

15 December 2009

*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 #91**

**1. IMPLICATIONS OF FLU PANDEMICS ON BLOOD SUPPLIES:** *"A German research team has examined data on supply and demand for blood transfusions against a computer simulation of an influenza pandemic, and discovered that a severe pandemic scenario could quickly lead to a deficit of up to 96,000 red blood cell (RBC) transfusion units in Germany alone, creating potentially fatal outcomes. Their study is published today in the journal Transfusion."*

**2. OPTIMIZING ALLOCATION FOR A DELAYED INFLUENZA VACCINATION CAMPAIGN:** *"For the projected schedule of H1N1 vaccine availability, the optimal strategy to reduce influenza-related deaths is to initial target high-risk people, followed by school-aged children (5–17) and then young adults (18–44). The optimal strategy to minimize hospitalizations, however, is to target ages 5–44 throughout the vaccination campaign, with only a tiny amount of vaccine used on high-risk people."*

**3. PANDEMIC TOOLKIT OFFERS FLU WITH A VIEW:** *"Scientists at the Department of Energy's Pacific Northwest National Laboratory (PNNL) have created a Pandemic Influenza Planning Tool to model the spread of a disease through various age groups and geographic populations. It also allows decision-makers to carefully assess the benefit of their decisions for different scenarios in advance."*

**4. SOLDIERS GET SWINE FLU SHOTS BEFORE HOLIDAYS:** *"Thousands of Army recruits in training must line up at least once more before heading home for the holidays, this time for mass inoculations by the hundreds against swine flu."*

**5. DESIGN AND VALIDATION OF REAL-TIME REVERSE TRANSCRIPTION-PCR ASSAYS FOR DETECTION OF PANDEMIC (H1N1) 2009 VIRUS:** *"They showed 100% specificity and did not cross-react with other respiratory viruses or seasonal influenza A virus subtypes."*

**6. NEW BIOLOGICAL ROUTE FOR SWINE FLU TO HUMAN INFECTIONS:** *"A new biological pathway by which the H1N1 flu virus can make the jump from swine to humans has been discovered by researchers with the U.S. Department of Energy's Lawrence Berkeley National Laboratory (Berkeley Lab) and the University of California, Berkeley. Early*

*test results indicate that a heretofore unknown mutation in one of the H1N1 genes may have played an important role in transmitting the virus into humans."*

# CB Daily Report

## ***Chem-Bio News***

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### **IMPLICATIONS OF FLU PANDEMICS ON BLOOD SUPPLIES**

Infection Control Today Magazine  
December 09, 2009

"A German research team has examined data on supply and demand for blood transfusions against a computer simulation of an influenza pandemic, and discovered that a severe pandemic scenario could quickly lead to a deficit of up to 96,000 red blood cell (RBC) transfusion units in Germany alone, creating potentially fatal outcomes. Their study is published today in the journal Transfusion.

"The pandemic model showed that after five to six weeks of a severe pandemic, there would be 220,000 fewer units than the normal supply, a reduction of 40 percent to 50 percent," said lead researcher Dr. Christel Kamp, of the Paul-Ehrlich Institute in Germany. "If we assume that 70 percent of required transfusion units are urgent and cannot wait, this could lead to approximately 100,000 units being denied to people who need them."

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"The study also highlighted parallel issues that could affect the supply of RBC units in a pandemic, such as blood collection staff staying home due to illness. In addition, the study identified the need to conduct smaller and more frequent blood donor collection activities at fixed sites or mobile locations to reduce the risk of spreading influenza while still maintaining adequate blood inventories."

The full article can be found at: <http://www.infectioncontroltoday.com/hotnews/flu-pandemics-and-blood-supplies.html>

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### **OPTIMIZING ALLOCATION FOR A DELAYED INFLUENZA VACCINATION CAMPAIGN**

By Jan Medlock, Lauren Ancel Meyers, and Allison Galvani  
PLoS Influenza  
December 12, 2009

"During unexpected infectious disease outbreaks, public health agencies must make effective use of limited resources. Vaccine distribution may be delayed and staggered through time, as underscored by the 2009 H1N1 influenza pandemic. Using a mathematical

model parametrized with data from the 2009 H1N1 pandemic, we found that optimal allocations of vaccine among people in different age groups and people with high-risk conditions depends on the schedule of vaccine availability relative to the progress of the epidemic. For the projected schedule of H1N1 vaccine availability, the optimal strategy to reduce influenza-related deaths is to initial target high-risk people, followed by school-aged children (5–17) and then young adults (18–44). The optimal strategy to minimize hospitalizations, however, is to target ages 5–44 throughout the vaccination campaign, with only a tiny amount of vaccine used on high-risk people. We find that optimizing at each vaccine release time independently does not give the overall optimal strategy. In this manuscript, we derive policy recommendations for 2009 H1N1 vaccine allocation using a mathematical model. In addition, our optimization procedures, which consider staggered releases over the entire epidemic altogether, are applicable to other outbreaks where not all supplies are available initially."

The full article can be found at: <http://knol.google.com/k/optimizing-allocation-for-a-delayed-influenza-vaccination-campaign?collectionId=28qm4w0q65e4w.1&position=1#>

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## **PANDEMIC TOOLKIT OFFERS FLU WITH A VIEW**

Infection Control Today Magazine

December 14, 2009

"Scientists at the Department of Energy's Pacific Northwest National Laboratory (PNNL) have created a Pandemic Influenza Planning Tool to model the spread of a disease through various age groups and geographic populations. It also allows decision-makers to carefully assess the benefit of their decisions for different scenarios in advance.

"No single approach provides an optimal strategy when battling the spread of a pandemic," said Robert Brigantic, PNNL operations research scientist. "But, the use of this tool can allow health officials to more accurately predict how a disease might evolve when various mitigation strategies are applied."

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"Brigantic's tool allows officials to easily evaluate potential response options by manipulating modeling parameters and running different simulations. For instance, officials could assess closing schools to decrease disease spread, initiate preventative media campaigns, or evaluate distributing antiviral medications to easily evaluate potential mitigation approaches.

In late September, PNNL demonstrated an early prototype of the tool during a Walla Walla County, Wash., pandemic influenza emergency exercise. Officials simulated an H1N1 Swine Flu outbreak and used the tool to predict resource needs and shortfalls, such as the loss of critical staff and lack of hospital beds.

"The tool illustrated how essential services can fail when critical employees became ill," said Gay Ernst, director of emergency management in Walla Walla County. "Visualizing possible

disease progression enables us to consider how many critical personnel may be unavailable at one time and plan accordingly."

The full article can be found at: <http://www.infectioncontroltoday.com/hotnews/influenza-pandemic-toolkit.html>

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## **SOLDIERS GET SWINE FLU SHOTS BEFORE HOLIDAYS**

By Susanne M. Schafer

The Associated Press on the Heraldonline.com

December 12, 2009

"Thousands of Army recruits in training must line up at least once more before heading home for the holidays, this time for mass inoculations by the hundreds against swine flu.

The Army's largest training camp, just outside Columbia, and other posts are hurrying to finish the shots before the year-end break. More than 40,000 soldiers in advanced and basic training across the country head home over the next two weeks in a massive troop movement known as "block leave," Army officials said."

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"Fort Jackson started the shots about two weeks ago and expects to vaccinate as many as 9,000 soldiers by the end of this week and another 2,000 by the middle of next week. The trainers who remain on post, the Army's medical work force, family members, pregnant women and those with certain medical conditions such as asthma also will get the shots for a total of about 15,000 doses, Kim-Delio said."

The full article can be found at: <http://www.heraldonline.com/109/story/1803477.html>

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## **DESIGN AND VALIDATION OF REAL-TIME REVERSE TRANSCRIPTION-PCR ASSAYS FOR DETECTION OF PANDEMIC (H1N1) 2009 VIRUS**

Health & Medicine Week

December 14, 2009

"Well-validated diagnostic tools that are rapid, sensitive, and specific for the detection and tracking of this virus are needed. Three real-time reverse transcription PCR (RT-PCR) assays for the amplification and detection of pandemic (H1N1) 2009 virus were developed, and their performance characteristics were compared with those of other published diagnostic assays. Thirty-nine samples confirmed to be positive for pandemic (H1N1) 2009 virus from Alberta, Canada, and six additional samples that were positive for influenza A virus but that were not typeable by using published seasonal influenza H1/H3 virus assays were available

for this validation. Amplification and direct sequencing of the products was considered the "gold standard" for case identification. The new assays were sensitive and able to reproducibly detect virus in a 10(-6) dilution of 4 x 10(6) 50% tissue culture infective doses/ml when 5 mu l was used as the template. They showed 100% specificity and did not cross-react with other respiratory viruses or seasonal influenza A virus subtypes. The coefficient of variation in crossing cycle threshold values for the detection of different template concentrations of pandemic (H1N1) 2009 virus was <= 3.13%, showing good reproducibility. The assays had a wide dynamic range for the detection of pandemic (H1N1) 2009 virus and utilized testing platforms appropriate for high diagnostic throughput with rapid turnaround times. We developed and validated these real-time PCR procedures with the goal that they will be useful for diagnosis and surveillance of pandemic (H1N1) 2009 virus."

The full article can be found at: (K. Pabbaraju, et. al., "Design and Validation of Real-Time Reverse Transcription-PCR Assays for Detection of Pandemic (H1N1) 2009 Virus". Journal of Clinical Microbiology, 2009; 47(11): 3454-3460). Link not available.

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## **NEW BIOLOGICAL ROUTE FOR SWINE FLU TO HUMAN INFECTIONS**

ScienceBlog

December 10, 2009

"A new biological pathway by which the H1N1 flu virus can make the jump from swine to humans has been discovered by researchers with the U.S. Department of Energy's Lawrence Berkeley National Laboratory (Berkeley Lab) and the University of California, Berkeley. Early test results indicate that a heretofore unknown mutation in one of the H1N1 genes may have played an important role in transmitting the virus into humans.

"Transmission of influenza viruses into the human population requires surmounting biological barriers to cross-species infection," says biochemist Jennifer Doudna, the principal investigator for this research. "We have identified an adaptive mutation in the swine origin H1N1 influenza A virus - a pair of amino acid variants termed the 'SR polymorphism' -- that enhance replication, and potentially pathogenesis of the virus in humans."

The full article can be found at: <http://www.scienceblog.com/cms/new-biological-route-swine-flu-human-infections-28244.html>

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