

# The Department of Defense (DoD) Global Influenza Surveillance Program

## Quick Facts

### Three components

- Sentinel-based Surveillance
  - \* US Air Force School of Aerospace Medicine (USAFSAM)
- Population-based Surveillance
  - \* Naval Health Research Center (NHRC)
- DoD overseas medical research facilities

### Surveillance Sites are global

- 43 countries
- USAFSAM sentinel sites
  - \* 43 military installations
  - \* Multiple sites in 9 allied countries
- NHRC population-based sites
  - \* 8 training sites
  - \* 11 shipboard sites
  - \* 2 Mexican border sites
- DoD overseas research laboratory sites

### Specimen Collection

- 6-10 specimens per week
  - \* Nasal wash
- Patients = DoD beneficiaries and civilians in allied countries meeting influenza-like illness (ILI) case definition
- ILI = fever  $\geq 100.5^{\circ}$  F/ $38^{\circ}$ C AND cough or sore throat of < 72 hours duration

### Specimen Processing

- Specimens tested for
  - \* Influenza A and B
  - \* Adenovirus
  - \* Parainfluenza 1-3
  - \* Enterovirus
  - \* Respiratory syncytial virus
  - \* Herpes simplex virus
- All respiratory viral specimens are isolated, and influenza is molecularly characterized
- Select specimens sent to CDC
  - \* Select isolates subtyped and antigenically characterized
  - \* Original samples for possible candidate material for vaccine production

### Annual Workload (Influenza & related respiratory illness)

- USAFSAM laboratory
- 6700+ specimens/year
    - \* 1483 (22%) influenza A
    - \* 560 (8%) influenza B

### NHRC laboratory

- 5,800+ specimens/year
  - \* 3,300 (57%) adenovirus
  - \* 622 (11%) influenza A
  - \* 68 (1%) influenza B

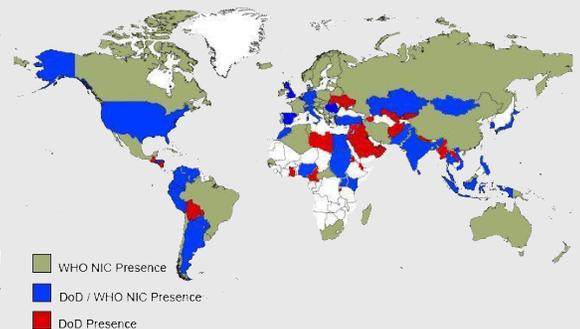
*The Presidential Decision Directive NSTC-7 (June 1996) charged the DoD with expanding its mission to "support global surveillance, training, and response to emerging infectious disease threats". More specifically, a Health Affairs Policy (February 1999) states that DoD will be able "to conduct global, operationally relevant, laboratory-based influenza surveillance".*

## Background

The DoD Global Emerging Infections Surveillance and Response System (DoD-GEIS) established a DoD-wide influenza surveillance network in 1997 that coupled existing surveillance systems from the Air Force (influenza surveillance established in 1976) and the Navy (adenovirus surveillance established in 1996). The Air Force Surgeon General was appointed as the Executive Agent for the program, with management responsibility given to the United States Air Force School of Aerospace Medicine (USAFSAM) (Formerly the Air Force Institute for Operational Health (AFIOH)), located at Brooks City-Base, in San Antonio, TX. The Navy's adenovirus surveillance was expanded to include febrile respiratory illnesses and is managed by the Naval Health Research Center (NHRC), located at San Diego, CA. DoD-GEIS provides funding, programmatic support, and professional guidance to both the Air Force and the Navy in administering the Program.

Extended resources include the DoD overseas medical research facilities (i.e., the Naval Medical Research Unit-2 [NAMRU-2], Naval Medical Research Unit-3 [NAMRU-3], Armed Forces Research Institute of Medical Sciences [AFRIMS],

the Naval Medical Research Center-Detachment [NMRC-D], the US Army Medical Research Unit-Kenya [USAMRU-K]), and the US Army Center for Health Promotion and Preventive Medicine-South (CHPPM-S) that conduct infectious disease research and are located in geographical areas of interest, including Africa, Asia, South America, and Central America. The value of the overseas facilities and CHPPM-S sites are twofold. First, the sites provide advance warning of national and international disease threats. Second, the sites augment the WHO's influenza surveillance program.



## Surveillance Populations

The Program provides an interesting and unique confluence of national and international respiratory disease data from DoD beneficiaries within the U.S. Air Force, Army, Navy, Marines and Coast Guard, as well as civilians from allied countries, DoD overseas medical research facilities, CHPPM-S sites, and military-to-military relationships.

Three DoD overseas research laboratories submit specimens to the USAFSAM program: NMRC-D in Lima, Peru (collecting from Argentina, Bolivia, Colombia, Ecuador, and Peru), AFRIMS in Bangkok, Thailand (collecting from Nepal, Thailand, Bangladesh, India, and Vietnam), and USAMRU-K in Nairobi, Kenya (collecting from Burundi, Cameroon, Kenya, and Uganda). Ad-

ditional DoD laboratories in Indonesia (NAMRU-2) and Egypt (NAMRU-3) send influenza data and specimens directly to WHO Influenza Collaborating Centers.

CHPPM-S began participating in the Program October 2005, collecting specimens from El Salvador, Guatemala, Honduras, and Nicaragua.

Any DoD medical treatment facility may participate. However, select sentinel sites are chosen according to their location and mission (i.e., potential for emergence of new strains, importation, future military contingencies or cooperations, areas with high troop concentrations and highly mobile/rapid response units).

## Role in Global Surveillance

The DoD influenza surveillance system is an important source of information regarding the impact of global influenza. The resources in remote locations allow the Program to potentially be the first to identify new or emerging strains. Each year the Program expands to provide early warnings of

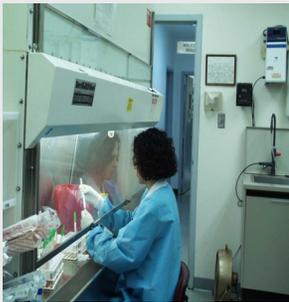
threats to DoD populations. Its contribution to the Vaccines and Related Biological Products Advisory Committee (VRBPAC) and other partners is valued and impacts both the health of the US military and global health.

## Surveillance at the US Air Force School of Aerospace Medicine (USAFSAM)



Ill soldiers during the 1918 influenza pandemic. The US military's high mobility and world-wide locations create a particularly vulnerable population.

The Program provides an interesting and unique confluence of national and international respiratory disease data...



The USAFSAM laboratory is accredited by the College of American Pathologists and is the central viral laboratory for the DoD Influenza Surveillance Program.

### Specimen Collection

USAFSAM provides sentinel sites with educational material and nasal wash collection kits. Sites are requested to collect 6-10 specimens per week and case data from patients meeting the case defini-

tion for influenza-like illness (ILI). Sites are contacted when submission increases unexpectedly, since an outbreak may be occurring.

### Specimen Processing

Specimens are processed in BSL-2 conditions (BSL-3 available) and tested for influenza A and B, adenovirus, parainfluenza 1-3, enterovirus, respiratory syncytial virus (RSV), and herpes simplex virus (HSV). All influenza isolates are subtyped using hemagglutination-inhibition (HI) or polymerase chain reaction (PCR) procedures and molecularly sequenced in order to identify significant amino acid changes.

Select isolates and all sequence data are sent to the Centers for Disease Control and Prevention (CDC) for further subtyping and antigenic characterization. Furthermore, original samples are provided for possible candidate material for vaccine production. Currently, only original sample material for growth in eggs is acceptable for vaccine production.

### Activities

**Reporting.** Reports are produced throughout the year for a variety of organizations, including base staff (lab and public health office), Health Affairs, VRBPAC, and GEIS.

Lab-confirmed specimen results are coupled with demographic data and shared electronically on the USAFSAM and GEIS web-based reporting systems. Additionally, surveillance information is shared at conferences worldwide.

**Communication.** Weekly interaction with sentinel sites is maintained for awareness of specimens submitted, questionnaires completed, ILI cases identified, and the value of their participation.

**Additional surveillance.** The Electronic Surveillance System for the Early Notification of Community-based Epidemics (ESSENCE) is a DoD-wide system that provides early detection of infectious disease outbreaks at medical treatment facilities.

ESSENCE is reviewed daily as a supplemental tool to identify respiratory outbreaks. Additionally, the Standard Ambulatory Data Registry (SADR) is also reviewed on a weekly basis for trends in ILI. In the

event of increased ILI visits occurring at a particular site, USAFSAM contacts the base PHO for an assessment and possible specimen collection.

**Recent Developments.** Influenza fluorogenic RT-PCR probe sets were designed, developed, and validated by the USAFSAM laboratory to rapidly detect influenza, including one probe targeting H5 influenza. Human influenza H3 and H1 subtype specific probes are currently being designed, tested, and evaluated in clinical isolates at USAFSAM.

**Vaccine Effectiveness Studies.** Studies aimed at assessing the annual effectiveness of the influenza vaccine are done at USAFSAM and NHRC. Vaccine effectiveness data are presented at professional meetings and published.

**Consultation.** USAFSAM provides training, guidance, and instruction (including site visits) to public health and lab personnel at sites and overseas research facilities. Training and guidance are also provided by Navy Environmental and Preventive Medicine Units.

### Contributions

**Influenza Vaccine.** Seasonal summaries of the surveillance data are annually presented to VRBPAC to assist in the decision-making process for the upcoming season's vaccine.

The Program's ability to provide not only specimens from remote locations, but also original samples for vaccine production has historically demonstrated its impact on vaccine compositions for both the Northern and Southern hemispheres.

**Rapid Awareness.** Continuous surveillance allow public health officials in the military and surrounding civilian communities to become immediately aware of potential outbreaks and respond with appropriate public health measures.

All specimen data, including demographical information, are sent to the CDC to be included in the US and Global Influenza Surveillance Programs. USAFSAM continues to serve as a WHO Collaborating Laboratory.



**USAFSAM**  
United States Air Force  
School of Aerospace Medicine

#### Contact Information

USAFSAM - <https://gumbo2.brooks.af.mil/pestilence/Influenza/>  
NHRC - <http://www.nhrc.navy.mil/geis/>  
GEIS - Website <http://www.geis.fhp.osd.mil/>

