

22 September 2009

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"No one was watching the pigs."

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"Our work provides further evidence that vaccination with influenza VLPs may be a productive approach to achieve protection against diverse H5N1 strains.."

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CB Daily Report

Chem-Bio News

SPECIAL REPORT: SURVEILLANCE GAP SLOWED H1N1 PANDEMIC RESPONSE

By Michael Smith

MedPage Today

September 18, 2009

"No one was watching the pigs.

That was one of the key factors that slowed the response to the 2009 H1N1 pandemic flu, experts said here at the Interscience Conference on Antimicrobial Agents and Chemotherapy.

Although the world was better prepared for a pandemic flu than it had ever been, the H1N1 strain blindsided scientists, who had expected the next pandemic to arise from an avian strain, probably the highly pathogenic H5N1 influenza that has been raging among poultry.

Instead, it came from pigs. And it was missed because flu surveillance -- good and getting better in birds -- was spotty at best in swine, according to Nancy Cox, PhD, chief of the CDC's influenza division.

Indeed, Cox said here, experts still don't know where and how the so-called triple reassortant H1N1 strain arose or how it got into humans. There is a gaping hole in the genetic record of several years between genes in the current H1N1 pandemic flu and their nearest known ancestors, she said.

"We still haven't found that missing link and we may never find it," she said.

That gap in surveillance led to a major gap in pandemic planning, according to Jon McCullers, MD, of St. Jude Children's Research Hospital in Memphis, Tenn.

Planners had assumed -- because they were watching the birds -- that they'd have enough warning of a pandemic strain to get mitigation schemes in place to slow its spread, perhaps even long enough to get vaccines ready before the flu really took off.

That part of the planning "basically failed completely," McCullers said. "The thing was all over the world by the time the CDC figured out we had a few cases in the U.S."

The full article can be found at: <http://www.medpagetoday.com/MeetingCoverage/ICAAC/16039>

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VIRUS-LIKE PARTICLE VACCINE COMPRISED OF THE HA, NA, AND M1 PROTEINS OF AN AVIAN ISOLATED H5N1 INFLUENZA VIRUS INDUCES PROTECTIVE IMMUNITY AGAINST HOMOLOGOUS AND HETEROLOGOUS STRAINS IN MICE

Pharma Investments, Ventures & Law Weekly
September 20, 2009

"Focusing on influenza virus-like particles (VLPs) has been suggested as a promising vaccine approach. Recent VLP vaccination efforts have been concentrated on the H5N1 strains isolated from humans. Because all confirmed cases of human H5N1 infection were directly transmitted from infected poultry, it is of interest to develop VLP vaccines comprised of antigenic proteins of avian H5N1 strains in order to compare their efficacy in fighting diverse H5N1 strains with vaccines developed using human isolates. In this study, we generated a VLP vaccine composed of the HA, NA, and M1 proteins of the avian H5N1 influenza virus isolate A/chicken/Hubei/489/2004, which seems to occupy a unique phylogenetic position; it belongs to neither clade 1 nor clade 2. Upon infection of Sf9 insect cells using recombinant baculoviruses, the co-expressed HA, NA, and M1 proteins self-assembled and released into the culture medium as VLPs. In a mouse model, purified VLPs elicited an effective antibody response and conferred complete protection against heterologous human H5N1 influenza virus, as well as a homologous avian H5N1 influenza virus isolate."

"Our work provides further evidence that vaccination with influenza VLPs may be a productive approach to achieve protection against diverse H5N1 strains.."

The full article can be found at: (P. Tao, et. al., "Virus-Like Particle Vaccine Comprised of the HA, NA, and M1 Proteins of an Avian Isolated H5N1 Influenza Virus Induces Protective Immunity Against Homologous and Heterologous Strains in Mice". *Viral Immunology*, 2009; 22(4): 273-281). Link not available.

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REDUCING INFLUENZA SPREADING OVER THE AIRLINE NETWORK

Jose Marcelino and Marcus Kaiser
Rapid Research Notes
August 21, 2009

"Most studies have proposed removing highly connected nodes (hubs) to control spreading. Here, we test alternative strategies using edge removal (flight cancellation) for spreading over the airline network. Flight cancellation was more efficient than shutting down whole airports: spreading took 81% longer if solely selected flights were removed, compared to a 52% reduction when entire airports were shutdown, affecting the same number of flights."

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"Introduction

Complex networks are pervasive and underlie almost all aspects of life. They appear at different scales and paradigms, from metabolic networks, the structural correlates of brain

function, the threads of our social fabric and to the larger scale making cultures and business come together through global travel and communication.

Recently, these systems have been modeled and studied using network science tools giving us new insight in fields such as sociology, epidemics, systems biology and neuroscience. Typically in such systems major components such as cities are modeled as nodes and functional or structural connections - flights, for example - between such components are represented as edges. Many such networks were shown to be small-world [1] with higher neighborhood connectivity compared to Erdős-Rényi random networks [2].

Some networks are scale-free containing highly connected nodes (hubs) and having a power-law degree distribution. In these networks, the probability of a node having k edges follows a power law $k^{-\gamma}$ [3]. It is possible for a network to show both scale-free and small-world properties, however the two features may also appear independently. In addition, small-world networks may or may not contain multiple clusters or communities.

The relation between changes in network topology and the resulting structural integrity, as measured by characteristic path length or global efficiency [4], gives an indication of the robustness towards failure in connected systems. Many studies have looked into the error and attack tolerance of these networks regarding the removal of nodes [5][6]. For scale-free networks, the selective inactivation of hubs had a much greater impact on structural network integrity than simply removing randomly selected nodes [6]. Spreading on such heterogeneous networks could be impeded by targeting hubs as well [7]. Structural network integrity could also be influenced by partially inactivating specific connections (edges) between nodes [8][9][10].

In this article we consider the dynamic effect of topological changes as measured by the time it takes until an epidemic spreading process reaches half of a network. Spreading starts from one infected node and progresses through connections to susceptible nodes as in the standard Susceptible-Infected (SI) model [11]. By using this model, combined with different strategies for predicting critical edges, we determined how the removal of edges slows down the spreading dynamics.

Comparing a range of removal strategies against the established hub removal we find that removing selected edges has a bigger impact on network spreading activity with significantly lower number of removed connections. For the global airline network this shows that only a smaller set of flights would need to be stopped instead of canceling all the flights from a set of airports (see Fig. 1 with Mexico City as starting node of an outbreak).

In addition we also found that community structure plays a critical role in spreading and not the degree distribution and this method of slowing spreading by removing critical, higher ranked, connections is particularly effective in finding the links that connect such communities.

Finally, we discuss the computational complexity of all strategies. Whereas some strategies are computationally costly for large or rapidly evolving networks, several edge removal strategies are as fast as hub removal while offering much better spreading control."

The full article can be found at: <http://knol.google.com/k/jose-marcelino/reducing-inuenza->

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TRIAL PREDICTS 2 H1N1 SHOTS FOR YOUNG KIDS, 1 FOR OLDER

By Robert Roos

CIDRAP News (Center for Infectious Disease Research & Policy – University of Minnesota)
September 21, 2009

"The earliest results from testing of a pandemic H1N1 vaccine in children suggest that older children will get a good immune response with a single dose, but children younger than 10 are likely to need two doses a few weeks apart, federal officials said today.

The early findings, based on blood samples taken just 8 to 10 days after vaccination, demonstrate a response "strikingly similar" to children's responses to seasonal flu shots, said Dr. Anthony Fauci, director of the National Institute of Allergy and Infectious Diseases (NIAID), which sponsored the trial.

Seventy-six percent of children between 10 and 17 years old had a "robust" immune response to one 15-microgram (mcg) dose of the injectable vaccine made by Sanofi Pasteur, Fauci reported, calling the result "quite good." That dose is what's used in seasonal flu shots.

But among 3- to 9-year olds, the proportion with a good immune response (hemagglutination inhibition titer of 1:40) dropped to 36%, and in children between 6 and 35 months old it was 25%, he reported.

"The initial results are encouraging," Fauci said at a press briefing this morning. "As we had hoped, in the children the 2009 H1N1 vaccine is acting just like the seasonal flu vaccine."

The data suggest that one dose would be enough to generate a protective immune response in 10- to 17-year-olds but that younger children may need two doses, depending on their health history, Fauci said."

The full article can be found at: <http://www.cidrap.umn.edu/cidrap/content/influenza/swineflu/news/sep2109children-jw.html>

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MOST AMERICANS LACKING DIRECTION FROM THEIR EMPLOYERS FOR THE H1N1 FLU SEASON, SURVEY SHOWS

Reuters

September 21, 2009

"Most workers have not had any direction from their employers about the upcoming flu

season, according to a national survey released today by Mansfield Communications Inc.

In the survey of a national representative sample, 69 per cent of respondents say they have received no communication about policies in the workplace pertaining to H1N1- not even information related to hand washing or sick leave.

The survey, conducted by Angus Reid Strategies for Mansfield Communications Inc., interviewed 1,028 workers from Sept. 10th 2009 thru Sept. 12th 2009. It was intended to gauge the readiness of workers for the pending H1N1 pandemic. The margin of error is +/- 3.1%, 19 times out of 20.

The poll found that a large majority (84%) of American workers believe the recession creates more pressure to show up for work- even if they are feeling sick.

"Many workers are understandably concerned about how absenteeism due to sickness will impact their job security in the current economic environment. However, sick employees coming into the office during the H1N1 flu season will undermine the health and productivity of the entire workplace," said Rob Ireland, partner at Mansfield Communications Inc."

The full article can be found at: <http://www.reuters.com/article/pressRelease/idUS58759+21-Sep-2009+BW20090921>

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LOCAL HEALTH DEPARTMENTS LOSE 8,000 MORE JOBS IN FIRST HALF OF 2009

NACCHO [National Association of County and City Health Officials News Release
September 21, 2009

"Local health departments—the public agencies that work on-the-ground to safeguard their communities against the H1N1 flu virus and other threats to public health—sustained accelerated job losses during the first half of 2009, a new survey shows. Because of budget-related cuts, city, county, and other local health departments eliminated 8,000 staff positions between January and June, according to a survey conducted by the National Association of County and City Health Officials (NACCHO).

This loss compounds the disappearance of 7,000 positions in 2008, determined by a previous NACCHO survey, the results of which were announced in January. Departments lost more jobs in the first six months of 2009 than in all of 2008.

The losses hit the field just as local health departments have been gearing up for what may be their most intense flu season in recent history. Beginning in October, departments will support, coordinate, and conduct community-wide immunization campaigns against the highly contagious H1N1 virus, while also immunizing residents against seasonal flu. They also have a host of related responsibilities, including monitoring the course of the epidemic, working with schools, businesses, and other local agencies to mitigate the spread of influenza, collaborating with local healthcare providers to manage a potential surge in

demand for medical care, and keeping the public well informed."

The full article can be found at: <http://www.naccho.org/press/releases/0921.cfm>

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PANAMAX 2009 TESTS PANDEMIC OUTBREAK IN EXERCISE: TWENTY COUNTRIES INVOLVED

The Intelligence Daily
September 22, 2009

"Representatives from 10 U.S. government agencies are holding a two-day table-top exercise in cooperation with the government of Panama to assist in responding to any future influenza pandemic Sept. 16.

The agency representatives are in Panama in conjunction with Fuerzas Aliadas PANAMAX 2009, a 12-day military security training exercise involving 20 countries.

The representatives discussed how the United States and the Panamanian government can manage an influenza outbreak by utilizing their agencies' assets to combat a pandemic.

"Our goal is to work as close as possible with the Panamanians in case there is a real threat, such as a pandemic influenza," said U.S. Navy Capt. Miguel A. Cubano, a medical doctor and command surgeon for the U.S. Southern Command. "We want to help them set up a plan so a pandemic outbreak does not have a great impact on their economy, stop people from going to work and school and stop the operations of the Panama Canal."

The agencies present included the Department of State, Department of Homeland Security, Department of Agriculture, Department of Commerce, Federal Aviation Administration, U.S. Agency for International Development, Department of Health and Human Services, U.S. Army, U.S. Coast Guard and U.S. Navy."

The full article can be found at: <http://www.inteldaily.com/news/178/ARTICLE/11916/2009-09-22.html>

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