

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**



Report Documentation Page				Form Approved OMB No. 0704-0188	
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1. REPORT DATE 08 JAN 2007		2. REPORT TYPE		3. DATES COVERED 00-00-2007 to 00-00-2007	
4. TITLE AND SUBTITLE DoD Global Emerging Infections Surveillance & Response System (DoD-GEIS) Global Influenza Surveillance Efforts				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S)				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Armed Forces Health Surveillance Center, Silver Spring, MD				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release; distribution unlimited					
13. SUPPLEMENTARY NOTES					
14. ABSTRACT					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT Same as Report (SAR)	18. NUMBER OF PAGES 42	19a. NAME OF RESPONSIBLE PERSON
a. REPORT unclassified	b. ABSTRACT unclassified	c. THIS PAGE unclassified			



Lab-Based Influenza Surveillance



- **Sentinel Surveillance**

- Air Force Institute for Operational Health (San Antonio, Texas)

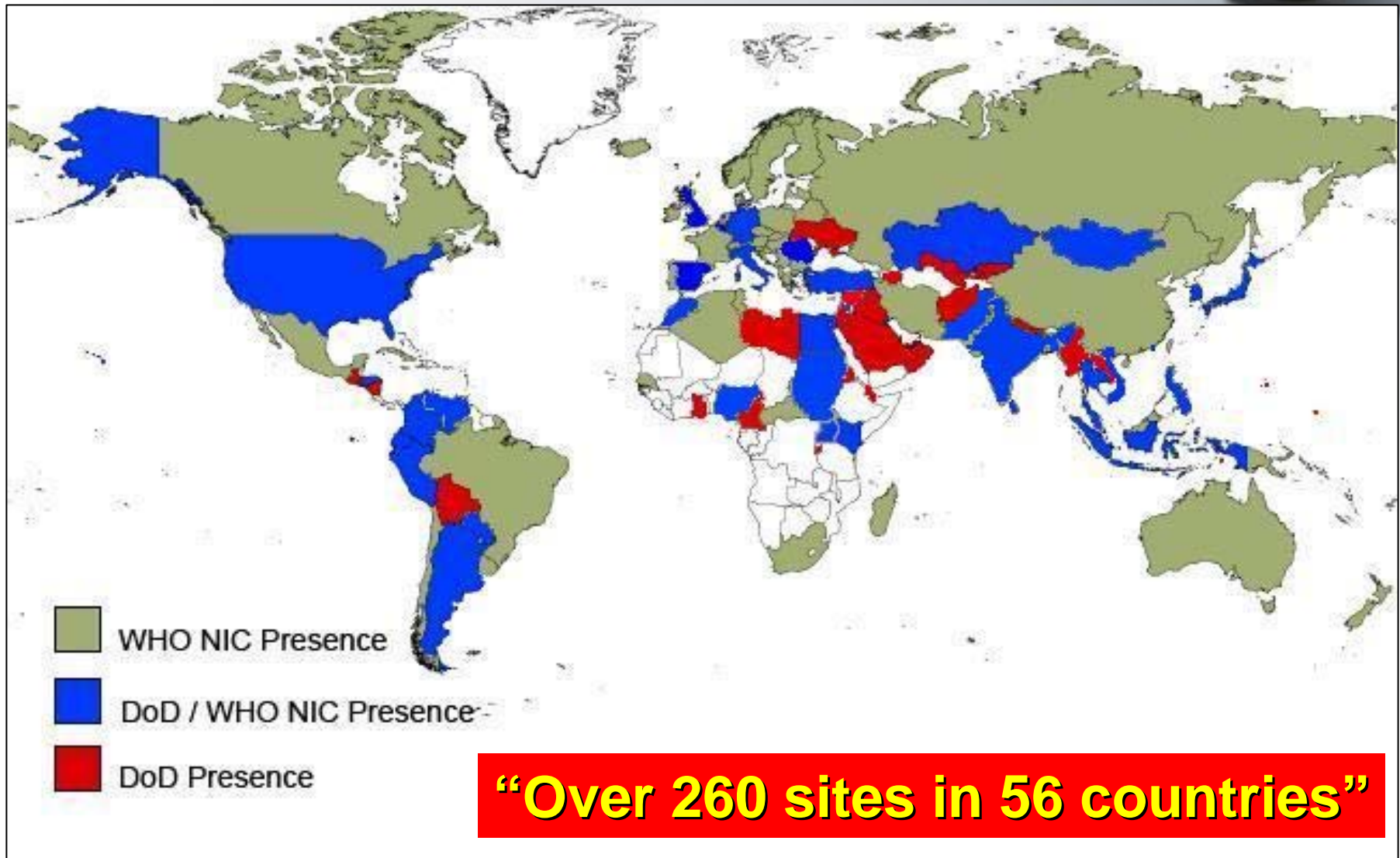
- **Population-based Surveillance**

- Navy Health Research Center (San Diego, California)

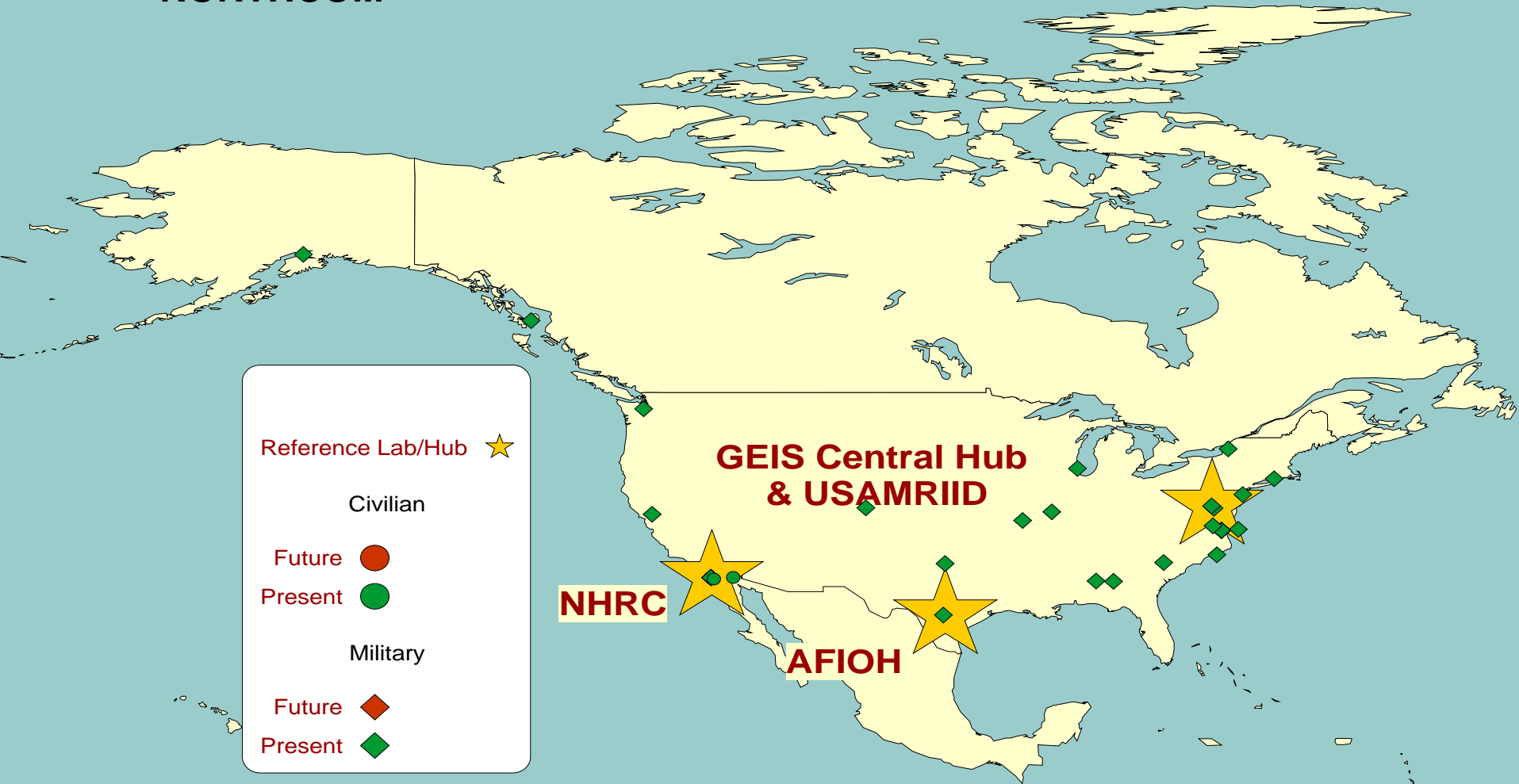
- **International Surveillance**

- NAMRU-2 (Jakarta, Indonesia)
- NAMRU-3 (Cairo, Egypt)
- NMRCDC (Lima, Peru)
- AFRIMS (Bangkok, Thailand)
- USAMRU-K (Nairobi, Kenya)

Influenza Surveillance by DoD



NORTHCOM





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

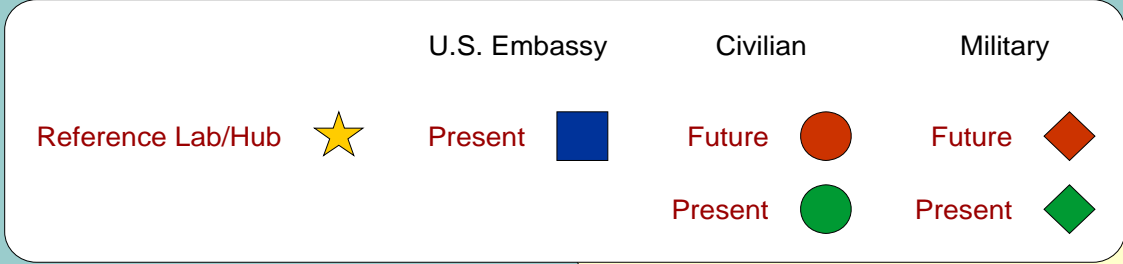
PACOM

18th MEDCOM

AFRIMS

NAMRU-2

Inset: Hawaii



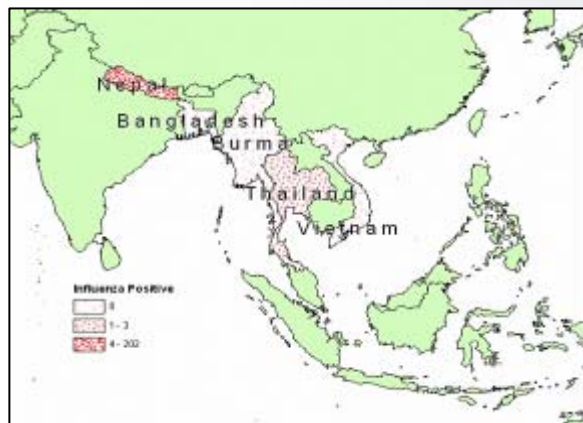
16 Countries Presently

20061201



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**



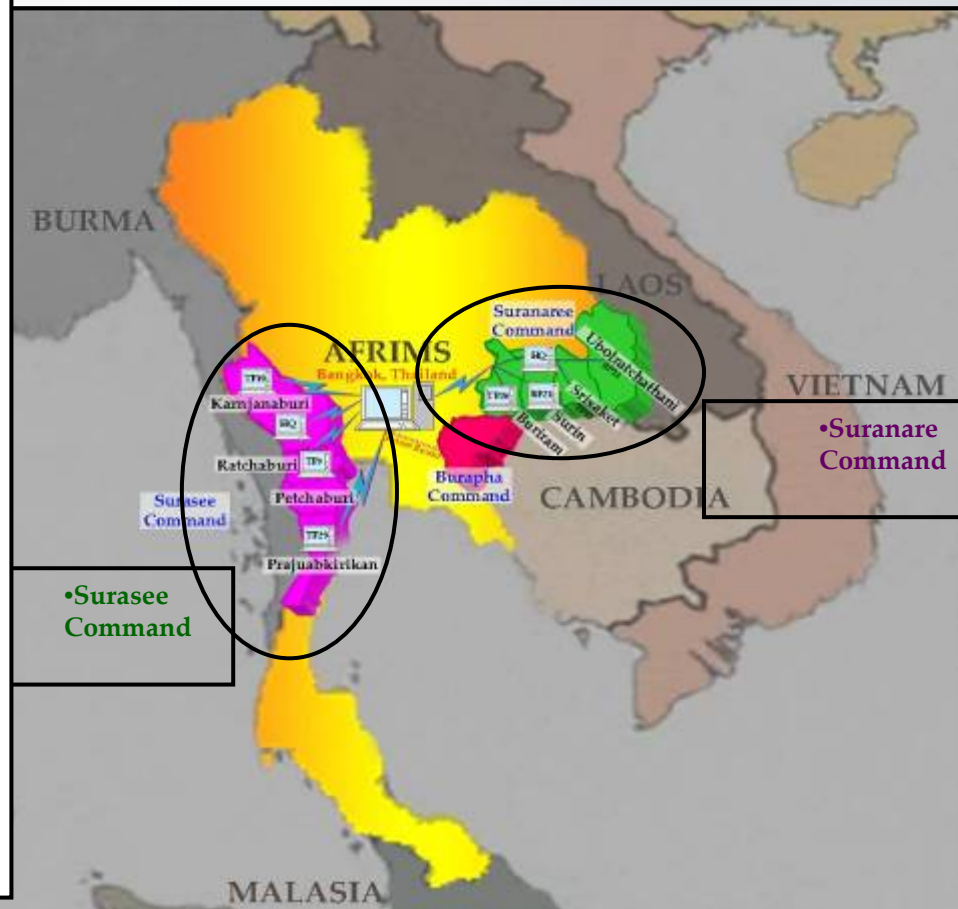
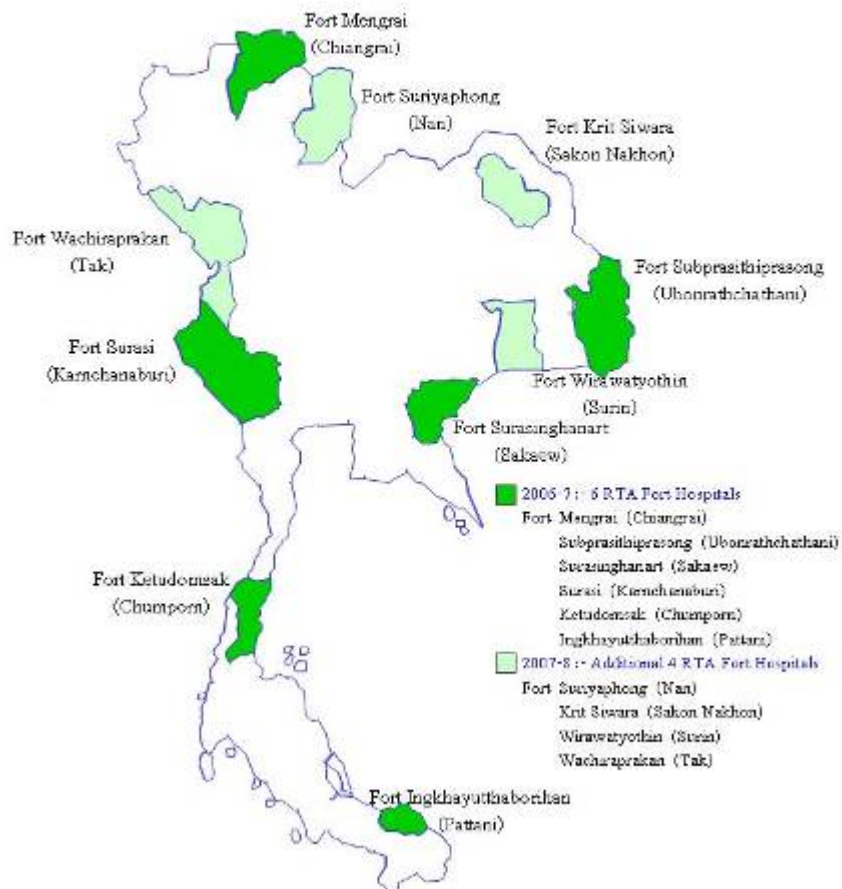
RTA Influenza & Unit-based Surveillance



RTA Influenza Surveillance

■ 2006-7 :- 6 RTA Fort Hospitals

■ 2007-8 :- Additional 4 RTA Fort Hospitals





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)



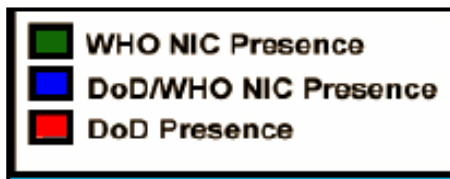
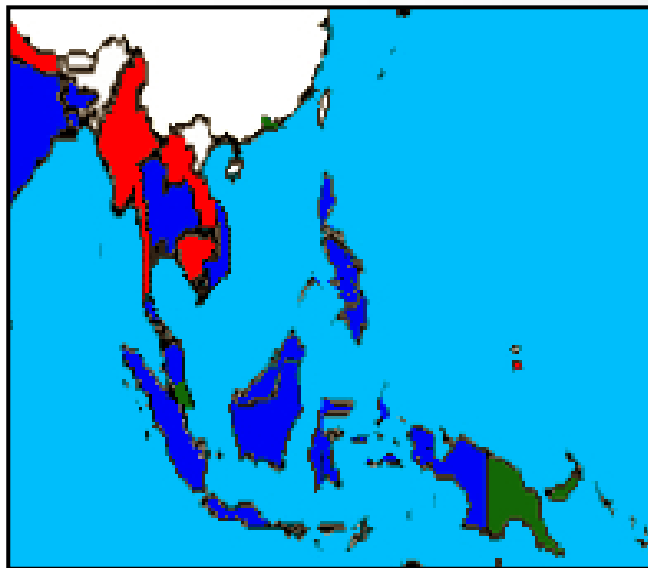


**Naval Medical Research Unit
Number 2
(NAMRU-2)
Jakarta, Indonesia**



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)



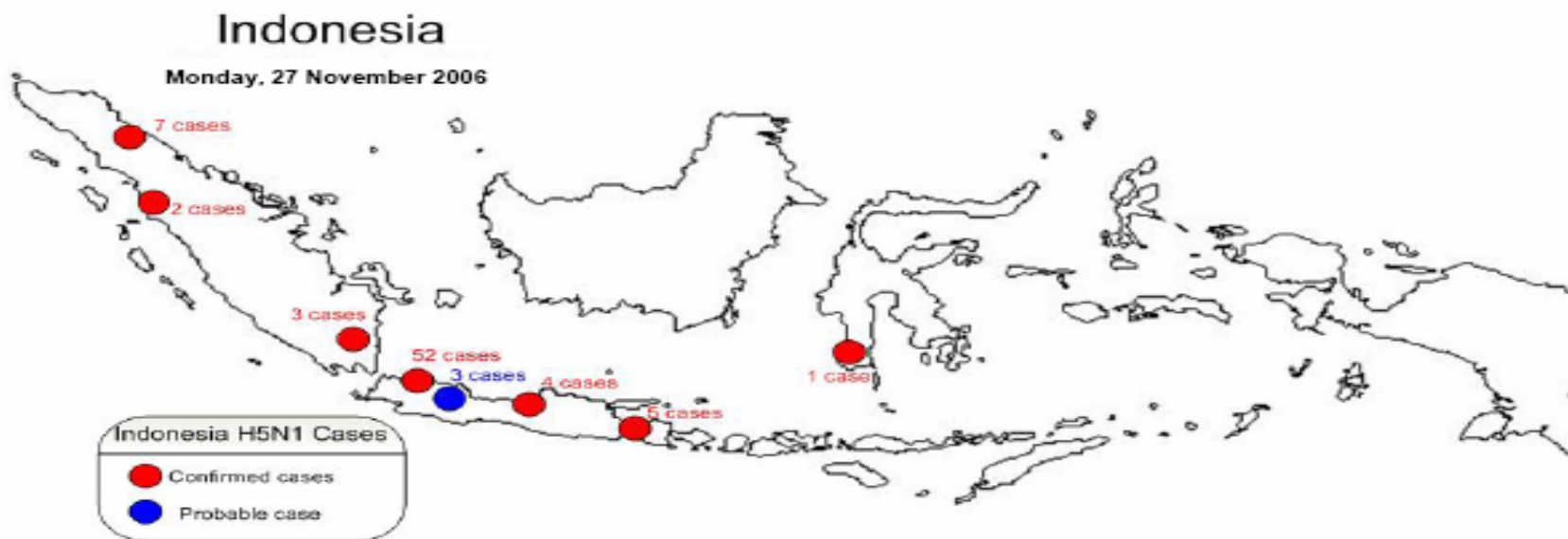


NAMRU-2

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**

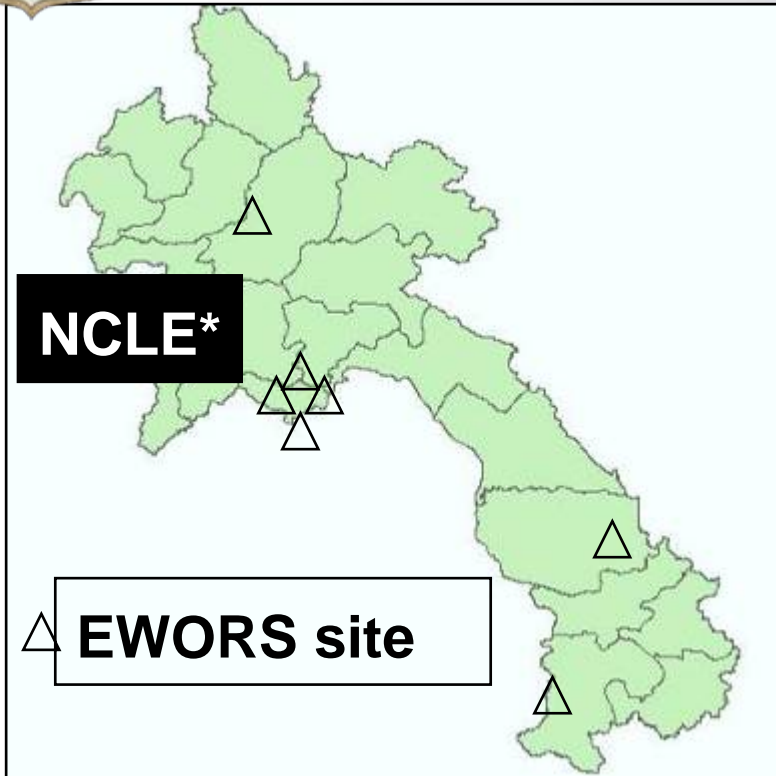


**NAMRU-2 Team collecting
samples from a suspected
human H5N1 case in an ICU**





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**

EUCOM

LRMC

Inset: LRMC Region

Reference Lab/Hub



Civilian

Future



Present



Military

Future

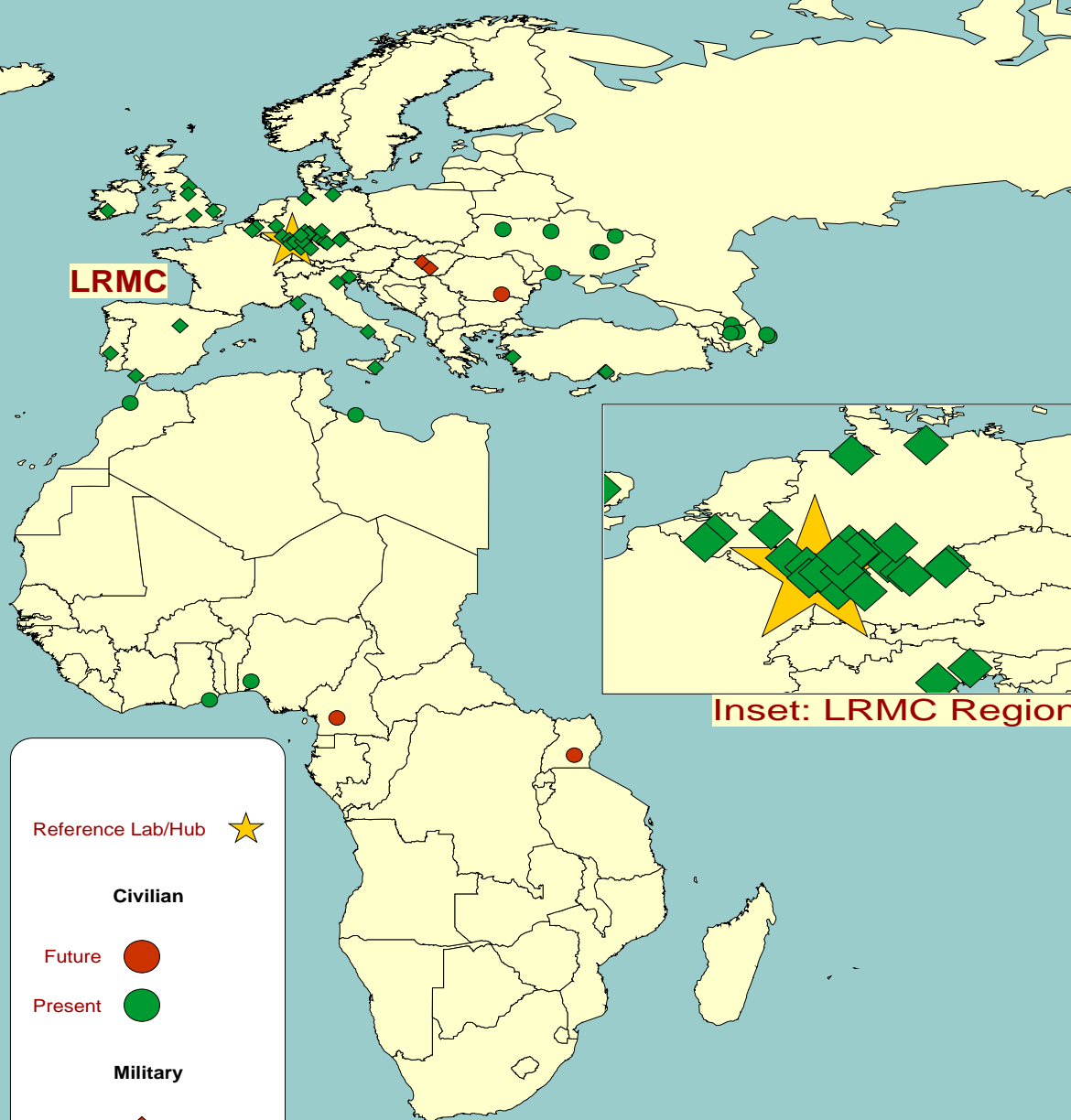


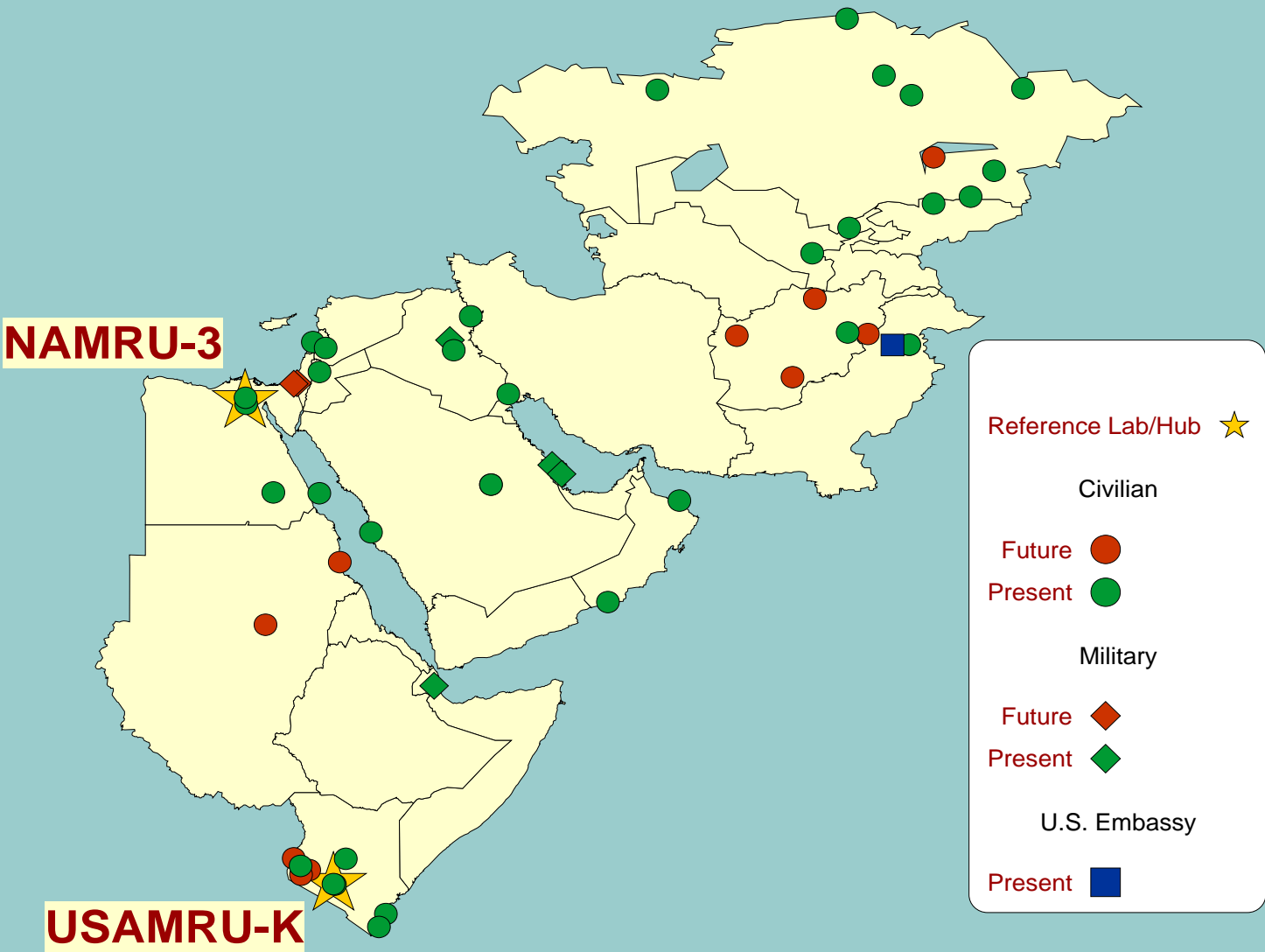
Present



13 Countries Presently

20061201







USAMRU-K

Influenza Surveillance-Background

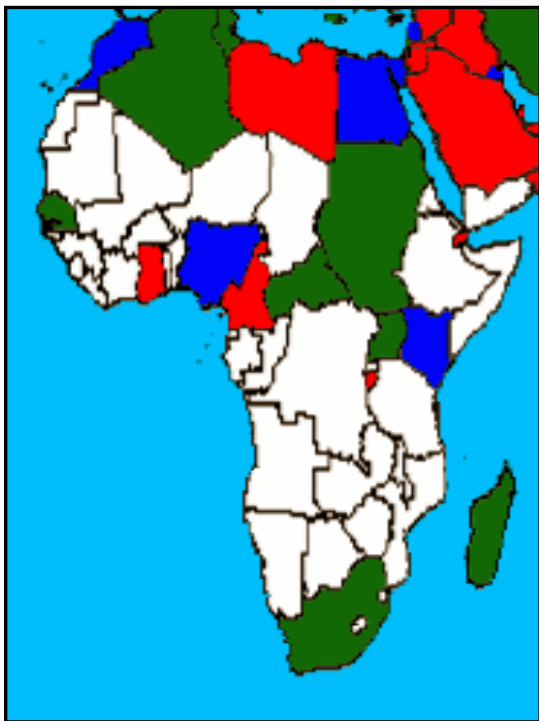


- **Previously no consistent surveillance in sub-Saharan Africa**
- **High regional threat of avian and pandemic influenza**
- **Goals:**
 - **Isolate and characterize influenza virus strains and other ILI viral causes**
 - **Part of global influenza surveillance network**
- **Protocol**
 - **Max of 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



- WHO NIC Presence
- DoD/WHO NIC Presence
- DoD Presence

- 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**



National Influenza Center (NIC) Kenyatta Hospital





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

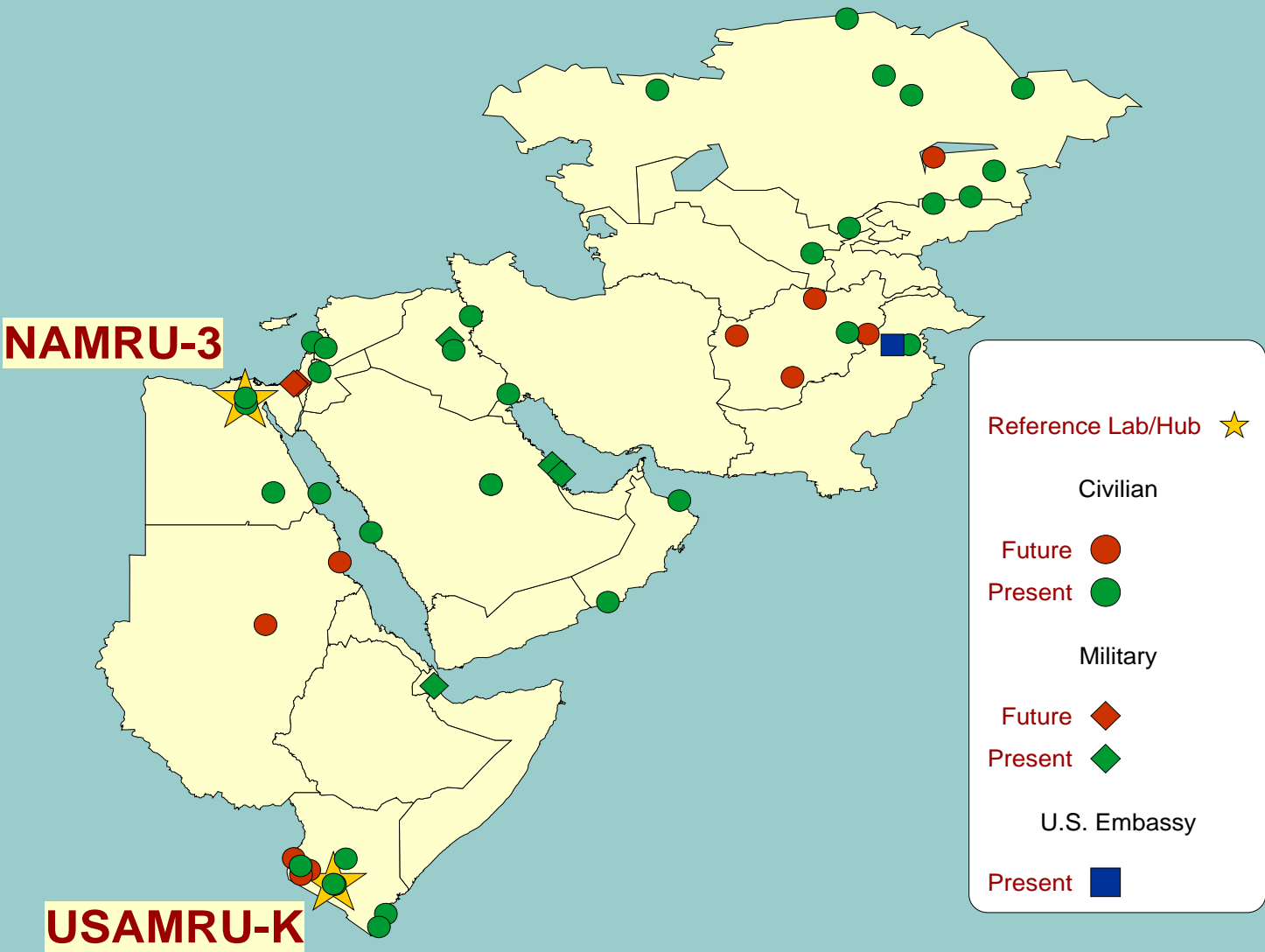
Future Efforts in FY07 (2 of 2)



- **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**



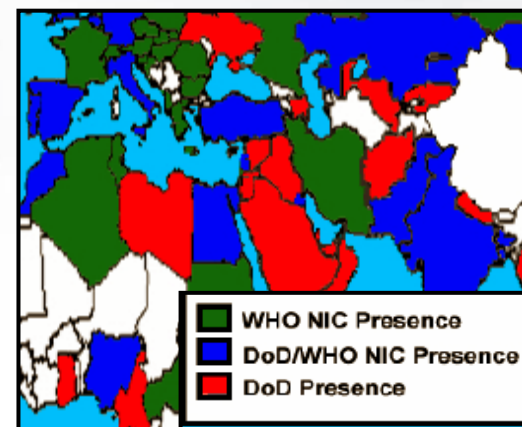


NAMRU-3

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

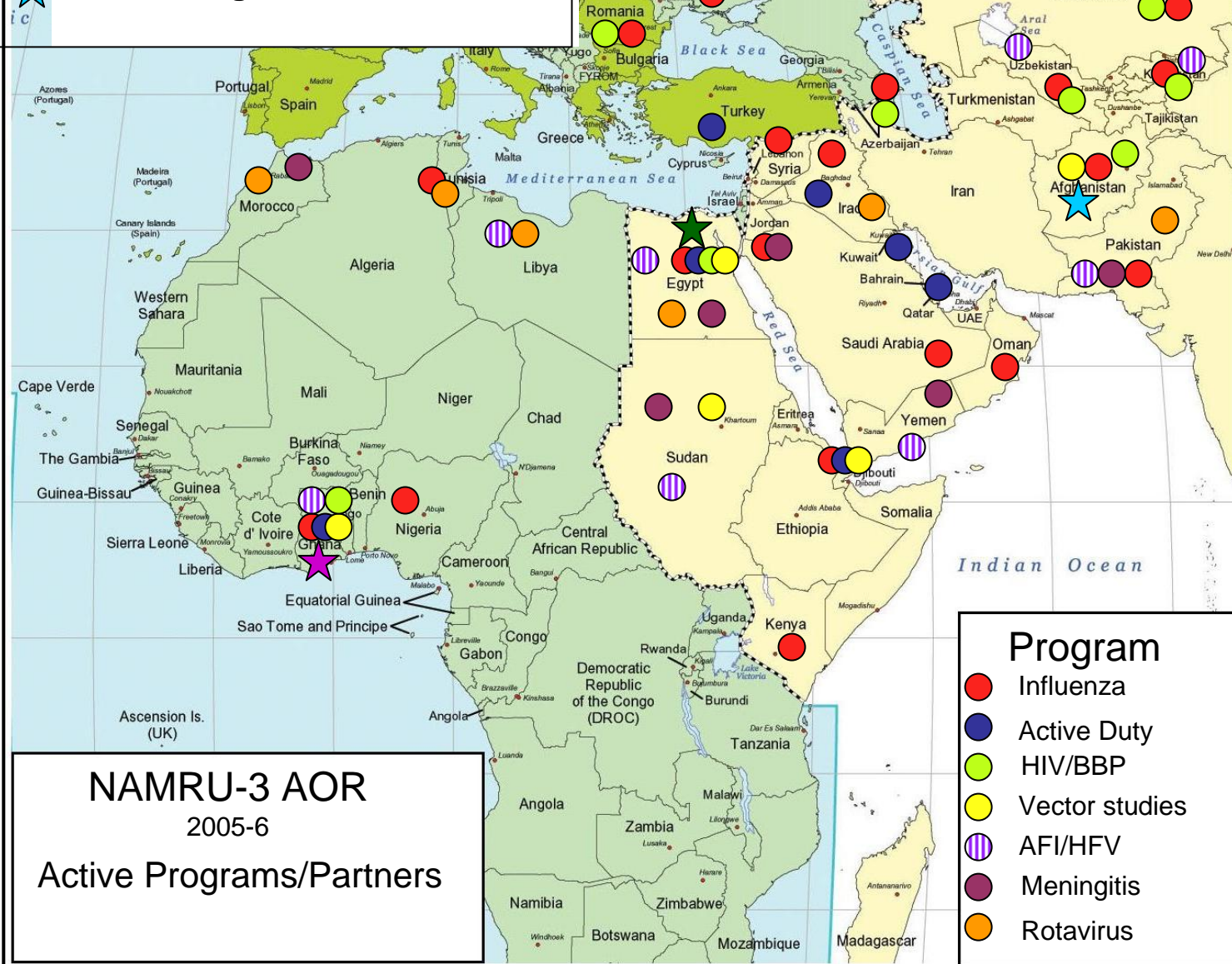
Highlights of AI/PI Work in FY06/07



- **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**



- ★ NAMRU-3
- ★ Ghana Detachment
- ★ UN-FAO Afghanistan Detachment





NAMRU-3

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
(NMRC-D-Lima)
Lima, Peru**

SOUTHCOM

NMRCD-Lima

Reference Lab/Hub ★

Civilian

Future ●

Present ●

Military

Future ◆

Present ◆





NMRCD-Lima

Highlights of AI/PI Work in FY06/07



- **Respiratory disease surveillance (over 6 years)**

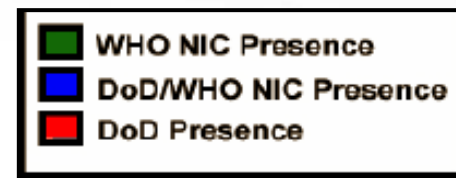
- FY00-05 under Project Gargle (12 sites)
 - Lab capacity: 300-400 samples
- FY06: 35 clinic/hospital sites in 6 countries
- FY07: Expansion to 71 sites in 10 countries
 - Lab Capacity: ~ 3,000-4,000 samples

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

- **New BSL-3 suite: Completion mid-FY07**

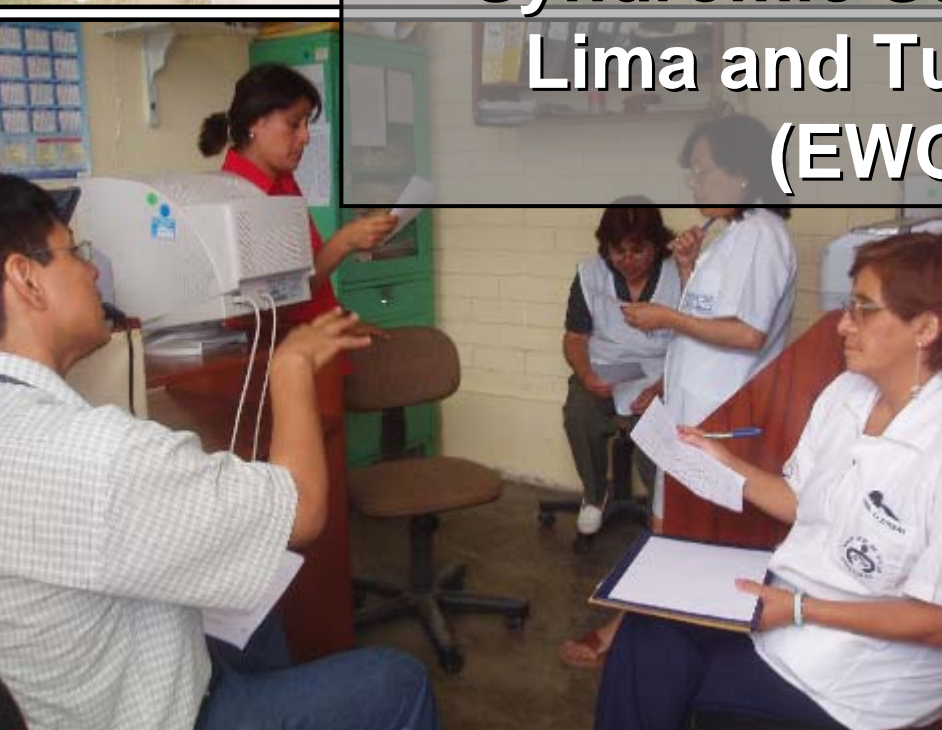
- **EWORS-based surveillance in 9 sites**

- **Alerta-DISAMAR syndromic surveillance reporting in Peruvian Navy and expanding to Peruvian Army bases**





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



AI/PI Surveillance and Response

Enhancements in FY06-07



Capability	FY05	FY06	FY07	Comment
Total # Countries in Network	30	56	65	Increases in S Amer, Africa, Mid East, SE Asia
Sampling Capacity # Specimens / year	~9000	~16000	~18000	Increased surge capacity and improved analysis capability
# Biosafety Level 3 Labs in Network	3	4	8	FY06-USAMRIID, AFIOH, AFRIMS-Vet Med & NAMRU-3 FY07-LRMC, 18 th MEDCOM, NHRC & AFRIMS-Virology Dept
Data Integration	No	Yes	Yes	Coord Center: synthesis for leadership, 24/7





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