DoD-GEIS Influenza Surveillance and Response Program

Information Only

Defense Health Board

03 May 2007
Background

DoD Global Influenza Surveillance Program

- DoD-GEIS Global, Laboratory-Based Influenza Surveillance Program
  - Sentinel site influenza surveillance
    - Managed at AFIOH, Brooks City-Base, TX
  - Population-based febrile respiratory illness surveillance
    - Managed at NHRC, San Diego, CA
Surveillance Sites

- **Routine Surveillance**
  - Sentinel sites
    - 65 Global Sites

- **Expansion efforts**
  - Initial discussions for participation
    - Hungary  Israel
    - Brazil    Poland
    - South Africa    Georgia
    - Romania    Bulgaria
Methods

DoD Global Influenza Surveillance Program

Surveillance at AFIOH

Public Health QUICK SHEET
for the Influenza Surveillance Program

1. Ensure all Primary Care Manager (clinic) teams are supplied with the "Influenza Surveillance Questionnaire" (https://gumbo.brooks.af.mil/pestilence/influenza).
2. Ensure Primary Care Manager (clinic) teams are supplied with collection kits (contact AFIOH lab: Ina Smith @ DSN 240-1680).
3. Pick up questionnaires weekly from Primary Care Manager teams.
4. Ensure 6-10 specimens meeting the ILI case definition are submitted each week. Do not submit specimens unless they meet the ILI case definition.
5. Enter all questionnaires online at (https://gumbo.brooks.af.mil/pestilence/influenza).
6. Enter all lab-confirmed positive influenza specimens into the service-specific Reportable Medical Events System (i.e., AFRESSII).
7. Recommend staff training at least 3 times/yr to ensure importance of influenza surveillance. A training presentation is available at https://gumbo.brooks.af.mil/pestilence/influenza.
8. Notify us at influenza@brooks.af.mil if you suspect an influenza outbreak at your base. It is important that outbreaks among the military communities are tracked so threats to our military forces can be mitigated. If assistance is needed, we are happy to support you as needed-contact Angie Owens or Matt Johns at DSN 240-3471.
9. Contact us at any time!! (210) 536-3471; DSN 240-3471
E-mail: influenza@brooks.af.mil
Website: https://gumbo.brooks.af.mil/pestilence/influenza
Methods

Routine Surveillance

- Educate
- Provide Supplies
  - Nasal wash collection kit
  - Shipping containers
  - Pay for shipments via commercial carrier
Methods

The DoD Global Influenza Surveillance Program at the Air Force Institute for Operational Health (AFIOH) reviews influenza-like illness (ILI) activity at US military sites each week. We noticed an increase in ILI activity at your site (see graph below). This is a significant increase that is notably higher than previous weeks. I understand it is currently the influenza season, but have you been made aware of any other factors that may be the cause for this spike? If so, please respond back to us within the next 8 hours.

Possible action items in response to the spike:
If your site experiences a respiratory spike such as this, we would appreciate if you could have your clinic/hospital staff:

- Contact the AFIOH laboratory at (210) 536-8383; DSN 240 for supplies and/or FedEx account number to ship specimens
- Collect a sample (6-10 per week) of specimens from patients meeting the ILI case definition (fever = 100.5°F and a cough or sore throat)
- Immediately ship to: AFIOH/SDE
  2730 Louis Bauer Drive, Bldg 930
  Brooks City-Base TX 78235-5132

This will help identify the agent if it is a respiratory outbreak and help to mitigate it as soon as possible. We test the specimens for a panel of respiratory viruses and report the results back to both the public health office (via electronic e-mail) and the provider (via CHCS). See the attached material for more information regarding our program. If you have any questions, you can contact us at influenza@brooks.af.mil.
Methods

- Routine Surveillance
  - Educate
  - Provide Supplies
  - Monitor influenza-like illness (ILI)
  - Routine communication
    - ILI status
    - Issues
Methods

- Routine Surveillance
- All original samples archived
  - Virology: Panel of respiratory viruses
    - Influenza A
    - Influenza B
    - Parainfluenza 1-3
    - Adenovirus
    - Respiratory Syncytial Virus (RSV)
Results

Summary of Submitted Specimens
All Sites by Week
Influenza Season 2006-2007

Total: 2,576
Influenza A: 541
Influenza B: 132

As Of 27 Apr 2007
Methods

Total Sub-typed: 559 (83%)
- A(H1): 306
- A(H3): 191
- B/Victoria: 57
- B/Yamagata: 5

As Of 27 Apr 2007
Products

Weekly results - Sentinel sites - Report into service - Specific reportable medical events system - CDC - Included in national surveillance reports - Select isolates & original samples - Molecular Sequencing Data - Los Alamos National Laboratory - GenBank - CDC

**Influenza (Flu)**

**Weekly Report: Influenza Summary Update**
Week ending March 17, 2007 - Week 11

**Synopsis:**
During week 11 (March 11 – March 17, 2007), influenza activity continued to decrease in the United States. Data from the U.S. World Health Organization (WHO) and National Respiratory and Enteric Virus Surveillance System (NREVSS) collaborating laboratories indicated a decline in activity for the fifth consecutive week; 17.0% of specimens tested positive for influenza this week. ILI data was similar to the previous week and above baseline for the thirteenth week this season. Fifteen states reported widespread influenza activity; 22 states reported regional influenza activity; nine states, New York City, and the District of Columbia reported local influenza activity; and four states reported sporadic influenza activity. The reporting of widespread or regional influenza activity decreased from 42 for week 10 to 37 for week 11. The percent of deaths due to pneumonia and influenza remained below baseline level.

**Laboratory Surveillance:**
During week 11, WHO and NREVSS laboratories reported 3,632 specimens tested for influenza viruses, 616 (17.0%) of which were positive: 32 influenza A (H1) viruses, 59 influenza A (H3) viruses, 271 influenza A viruses that were not subtyped, and 144 influenza B viruses. Since October 1, 2006, WHO and NREVSS laboratories have tested a total of 137,755 specimens for influenza viruses and 18,246 (13.2%) were positive. Among the 18,246 influenza viruses, 14,795 (81.1%) were influenza A viruses and 3,451 (18.9%) were influenza B viruses. Four thousand two hundred forty-six.
DoD Global Influenza Surveillance Program: Influenza Surveillance at AFIOH

Influenza-like Illness (ILI) Overview
ILI activity among overall DoD MTFs is currently 1 standard deviation (SD) below the mean for Week 87 (presented in Graph A). For the past 14 weeks, the ILI activity has been below the mean. Note: at this time, all data is preliminary.

Influenza surveillance questionnaire overview
The time of this report, 296 of the 589 based on the questionnaire:
- 30% of 602 (212) had influenza
- 40% (60/150) received the influenza vaccine
- 25% (17/68) received the influenza vaccine
- U.S. USDOS has identified at least 115, 11, Army, Navy, and at least 34 in DOD
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Locations of Lab-confirmed Influenza

Human Avian Influenza (HSN1) Update
2007: 11 cases, 9 of 11 fatal, confirmed in Egypt, Indonesia, and Nigeria. Since CY 2003, 274 highly pathogenic (HP) HSN1 human cases (81% mortality rate) have been confirmed in Azerbaijan, Cambodia, China, Djibouti, Egypt, Indonesia, Iraq, Nigeria, Thailand, Turkey, and Viet Nam (19 Feb 2007, WHO).

Click on the following links for updates regarding human HSN1:
- World Health Organization (WHO)
- Centers for Disease Control and Prevention (CDC)
- Global Emerging Infections System (GEIS)

Influenza Outbreaks / News
- News
  - AFIC and PADC partners discussing increased surveillance capabilities during regional military exercises. AFIC continues to support such activities with surveillance instruments, specimen collection/transport supplies, and epidemiology support.
  - Storage of specimens prior to shipping. PADC staff to store specimens in a −20°C freezer or a regular refrigerator. Prior to shipping is −20°C is not acceptable. Ship at least twice weekly.

AFIOH Report Overview
This report summarizes the status of all respiratory viral cultures processed at the AFIOH laboratory. For more background information, please visit last page of this report.
Products

Active Duty Influenza Immunization Status

Immunization Data collected by AFCITA

Data Stamps as of 23 Mar 2007 06:36

Notes: # Required covers the active duty AF personnel assigned to each base - excluding DMARs. If someone is both a student and in a GSU, they are counted only once in the student category. # Current only considers shots given on or after 1 July 2006

| MAJCOM | Base | Req | Imm | Exempt | Nbr Curr | % Curr | Req | Imm | Exempt | Nbr Curr | % Curr | Req | Imm | Exempt | Nbr Curr | % Curr | Req | Imm | Exempt | Nbr Curr | % Curr | Req | Imm | Exempt | Nbr Curr | % Curr |
|--------|------|-----|-----|--------|---------|--------|-----|-----|--------|---------|--------|-----|-----|--------|---------|--------|-----|-----|--------|---------|--------|-----|-----|--------|---------|--------|-----|-----|--------|---------|--------|
| ACC    | BARK | 5,332 | 5,296 | 17 | 5,319 | 99.6% | 207 | 201 | 1 | 202 | 97.6% | 130 | 118 | 0 | 118 | 90.3% | 5,669 | 5,615 | 18 | 5,633 | 96.4% |
| ACC    | SEAL | 2,225 | 2,160 | 0 | 2,166 | 99.5% | 16 | 16 | 0 | 16 | 100.0% | 9 | 3 | 0 | 3 | 33.3% | 3,200 | 3,199 | 0 | 3,207 | 96.7% |
| ACC    | CANH | 2,036 | 2,002 | 7 | 2,009 | 99.0% | 16 | 13 | 0 | 13 | 81.3% | 7 | 0 | 0 | 0 | 0.0% | 2,692 | 2,615 | 7 | 2,622 | 96.6% |
| ACC    | DAVI | 5,990 | 5,666 | 11 | 5,866 | 95.5% | 72 | 69 | 0 | 69 | 95.8% | 395 | 241 | 0 | 241 | 79.0% | 6,377 | 6,165 | 11 | 6,176 | 97.5% |
| ACC    | DYEX | 4,663 | 4,414 | 11 | 4,376 | 97.5% | 83 | 74 | 0 | 74 | 92.2% | 327 | 183 | 0 | 183 | 56.0% | 5,273 | 5,001 | 11 | 5,012 | 95.1% |
| ACC    | ELLS | 3,527 | 2,976 | 3 | 2,973 | 99.2% | 16 | 14 | 0 | 14 | 97.5% | 0 | 0 | 0 | 0 | 0.0% | 3,043 | 2,969 | 3 | 2,987 | 96.2% |
| ACC    | HOLL | 3,423 | 3,187 | 9 | 3,196 | 99.5% | 7 | 7 | 0 | 7 | 100.0% | 65 | 54 | 0 | 54 | 84.1% | 3,315 | 3,246 | 9 | 3,257 | 96.3% |
| ACC    | LANG | 6,072 | 7,332 | 30 | 7,562 | 97.4% | 71 | 41 | 0 | 41 | 57.7% | 453 | 212 | 0 | 212 | 47.0% | 3,656 | 6,066 | 31 | 6,116 | 94.4% |
| ACC    | MEAD | 2,088 | 2,046 | 10 | 2,056 | 99.4% | 40 | 40 | 0 | 40 | 100.0% | 24 | 16 | 0 | 16 | 66.7% | 2,152 | 2,101 | 10 | 2,111 | 96.1% |
| ACC    | MINO | 4,425 | 4,277 | 17 | 4,264 | 99.3% | 13 | 13 | 0 | 13 | 100.0% | 0 | 0 | 0 | 0 | 0.0% | 4,430 | 4,390 | 17 | 4,407 | 99.3% |
| ACC    | MOOD | 3,357 | 3,312 | 10 | 3,322 | 99.7% | 54 | 43 | 0 | 43 | 79.6% | 94 | 59 | 0 | 59 | 73.4% | 3,615 | 3,423 | 10 | 3,434 | 97.7% |
| ACC    | MOUN | 4,066 | 3,966 | 12 | 4,000 | 99.3% | 11 | 11 | 0 | 11 | 100.0% | 25 | 6 | 0 | 6 | 32.0% | 4,104 | 4,007 | 12 | 4,019 | 97.9% |
| ACC    | NEIL | 7,057 | 6,933 | 20 | 6,863 | 97.1% | 49 | 39 | 0 | 39 | 79.5% | 1,033 | 941 | 0 | 941 | 94.2% | 3,959 | 7,913 | 24 | 7,937 | 96.5% |
| ACC    | OFFU | 5,646 | 5,503 | 7 | 5,516 | 97.6% | 307 | 207 | 0 | 207 | 61.1% | 116 | 56 | 0 | 56 | 99.5% | 5,609 | 5,679 | 7 | 5,688 | 96.6% |
| ACC    | SEYM | 4,986 | 3,944 | 9 | 3,963 | 97.6% | 125 | 97 | 0 | 97 | 77.8% | 45 | 22 | 0 | 22 | 47.8% | 4,221 | 4,063 | 9 | 4,072 | 96.5% |
| ACC    | SHAW | 4,980 | 4,726 | 8 | 4,767 | 98.9% | 102 | 76 | 0 | 76 | 74.5% | 599 | 92 | 3 | 92 | 92.5% | 5,551 | 5,776 | 11 | 5,787 | 97.2% |
| ACC    | WHIT | 3,232 | 3,224 | 3 | 3,221 | 99.5% | 116 | 115 | 0 | 115 | 99.1% | 50 | 48 | 0 | 48 | 96.0% | 3,390 | 3,367 | 3 | 3,389 | 96.9% |
| AECC   | ALTU | 1,470 | 1,446 | 13 | 1,460 | 99.2% | 131 | 131 | 0 | 131 | 100.0% | 4 | 3 | 0 | 3 | 75.0% | 1,605 | 1,579 | 13 | 1,592 | 99.2% |
| AECC   | COLO | 845 | 829 | 11 | 844 | 99.4% | 429 | 419 | 0 | 419 | 97.7% | 147 | 104 | 1 | 105 | 71.4% | 1,421 | 1,352 | 12 | 1,364 | 96.0% |
| AECC   | GOOD | 1,138 | 1,123 | 4 | 1,127 | 99.9% | 716 | 690 | 1 | 691 | 96.5% | 95 | 30 | 2 | 37 | 43.5% | 1,305 | 1,315 | 7 | 1,360 | 95.7% |
| AECC   | KEEES | 2,206 | 2,172 | 26 | 2,179 | 99.7% | 1,416 | 1,363 | 1 | 1,384 | 97.9% | 57 | 34 | 1 | 35 | 61.4% | 4,270 | 4,190 | 20 | 4,217 | 96.6% |
| AECC   | LACOM | 0,339 | 0,110 | 26 | 0,144 | 97.1% | 2,653 | 2,349 | 0 | 2,349 | 99.2% | 434 | 256 | 5 | 300 | 81.1% | 11,405 | 10,762 | 31 | 10,793 | 94.0% |

U.S. AIR FORCE
Vaccine Coverage Overview

- **Period of Review:**
  01 October 2006 – 13 April 2007

- **Fully Vaccinated**

  Vaccination date >14 days prior to clinic visit date
  - Patients with vaccination date prior to August classified as unvaccinated
  - Vaccination data gathered from Defense Enrollment Eligibility Reporting System (DEERS) and Influenza surveillance questionnaire
Vaccine Coverage Overview

- Culture and/or PCR-confirmed influenza was observed in 19.4% (540 of 2,784) of the total respiratory samples submitted.

- Of these, 21.7% (117 of 540) had history of influenza vaccination during the 2006-2007 season.

- 64.1% (75 of 117) patients received the vaccine >14 days prior to the collection of an influenza isolate.

<table>
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<th>REGION</th>
<th>A/not subtyped</th>
<th>A/H1</th>
<th>A/H3</th>
<th>B/not subtyped</th>
<th>B/Victoria</th>
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| Vacci... 

Possible Breakthroughs at DoD Sites
Key influenza A/H3 isolates exhibited a R142G mutation, which has been characterized as a potential key contributor to the antigenicity of these strains.

A small percentage of the isolates conferred mutations at several other of the reported antigenic sites.
Based on sequence analysis, a vast majority of the A/H1 isolates were homologous to the vaccine’s New Caledonia component. However, there were a few divergent strains (Clade 2-like). Isolates from Clade 2 were obtained from CONUS.
• **Conclusions:**

Of patients participating in the DoD Influenza Surveillance Program, 64% who had a history of influenza vaccination contracted an influenza infection >14 days post-vaccination.

Numerous influenza A isolates appeared to show certain genetic changes.

These changes have been of interest to the Centers for Disease Control and Prevention, where further characterization showed reduced hemagglutinin inhibition titers in some isolates.
Future

Molecular Characterization

- ID Tag (Luminex)
- Neuraminidase sequencing
  - Potential antiviral resistance characterization
- Hemagglutinin inhibition
Collaborators

Global Emerging Infections Surveillance and Response System (GEIS)
Naval Health Research Center (NHRC)
Armed Forces Research Institute for Medical Sciences (AFRIMS)
Naval Medical Research Center-Detachment (NMRC-D)
US Army Medical Research Unit-Kenya (USAMRU-K)
Center for Health Promotion and Preventive Medicine-West (CHPPM-W)
Health Affairs
Combatant Commands (COCOM)
Military Surveillance sites
Centers for Disease Control and Prevention (CDC)
World Health Organization (WHO)
AFIOH Contacts

E-mail: influenza@brooks.af.mil

Phone Contact

**Epidemiology:** (210) 536-3471; DSN 240

**Laboratory:** (210) 536-1679; DSN 240

Website:

https://gumbo.brooks.af.mil/pestilence/Influenza/