FY18 Epi-Tech Surveillance Training
Sunday, October 01, 2017 - Sunday, September 30, 2018
DCS, APG, MD

Provided By
U.S. Army Medical Command

<table>
<thead>
<tr>
<th>Activity ID</th>
<th>Course Director</th>
<th>CME Planner</th>
</tr>
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<tbody>
<tr>
<td>2017-1636</td>
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<td>Mimi C. Eng</td>
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</tbody>
</table>

Accreditation Statement
This activity has been planned and implemented in accordance with the accreditation requirements and policies of the Accreditation Council for Continuing Medical Education (ACCME) through the joint providership of U.S. Army Medical Command and ARMY PUBLIC HEALTH CENTER. The U.S. Army Medical Command is accredited by the ACCME to provide continuing medical education for physicians.

Credit Designation
The U.S. Army Medical Command designates this Live Activity for a maximum of 5 AMA PRA Category 1 Credit(s)™. Physicians should claim only the credit commensurate with the extent of their participation in the activity.
Statement of Need/Gap Analysis

The purpose of this CME activity is to address the identified gap(s):

1. Surveillance techniques - Surveillance of common communicable diseases continues to be a problem among local MTFs. In fact, cases of campylobacter were not investigated in 2015 for PACOM MTFS, while 2016 cases of salmonella were not investigated. Civilian public health agencies are required to conduct investigations into all reportable medical events. However, DoD facilities often do not take initiative to conduct this investigation.

2. Disease identification - verification of disease by established case definitions have been utilized by the local health departments, Centers for Disease Control and Prevention, World Health Organization, and the Department of Defense. With the every changing list of reportable medical events and new emerging infections, case definitions change rapidly. Army epidemiologist conduct verification studies that monitor the efficiency of reporting by local public health experts and have concluded that completeness percentages for reportable medical events range as low as 35% for select diseases.

3. Outbreak reporting - Recent evidence have demonstrated that outbreak reporting and communication between public health agencies is poor. In fact, the Army failed to report six outbreaks in the DRSi between June 2016 and September 2016.

Learning Objectives

1. Based on case presentation, enhance your ability to improve case finding and surveillance practices within your local MTF.

Target Audience / Scope of Practice

Target Audience: The intended audience for this educational activity includes preventive medicine physicians, community health nurses, public health nurses, and epidemiology technicians.

Scope of Practice: This activity will improve the performance of preventive medicine personnel who conduct surveillance activities in inpatient and outpatient settings.
**Disclosure of Faculty/Committee Member Relationships**

It is the policy of the U.S. Army Medical Command that all CME planning committee/faculty/authors disclose relationships with commercial entities upon invitation of participation. Disclosure documents are reviewed for potential conflicts of interest and, if identified, they are resolved prior to confirmation of participation.

<table>
<thead>
<tr>
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<th>Committee Members</th>
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<tbody>
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<td>Brown, Jodi</td>
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<td>Fumia, Kristine</td>
<td>Eng, Mimi</td>
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<td>Gibson, Kelly</td>
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<td>Graham-glover, Bria</td>
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<td>Reynolds, Mark</td>
<td>Riegodeklos, Asha</td>
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<tr>
<td>Ricgodéklos, Asha</td>
<td>Rudiger, Courtney</td>
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<tr>
<td>Rudiger, Courtney</td>
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<td>Russell, Jamaal</td>
<td>Employment/Salary: Abbvie (spouse)</td>
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<td>- No information to disclose.</td>
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<tr>
<td>Wolff, Greg</td>
<td>- No information to disclose.</td>
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</tbody>
</table>

**Acknowledgement of Commercial Support**

There is no commercial support associated with this educational activity.
ANNOUNCEMENT

To Register for the Monthly Disease Surveillance Trainings:

1. Contact your Service Surveillance HUB to receive monthly updates and reminders
2. Log-on or Request log-on ID/password: https://tiny.army.mil/r/zB8A/CME
3. Register at: https://tiny.army.mil/r/MEHsS/EpiTechFY18

Confirm attendance:

- Please enter your full name/email into the DCS chat box to the right or email your Service hub
- You will receive a confirmation email within 48 hours with your attendance record; if you do not receive this email, please contact your Service hub
Influenza and the DoD

Defense Health Agency, Public Health Division, Armed Forces Health Surveillance Branch, AF Satellite and USAF School of Aerospace Medicine, Department of Public Health

Presented by: DoD Global Respiratory Pathogen Surveillance Program (DoDGRS)

Lt Col Federinko, MD, MPH; Kristine Fumia, MS; Gregory Wolff, MPH; Geeta Kersellius, DSN: 798-3196 (Comm: 937 938-3196)

25 September 2018
Outline

1. Influenza Background
   a. Influenza Characteristics
   b. Subtypes and Strains
   c. Antigenic Drift/Shift
   d. Influenza Vaccine

2. Military Impact
   a. Historical Impact on the Military
   b. Military Connection to Pandemics
   c. Military Environment & Flu
   d. DoD 2017-2018 Influenza Vaccine Effectiveness (VE)

3. Lab Testing and Surveillance
   a. Laboratory Testing Capabilities
   b. Surveillance Programs
   c. Surveillance Coverage Maps
   d. Surveillance Process and Vaccine Development
1. Recognize influenza characteristics, define influenza subtypes and strains, and explain antigenic changes in seasonal influenza cases in order to educate patients regarding need for annual vaccination.

2. Discuss the impact of influenza on the military within the active duty population to improve influenza prevention.

3. List influenza testing and surveillance capabilities available in the military for patients who present to the clinic with Influenza like illness, so that testing and surveillance is appropriately conducted for suspected influenza cases and outbreaks.
1. Influenza Background
1a. Influenza Characteristics

Infection Timeline

- Exposure to virus
- High fever
- Headache
- Aches, muscle pains, fatigue
- Sore throat
- Stuffy nose, sneezing
- Dry cough
- Contagious

Severity Factors

- Age
- Health
- Vaccination Status
- Prior Exposure
- Specific Virus Strain
- Pregnancy

© Intermountain Healthcare - GermWatch
1a. Influenza Characteristics

Global cycle of avian influenza viruses in animals.

Influenza activity peak: November-March

Influenza activity peak: April-September

Year-round activity
1b. Subtypes and Strains

Influenza Strains (A, B, C, D)

Influenza A
- Multiple Species
- Pandemics

Hemagglutinin
- Subtypes
Neuraminidase

Influenza B
- Humans & Seals
- No Pandemics

Victoria
Lineages
Yamagata
1c. Antigenic Drift/Shift

**Antigenic Drift**
- Small gradual changes that occur over time and create a new strain that may not be recognized by immune system
- New influenza vaccine is manufactured & distributed each year

**Antigenic Shift**
- Abrupt major change that produces a novel virus (Not previously encountered in humans)
- Direct animal-to-human transmission or mixing of human and animal genes
1d. Influenza Vaccine

- Helps protect against influenza by triggering immune response
- Immunity takes about two weeks to develop
- Influenza vaccine cannot give you influenza
- Recommended that anyone over six months be vaccinated
- Can reduce the risk of medically attended influenza by approximately 40-60%
Recommended 2018-2019 Northern Hemisphere influenza vaccine:

**Trivalent (three strains)**
- A/Michigan/45/2015 2009 H1N1-like virus
- *A/Singapore/INFIMH-16-0019/2016 H3N2-like virus
- *B/Colorado/06/2017-like virus (B/Victoria lineage)

**Quadrivalent (four strains)**
- B/Phuket/3073/2013-like virus (B/Yamagata lineage)

*Switched from 2017-18 to 2018-19 in the Trivalent vaccine

**Includes three strains in Trivalent vaccine
2a. Historical Impact on the Military

- War and disease are linked all throughout history:
  - For every soldier that was killed in the US Civil War, two died of disease
  - The Conquistadores brought diseases that devastated the New World, such as smallpox and syphilis
  - Typhus plagued Napoleon's armies
  - Of 171,000 US military personnel of the Spanish-American War, 20,700 contracted typhoid fever and more than 1,500 died

- **1918 Spanish Influenza**
  - 500 million infections and 50-100 million deaths (more than WWI, which lasted four years)
  - During Sept – Nov 1918, 20-40% of US Army and Navy personnel contracted influenza or pneumonia
  - High morbidity interfered with training and induction schedules in the US and left hundreds of thousands of military personnel non-effective
  - More American soldiers and sailors were killed by influenza and pneumonia than by enemy weapons in WWI

(Source: Office of the Historian and Navy Medicine Magazine; Byerly, CR. The US Military and the Influenza Pandemic of 1918-1919. Public Health Reports 2010; 125(Suppl 3)).
2b. Military Connection to Pandemics

Spanish – A(H1N1)
- 20-40% global morbidity
- 50 million fatalities

1918

Asian – A(H2N2)
- <65 yrs affected
- 2 million deaths worldwide

1957

Russian – A(H1N1)
- <26 yrs affected
- Similar to H1N1 circulating in 1950
- Uncertain origin*

1968

Hong Kong – A(H3N2)
- Similar to 1957 Asian flu
- 1 million deaths worldwide

1977

2009 H1N1
- Younger affected
- 61 million cases, 275K hospitalized, 12.5K fatalities (U.S) in 1 year

2009

1900 1918 1957 1968 1977 2009  Today

A(H1N1) Ft. Riley
A(H1N1) Swine Flu Ft. Dix (1976)
A(H1N1) USAFA
A(H1N1)pdm09 NHRC/USAFSAM
Potentially significant breakthrough cases for highly vaccinated population

Increased risk of spreading respiratory pathogens through global travel

Training environments and deployed settings increase the risk and are well suited for the spread of emerging and novel respiratory pathogens

Surveillance network covers areas not monitored by CDC and WHO

“The flu is very unpredictable when it begins and in how it takes off” – Harvey V. Fineberg
2d. Vaccine Effectiveness (VE) 2017-2018 season

- Population: DoD healthcare beneficiaries (excluding Active Duty members)

- Analyses by influenza type and subtype and beneficiary group (children, adults)

- Cases: confirmed by RT-PCR, viral culture, or Multiplex Respiratory Panel

- Controls: test-negative for influenza

- Odds ratio (OR) and 95% confidence intervals (CI) were calculated using multivariable logistic regression adjusted for age group, month of collection, sex and geographic location
  - \( \text{VE} = (1-\text{OR}) \times 100\% \)
## 2d. AFHSB-AF Satellite end of season influenza vaccine effectiveness (VE) estimates, 2017-2018

<table>
<thead>
<tr>
<th>Type</th>
<th>Population</th>
<th>Vaccine Status</th>
<th>Cases (%)</th>
<th>Controls %</th>
<th>Adjusted VE%*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>All Dependents</td>
<td>Yes</td>
<td>810 (19)</td>
<td>1255 (30)</td>
<td>49 (42, 55)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No</td>
<td>1177 (28)</td>
<td>996 (24)</td>
<td></td>
</tr>
<tr>
<td>Overall</td>
<td>Children</td>
<td>Yes</td>
<td>417 (19)</td>
<td>633 (29)</td>
<td>50 (40, 59)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No</td>
<td>617 (28)</td>
<td>498 (23)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Adults</td>
<td>Yes</td>
<td>393 (19)</td>
<td>622 (30)</td>
<td>50 (39, 58)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No</td>
<td>560 (27)</td>
<td>498 (24)</td>
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</tr>
<tr>
<td>A(H3N2)</td>
<td>All Dependents</td>
<td>Yes</td>
<td>374 (12)</td>
<td>1255 (40)</td>
<td>41 (30, 50)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No</td>
<td>486 (16)</td>
<td>996 (32)</td>
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<tr>
<td></td>
<td>Children</td>
<td>Yes</td>
<td>147 (10)</td>
<td>633 (42)</td>
<td>45 (29, 57)</td>
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<tr>
<td></td>
<td></td>
<td>No</td>
<td>229 (15)</td>
<td>498 (33)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Adults</td>
<td>Yes</td>
<td>227 (14)</td>
<td>622 (39)</td>
<td>38 (21, 51)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No</td>
<td>257 (16)</td>
<td>498 (31)</td>
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</tr>
<tr>
<td>A(H1N1)</td>
<td>All Dependents</td>
<td>Yes</td>
<td>71 (3)</td>
<td>1255 (49)</td>
<td>77 (69, 83)</td>
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<tr>
<td></td>
<td></td>
<td>No</td>
<td>220 (9)</td>
<td>996 (39)</td>
<td></td>
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<tr>
<td></td>
<td>Children</td>
<td>Yes</td>
<td>39 (3)</td>
<td>633 (49)</td>
<td>80 (70, 86)</td>
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<tr>
<td></td>
<td></td>
<td>No</td>
<td>129 (10)</td>
<td>498 (38)</td>
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<tr>
<td></td>
<td>Adults</td>
<td>Yes</td>
<td>32 (3)</td>
<td>622 (50)</td>
<td>72 (56, 82)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No</td>
<td>91 (7)</td>
<td>498 (40)</td>
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<tr>
<td>Influenza B</td>
<td>All Dependents</td>
<td>Yes</td>
<td>360 (12)</td>
<td>1255 (41)</td>
<td>47 (37, 55)</td>
</tr>
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<td></td>
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<td>No</td>
<td>460 (15)</td>
<td>996 (32)</td>
<td></td>
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<tr>
<td></td>
<td>Children</td>
<td>Yes</td>
<td>227 (14)</td>
<td>633 (39)</td>
<td>39 (24, 52)</td>
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<td></td>
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<td>No</td>
<td>252 (16)</td>
<td>498 (31)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Adults</td>
<td>Yes</td>
<td>133 (9)</td>
<td>622 (43)</td>
<td>56 (42, 66)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No</td>
<td>208 (14)</td>
<td>498 (34)</td>
<td></td>
</tr>
</tbody>
</table>

*Adjusted for age group (2-8, 9-17, 18-49, 50-64, 65+), collection month (November-April), sex, geographic location (Eastern US, Western US, OCONUS).
3. Laboratory Testing Capabilities
3a. Laboratory Testing Capabilities

Tests performed by AFHSB-AF Satellite

1. Multiplex PCR using a Respiratory Pathogen Panel
   - Detects up to 20 respiratory pathogens
   - Higher throughput of all respiratory pathogens, 96 specimens in 5 hours

2. Viral culture (up to 10 days for negative result)
   - Detects flu and other respiratory viruses

3. Next Generation Sequencing
   - Higher throughput & low turnaround time

4. *Influenza A/B and subtyping PCR
   - CDC assay

Tests performed by other sites

- Rapid Antigen Testing Assay
- FilmArray Respiratory Panel
- Immunofluorescence Antigen Assay
- Direct fluorescence Antigen Assay

*Available for troubleshooting
3b. Reportable Medical Events (RMEs)

- “A reportable event may represent an inherent, significant threat to public health and military operation. These events have the potential to affect large numbers of people, to be widely transmitted within a population, to have severe/life threatening clinical manifestations, and to disrupt military training and deployment. Timely accurate reporting of probable, suspected or confirmed cases ensures proper identification, treatment, control, and follow-up of cases”
  - AFI 48-105, DA PAM 40-11 & AR 40-50, BUMED INST 6220.12C

- DRSi
  - Web-based application
  - Identify, collect, document, manage, and track information on RMEs
  - Completeness/timeliness of data is user-driven
3b. 2017 Influenza-Associated Hospitalization Case Definition for Reporting

**Background**

<table>
<thead>
<tr>
<th>Causative Agent</th>
<th>Influenza virus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Travel Risks</td>
<td>Present worldwide</td>
</tr>
<tr>
<td>Clinical Description</td>
<td>An acute viral disease of the respiratory tract characterized by fever, chills, cough, sore throat, runny or stuffy nose, muscle or body aches, headache, and fatigue.</td>
</tr>
</tbody>
</table>

**Case Classification**

**Confirmed:**
A case that meets the clinical description as described above with **All** of the following:

- Younger than 65 years of age and
- Any positive influenza laboratory test (example: culture, DFA, IFA, rapid, PCR)

**AND**

- Hospital admission date was ≤ 14 days after a positive influenza test or
- Hospital admission date was ≤ 3 days before a positive influenza test

**Critical Reporting Elements**
Specify the virus type (A or B) and subtype (example: H3N2, H1N1) if available.
Note the patient’s influenza immunization history.
3b. ILI Syndromic Surveillance

- Electronic Surveillance System for the Early Notification of Community-based Epidemics (ESSENCE)
  - Internet-based syndromic disease surveillance system
- Useful for early detection with maximum sensitivity
  - Often at the cost of specificity (false alerts)
- ILI
  - Includes ICD and Chief Complaint data
- Influenza Specific
  - Influenza specific ICD codes only
3c. Surveillance Coverage - Navy

Surveillance Sites:
- Recruit Febrile Respiratory Illness (FRI) Surveillance
- Beneficiaries Febrile Respiratory Illness (FRI) Surveillance
- FRI Surveillance at the U.S.-Mexico Border
- Shipboard FRI Surveillance

Influenza Diagnostic Collaborators:
- Center for Disease Control and Prevention (CDC)
- U.S. Air Force School of Aerospace Medicine (USAFSAM)
3c. Surveillance Coverage - DoDGRS

Department of Defense Global Respiratory Pathogen Surveillance Program (DoDGRS)
*FDA's VRBPAC

annual flu vaccine strain selection

**NORTHERN SEASONAL INFLUENZA VACCINE PRODUCED**

*Food and Drug Administration (FDA), Vaccines and Related Biological Products Advisory Committee (VRBPAC)*
Resources

**USAFSAM/PHR Epidemiology Consult Service: Influenza Surveillance**
https://gumbo2.area52.afnoapps.usaf.mil/epi-consult/influenza/dashboard

**Air Force:** Contact your MAJCOM PH or USAFSAM/PHR
USAFSAM / PHR / Epidemiology Consult Service
Wright-Patterson AFB, Ohio
Comm: (937) 938-3207  DSN: 798-3207
episervices@us.af.mil

**Navy and Marine Corps Public Health Center: Influenza homepage**
http://www.med.navy.mil/sites/nmcphc/program-and-policy-support/Pages/Influenza.aspx

**Navy and Marine Corps Weekly Influenza SITREP**

**Army Public Health Center: Influenza Reports**
https://tiny.army.mil/r/iRWUw/APHCInfluenzaReport

**DHA Public Health Division, Immunization Healthcare Branch, Influenza – Seasonal vaccine information:**
https://www.health.mil/vaccines

**CDC Influenza Home Page**
http://www.cdc.gov/flu/

**WHO Global Influenza Surveillance Network: Manual for the laboratory diagnosis and virological surveillance of influenza**
QUESTIONS?
Contact Information

- Army: APHC – Disease Epidemiology Division
  Aberdeen Proving Ground – MD
  COMM: (410) 436-7605  DSN: 584-7605
  usarmy.apg.medcom-aphc.mbx.disease-epidemiologyprogram13@mail.mil

- Navy: NMCPHC Preventive Medicine Programs and Policy Support Department
  COMM: (757) 953-0700; DSN: (312) 377-0700
  Email: usn.hampton-roads.navmcpubhlthcnpons.list.nmcphc-threatassess@mail.mil
  Contact your cognizant NEPMU
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  Email: usn.hampton-roads.navhospporsva.list.nepmu2norfolk-threatassess@mail.mil
  NEPMU5: COMM: (619) 556-7070; DSN (312) 526-7070
  Email: usn.san-diego.navenpvntmedufive.list.nepmu5-health-surveillance@mail.mil
  NEPMU6: COMM: (808) 471-0237; DSN: (315) 471-0237
  Email: usn.jbphh.navenpvntmedusixhi.list.nepmu6@mail.mil
  Email: NEPMU7@eu.navy.mil

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  usafsam.phrepiservic@us.af.mil