



Influenza in the DoD

USAF School of Aerospace Medicine / Epidemiology Consult Services
Presented by: DoD Global, Laboratory-based, Influenza Surveillance Program
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Navy and Marine Corps Public Health Center
U.S. Army Public Health Command
U.S. Air Force School of Aerospace Medicine
30 September 2014





Influenza Outline



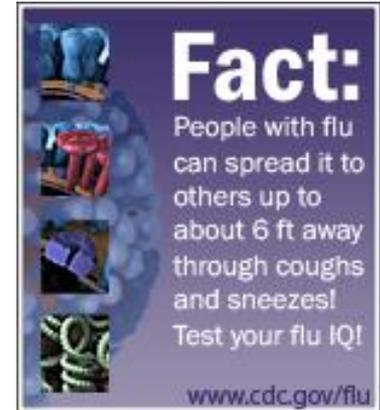
- I. About Influenza**
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 - II. Subtypes and Strains**
 - III. Immunity-related Changes: Antigenic Drift/Shift**
 - IV. Vaccine**
- II. Influenza Surveillance in Military Populations**
 - I. Reportable Medical Event Case Definition**
 - II. Influenza-like Illness (ESSENCE)**
 - III. Surveillance Activities by Service**
- III. Contact Information**



Clinical Information



- An acute viral disease of the respiratory tract
 - Fever, cough, sore throat, runny nose, headache, fatigue, body aches
- Spread by droplets or touching contaminated surfaces
- Incubation period is 1-4 days (2 days on average)
- Contagious 1 day prior, and up to 5-7 days after symptom onset (longer for children & immunocompromised)
- Severity depends on flu virus, vaccination status, and health status
- Recovery: few days to two weeks (1 week on average)





Subtypes and Strains

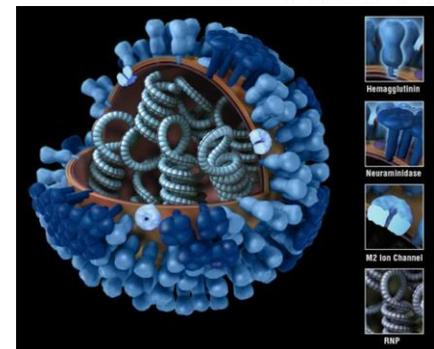
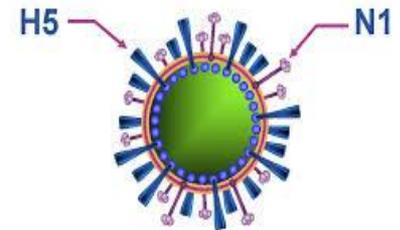


- **Influenza A**

- Evolves rapidly & responsible for most epidemics and pandemics
- Subtypes:
 - Divided into subtypes based on two surface proteins:
 - Hemagglutinin (HA)
 - Neuraminidase (NA)
 - Combine to create a single subtype (Example: H5N1, H1N1)
 - Are further divided into strains
- Found in many different animals

- **Influenza B**

- Gradually changing virus
- Classified by strains based on their lineage: currently Yamagata or Victoria
- Found primarily in humans
- May cause epidemics, but not pandemics





Antigenic Drift

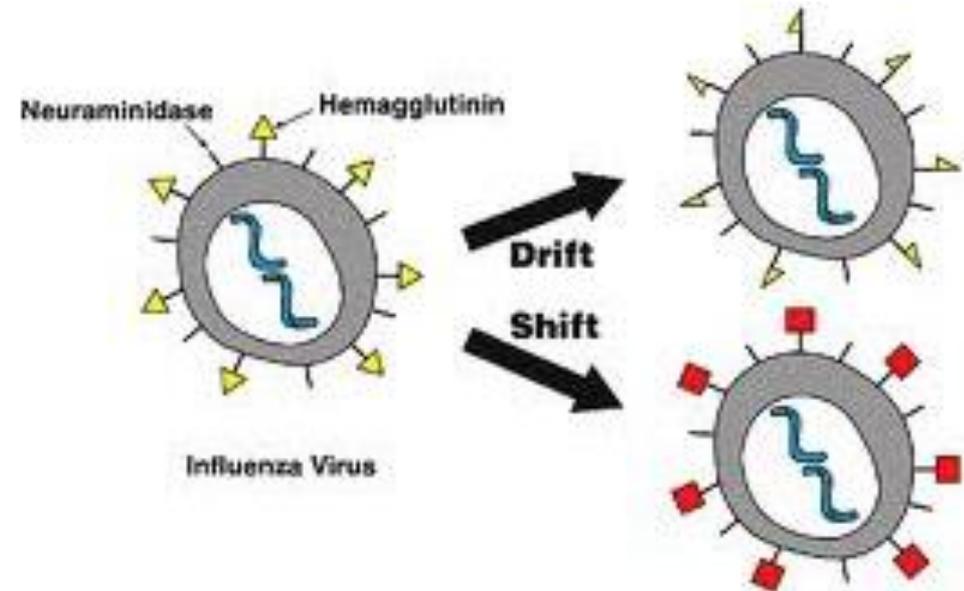
- **Immunity-related changes to influenza A virus**
 - Changes to regions of the HA surface protein can affect human antibody responses to the virus
- **Antigenic Drift**
 - Small gradual changes that occur over time and create a new strain that may not be recognized by immune system
 - Reason that new influenza vaccine is manufactured and distributed each year
 - USAFSAM conducts molecular sequence analysis on influenza specimens to monitor these changes



Antigenic Shift

- **Antigenic Shift**

- Abrupt major change that produces a novel (not seen previously in humans) influenza A virus, for example pandemic H1N1
- Result of direct animal-to-human transmission or mixing of human and animal viral genes within the same individual (reassortment)
- Most people have little or no protection against the new virus



- **Example: 2009 influenza A(H1N1)pdm**



Vaccine



- **Get Vaccinated Early**

- Flu seasons can be unpredictable and begin as early as October
- Takes about 2 weeks for antibody production after vaccination
- Influenza vaccine cannot give you influenza
 - The virus injected is inactivated (killed) or is attenuated (weakened)
 - Designed to only cause mild infection at cooler temperatures (not in the lungs)

- **This year, DoD ordered 3.8 M doses of trivalent (injection) and quadrivalent (injection & mist) vaccines for service members and beneficiaries**

- Trivalent: A(H3N2), A(H1N1)pdm09, B/Yamagata
- Quadrivalent: A(H3N2), A(H1N1)pdm09, B/Yamagata, B/Victoria

- **For the 2013-2014 influenza season, CDC estimated that among vaccinated individuals, about 60% fewer influenza cases occurred than would have if they had not been vaccinated.**



DoD Influenza Vaccination Policy



- DoD Policy
 - DoD HA Memo 9 July 2014: Guidance for the Use of Influenza Vaccine for the 2014-2015 Influenza Season
 - Service specific guidance:
 - Navy: BUMED msg Aug 2014
 - Air Force: Air Force 2014-2015 Influenza Immunization Program Guidance
 - Army: OPORD 14-85
 - HA Policy 08-005: Policy for Mandatory Seasonal Influenza Immunization for Civilian Health Care Personnel Who Provide Direct Patient Care in DoD Military Treatment Facilities



Testing for Influenza



- **Rapid Diagnostic Tests**
 - Fast & easy but....
 - High specificity (correctly identifies negatives)
 - Low sensitivity (does not pick up positives very well)
 - Accuracy depends on the prevalence of circulating viruses
- **Confirmatory Tests**
 - Much more sensitive & specific
 - Common
 - RT-PCR detection (24-48 hours)
 - Tissue cell culture (up to 10 days for negative result)
 - Others
 - Immunofluorescent antibody staining (IFA) antigen detection
 - Hemagglutination inhibition (HI) 4-fold rise in antibody titer in paired acute and convalescent sera
 - Immunohistochemical (IHC) staining antigen detection (autopsy)



Influenza Surveillance



- Surveillance in military populations
- Varied approaches
 - Reportable Medical Events (RME)
 - Syndromic
 - Sentinel - AF
 - Shipboard, Recruit, & Population - Navy
 - Population - Army



Influenza and Military Populations



- Even with modern medical advances, influenza and influenza-like illness can cause high morbidity rates, undermining readiness
- Military members and their families:
 - Are stationed where new strains are likely to appear
 - Are highly mobile across the globe and could quickly spread a pandemic strain
 - May live in areas that represent "gaps" in the World Health Organization (WHO)/Centers for Disease Control and Prevention (CDC) influenza surveillance network
- Training environments are well suited for the spread of emerging respiratory pathogens
- Highly immunized military plus electronic vaccination data registry facilitate rapid assessment of vaccine protection against emerging strains



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, BUMEDINST 6220.12C
- DRSi
 - Web-based application
 - Identify, collect, document, manage, and track information on RMEs
 - Completeness/timeliness of data is user-driven



Reportable Medical Events (RMEs)



Influenza-associated Hospitalization	
Criteria	
Included population	< 65 years of age Any beneficiary type/mandate status
Patient status	Influenza-associated hospitalization Fever $\geq 100.5^{\circ}\text{F}$ with cough or sore throat in absence of other diagnosis
Laboratory	Positive rapid or confirmatory test < 4 days after hospital admission
Case Classification	
Confirmed	Meet criteria with confirmatory lab test (RT-PCR, culture, IFA, IHC, HI titer)
Probable	Meet case definition with positive rapid antigen test
Notes	
	For all confirmed cases, a nasal wash specimen should be submitted to an appropriate lab for further influenza lab testing (i.e. sequencing)



Reportable Medical Events (RMEs)



Navy Required Reportable - Novel (and variant) Influenza Reference: NMCPHC-TM-6220.12

Criteria

Included population	Any beneficiary type/mandate status
Patient status	Fever $\geq 100.5^{\circ}\text{F}$ with cough or sore throat in absence of other diagnosis Epi-linked (contact of a known case during which transmission was plausible)
Laboratory	Influenza A found to be a different subtype from currently circulating H1 and H3 viruses Using detection methods only available at state or military public health labs (like RT-PCR) Confirmed by CDC or by CDC/FDA approved protocols

Case Classification

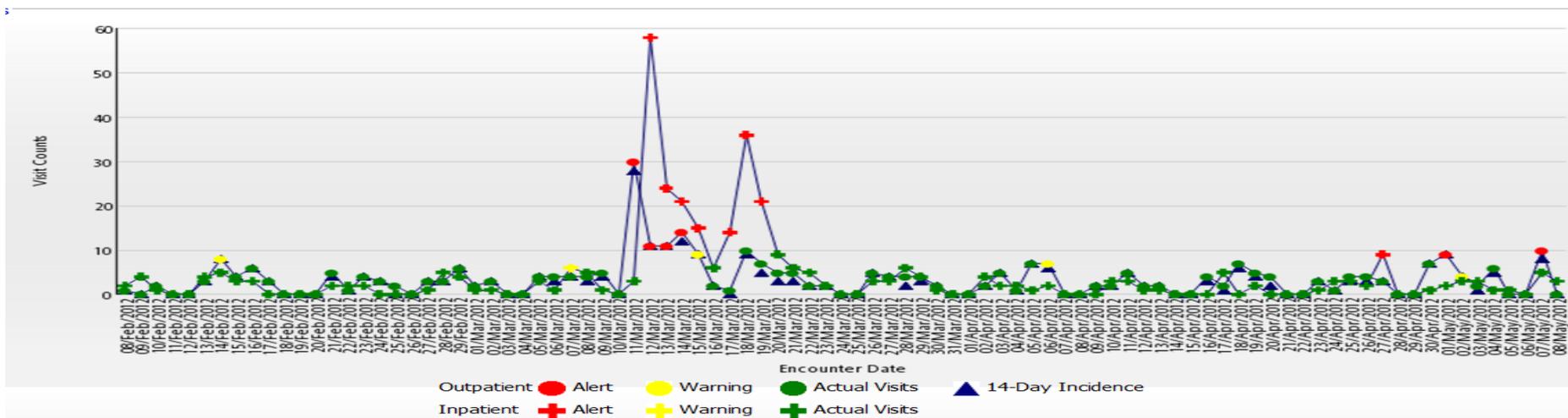
Confirmed	Meet criteria with confirmatory lab test (CDC/FDA approved methods)
Probable	Meet case definition and is epi-linked without lab confirmation (i.e., no lab testing performed or inconclusive lab results)
Suspect	Meet case definition with pending lab confirmation



ILI Syndromic Surveillance



- Electronic Surveillance System for the Early Notification of Community-based Epidemics (ESSENCE)
 - Designed by Johns Hopkins University Applied Physics Laboratory and DoD
 - Internet-based syndromic disease surveillance system
 - Used by DoD and some civilian health departments
- Useful in tracking an outbreak, monitoring the outbreak's impact on medical resources, and monitoring success of mitigation measures.





ILI Syndromic Surveillance



- ILI
 - ICD codes include:
 - General respiratory diagnosis codes
 - Influenza specific ICD codes
 - CPT code
 - Infectious Agents
 - Chief Complaint
 - Influenza, fever and cough, or sore throat
- For more information on ESSENCE, please refer to <https://gumbo2.area52.afnoapps.usaf.mil/epi-consult/training/index.cfm>



DoD Global, Lab-based, Influenza Surveillance Program



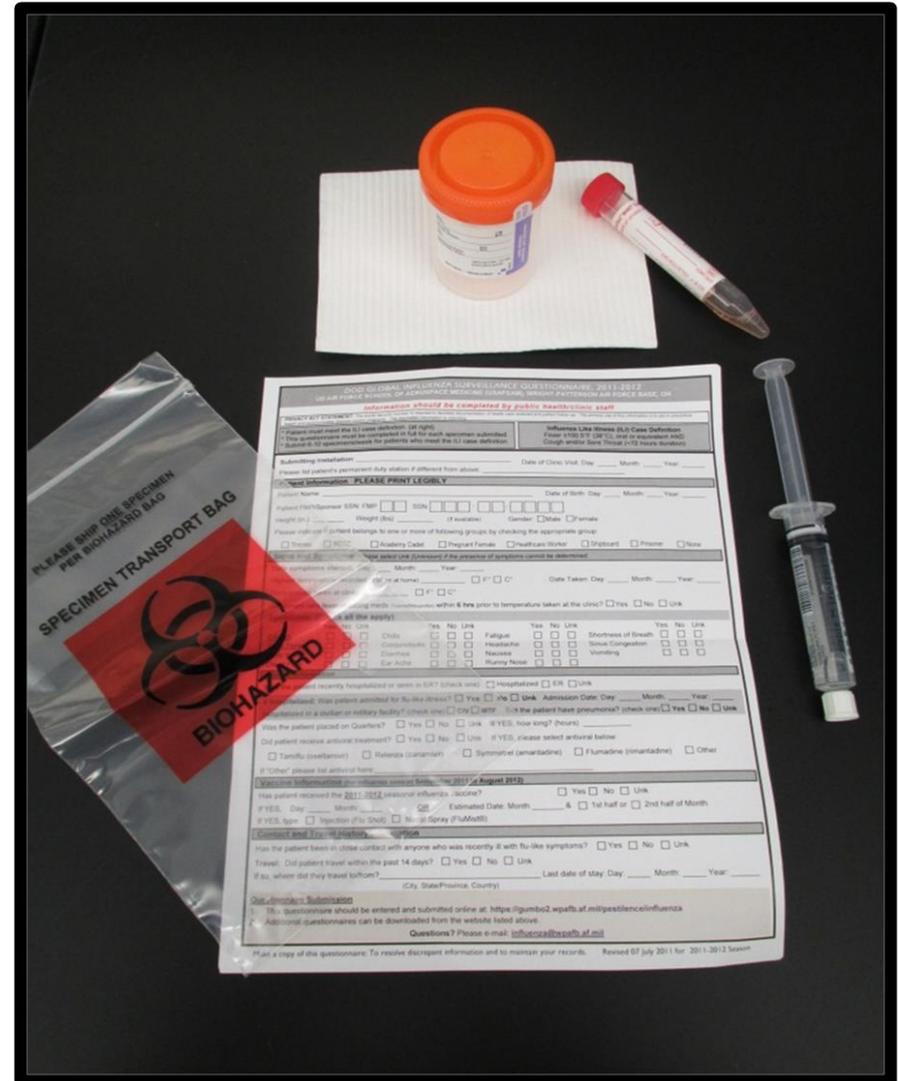
- **AF Influenza Program “Project Gargle” : 1976-1997**
- **National Science and Technology Council Presidential Decision Directive (NSTC PDD-7)**
 - U.S. not prepared for threat posed by emerging infectious diseases
 - Action taken and AF was assigned lead executive agent for DoD influenza surveillance
- **DoD Global, Lab-based Influenza Surveillance Program : 1998 – present**
 - Sentinel-based, across services
 - Selected according to mission, location, gap in international surveillance
 - Collect 6-10 specimens/week meeting ILI case definition
 - Complete patient information on influenza surveillance questionnaire
 - Submit specimens and questionnaires to the USAFSAM lab



DoD Global, Lab-based, Influenza Surveillance Program



- USAFSAM provides collection kits to sentinel and participating sites
- Nasal wash collection kit
 - Questionnaire
 - Syringe
 - Collection cup
 - VTM vial
 - Biohazard bag
 - Bib

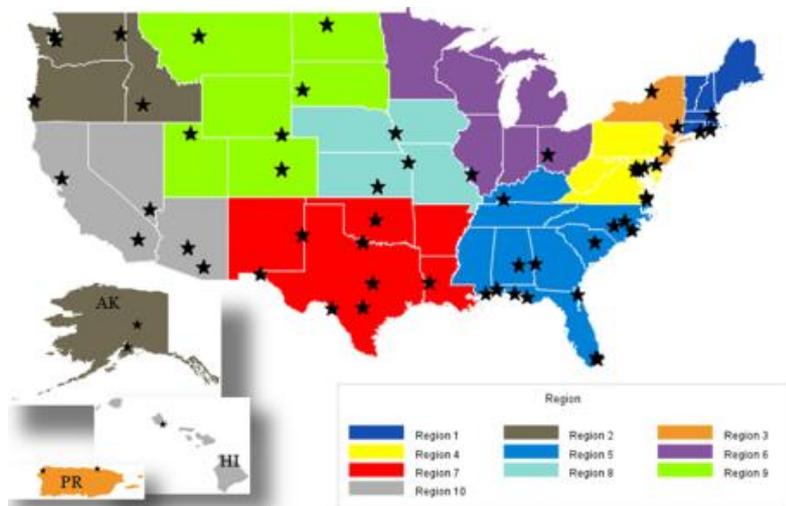




DoD Global, Lab-based, Influenza Surveillance Program



Sentinel Surveillance Sites 2014-2015

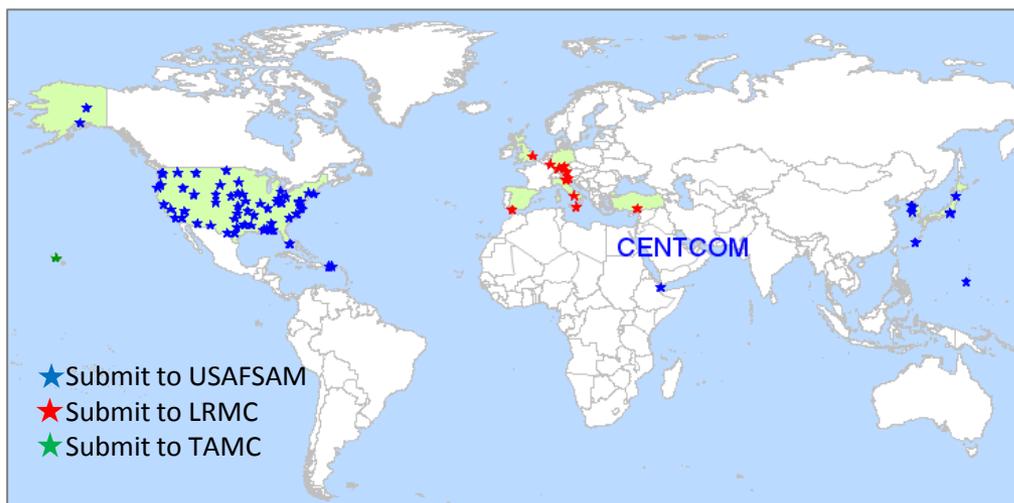


CONUS Sites: 55

- Air Force: 33
- Army: 11
- Navy & Marine Corps: 7
- Coast Guard: 6
- JTF CAPMED/DHA: 2

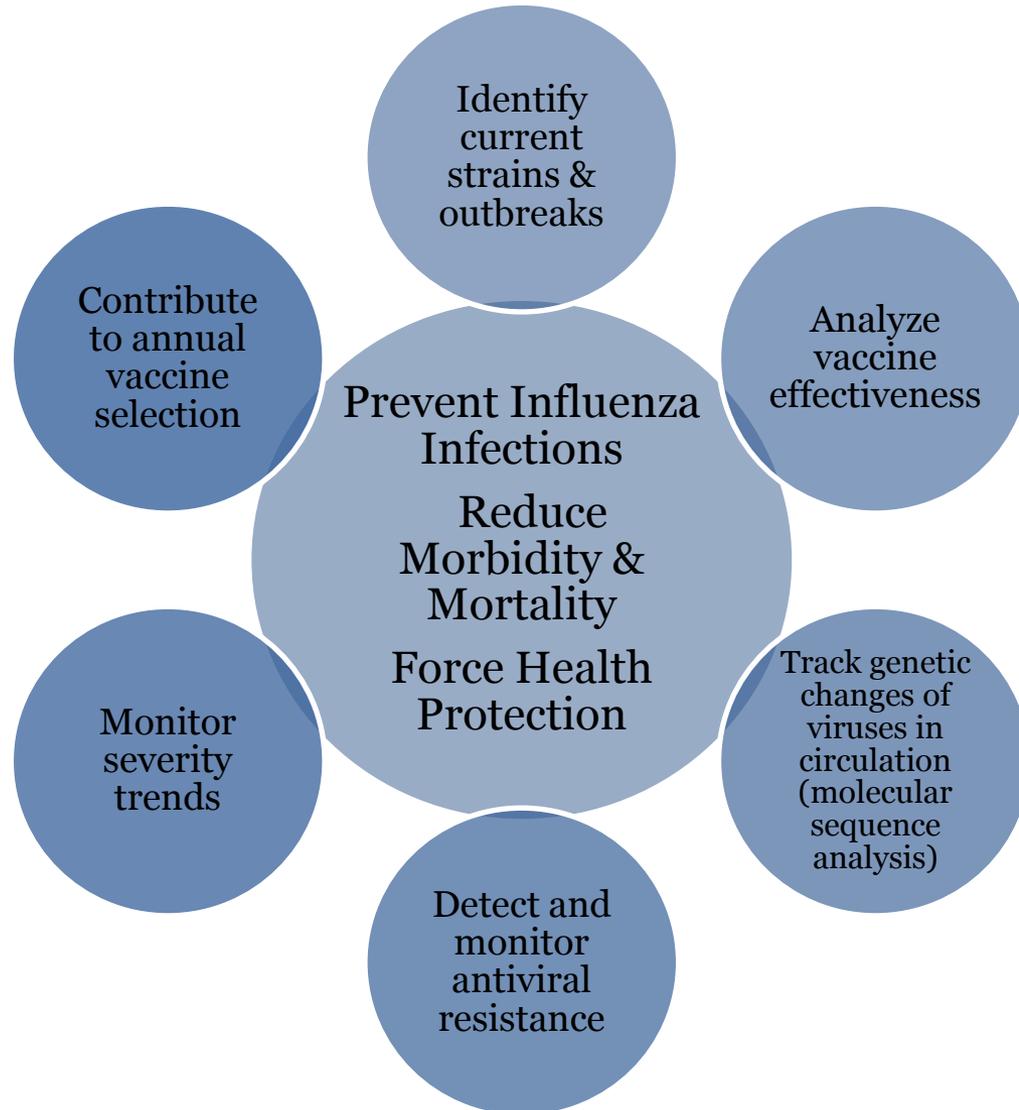
OCONUS Sites: 36

- Air Force: 18
- Army: 9
- Navy & Marine Corps: 7
- Coast Guard: 2



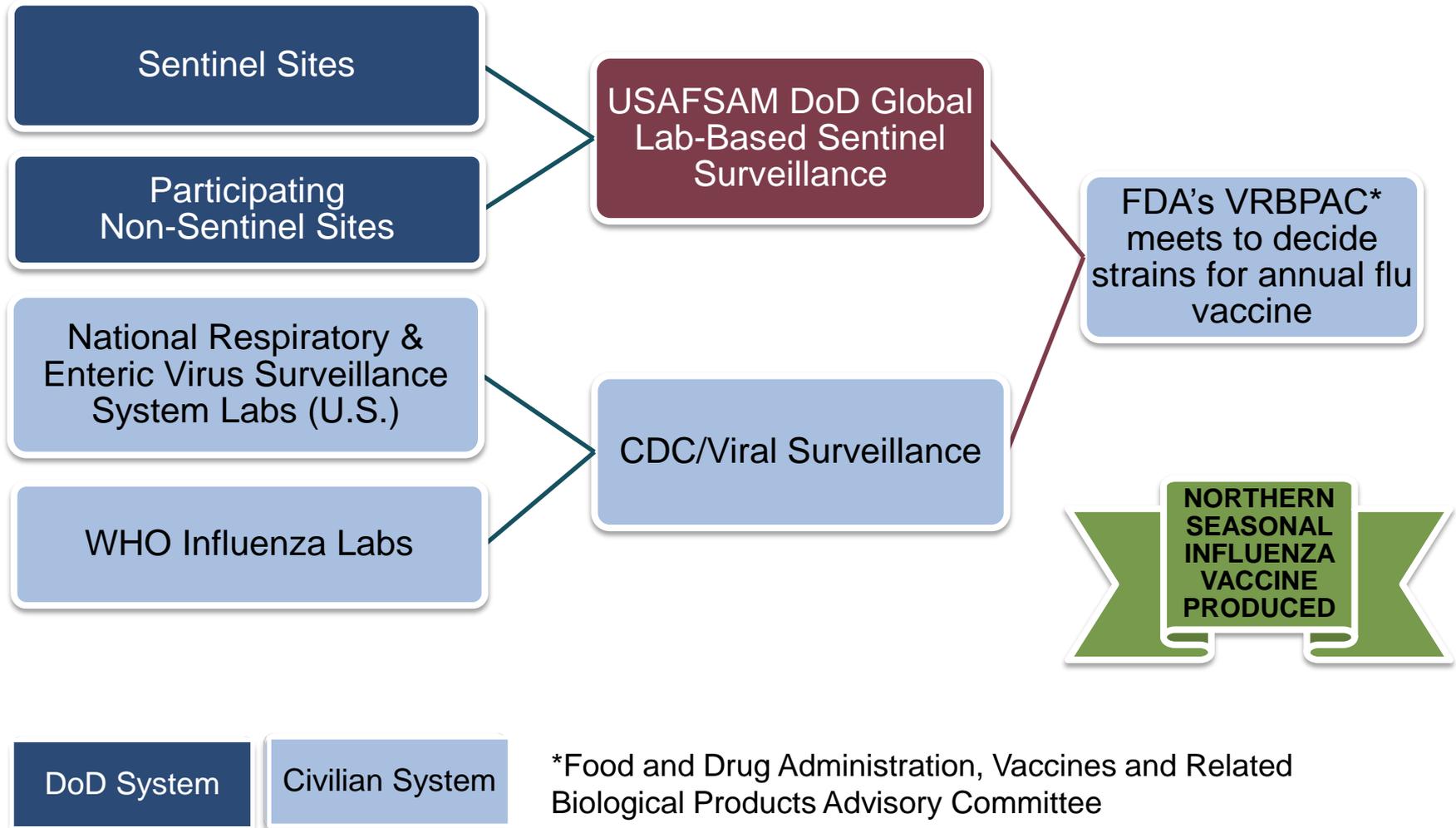


DoD Global, Lab-based, Influenza Surveillance Program





Surveillance Process and Vaccine Development





DoD Global, Lab-based, Influenza Surveillance Program



<https://gumbo2.area52.afnoapps.usaf.mil/epi-consult/influenza>

<https://kx2.afms.mil/kj/kx7/Influenza/Pages/home.aspx>

- Site-specific surveillance dashboard

- ✓ Submission data
- ✓ POC information
- ✓ Shipping/storage

- Welcome packet
- Weekly reports
- Other sentinel site resources
- Novel virus information
- Historical data
- Program publications

The screenshot shows the USAFSAM/PHR Epidemiology Consult Service website. The main heading is "DoD Influenza Surveillance" with a sub-heading "Welcome Packet - 2014-15 Season". The page includes a "Hot Topics" section with a "DoD Flu Surveillance" link, a "Welcome Packet" section with links to "Welcome Packet", "Weekly Reports", "Surveillance Dashboard", "Sentinel Site Resources", "Surveillance Data", and "Novel Virus", and a "DoD Policy" section with a link to "Sentinel Sites for the 2014-2015 Influenza Surveillance Program". There are also links for "Training" (Visual Site Training Presentation, Audio/Video Sentinel Site Training Presentation) and "Surveillance Questionnaire".

The screenshot shows the "Surveillance Data" section of the website. It includes a "Weekly Influenza Surveillance Reports" section with links to "USAFSAM Weekly Influenza Surveillance Reports" and "EUCCOM Weekly Influenza Surveillance Reports". There is also a "Surveillance Dashboard" section with links to "Site & Service Specific Data", "Aggregate Specimen Results", and "Influenza Like Illness Graphs". A world map is displayed with various locations marked.

Note: If you would like to receive these reports by email, send a request via email to the program at: usafsam.phrflu@us.af.mil



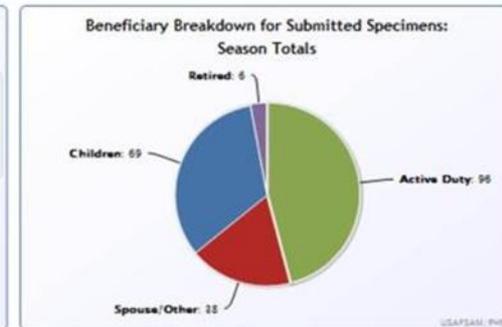
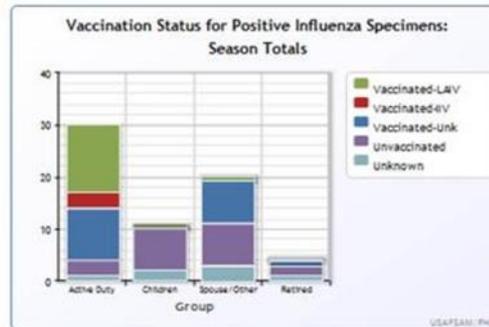
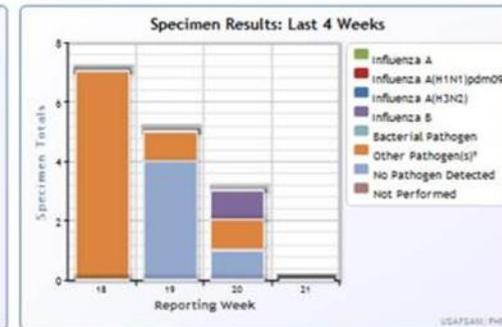
Influenza Dashboard



- Online dashboard that displays base-level information
 - Submission data
 - POC information
 - Shipping & storage information

<https://gumbo2.area52.afnoapps.usaf.mil/epi-consult/influenza/dashboard/>

WEEKLY SPECIMEN TOTALS									
Week	Influenza A	Influenza A(H1N1) pdm09	Influenza A (H3N2)	Influenza B	Bacterial Pathogen	Other Pathogen(s)*	No Pathogen Detected	Not Performed	Total
40	0	0	0	0	0	0	0	0	0
41	0	0	0	0	0	0	1	0	1
42	0	0	0	0	0	0	0	0	0
43	0	0	0	0	0	0	0	0	0
44	0	0	0	0	0	0	0	0	0
45	0	0	0	0	0	0	1	0	1
46	0	0	0	0	0	0	0	0	0
47	0	0	0	0	0	0	0	0	0
48	0	0	0	0	0	0	0	0	0
49	0	0	0	0	0	0	0	0	0
50	0	0	0	0	0	0	0	0	0
51	0	0	0	0	0	0	0	0	0
52	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	1	0	1
2	0	1	0	0	0	0	0	0	1
3	0	2	0	0	0	0	1	0	3
4	0	7	0	0	0	0	1	0	8
5	0	3	0	0	0	1	0	0	4
6	0	0	0	0	0	2	0	0	2
7	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0
9	0	1	0	0	0	0	0	0	1
10	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	1	0	0	1





Navy Influenza Surveillance Activities



- Shipboard and Recruit ILI surveillance
 - Fleet Disease and Injury Surveillance (D&I)
 - Naval Health Research Center (NHRC) FRI program
- Participate in USAFSAM sentinel surveillance program
- NMCPHC Epi Data Center Influenza SITREPs
- NMCPHC Influenza Advisory
 - Guide to tracking pneumonia in ESSENCE



Navy Influenza Surveillance Activities



- Fleet D&I surveillance (formerly known as DNBI)
 - Shift from weekly reporting of xls reports to electronic D&I tracking of AHLTA-T/SAMS encounters
 - Develop D&I report, including Fever and Respiratory categories
 - Track electronic encounters by ship to ensure complete capture
 - Units who wish to continue to report via xls spreadsheet - templates and reporting guidance can be found at: website
<http://www.med.navy.mil/sites/nmcphc/program-and-policy-support/disease-and-injury-reports>



Navy Influenza Surveillance Activities



- NHRC FRI program
 - Includes recruit training centers and participating ships
 - Describe circulating respiratory pathogens, including influenza
 - Identify pathogens in support of outbreaks
 - Contributes to FDA's VRBPAC discussion for development of next year's influenza vaccine
 - Contact NHRC at nhrc-fri@med.navy.mil for more information and to receive routine reports
- Can describe ILI outbreaks, anticipate duration of illness, describe extent of outbreak, and identify patterns to curtail disease spread



Navy Influenza Surveillance Activities



DON Influenza SITREP

2013-2014 Influenza Season
Week 36 (31 August 2014 — 6 September 2014)

Laboratory:

There were two laboratory positive influenza result among DON beneficiaries during Week 36 (equal to seasonal baseline). [More](#)



Vaccination:

Vaccination coverage reports for the 2014-2015 influenza season will resume in October.

Antivirals:

There were six influenza-specific antiviral (AV) medications prescribed to DON beneficiaries this week (one amantadine, five oseltamivir). Influenza-specific AV prescriptions this week were above baseline. [More](#)

Inpatient:

There were eight inpatient influenza tests performed during Week 36; none were positive. There was one inpatient AV prescription dispensed this week and no cases were reported to DRSi. [More](#)

Coinfections:

No coinfections were identified among DON beneficiaries during Week 36. [More](#)

Active Duty & Recruits:

In Week 36, there was one laboratory positive influenza cases among DON active duty service members or DON recruits. [More](#)

NHRC reports febrile respiratory illness rates are at or below expected values for DON basic training centers. [More](#)

Children:

Laboratory influenza rates in the 0-4 age groups were 0 per 100,000 and 0.33 per 100,000 in the 5-17 age group. There was one AV prescriptions dispensed to children this week. [More](#)

In the News:

See page 4 for this week's influenza news updates. [More](#)

Contact Information: Gosia Nowak, 757-953-0979, gosia.nowak@med.navy.mil ~ On the Web: <http://go.usa.gov/DrUC>

- Weekly SITREP including:
 - Vaccination rates
 - Overall flu burden
 - Active Duty/recruit burden
 - Description of hospitalized cases and trends
 - Noteworthy information in the open media
- Other reports to track vaccine use and disease burden for BUMED
- For more information and to access the latest SITREP, email: epi@nmcphc.med.navy.mil





Navy Influenza Surveillance Activities



- NMCPHC Influenza Advisory:
 - Navy flu reporting requirements in DRSi
 - Surveillance recommendations for upcoming season
 - Includes guidance on pneumonia surveillance in ESSENCE
 - <http://www.med.navy.mil/sites/nmcphc/program-and-policy-support> for more information



NAVY AND MARINE CORPS PUBLIC HEALTH CENTER
PREVENTION AND PROTECTION START HERE

Department of Navy (DON) Surveillance Advisory: Seasonal Influenza 17 September 2013

Issue

- Influenza vaccine for the upcoming flu season is available at military treatment facilities beginning this month and immunization campaigns are underway.
- Department of Defense (DOD) policy requires influenza vaccination for all Active Duty and Reserve Component personnel.
- NMCPHC influenza surveillance strategy includes central analysis of electronic clinical data, local ESSENCE monitoring, Fleet Disease and Injury Reporting, and reporting hospitalizations associated with laboratory confirmed influenza via Disease Reporting System internet (DRSi).
- The topic of September's Disease Surveillance Training is 'Influenza Surveillance'. For information about how to join this online discussion on 24 September, contact the DOD helpdesk as described below.

Background

Influenza, or the flu, is a viral illness characterized by the sudden onset of fever, respiratory



Creating a User Defined Pneumonia Syndrome in DOD ESSENCE

Preventive Medicine Directorate User Guide
Sept 2013



NAVY AND MARINE CORPS PUBLIC HEALTH CENTER
PREVENTION AND PROTECTION START HERE

WWW.NMCPHC.MED.NAVY.MIL



Army Influenza Surveillance



- Uses a combination of CHCS Ad Hoc Reporting, DRSi and ESSENCE
- CHCS flat files are sent from each Army lab on a weekly basis to USAPHC containing all positive and negative results of PCRs, cultures and rapid antigen testing
- Army influenza reports can be found at:
<http://phc.amedd.army.mil/whatsnew/Pages/PublicationDetails.aspx?type=USAPHC%20Influenza%20Surveillance%20Activity>



Resources



USAFSAM/PHR Epidemiology Consult Service: Influenza Surveillance

<https://gumbo2.area52.afnoapps.usaf.mil/epi-consult/influenza/>

NMCPHC Epi Data Center: Influenza homepage

<http://www.med.navy.mil/sites/nmcphc/program-and-policy-support/Pages/Influenza.aspx>

US Army Public Health Command: Influenza Reports

<http://phc.amedd.army.mil/whatsnew/Pages/PublicationDetails.aspx?type=USAPHC%20Influenza%20Surveillance%20Activity>

MILVAX, Influenza – Seasonal vaccine information

<http://www.vaccines.mil/Influenza - Seasonal>

FLU.GOV “Know what to do about the flu”

<http://www.flu.gov/>

CDC Influenza Home Page

<http://www.cdc.gov/flu/>

WHO Global Influenza Surveillance Network: Manual for the laboratory diagnosis and virological surveillance of influenza

http://whqlibdoc.who.int/publications/2011/9789241548090_eng.pdf



Contact Information



Air Force:

Email: episervices@wpafb.af.mil or usafsam.phrflu@us.af.mil (flu program)

Website(CAC-required): <https://gumbo2.area52.afnoapps.usaf.mil/epi-consult/influenza/>

Commercial (937) 938-3207; DSN 798-3207

Navy: Contact your cognizant NEPMU

NEPMU2: COMM: (757) 953-6600; DSN: (312) 377-6600

Email: NEPMU2Norfolk-Threat-MedEpi@med.navy.mil

NEPMU5: COMM: (619) 556-7070; DSN (312) 526-7070

Email: HealthSurveillance@med.navy.mil

NEPMU6: COMM: (808) 471-0237; DSN: (315) 471-0237

Email: NEPMU6@med.navy.mil

NEPMU7: COMM (international): 011-34-956-82-2230 (local: 727-2230); DSN: 94-314-727-2230

Email: NEPMU7@eu.navy.mil

Army:

USAPHC – Disease Epidemiology Program

Aberdeen Proving Ground – MD

COMM: (410) 436-7605 DSN: 584-7605

USAPHC.Disease.epidemiology@us.army.mil