DoD Global Emerging Infections Surveillance & Response System (DoD-GEIS)

Global Influenza Surveillance Efforts

8 January 2007

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For presentation to: DoD/CDC Working Group Meeting
# DoD Global Emerging Infections Surveillance & Response System (DoD-GEIS) Global Influenza Surveillance Efforts

**Report Date:** 08 JAN 2007  
**Dates Covered:** 00-00-2007 to 00-00-2007

**Performing Organization:** Armed Forces Health Surveillance Center, Silver Spring, MD

**Distribution/Availability Statement:** Approved for public release; distribution unlimited

**Subject Terms:**

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**Limitation of Abstract:** Same as Report (SAR)

**Number of Pages:** 42

**Security Classification of Abstract:** unclassified
Lab-Based Influenza Surveillance

• **Sentinel Surveillance**
  • Air Force Institute for Operational Health (San Antonio, Texas)

• **Population-based Surveillance**
  • Navy Health Research Center (San Diego, California)

• **International Surveillance**
  • NAMRU-2 (Jakarta, Indonesia)
  • NAMRU-3 (Cairo, Egypt)
  • NMRCDD (Lima, Peru)
  • AFRIMS (Bangkok, Thailand)
  • USAMRU-K (Nairobi, Kenya)
Influenza Surveillance by DoD

“Over 260 sites in 56 countries”
1 Country Presently

1 Country Presently

20061201

Reference Lab/Hub

Civilian

Future

Present

Military

Future

Present

GEIS Central Hub & USAMRIID

NHRC

AFIOH
Armed Forces Research Institute of Medical Sciences (AFRIMS)
Bangkok, Thailand
AFRIMS

Highlights of AI/PI Work in FY06/07

- Sentinel surveillance sites established in Nepal, Thailand and the Philippines and at regional US Embassies

- Philippines: New sites in early FY07

- Nepal-based Influenza surveillance network:
  - Detected H1N1 and H3N2 strain emergence in Jun-Jul 04-05
  - Jul-Aug 06 outbreak with 174 cases sampled by WARUN staff
  - H3N2 subtype similar to vaccine strain for 2006-07 (Wisconsin-like strains)
AFRIMS
Highlights of AI/PI Work in FY06/07

• US Embassy site reporting from 11 countries in region

• Internet-based reporting from Thai civilian hospitals in 18 key provinces and 6 RTA hospitals in border areas of Burma, Laos, Cambodia & Malaysia

• Build-up of new BSL-3 laboratory in Bangkok

• PCR lab in Burmese border in FY07

• Upgrade of Vet Med BSL-3 facility
RTA Influenza Surveillance

- 2006-7: 6 RTA Fort Hospitals
- 2007-8: Additional 4 RTA Fort Hospitals

Map showing RTA Influenza Surveillance locations.
AFRIMS
Human Capacity Development

• Partnering with CDC, WHO and Thai MoPH

• Training of rapid response teams (Jul-Aug 06)

• USUHS-based outbreak detection and response course (Aug 06)
Close Collaborations are Key!

CDC-IEIP, Thai MoPH and WHO

Royal Thai Army (RTA)
Naval Medical Research Unit Number 2 (NAMRU-2) Jakarta, Indonesia
NAMRU-2
Highlights of AI/PI Work in FY06/07

- Surveillance sites in 3 countries
- BSL-2+ Labs in Jakarta & Phnom Penh
- Collaborative Lab in Vientiane (at NCLE)
- Singapore Diagnostic Lab Platform
- Key Studies in FY06-07:
  - Longitudinal cohort study of 600+ households in Cambodia & Thailand (H1-H9 surveillance; w/ Univ of Iowa-CEID)
  - Remote sensing & environmental risk factor modeling project
  - Migratory and domestic bird surveillance
  - Pediatric and Influenza-like illness study
NAMRU-2 Diagnostic Capability
ILI Outbreak & Case Investigation Support

• Molecular biology laboratory with sequencing capability
• H5N1 real-time RT-PCR screening before culturing
• Supports Indonesian MoH and WHO: Identify human and animal H5N1 cases
• Only in-country reference lab for work-up of avian and human influenza samples (referral to CDC influenza lab)
• Source of three H5N1 strains (A/Indo/5/05) - Clade 2 vaccine development by the CDC/NIH
• New BSL-3 Lab Suite being built at NIHRD (mid-FY07)
NAMRU-2
Jakarta, Indonesia

• NIHRD, WHO and CDC collaboration during Medan H5N1 cluster investigation in northern Sumatra (May 06)
• NIHRD and CDC investigative support for all H5N1 suspected cases
  • Total of 74 confirmed cases (Jun 05-Nov 06), young age
  • Cases sampled within 24 to 48 hrs (37 H5N1 virus isolates)
  • High-level mortality (57 deaths, 77%)
  • Eleven familial clusters identified (Jun 05-Nov 06)
NAMRU-2 Team supporting poultry investigation around human H5N1 case investigation

NAMRU-2 Team collecting samples from a suspected human H5N1 case in an ICU
EWORS Syndromic Surveillance
Lao PDR

- ILI hospital-based surveillance (NCLE) in Vientiane
- Total of ten sites (4 central, 7 provincial) in network collaborating with CDC and local MoH
- Daily & Weekly reporting to NCLE
- Weekly reports to sites & MoH
- Day-to-day phone contact for potential outbreaks and further definition of cases
- Well-developed analysis & reporting procedures
Migratory Bird Surveillance
Indonesia-FY06

- Five Java island sites
- Sampling of domestic poultry & waterfowl (ducks), wild resident & migratory birds
- Over 5,000 samples collected
  - H5N1 screening of ~700 samples (8 positive, 1 wild bird)
  - 1:1 domestic:wild bird
- Training of Indonesian Ecology Health Status Research & Dev Center and NIHRD scientists at Univ Iowa’s CEID
US Army Medical Research Unit-Kenya (USAMRU-K) Nairobi, Kenya
13 Countries Presently

Inset: LRMC Region

LRMC

Reference Lab/Hub

Civilian

Future
Present

Military

Future
Present
16 Countries Presently

NAMRU-3

USAMRU-K

CENTCOM
• Previously no consistent surveillance in sub-Saharan Africa
• High regional threat of avian and pandemic influenza
• Goals:
  • Isolate and characterize influenza virus strains and other ILI viral causes
  • Part of global influenza surveillance network
• Protocol
  • Max of five (5) ILI samples per day per site
  • Transport at -80 degrees to Kenyatta Hospital, NIC, Nairobi
  • Flu A isolates sent to CDC-KEMRI Virus Research Lab (VRL) and Air Force’s reference lab at AFIOH
Highlights of AI/PI Work in FY06

- Surveillance on Jul-Oct 06 at 5 sites in Kenya
- Large catchment areas in NE, NW-Uganda, West Lake Victoria, Central and SW Coastal regions
- BSL-2 lab capable for primary culture & rapid testing
- No BSL-3 capability needed here, CDC-KEMRI VRL conducting culture work
• Malindi District Hospital, SE Coastal region
• Isiolo District Hospital, NE region
• Alupe Sub-District Hospital, Busia, NW region-Ugandan border
• Mbagathi District Hospital, Nairobi
• Kondele Children’s Hospital, Kisumu, West, Lake Victoria region
Future Efforts in FY07 (1 of 2)

• Kenya:
  • **LoI with CDC-KEMRI:** BSL-3 work of influenza A samples at Virus Research Laboratory (VRL)
  • **MOA with AFIOH:** Shipping, specimen processing, and genetic sequencing
  • **NIC, Kenyatta Hospital:** Culture and identification of non-H5N1 influenza strains
  • Future sites in Western Highlands (Kericho) and Lake Victoria (Kisii) regions
  • Establish mil-mil collaboration with Kenyan DoD (4-5 sites)
Future Efforts in FY07

- Uganda:
  - Agreement with Makerere Univ (Kampala) through HJF-MRI
  - Human surveillance: 3-4 hospital sites

- Cameroon:
  - Agreement with Univ of Buea (Yaounde) through HJF-MRI
  - Human surveillance: 3-4 hospital sites

- Nigeria:
  - Establish mil-mil collaboration with Nigerian MoD (4-5 sites)
  - Pending additional funding in FY07
Naval Medical Research Unit Number 3 (NAMRU-3) Cairo, Egypt
20061201
16 Countries Presently

NAMRU-3
USAMRU-K

CENTCOM

Reference Lab/Hub ✡
Civilian
Future
Present
Military
Future
Present
U.S. Embassy
Present
NAMRU-3
BSL-3 Laboratory Capability

• EMRO Regional Influenza Reference Center for the WHO (23 countries)

• Training of region’s country lab personnel (90 scientists from 18 countries trained)

• Only region’s lab with full capability for H5N1 testing (PCR and culture)

• Rapid response capability (14 outbreaks & 6 assessments)
Highlights of AI/PI Work in FY06/07

• Seasonal human and animal surveillance
  • Over 30 locations and clinical centers
  • 19 countries in Africa, East Europe, the Middle East and the FSU:
    • Future plans to add 6 other countries in the region

• Assisting Jordanian MoH with Influenza Surveillance Network

• Assisting Libyan MoH to develop an Influenza Reference Laboratory in Tripoli
Highlights of AI/PI Work in FY06/07

• Approx 500 human specimens obtained during influenza seasonal surveillance and outbreak investigations:
  • 26 (5%) tested positive for H5N1

• Over 2,700 avian specimens obtained during AI surveillance and outbreak investigations:
  • 86 (3%) tested positive for H5N1

• Ongoing coordination for co-location of CDC’s Global Disease Detection (GDD) and response unit (separate funding by DHHS)
NAMRU-3
Major Investigations in FY05-06

• Egyptian MoH and CDC: Supported H5N1 case investigations

• Djibouti: Coordination with CDC for investigation in Somali border

• Kabul, Afghanistan: Supported AI investigations and opening of MoH-based central reference lab

• Azerbaijan: Support in AI investigations
Naval Medical Research Center Detachment (NMRCDD-Lima) Lima, Peru
36 Countries Presently

NMRCD-Lima

Reference Lab/Hub ★

Civilian

Future ●
Present ●

Military

Future ★
Present ★
• Respiratory disease surveillance (over 6 years)
  • FY00-05 under Project Gargle (12 sites)
    • Lab capacity: 300-400 samples
  • FY06: 35 clinic/hospital sites in 6 countries
  • FY07: Expansion to 71 sites in 10 countries
    • Lab Capacity: ~3,000-4,000 samples

• Increased capability for cell culture of viral pathogens & PCR testing (under BSL-2 +)

• New BSL-3 suite: Completion mid-FY07

• EWORS-based surveillance in 9 sites

• Alerta-DISAMAR syndromic surveillance reporting in Peruvian Navy and expanding to Peruvian Army bases
Syndromic Surveillance in Lima and Tumbes, Peru (EWORS)
• Started on Jan 03
• 97.5% of the Peruvian Navy covered (125,000)
• 43 reporting units
• 19 ships off-coast
• Daily reporting with cell phone notification
• Biweekly analysis for each site (via internet)
• Expansion to 5 other militaries in region
## AI/PI Surveillance and Response
### Enhancements in FY06-07

<table>
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<tr>
<th>Capability</th>
<th>FY05</th>
<th>FY06</th>
<th>FY07</th>
<th>Comment</th>
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<tbody>
<tr>
<td>Total # Countries in Network</td>
<td>30</td>
<td>56</td>
<td>65</td>
<td>Increases in S Amer, Africa, Mid East, SE Asia</td>
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<tr>
<td>Sampling Capacity # Specimens / year</td>
<td>~9000</td>
<td>~16000</td>
<td>~18000</td>
<td>Increased surge capacity and improved analysis capability</td>
</tr>
<tr>
<td># Biosafety Level 3 Labs in Network</td>
<td>3</td>
<td>4</td>
<td>8</td>
<td>FY06-USAMRIID, AFIOH, AFRIMS-Vet Med &amp; NAMRU-3 FY07-LRMC, 18&lt;sup&gt;th&lt;/sup&gt; MEDCOM, NHRC &amp; AFRIMS-Virology Dept</td>
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<td>Data Integration</td>
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<td>Coord Center: synthesis for leadership, 24/7</td>
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