fever was a universal symptom in patients with H1N1 virus infection; other symptoms included cough (present in 96% of patients), myalgia or arthralgia (57%), and sore throat (51%). Sixty-eight (70%) of our patients had an identifiable epidemiologic link to another confirmed patient. The largest cluster of cases of H1N1 virus infection occurred on a Navy ship and involved 32 (8%) of 402 crew members; the secondary attack rate was 6%-14%. The rapid influenza testing that was used during this outbreak had a sensitivity of 51% and specificity of 98%, compared with rRT-PCR. Only 1 patient was hospitalized, and there were no deaths. A novel H1N1 influenza A virus caused a significant outbreak among military beneficiaries in San Diego County, including a significant cluster of cases onboard a Navy ship."

"The outbreak described here primarily affected adolescents and young adults and resulted in a febrile illness without sequelae."

The full article can be found at: (N.F. Crumcianflone, et. al., "Clinical and Epidemiologic Characteristics of an Outbreak of Novel H1N1 (Swine Origin) Influenza A Virus among United States Military Beneficiaries". Clinical Infectious Diseases, 2009;49(12):1801-1810). Link not available.

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WHO, VACCINE GROUP DENY PANDEMIC SCARE CHARGES

By Lisa Schnirring

CIDRAP News (Center for Infectious Disease Research & Policy – University of Minnesota)

January 14, 2010

“The World Health Organization (WHO) and vaccine makers from Europe today defended themselves against the charges of some European officials that the agency was improperly influenced by vaccine companies and exaggerated the threat of the pandemic H1N1 virus.

Keiji Fukuda, MD, special adviser to the WHO director-general on pandemic flu, told reporters at a press briefing that the WHO welcomes constructive criticism, but said charges of a "false pandemic" by a group of European officials led by Dr Wolfgang Wodarg, a German physician who chairs the Council of Europe's health committee, are "scientifically wrong and historically inaccurate."

Wodarg and 13 others charged in a proposed resolution that pharmaceutical company pressure on the WHO and member countries have led governments to waste healthcare resources and expose their citizens to insufficiently tested vaccines. The action comes as several European countries are cutting back on their vaccine orders because of weak demand, ebbing flu activity, and the need for just one dose per person."

The full article can be found at:

<http://www.cidrap.umn.edu/cidrap/content/influenza/swineflu/news/jan1410who.html>

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EXTENSIVE MAMMALIAN ANCESTRY OF PANDEMIC (H1N1) 2009 VIRUS

By Natalia A. Ilyushina, Jeong-Ki Kim, Nicholas J. Negovetich, Young-Ki Choi, Victoria Lang, Nicolai V. Bovin, Heather L. Forrest, Min-Suk Song, Philippe Noriel Q. Pascua, Chul-Joong Kim, Robert G. Webster, and Richard J. Webby

Emerging Infectious Diseases

January 2010 (e-pub ahead of publication)

“We demonstrate that the novel pandemic influenza (H1N1) viruses have human virus-like receptor specificity and can no longer replicate in aquatic waterfowl, their historic natural reservoir. The biological properties of these viruses are consistent with those of their phylogenetic progenitors, indicating longstanding adaptation to mammals.”

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“Recent phylogenetic analysis showed that each segment of the pandemic (H1N1) 2009 virus is nested within a well-established swine influenza lineage for >10 years before the recent outbreak (7). Hence, the ancestors of this virus circulated undetected for about a decade before the virus emerged in humans. Our finding that contemporary swine viruses acquired the ability to recognize 6'SLN with at least 5-fold higher affinity than did human strains and completely lost the ability to bind to Neu5Acα2,3Gal provides clear evidence to support this hypothesis. It is possible that the progenitors of pandemic (H1N1) 2009 virus were accumulating enough mammal-associated changes to allow a refinement of their receptor-binding properties. Our findings substantiate that strong mammalian-like receptor specificity is a critical barrier to infection of various hosts with pandemic (H1N1) 2009 virus. Other biological factors associated with their adaptation and tissue tropism in humans will likely be identified in the future.”

The full article can be found at: <http://www.cdc.gov/eid/content/16/2/pdfs/09-1141.pdf>

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