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

Global Influenza Surveillance Efforts
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For presentation to:
Committee for the Assessment of DoD-GEIS Influenza Surveillance and Response Programs
Board of Global Health, Institute of Medicine (IoM)
National Academy of Sciences (NAS)
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)
  • NMRCRD (Lima, Peru)
  • AFRIMS (Bangkok, Thailand)
  • USAMRU-K (Nairobi, Kenya)
Influenza Surveillance by DoD

“Over 260 sites in 56 countries”
Armed Forces Research Institute of Medical Sciences (AFRIMS)
Bangkok, Thailand
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 & Unit-based Surveillance

RTA Influenza Surveillance

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

Map of RTA Influenza Surveillance

- Fort Mongrai (Chiangrai)
- Fort Suayphong (Chiangrai)
- Fort Kri Kawn (Sakon Nakhon)
- Fort Sukhaphong (Ubonratchathani)
- Fort Kri Kawn (Champheng)
- Fort Suayphong (Champheng)

Map of RTA Command

- Suranare Command
- Surasee Command
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
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)
• 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
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
• 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
USAMRU-K

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
USAMRU-K
Existing Sites

- 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
USAMRU-K

Future Efforts in FY07 (1 of 2)

• Kenya:
  • Lol 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)
USAMRU-K

Future Efforts in FY07 (2 of 2)

• 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
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)
NAMRU-3
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
• 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)
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 (NMRC-D-Lima) Lima, Peru
NMRC-D-Lima
Highlights of AI/PI Work in FY06/07

- 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
Current & New Influenza & Febrile Surveillance Syndrome Sites
Syndromic Surveillance in Lima and Tumbes, Peru (EWORS)
Alerta-DISAMAR Syndromic Surveillance
Peruvian Military

- 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
US Army Medical Research
Institute for Infectious Diseases

- BSL4 labs for analysis of novel influenza strains
- Development of serologic tests and reagents for DoD
- Consultative advice to DoD CONUS and OCONUS research lab personnel
- Registered with CDC for avian influenza virus work
- Maintains DoD AI/PI virus strain repository
- Training plans for laboratory staff
• Ongoing clinic-based surveillance at 36 MTFs (EUCOM / CENTCOM AORs)
  • Army (n=25), AF (n=12), Navy (n=1)
  • Expanding to 45 MTF sites in FY07
• Upgrade Lab to BSL-3
• Participant in CDC’s LRN network
  • H5 RT-PCR testing protocol
• AFIOH Collaborator
  • Sequencing analysis for determination of strain variation
• Educational and training materials for MTFs
• Yearly PI preparedness training workshop
• Center Epidemiology & Serosurveillance for PI (CESPI)
  • Serologic testing capability for analysis of exposure in deployed military personnel
  • Contract with Southern Research Institute (SRI)
• Increase in staffing to enhance epidemiologic analytical capability
  • Developed 9 position descriptions, 4 hired in FY06
• Increase in DoD-GEIS Headquarters Staff
  (9 position descriptions, 5 hired in FY06)

• Establishment of DoD-GEIS Communications Center
  • Interactive data feeds and updated summaries
  • AI/PI-related information from partners

• Collaboration with Johns Hopkins Univ Applied Physics Lab:
  • EWORS/lab-based influenza surveillance evaluation for use in developing countries
  • Pandemic influenza Policy Model (PIPM) development to model impact of PI on operational readiness
FY07 AI/PI Surveillance
“Where We Need to Go”

- Sustainment of FY06 surveillance efforts into FY07
  - Need continued funding to at least $25 Mill level
- Consolidation of influenza surveillance efforts with other disease surveillance efforts
  - Armed Forces Health Surveillance Center (AFHSC)
  - Service-specific hubs (NEHC and AFIOH)
- Expansion of educational and PI preparedness activities with COCOMs
  - USUHS-CDHAM led centralized coordination effort
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¿Preguntas?
### AI/PI Surveillance and Response
Enhancements in FY06-07

<table>
<thead>
<tr>
<th>Capability</th>
<th>FY05</th>
<th>FY06</th>
<th>FY07</th>
<th>Comment</th>
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<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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<td>Sampling Capacity # Specimens / year</td>
<td>~9000</td>
<td>~16000</td>
<td>~18000</td>
<td>Increased surge capacity and improved analysis capability</td>
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<td># Biosafety Level 3 Labs in Network</td>
<td>3</td>
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<td>USAMRIID + new BL-3: LRMC, AFRIMS, NHRC</td>
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<td>Data Integration</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Coord Center: synthesis for leadership, 24/7</td>
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