

26 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 #96

1. DOUBLE TROUBLE: BACTERIAL SUPER-INFECTION AFTER THE FLU: *“Current research suggests that the flu may predispose to secondary bacterial infections, which account for a significant proportion of mortality during flu pandemics. The related report by Lee, et al., “A mouse model of lethal synergism between influenza virus and Haemophilus influenzae,” appears in the February 2010 issue of the American Journal of Pathology.”*

2. IMPACT OF PANDEMIC (H1N1) 2009 INFLUENZA ON CRITICAL CARE CAPACITY IN VICTORIA [AU]: *“Prospective use of the RuAid 2.0 model provided valuable health intelligence for assessment and projection of hospitalisation and critical care demand through the first 10 weeks of the pandemic in Victoria.”*

3. [CALIFORNIA] STATEWIDE CONCEPT OF OPERATIONS FOR PANDEMIC INFLUENZA: *California Emergency Management Agency Conops.*

4. [BRITISH COLUMBIA] GENOMIC SURVEILLANCE OF PANDEMIC H1N1: *“This project capitalizes on BC's expertise and capacity in genome sequencing to generate hundreds of complete genomes from circulating influenza viruses collected in British Columbia during the H1N1 pandemic, as well as during and after the Olympics. By comparing the evolution of BC's influenza virus to that of viruses sequenced in other regions, researchers hope to learn how a mass gathering such as the Olympics can impact the virus' genetic sequence. The project will also allow researchers to track the geographic origins of the H1N1 virus that entered BC in 2009.”*

5. TRUST ACROSS BORDERS: RESPONDING TO 2009 H1N1 INFLUENZA IN THE MIDDLE EAST: *“Disease surveillance networks in the Middle East, Southeast Asia, and Africa are models for the kind of transnational cooperation that can mount the needed flexible and coordinated response to the spread of 2009 H1N1 influenza and future pandemic threats.”*

6. PRE-EXISTING IMMUNITY AGAINST SWINE-ORIGIN H1N1 INFLUENZA VIRUSES IN THE GENERAL HUMAN POPULATION: *“Using data from the Immune Epitope Database, we found that only 31% (8/26) of B-cell epitopes present in recently circulating H1N1 strains are conserved in the S-OIV, with only 17% (1/6) conserved in the*

hemagglutinin (HA) and neuraminidase (NA) surface proteins."

CB Daily Report

Chem-Bio News

DOUBLE TROUBLE: BACTERIAL SUPER-INFECTION AFTER THE FLU

Infection Control Today Magazine

January 22, 2010

"Current research suggests that the flu may predispose to secondary bacterial infections, which account for a significant proportion of mortality during flu pandemics. The related report by Lee, et al., "A mouse model of lethal synergism between influenza virus and Haemophilus influenzae," appears in the February 2010 issue of the American Journal of Pathology."

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"To explore the mechanisms governing the increased pathogenesis of flu upon super-infection, a group led by Dr. Sally R. Sarawar of the Torrey Pines Institute for Molecular Studies in San Diego confirmed that otherwise nonlethal influenza and H. influenzae infections cause high mortality rates in mice when flu infection precedes H. influenzae infection. Their data confirm a restricted time period for this heightened susceptibility and highlight that excessive bacterial, and not viral, growth is associated with increased lethality. The fact that this increased mortality was observed in both immune-compromised and immune-competent mice suggests that even normal healthy people are at increased risk for complications following bacterial super-infection."

The full article can be found at: <http://www.infectioncontrolday.com/hotnews/super-infection-after-the-flu.html>

[Return to Top](#)

IMPACT OF PANDEMIC (H1N1) 2009 INFLUENZA ON CRITICAL CARE CAPACITY IN VICTORIA [AU]

Preventive Medicine Week

January 31, 2010

"To describe the demand for critical care hospital admissions in Victoria resulting from the rapid rise in the number of pandemic (H1N1) 2009 influenza cases, and to describe the role of modelling tools to assist with the response to the pandemic. Prospective modelling with the tools FluSurge 2.0 and FluAid 2.0 (developed by the United States Centers for Disease Control and Prevention) over 12 weeks from when the pandemic "Contain" Phase was declared on 22 May 2009, compared with data obtained from daily hospital reports of pandemic (H1N1) 2009 influenza-related admissions and transfers to intensive care units

(ICUs)."

"The effect on hospitals as projected by the FluAid 2.0 model compared with observed hospital admissions and ICU admissions. Prospective use of the RuAid 2.0 model provided valuable health intelligence for assessment and projection of hospitalisation and critical care demand through the first 10 weeks of the pandemic in Victoria. The observed rate of hospital admissions for pandemic (H1N1) 2009 was broadly consistent with a 5% gross clinical attack rate, with 0.3% of infected patients being hospitalised. Transfers to ICUs occurred at a rate of 20% of hospital admissions, and were associated with vulnerable patient groups, and severe respiratory failure in 82% of patients admitted to ICUs. Most patients treated in ICUs (85%) survived after an average ICU length of stay of 9 days (SD, 6.5 days). Mechanical ventilation was required by 72% of patients admitted to ICUs, and extracorporeal membrane oxygenation (ECMO) was used for 7%. Pre-existing haematological malignancy accounted for half of all the deaths in patients admitted to ICUs with pandemic (H1N1) 2009 influenza. Prospective use of modelling tools informed critical decisions in the planning and management of the pandemic. Early estimation of the clinical attack rate, hospitalisation rates, and demand for ICU beds guided implementation of surge capacity."

"ECMO emerged as an important treatment modality for pandemic (H1N1) 2009 influenza, and will be an important consideration for future pandemic planning."

The full article can be found at: (M.E. Lum, et. al., "Impact of pandemic (H1N1) 2009 influenza on critical care capacity in Victoria". Medical Journal of Australia, 2009; 191(9): 502-506). Link not available.

[Return to Top](#)

[CALIFORNIA] STATEWIDE CONCEPT OF OPERATIONS FOR PANDEMIC INFLUENZA

California Emergency Management Agency

November 2009

"Annually, the California Emergency Management Agency (Cal EMA) assists the California Department of Public Health (CDPH) to prepare a plan that meets the Centers for Disease Control and Prevention (CDC) pandemic influenza grant requirements. The role of Cal EMA is to coordinate and summarize state agencies' pan flu planning efforts and ensure the plan supplemented and is consistent with the CDPH Pandemic Influenza Response and Recovery Plan.

In 2009, the Governor established a Cabinet Pandemic Influenza Working Group which has met monthly to report on H1N1 activity and to review the state's response. California Health and Human Services (CHHS) and Cal EMA decided to continue the statewide planning effort, initiated to meet CDC grant requirements, as a way to benchmark the level of state agency preparedness and response.

In order to differentiate statewide plan from the CDPH Pandemic Influenza Response and Recovery Plan, this plan was entitled the Statewide Concept of Operations for Pandemic

Influenza.

The Statewide Concept of Operations discusses communication and coordination at the local state and federal government levels. At the local level, checklists are included in the Statewide Concept of Operations to assist with local government pandemic influenza preparedness, including alert and warning considerations and suggested response actions. At the state level, the Statewide Concept of Operations includes a discussion of how public health and medical information should flow and how resources should be ordered among the levels of government. At the federal level, the Statewide Concept of Operation describes the established federal role in managing the Strategic National Stockpile, which is vital to pandemic influenza response planning and State Operations Center coordination.

The Statewide Concept of Operations emphasizes that all events begin at the local level and recommends that each local agency prepare a pandemic influenza operations plan. At the state level, the plan outlines 27 preparedness, response and recovery objectives under three strategic goals as established by the CDC and outlines the agencies that have plans and procedures for each objective. The plan also includes a State Agency Responsibilities Matrix that lists the state agencies that have lead and support roles for each CDC objective.

The Statewide Concept of Operations subscribes to the emergency management principles described in the Standard Emergency Management System (SEMS) and the National Incident Management System (NIMS). The plan is consistent with the State Emergency Plan (SEP), the National Response Framework (NRF), Interim California Disaster Health Operations Manual (CDHOM), CDPH Standards and Guidelines for Healthcare Surge During Emergencies, and the Federal Guidance To Assist States In Improving State-Level Pandemic Influenza Plans."

The full article can be found at: [http://www.oes.ca.gov/WebPage/oeswebsite.nsf/ClientOESFileLibrary/Plans%20and%20Publications/\\$file/Statewide%20PanFlu%20ConOps%20-%202012-02-09.pdf](http://www.oes.ca.gov/WebPage/oeswebsite.nsf/ClientOESFileLibrary/Plans%20and%20Publications/$file/Statewide%20PanFlu%20ConOps%20-%202012-02-09.pdf)

[Return to Top](#)

[BRITISH COLUMBIA] GENOMIC SURVEILLANCE OF PANDEMIC H1N1

Genome British Columbia News Release

January 21, 2010

"This project capitalizes on BC's expertise and capacity in genome sequencing to generate hundreds of complete genomes from circulating influenza viruses collected in British Columbia during the H1N1 pandemic, as well as during and after the Olympics. By comparing the evolution of BC's influenza virus to that of viruses sequenced in other regions, researchers hope to learn how a mass gathering such as the Olympics can impact the virus' genetic sequence. The project will also allow researchers to track the geographic origins of the H1N1 virus that entered BC in 2009."

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"The data uncovered from this project will enable BC to track how the virus moved through the population - information that can assist public health officials in understanding the virus and preparing for future outbreaks," explains Dr. Perry Kendall, British Columbia's Provincial Health Officer."

The full article can be found at: http://www.genomebc.ca/whatnew_press/press_releases/2010_press/012110_H1N1.htm

[Return to Top](#)

TRUST ACROSS BORDERS: RESPONDING TO 2009 H1N1 INFLUENZA IN THE MIDDLE EAST

Drug Week

January 29, 2010

"Disease surveillance networks in the Middle East, Southeast Asia, and Africa are models for the kind of transnational cooperation that can mount the needed flexible and coordinated response to the spread of 2009 H1N1 influenza and future pandemic threats. For example, members of the Middle East Consortium on Infectious Disease Surveillance (MECIDS), a regional disease surveillance network of public health experts and ministry of health officials from Israel, the Palestinian Authority, and Jordan, have coordinated the screening, laboratory testing, and risk communication strategies to detect and control 2009 H1N1 influenza."

"This coordination is made possible by trust and by well-exercised national and regional pandemic preparedness policies. The consortium illustrates the value of regional disease surveillance networks in shaping and managing cohesive policies on current and future threats. The MECIDS alliance partnership also exemplifies to other parts of the world that are experiencing conflict-like South Asia-that finding common ground is imperative to promoting health security and cooperation where it is most lacking and needed and that developing cohesive infectious disease control policies can build trust across the most difficult boundaries in the world."

"This article provides an overview of the history of MECIDS and similar networks and of the MECIDS response to 2009 H1N1 influenza."

The full article can be found at: (L. Gresham, et. al., "Trust Across Borders: Responding To 2009 H1N1 Influenza In The Middle East". Biosecurity and Bioterrorism - Biodefense Strategy Practice and Science, 2009; 7(4):399-404). Link not available.

[Return to Top](#)

PRE-EXISTING IMMUNITY AGAINST SWINE-ORIGIN H1N1 INFLUENZA VIRUSES IN THE GENERAL HUMAN POPULATION

Health Risk Factor Week

January 26, 2010

"A major concern about the ongoing swine-origin H1N1 influenza virus (S-OIV) outbreak is that the virus may be so different from seasonal H1N1 that little immune protection exists in the human population. In this study, we examined the molecular basis for pre-existing immunity against S-OIV, namely the recognition of viral immune epitopes by T cells or B cells/antibodies that have been previously primed by circulating influenza strains."

"Using data from the Immune Epitope Database, we found that only 31% (8/26) of B-cell epitopes present in recently circulating H1N1 strains are conserved in the S-OIV, with only 17% (1/6) conserved in the hemagglutinin (HA) and neuraminidase (NA) surface proteins. In contrast, 69% (54/78) of the epitopes recognized by CD8(+) T cells are completely invariant. We further demonstrate experimentally that some memory T-cell immunity against S-OIV is present in the adult population and that such memory is of similar magnitude as the pre-existing memory against seasonal H1N1 influenza. Because protection from infection is antibody mediated, a new vaccine based on the specific S-OIV HA and NA proteins is likely to be required to prevent infection. However, T cells are known to blunt disease severity. Therefore, the conservation of a large fraction of T-cell epitopes suggests that the severity of an S-OIV infection, as far as it is determined by susceptibility of the virus to immune attack, would not differ much from that of seasonal flu."

"These results are consistent with reports about disease incidence, severity, and mortality rates associated with human S-OIV."

The full article can be found at: (J.A. Greenbaum, et. al., "Pre-existing immunity against swine-origin H1N1 influenza viruses in the general human population". Proceedings of the National Academy of Sciences of the United States of America, 2009; 106(48): 20365-20370). Link not available.

[Return to Top](#)

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