UNITED STATES GOVERNMENT AVIAN INFLUENZA AND PANDEMIC INFLUENZA PREVENTION AND CONTROL EFFORTS IN INDONESIA
PROGRAM ASSESSMENT

August 2008
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<th>ACRONYMS</th>
<th>Description</th>
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<tbody>
<tr>
<td>ACIAR</td>
<td>Australian Centre for International Agricultural Research</td>
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<td>AI</td>
<td>Avian influenza</td>
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<td>AIWG</td>
<td>Avian Influenza Working Group</td>
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<td>APHIS</td>
<td>Animal and Plant Health Inspection Service of USDA</td>
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<td>AusAID</td>
<td>Australian Agency for International Development</td>
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<td>Balivet</td>
<td>Central Veterinary Research Laboratory, Bogor</td>
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<td>BEP</td>
<td>Bio-security Engagement Program of US State Department</td>
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<td>CBAIC</td>
<td>Community-Based Avian Influenza Control program</td>
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<td>CDC</td>
<td>US Centers for Disease Control</td>
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<td>CFR</td>
<td>Case fatality rate</td>
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<td>CMU</td>
<td>Campaign Management Unit of DGLS for HPAI control activities</td>
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<td>DAI</td>
<td>Development Alternatives Inc.</td>
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<td>DIC</td>
<td>Disease Investigation Center (livestock)</td>
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<td>Dinas</td>
<td>(Indonesian local government administration)</td>
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<td>DGLS</td>
<td>Directorate General of Livestock Services of Ministry of Agriculture</td>
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<td>DKI</td>
<td>Province of Jakarta</td>
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<td>DSO</td>
<td>District Surveillance Officer</td>
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<td>FAO</td>
<td>Food and Agriculture Organization of the United Nations</td>
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<td>FETP</td>
<td>Field Epidemiology Training Program</td>
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<td>GOI</td>
<td>Government of Indonesia</td>
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<td>HHS</td>
<td>Department of Health and Human Services</td>
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<tr>
<td>HPAI</td>
<td>Highly pathogenic avian influenza</td>
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<tr>
<td>H5N1</td>
<td>(Sub-type of influenza virus causing the current HPAI panzootic)</td>
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<tr>
<td>IEC</td>
<td>Information, education, and communication</td>
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<td>ILI</td>
<td>Influenza-like illness</td>
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<td>IOM</td>
<td>International Organization of Migration</td>
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<td>IS-AI</td>
<td>Integrated surveillance for avian influenza</td>
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<td>ILRI</td>
<td>International Livestock Research Institute</td>
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<td>ISID</td>
<td>International Society for Infectious Diseases</td>
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<td>JICA</td>
<td>Japan International Cooperation Agency</td>
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<td>KAP</td>
<td>Knowledge, attitudes, and practice</td>
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<td>KOMNAS</td>
<td>(Indonesian coordinating unit for avian and human influenza)</td>
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<td>LDCC</td>
<td>Local Disease Control Center (livestock)</td>
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<td>MOA</td>
<td>Ministry of Agriculture</td>
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<td>MOH</td>
<td>Ministry of Health</td>
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<td>MOH-ISPA</td>
<td>MOH (Respiratory Diseases Subdivision)</td>
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<td>MOH-P2M</td>
<td>MOH (Communicable Disease Control Division)</td>
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<tr>
<td>M&amp;E</td>
<td>Monitoring and evaluation</td>
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<td>NAMRU</td>
<td>Navy Medical Research Unit</td>
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<tr>
<td>Acronym</td>
<td>Full Form</td>
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<td>NFTP</td>
<td>Nurses Field Training Program</td>
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<td>NIHRD</td>
<td>National Institute of Health Research and Development</td>
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<td>OFFLU</td>
<td>OIE/FAO network of expertise on avian influenza laboratories</td>
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<td>OIE</td>
<td>World Organisation for Animal Health</td>
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<td>PAEL</td>
<td>(Medical field assistant training program)</td>
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<td>PCR</td>
<td>Polymerase chain reaction (laboratory test)</td>
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<td>PDSR</td>
<td>Participatory disease surveillance and response</td>
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<td>PI</td>
<td>Pandemic influenza</td>
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<td>PKK</td>
<td>(Women’s community network)</td>
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<td>PMI</td>
<td>Indonesian Red Cross</td>
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<td>PPE</td>
<td>Personal protective equipment</td>
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<td>QA/QC</td>
<td>Quality assurance / quality control</td>
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<td>RT/RW</td>
<td>(Community administrative divisions)</td>
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<td>TB</td>
<td>Tuberculosis</td>
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<tr>
<td>UNICEF</td>
<td>United Nations Children’s Fund</td>
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<td>USAID</td>
<td>US Agency for International Development</td>
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<td>USDA</td>
<td>US Department of Agriculture</td>
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<td>USG</td>
<td>US Government</td>
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<td>WHO</td>
<td>World Health Organization</td>
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EXECUTIVE SUMMARY

In June 2008, the Avian Influenza (AI) Working Group of the US Embassy in Jakarta commissioned an assessment of the USG’s AI assistance program to Indonesia. The objectives were to (1) determine progress and achievements to date; (2) analyze gaps and constraints; and (3) make recommendations about strategic directions for the future. The information in this report is current as of mid-June 2008, when the assessment was conducted.

The key assessment findings are:

- Indonesia is struggling with a variety of infectious diseases that take a much larger toll on human life than H5N1 infection, and with the problems of poverty, underfunding of the health system, and challenges brought about by the decentralization of government ministries. These factors undermine political support for AI programs.

- The following achievements were noted in the AI program.
  - Substantial improvements have been made in animal health laboratory diagnostic capacity and in establishing a participatory disease surveillance and response (PDSR) system.
  - A broad geographic prevalence of highly pathogenic avian influenza (HPAI) H5N1 in poultry was identified, with the highest incidence in central and western Java.
  - Substantial progress was made developing a Pandemic Influenza Epicenter Containment Operational Plan; Indonesia is the first nation to have carried out a large-scale exercise of the plan.
  - Basic systems for sentinel surveillance of influenza-like-illness (ILI) and a District Surveillance Officer (DSO) program were also established within the Ministry of Health (MOH) and at District Health Offices.
  - A large number of educational materials have been produced and community volunteers fielded to increase public awareness about the dangers of H5N1 infection.

The principal gaps and challenges highlighted in this report are:

- The interventions with village-based poultry were found not to be intensive enough to have significant impact on disease control and did not address other critical control points in the poultry value chain.

- The commercial poultry industry itself must be brought into finding solutions to the H5N1 HPAI problem, and meaningful improvements must be made in preventing disease transmission along the market chain.

- Studies must be undertaken to help define transmission routes and monitor progress.

- H5N1 infection case fatality rates are still high, testing is low, laboratory capacity is limited, and institutional capacity needs improvement to investigate and deal with disease outbreaks, including investigating clusters of acute respiratory disease.
• Communication, behavior change, and social mobilization programs have been insufficiently focused and have not adequately involved village-based institutions

• Policy level problems related to the free and open sharing of specimens, data, and scientific exchange complicate international cooperation to help find solutions to the problems.

Recommendations include actions that could help improve the impact of the USG-supported program, in both the short and longer terms to deal with HPAI and H5N1 infectious disease outbreaks. The detailed recommendations are listed in Section V of this paper. The key recommendations are:

• USG support for control of HPAI H5N1 in poultry should shift from attention mainly to backyard poultry to a strategy that includes prevention and control of the disease in commercial poultry and the market chain.

• Building capacity for H5N1 surveillance and outbreak response and reducing the 80 percent case fatality rate should be primary areas of focus for the USG program. Steps must also be taken to broaden surveillance for pandemic influenza viruses, improve laboratory capacity, and expand support for pandemic epicenter containment.

• USG support to Indonesia for AI prevention and control must be more geographically focused in the western half of Java to improve the impact of the programs on animal and human health.

To achieve these, there are a number of more specific recommendations.

For animal health, HPAI H5N1 control efforts must

• better institutionalize and focus the PDSR program and continue support for laboratory improvements,

• regulate animal health activities at the appropriate levels of government,

• improve biosecurity in commercial production units, and

• improve market hygiene and support market restructuring.

Human health interventions must

• improve the intensity of ILI surveillance and requisite laboratory capacity;

• support activities aimed at earlier identification of suspected H5N1 infections, including a “point-of-care” rapid (<3 hour) low-cost, diagnostic test (when available) and linkages with private institutions where most H5N1 patients first present;

• as feasible, support testing and appropriate use of human vaccines that elicit an immune response against the Indonesian strain of H5N1;

• improve clinical case management in the public and private sectors; and

• increase the capacity within provinces and districts to conduct surveillance and response to infectious diseases.

Communication and social mobilization activities should

• target producers, marketers, and consumers as appropriate to improve biosecurity and hygiene, and involve community-based organizations.
I. INTRODUCTION

Although highly pathogenic avian influenza (HPAI) H5N1 was first confirmed in Indonesia early in 2004, because of the apparently more serious public health threat in some other countries, it received little international attention until the first human case of H5N1 infection was reported in June 2005. Little was known of the extent of the poultry disease, but due to the slow appearance of human H5N1 infections, it was assumed to be of low incidence and thought to be primarily in village-based poultry and small commercial production units. Indonesia now leads the world in human cases, with 135 as of June 19, 2008. The current case fatality rates in the three provinces with the highest number of patients range from 82 percent to 88 percent, roughly twice that of Egypt (44 percent). Currently, HPAI H5N1 appears to be well-established in poultry throughout the country, with 31 of the 33 provinces reporting outbreaks.

Challenges abound in both the human and the animal dimensions of the problem. Laboratory and epidemiological support is limited, especially in the Ministry of Agriculture (MOA). The government’s access to and control over commercial poultry is poor. Veterinary services are not well developed. The decentralization of authority and budgets for government services in health and agricultural services have complicated disease control programs and necessitated a focus on developing capacity for surveillance and outbreak investigation at the provincial and district levels. Furthermore, since January 2007 the Minister of Health has blocked the sharing of human samples with external organizations. This has made international assistance for risk assessment and tracking of virus mutation very difficult. There have also been challenges with organizing a well-coordinated response involving government agencies, donors, and other entities that need to be involved. Given that human cases of H5N1 are relatively rare in a population of approximately 240 million, it is perhaps not surprising that the Government of Indonesia (GOI) and its civil servants may not always share the high priority afforded to this issue by the US Government (USG). Clearly, this discordance of interests and perspectives, combined with erratic leadership from the highest level of the MOH, has hindered USG efforts on AI from the outset.

Efforts have been made to address the HPAI H5N1 problem over the past several years. The Government of Indonesia established a National Committee on Avian Influenza (KOMNAS) under the Coordinating Ministry of People’s Welfare with members from 19 organizations within Indonesia. A National Strategic Plan for Avian Influenza Control and Pandemic Preparedness for 2006–2008 is in place. A number of development partners, including the US, Australian, Dutch, and Japanese governments; the World Bank; WHO; FAO; UNICEF; and others are providing support for various elements of the program. The USG agencies involved are USAID, CDC/Atlanta, NAMRU-2, USDA, and the Department of State. Activities of the US agencies are coordinated through the Avian Influenza Working Group (AIWG) in Jakarta, which was established by the US Ambassador in 2005.

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1 The information in this report is current as of mid-June 2008, when the assessment was conducted.
2 When referring to animal disease, the term HPAI H5N1 is used; for human infection, H5N1 is used.
II. ASSESSMENT OBJECTIVES AND METHODOLOGY

The USG program of support to contain HPAI H5N1 in Indonesia has been in progress since 2005. The AIWG decided in June 2008 to undertake an independent assessment of its program. The objective was to analyze progress and learn lessons from the past several years for the purpose of making strategic recommendations for the future. An external team was assembled and tasked with assessing the progress and results of USG-supported programs implemented over the past three years, identifying gaps and constraints, and assessing the current relevance of their goals and objectives. The team was also asked to assess the degree of coordination among USG, GOI, and other stakeholders. Most importantly, the assessment team was directed to develop specific recommendations about enhancing program results, improving focus on priority activities, and improving coordination.

The team consisted of nine individuals with the following expertise: veterinary virology and epidemiology, human and animal laboratory specialties, communication and behavior change, medical epidemiology, infectious disease/clinical medicine, and a team leader with a public health program management background. USAID, USDA, and CDC provided some of the team members and GH Tech provided others. The team interviewed a wide variety of key individuals from the MOH, MOA, and KOMNAS; government staff at provincial and district levels; poultry industry representatives; bilateral and multilateral donors; and UN agencies in Jakarta (see Annex A). Three field visits were made to Tangerang in Banten, Bandung in West Java, and Yogyakarta. The team split into three subteams for much of the field work to view activities both in health and veterinary facilities and in the communities. Lists of questions were developed for various informants to ensure that important topics were covered. Annex B provides a list of documents reviewed during the course of the assessment.

The report resulting from this assessment focuses on achievements, analysis of constraints and gaps, and recommendations for the future. There is little space devoted to descriptive information about the AI control program in Indonesia or on the USG support for that effort because that information is readily available elsewhere, including in documents listed in Annex B. Instead the report moves directly into what has been learned over the past few years and where the USG agencies should invest their resources to improve outcomes. Recommendations include those that could produce measurable results over the short term and those that are just as important but that may take much longer to accomplish.
III. ASSESSMENT FINDINGS

A. ANIMAL HEALTH

i. Key Results and Achievements

Veterinary Field Service Delivery: HPAI was first thought to be confined primarily to village-based poultry, comprising free-ranging scavenging poultry (sector 4) and small commercial production units (sector 3). This assumption guided an approach, funded by USAID, of PDSR in village poultry. The disease was found to be present in all areas where investigations were undertaken.

The initial plan to respond to identified outbreaks was to cull all poultry in a village and employ compensation, with ring vaccination to contain outbreaks. This was soon limited to culling the holdings of a household only with the owner’s consent and generally without compensation. Wide area vaccination of village poultry was considered as a control option but not pursued due to the perceived lack of capacity to implement a properly controlled campaign and other cost and sustainability issues. The PDSR approach has substantially strengthened field veterinary service delivery and has potential for expansion beyond control of HPAI.

As the geographic extent of H5N1 HPAI in poultry came to be appreciated, the PDSR program was expanded out of the original four provinces to the rest of Java, then Sumatra and other islands and provinces to the east. Subsequently, the disease was identified in all provinces in which the PDSR program has been active, with Western and Central Java and Lampung apparently being the most affected. The program is managed with FAO assistance through a Campaign Management Unit (CMU) at the national level, under the Directorate General of Livestock Services, with field activities coordinated through local disease control centers (LDCCs) and laboratory diagnostic support from Disease Investigation Centers (DICs) and central laboratories, in particular Balitvet. Since 2007 Australian (AusAID) and Japanese (JICA) resources have supplemented those provided by USAID and by support from a World Bank grant. Also, in 2007 USDA APHIS opened an office in Jakarta dedicated to support for the control of H5N1 HPAI.

Poultry Mortality Reporting: The sensitivity of the reporting of unusual poultry deaths in villages has recently been strengthened somewhat through the Community-Based Avian Influenza Control (CBAIC) project, supported by USAID in 80 districts in 9 provinces that comprise all the provinces in Java, Bali, North Sumatra, and Lampung. This project trains volunteers (VAICs) in villages who can report cases of poultry deaths and inform communities about preventing HPAI and avoiding human exposure to the H5N1 virus.

Veterinary Lab Services: A critical component of HPAI diagnosis is competent laboratory support. Severe weaknesses are being addressed through support from USDA APHIS, the US State Department Bio-security Engagement Project (BEP), the Indonesia-Dutch Cooperative Project, and AusAID and JICA-funded initiatives. USAID also provides some laboratory capacity-building support through the OIE/FAO Network for Avian Influenza Expertise (OFFLU) Project.

3 In the terminology used by FAO, the poultry industry comprises four sectors: sector 1 – vertically integrated industrial-scale enterprises; sector 2 – large-scale broiler and layer farms; sector 3 – small-scale commercial units; and sector 4 – free-ranging village poultry.
**Poultry Slaughterhouses and Markets:** Recognizing serious deficiencies in poultry slaughterhouses and markets, USDA has also conducted live-bird market workshops to assist participants in improving hygiene conditions and provide the basis for model disease control within the market system.

**Key Outcomes:** The key outcomes of USG-supported initiatives to date can be summarized as follows:

- An H5N1 HPAI surveillance and response capacity has been established through the PDSR program. More than 1,240 PDSR officers have been trained and are coordinated through the national CMU and the 12 Local Disease Control Centers (LDDCs) covering nine provinces within Java, Bali, and N. Sumatra. The program is currently being expanded to other provinces to ultimately involve 2,300 trained officers in all districts of Bali, Java and Sumatra and with coverage at the provincial level in Kalimantan and Sulawesi.

- Reporting of H5N1 HPAI rumors has been somewhat strengthened through the CBAIC project to improve the sensitivity of outbreak detection.

- Cascade training has produced a team of competent personnel to train new PDSR staff and provide refresher training to others.

- Laboratory diagnostic capacity has been substantially improved with training, provision of reagents, and support from international reference laboratories, assisted by USDA APHIS and the US State Department BEP program, in collaboration with other donors.

- Communities have developed a greater awareness of H5N1 HPAI prevention and control needs and human exposure risk reduction.

- The broad geographic prevalence of H5N1 HPAI has been identified, with the highest incidence of disease apparently in Western and Central Java.

**ii. Changes/New Information**

**Improved Data Collection:** The FAO-supported PDSR program was first proposed to explore the extent of H5N1 HPAI in village poultry. It has now been recognized that there is a need to enhance the data output from field activities to provide more quantitative data that will allow mapping of disease incidence, improve tracking of disease transmission routes, and monitor the effectiveness of control measures.

**Engaging Commercial Industry:** The focus of both the FAO-supported PDSR program and the CBAIC project has been on improving capacity for H5N1 HPAI detection and control in village poultry. Although commercial production units are inaccessible to government veterinarians, there is increasing evidence that H5N1 HPAI is also a major problem in commercial poultry, particularly in sector 3. Such evidence includes

- informal but reliable reports from industry sources;

- a growing willingness of industry leaders to engage in collaborative efforts to control H5N1 HPAI;

- provision of multiple H5N1 virus isolates from industry sources;

- the fact that the highest incidence of HPAI in village poultry appears to be in areas of intensive commercial poultry production; and
patterns of human clusters of H5N1 virus infection that may suggest occasional flooding of a market with infected birds from a commercial source.

Following preliminary discussion through FAO, USDA is now engaging with the poultry industry to seek ways in which the latter can collaborate with government and industry in assisting with H5N1 HPAI control in the commercial sectors, primarily through initiatives to improve biosecurity. USDA has sponsored a number of useful seminars, workshops, and training programs for Indonesian animal health personnel, including DIC staff.

**Vaccine Efficacy:** Indications have arisen of antigenic variation in strains of H5N1 virus isolated in Indonesia, suggesting that vaccines currently used may not provide adequate protection against all field viruses. This has international implications; the support of USAID to the OFFLU through FAO, in collaboration with other agencies, has led to efforts to characterize Indonesian field isolates from H5N1 HPAI outbreaks so as to anticipate any needs to modify vaccines.

**Operational Research:** Uncertainties about the effectiveness of interventions to control H5N1 HPAI in village poultry have led to an initiative to undertake operational research, managed by the International Livestock Research Institute (ILRI) and jointly funded by USAID and World Bank. A major part of this research will be to compare the effectiveness of different control measures in village poultry using the current PDSR approach, enhanced culling with compensation, and mass vaccination with either AI vaccine or combined AI and Newcastle disease vaccination. This work is just commencing.

**Market Chain Studies:** While the relative roles of commercial and village-based poultry production in H5N1 HPAI maintenance have yet to be established, there is no doubt that transmission of the virus is associated with the movement of poultry, poultry products, and contaminated materials (fomites) in the complex activities of the poultry production cycle (the value chain) and, in particular, marketing activities (the market chain). Through a budget revision within the USAID project, FAO-supported activities have been expanded to include descriptive profiling of commercial production facilities in areas representing the main sources of poultry supply to Jakarta and other areas of high case occurrence, as the start of planned interventions to break the transmission of the virus. This is being supplemented by market chain studies being conducted with FAO support and funded by other donors. The Trilateral (USG, GOI, Government of Singapore) Project in Tangerang Municipality aimed at strengthening the capacity to respond to HPAI has identified heavy contamination of markets with H5N1 virus. However, progress with the project has been slow, and other data are scarce. A review of the project is planned.

iii. **Emerging Gaps**

**Interaction with Commercial Producers:** With the growing realization that segments of the commercial poultry industry, specifically sector 3 contract and independent growers, may be important in the maintenance and spread of H5N1 HPAI, there is a need for greater understanding of the relationship of H5N1 HPAI occurrence in different sectors to the transmission routes. It is likely H5N1 HPAI in village land-based poultry is generally an indication of spill-over from commercial units, with a minor role in disease maintenance.

**Market Chain Epidemiology:** While market contamination is almost certainly a major risk point for human exposure to H5N1 virus, its contribution to onward transmission of the virus in poultry is not known. The activities of small traders and movement of poultry through collection yards are likely to be major contributors to spread, but evidence is not yet available. At the production end of the value chain, the movement of feed, vehicles delivering day-old chicks, and even poorly trained animal health care professionals is likely to represent a high risk of disease transmission. There is a need for epidemiological studies to understand the movement of HPAI virus in order to...
identify critical control points and plan interventions that can be applied to most effectively reduce spread.

**Role of Ducks in HPAI Persistence:** Ducks are known to be a source of maintenance of spread of infection in other countries with similar management practices, such as China, Thailand, and Vietnam. They often show milder or no signs of infection, and grazing ducks are moved over considerable distances after the rice harvest. Their role in the epidemiology of HPAI has attracted some study in Indonesia by the Australian Centre for International Agricultural Research (ACIAR), which found a varying prevalence of the virus in different duck populations, but further research is needed.

**iv. Analysis of Constraints and Lessons Learned**

**Support for PDSR:** Long-term support of the PDSR program represents a major challenge. Training and retraining needs are large, the costs of maintaining people in the field are considerable, and support for quality control and analysis of data collected in the field demands skills that are in short supply. The program was established outside of existing government structures due to perceived weaknesses in government capacity,

4 including the lack of command structure, and because it was thought that a relatively short campaign-style approach might contain the disease. We now know that H5N1 HPAI will remain entrenched in Indonesia for the foreseeable future. Given uncertainties about the continuation of donor funding, it is essential to consider how H5N1 HPAI surveillance and control activities can be sustained, both financially and with regard to management structure. The size of the program may overwhelm the capacity for its support. Thus, consideration should be given to focusing efforts geographically, especially in areas of high human disease incidence and other areas for which dedicated funding is available. The campaign approach, with the program supported outside the normal government structure, is becoming less relevant; consideration needs to be given to subsuming the CMU, the supporting epidemiology group, the LDCCs, and the PDSR personnel into the appropriate levels of government veterinary services. While the limited ability of these services to support AI control activities is recognized, the activities are unlikely to be sustained otherwise.

**Program Focus on Village Poultry:** Attempts to control H5N1 HPAI in village chickens, as part of PDSR activities and by local Dinas efforts, has probably been useful in limiting human exposure but has had little significant effect on limiting H5N1 HPAI incidence or transmission. It is likely that a more comprehensive approach will be required to control HPAI, including greater attention to H5N1 HPAI control in commercial production units and control of HPAI transmission along the value chain.

If a broader and more intensive approach is necessary to make real progress in controlling H5N1 HPAI, it will have to be geographically focused or the resource demands will be too great to sustain the effort. It has been proposed by others that the main effort should be focused on western Java, due to the high incidence of human H5N1 cases and the high concentrations of poultry there. In light of concern about continuing human cases around Jakarta, it would be in USG’s interest to support HPAI control in areas from which Jakarta markets are supplied.

Support from poultry producers generally is critical to the success of any control efforts. For sector 4 poultry production, FAO personnel have argued for migration to a strategy with a broader approach, addressing not just HPAI but general poultry health issues. Such an approach may be more acceptable to producers.

\[4\] Weaknesses in government veterinary services are comprehensively documented in the OIE Report of the Performance, Vision and Strategy study undertaken in April-May 2007.
More compelling is the need to engage commercial producers. The best option for reducing disease incidence in the commercial sectors is probably to improve biosecurity, especially in the absence of provisions for compensation for commercial flocks in the event of compulsory culling. Disease control in commercial production units is more amenable to the application of stricter biosecurity measures, especially in the industrial sectors (sectors 1 and 2), and also of appropriately controlled vaccination programs, although vaccination of broilers is unlikely to be cost-effective. With weak regulatory powers and misgivings within industry about government capacity, specialist international technical agencies like USDA could play an important role in engaging stakeholders.

National Veterinary Service Priorities: Although devolution of government services to district level is blamed for an inability to mount a cohesive national approach to HPAI control, it would appear that within the MOA, this issue is not given high priority. The priorities of GOI are national needs and are understandably different from those of the international community, whose immediate concern is the pandemic threat. An approach must be found in which future activities are likely to better satisfy national priorities. It is possible that a broader approach to strengthening government capacity for livestock disease control, which includes HPAI control but which is more comprehensive and long term, may better reflect national needs.

Laboratory Support: There is a continuing need to improve the performance of diagnostic laboratories. Australian-supported efforts to improve testing proficiency indicate that quality control is not well maintained without external support. The national veterinary laboratory, Balitvet, is primarily a research laboratory and appears to be reluctant to accept a role as the national HPAI reference laboratory.

Further Studies on HPAI in Ducks: Evidence from other countries indicates that it is highly likely that ducks will be found to play a key role in virus maintenance in Indonesia. Studies conducted with support from the ACIAR suggest that the prevalence of H5N1 virus in duck populations is highly variable. Further studies are needed to understand how ducks contribute to H5N1 virus maintenance and to plan appropriate interventions.

Poultry Market Infrastructure and Management: While evidence is lacking to implicate poor market hygiene as a risk factor for HPAI spread, it is very likely that market contamination is a primary risk factor, and there are additional strong arguments for identifying markets as a control point for interventions. Markets clearly represent a potential source of human exposure to H5N1 virus, from the market environment and from the passage through markets of product, particularly live birds which may be infected. Poor market hygiene also represents a public health risk for other pathogens. Continuing to support the existence of wet markets constrains the development of modern poultry processing facilities in which hygiene can be better controlled. Improved market management could include proper cleaning and disinfection (possibly with regular rest days); inspection (ideally with certification at source) of poultry and products coming into the market; banning of live bird removal from markets with hygienic slaughtering facilities; and ultimately construction of new facilities, appropriately located, registered, and supervised. This is an area where collaboration is required between veterinary, public health and local marketing authorities. There will be a need to consolidate slaughtering and retail marketing into fewer locations with appropriate facilities where hygiene conditions can be properly supervised. The Province of Jakarta (DKI) has proposed such a program and is currently attempting its implementation, but with inadequate technical support and funding. There are economic and livelihood implications for market restructuring that need to be considered both for humanitarian reasons and to encourage compliance. In addition, reasons for the poor performance of the Tangerang Project need to be understood. The outcome of the currently planned review should be considered within the process of planning further market chain interventions.
Operational Research: The operational research being conducted to compare culling and vaccination as control options is unlikely to answer the most important questions relating to improved disease control. To some extent the information being sought is already available (Dutch studies in Indonesia indicate vaccination of village poultry provides between 20 and 50 percent protection); in any event, epidemiological studies to identify other critical control points along the value chain are more immediately needed.

In summary, the key constraints and lessons learned for improved H5N1 HPAI control in Indonesia are that

- Interventions in village-based poultry production, including PDSR and CBAIC programs, are not sufficiently intensive to have a significant impact on disease control and in any event cannot address other critical control points in the poultry value chain.

- Control of HPAI in the commercial sectors will require the willing compliance of industry and will most likely be best addressed by improving biosecurity, together with effective and properly controlled vaccination.

- Meaningful improvement in slaughterhouse and market hygiene will require consolidation of the numerous small traditional sites in locations where proper hygiene measures can be applied and market operations supervised.

- Broad-based, intensive control efforts, addressing critical control points in village and commercial poultry and along the value chain, cannot be applied nationwide with available resources; efforts must therefore be geographically focused.

B HUMAN HEALTH

i. Key Results and Achievements

Surveillance Capacity Development: USG efforts to strengthen surveillance capacity within the MOH are focused on the development of the National Influenza Center (NIC) in the National Institute of Health Research and Development (NIHRD), and supporting surveillance activities in the Indonesian Disease Control Directorate through the Integrated Surveillance for Avian Influenza program with the Dinas health offices.

CDC provides support for the development of influenza surveillance activities to monitor circulating virus strains and assist the MOH in characterizing the epidemiology of influenza in Indonesia. Influenza-like illness (ILI) surveillance was initiated through a cooperative agreement awarded in 2005 to NIHRD, but due to administrative challenges, ILI surveillance at NIHRD was not implemented until January 2006. To date, approximately US$2 million has been awarded to support improvement of laboratory capacity, recruitment of staff, support of sentinel specimen collection sites, and diagnostic testing at NIHRD. These funds have resulted in substantial gains in laboratory capacity, staff training, and overall capacity to monitor human influenza activity and detect new viral strains. By order of senior MOH leadership, NIHRD is currently not able to share its influenza isolates (human or avian) with the WHO Global Influenza Surveillance Network (GISN).

The US Navy Medical Research Unit (NAMRU) Jakarta also received USAID and CDC funding to support a parallel ILI surveillance system that was in place by 2005. Together, the NAMRU and NIHRD ILI surveillance systems enjoyed very broad geographic coverage and received large numbers of clinical specimens, well in excess of that achieved in other countries in the region. Before its discontinuation was ordered by the MOH in May 2008, the NAMRU ILI system and its sophisticated laboratories had collected and analyzed several thousand clinical specimens,
primarily from outpatients with ILI identified in hospital outpatient clinics and several health centers.

Importantly, neither the NIHRD nor the NAMRU ILI surveillance systems was designed to detect human infections of H5N1. In fact, despite at least 7,000 clinical specimens having been collected and tested by both systems, only two H5N1 positive cases have been identified, and neither patient was subsequently located. Through these ILI surveillance systems NAMRU has managed to establish very productive relationships with key hospitals throughout Indonesia. The cessation of NAMRU ILI surveillance activities will likely result in less case detection because the number of sites may be reduced.

The closure of the NAMRU ILI surveillance system has also resulted in a transitional period where NIHRD will assume responsibility for some sentinel sites and others may be closed. Still, it appears that while reporting and sophisticated molecular and serological analysis of influenza isolates will be less timely, the ILI surveillance system will continue to be effective under NIHRD supervision with ongoing CDC/Atlanta support. NAMRU and NIHRD report that they have reached a tentative agreement to develop important scientific articles based on surveillance data gathered since 2005. A timeline for publication of the findings was not available.

Laboratory services are an essential element of an effective ILI and H5N1 surveillance system. Annex D identifies a number of areas where laboratory services need to be strengthened, particularly in the area of human resources. Quality assurance programs on paper need to be followed and laboratory management skills improved. Most labs need more bench strength, especially when new staff are away from labs on training. Core functions of the National Influenza Center lab need to be further improved.

The Integrated Surveillance for Avian Influenza (IS-AI) program was implemented through WHO in late 2006 with USAID funding of $2.0 million during the first two years of the project. Broadly, this project is designed to complement a previously established PDSR program operated by MOA with FAO assistance, also with USAID funding. To date 90 districts in 8 provinces have implemented this program designed to communicate poultry outbreak information to DSOs in order to elicit active case detection for human H5N1 infections in areas with H5N1 HPAI. This program does have mechanisms in place for frequent progress reporting, although the data made available to the assessment team suggested that the project goal of identifying H5N1 cases was not being achieved. As of this writing, 563 reports of responses by DSOs had been recorded with 130 suspected human H5NI cases identified and no positive laboratory confirmations. It is not known whether the human resource limitations in laboratories needed for an effective ILI surveillance system (see Annex D) plays a role in the low level of lab confirmations.

While the DSO program is still in a development phase, the assessment team found that DSOs appeared to be active and were keeping records and undertaking simple analyses on their own that they readily shared with the team. The DSOs interviewed stated that only a portion of their time is devoted to AI because they have other disease control responsibilities. The DSOs in Bandung stated that the skills they are developing with outbreak investigation are more broadly useful. The WHO is undertaking a complete evaluation of the project beginning in July 2008. The report will merit careful scrutiny to determine the likelihood of the Dinas (local) Health Offices taking over ongoing funding of the program given the operational inputs currently provided by WHO/USAID.

Data on reported human suspected H5N1 cases by district by month were requested from several MOH sources in Jakarta but were not provided. Such information would provide useful insight into the impact of the IS-AI and other surveillance programs. The assessment team found on several occasions a reluctance to share data given the MOH’s recent pronouncements restricting
information dissemination about AI. Furthermore, MOH disease reporting systems in general are fragmented and not functioning well, especially with decentralization of authority to the Dinas level.

**Pandemic Preparedness:** Indonesia is the first and only nation in the world to conduct a large-scale, operational simulation of the early response and containment of an epicenter of human-to-human transmission of a novel influenza virus strain. The MOH guidelines for rapid containment of an epicenter outbreak are based on the WHO interim protocol. The MOH used these guidelines as the basis for the development of operational plans for epicenter containment. A simulation exercise of these operational plans occurred April 25–27, 2008, in Bali. Participants in the multisectoral exercise included the Ministries of Health, Agriculture, Defense, and Internal Security, the coordinating Ministry for Peoples Welfare, and multiple other organizations. International partners included WHO, US CDC, USAID, and UNICEF. The event was widely publicized in Indonesian and international media. This simulation is an example of national and international leadership on the part of the GOI. Importantly, operational planning was tested as well as more general guidelines in this three-day simulation.

As a follow-on to the simulation in Bali, the Indonesian MOH – ISPA (Respiratory Diseases) and WHO sent out a request for comments on the nine focus areas to international experts. The MOH is revising the epicenter containment guidelines and operational plans based on their comments and internal evaluations of the simulation exercise and will use the final documents in a cascade training approach to orient all districts in epicenter containment. CDC is supporting this training over the next 12 months. Planning is underway for multiple follow-up exercises that will focus on critical components of pandemic preparedness.

**Improved Management of H5N1 Human Cases:** Al referral hospitals have been designated in 31 of the 33 provinces of Indonesia. Most of the provinces have more than one. West Java, for example, has seven of these referral centers. At an MOH Directorate of Medical Services Workshop supported by REDI CENTRE June 11–12, 2008 in Jakarta, it was noted that of the 100 referral hospitals, 67 have isolation facilities, and of these 37 are fully operational. Each hospital should have designated a specialist H5N1 medical team that includes a pulmonologist, internist, pediatrician, anesthesiologist, general practitioner, and nurses. These referral hospitals include H5N1 isolation wards, personal protective equipment (PPE), stockpiles of oseltamivir (Tamiflu), and mechanical ventilators.

Training for physicians and hospital health care teams on how to provide medical care for patients with H5N1 infection was reported at the major referral hospitals the team visited. REDI Centre has also provided technical assistance and financial support for a workshop on case management and hospital infection control training for H5N1 as recently as this month. Medical staff from the AI teams at referral hospitals have been prioritized for training through regional site visits by Indonesian experts sent by the MOH, as well as at three training workshops conducted over the last year with support from WHO and REDI Center. The curriculum for the training course was developed based on the 2006 Indonesian guidelines, *Pedoman Penatalaksanaan Flu Burung di Rumah Sakit*, WHO and international guidelines, and input from Indonesian medical experts.

At least 44 diagnostic laboratories for polymerase chain reaction (PCR) testing of H5N1 virus infection have recently been established across the country. Expansion to a total of 100 such labs is planned. The structure and function of these labs to minimize contamination, with subsequent  

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5 Cited from the Report of the MOH Directorate of Medical Services AI Case Management Workshop supported by the REDI Centre, June 11-12, 2008
false-positive test results, has been standardized under the supervision by the MOH NIHRD. These labs include 2 central labs in Jakarta, 8 regional labs, and 34 subregional labs.

Indonesian participation in an international H5N1 clinical research study comparing the standard dose with a higher dose (2x) of the anti-influenza drug oseltamivir (Tamiflu) is in progress. Research on H5N1 is limited but has included other groups within Indonesia (e.g., Eijkmen Institute) and outside (e.g., HCM city, Vietnam) to assess oseltamivir (Tamiflu) drug resistance markers, detection of H5N1 virus in blood and respiratory tract swabs, and genetic sequencing of the virus. As part of this study, serum is sent to a collaborating lab in Bangkok, Thailand to measure oseltamivir (Tamiflu) levels in the blood.

A well-established and close working relationship appears to exist between the Indonesian MOH and the WHO in Indonesia. The US AI Working Group (AI-WG) is aware of the depth of this relationship. It includes MOH sharing of epidemiological data on patient cases and risk factors for human H5N1 infection with WHO officials in Indonesia. An updated WHO website dedicated to AI in Indonesia can be accessed at www.who.or.id/avian

### ii. Changes/New Information

**Understanding Risk Factors for Human Infection:** Of the human cases 55 percent are “indirect” exposures or “inconclusive,” with apparent decreases in “direct exposure” since July 2007. The term “indirect exposure” is defined as referring “to cases where there were recent poultry deaths in the case’s environment or where there were any poultry in the environment.” “Direct exposure” is defined as referring “to cases that slaughtered or handled sick/dead birds, cases that were exposed to H5N1-confirmed animals or animal by-products and cases that had recent poultry deaths within the home.” Epidemiologic data suggest that a significant proportion (78/133 = 57 percent) of human H5N1 AI cases in Indonesia do not have direct exposure to infected birds. Instead, they have indirect exposures (55/133 = 40 percent) or the mode of transmission is inconclusive (23/133 = 17 percent). Thus, as of May 29, 2008, only 43 percent (55/133) of human cases had direct exposure as the mode of H5N1 AI transmission. Notably, from July 1, 2007, until May 29, 2008, the proportion of human cases of AI with indirect exposure has increased to much more than 50 percent, whereas from June 2005 until June 2007 human cases due to indirect exposure were much less than 50 percent.

There are several possible explanations for the increase in indirect exposures. For example, some could represent denial of known exposures to the virus due to stigma associated with having the disease or fear of adverse economic and societal repercussions from being diagnosed with AI in terms of subsequent testing and culling of AI-infected birds in the patient’s home or neighborhood-village. The increase in cases without clear information about poultry contact also coincides with reduced support from WHO in outbreak investigations. Insufficient training or insufficient probing by MOH staff may also explain the increase in indirect exposures. On the other hand, the Clade 2.1 virus that is predominantly found in Indonesia may be evolving in such a way that it is acquiring the ability to cause infection from an H5N1-contaminated environment without direct contact with an infected animal. At this point there is insufficient information to draw conclusions. This issue, however, is a very important concern for multiple reasons, epidemiological, medical, societal, environmental, and political (including human-to-human transmission concerns, and fear of intentional transmission of the virus).

**Restrictions on Sharing Information and Specimens:** Within the past month the MOH stated that Indonesia will report human H5N1 infections and deaths in a less immediate manner than over the past three years (deaths might be reported only on a cumulative six-month basis). On June 19, however, the WHO posted on its AI website two recent human H5N1 infections. Restrictions on sharing H5N1 patient specimens with NAMRU-2 over the past 17 months (since
January 2007), and with laboratories outside of Indonesia in general, are well-known to the AI Working Group. This month, however, the long-standing multicentered ILI surveillance study, which has multiple NAMRU-2 collaborative study sites, no longer allows sharing of any ILI specimens either. The concern is that H5N1 testing and case finding may also decline.

**Underutilized AI Referral Hospital Isolation Wards and PCR Laboratories:** The 135 WHO lab-confirmed human infections with H5N1 AI were reported from 12 of the 33 provinces in Indonesia. Thus, very few lab-confirmed cases have been treated at the dozens of new AI isolation wards at referral hospitals. Similarly, the absolute number of “suspect” AI human cases appears to be so low that none of the AI referral hospitals we visited this past week had any suspect, probable, or confirmed cases. Thus, both the AI isolation wards and the AI-dedicated PCR labs appear currently to be underutilized.

**H5N1 Vaccine Development:** Availability of an effective vaccine is an important issue for Indonesia. A recent WHO scientific consultation paper discusses options for use of evolving H5N1 vaccines for prepandemic situations or when one is imminent. Health Minister Siti Fadillah Supari was quoted recently in a newspaper as stating that “Russia has stepped forward to offer Indonesia anti-Avian Influenza (AI) vaccine assistance.” She stated that “The AI vaccine is different from the previous one because this vaccine is in the form of a nasal spray.” In a March 28, 2008, article in the same paper, Russia was cited as proposing bird flu vaccine cooperation with Southeast Asia. Hungary and Canada were also mentioned to us as potential partners with Indonesia in the development of human H5N1 vaccines. Of interest, Hungary is one of the few nations to publish that they have an H5N1 vaccine for humans that requires only a single immunization to attain antibody levels approximately equal to those achieved by other H5N1 vaccines following two immunizations 21–28 days apart. In June 2008, Baxter also announced a new H5N1 vaccine that, in vitro, induced antibodies based on Clade 1 H5N1 that did offer partial protection against the 2005 Indonesian Clade 2.1 H5N1 virus.

**iii. Emerging Gaps**

**Results Monitoring:** USG-supported programs have devoted insufficient attention to establishing good monitoring and evaluation (M&E) mechanisms that enable better tracking of results and ultimately generating data that can demonstrate the impact of the programs. The USG AI Strategy document “Avian and Pandemic Influenza in Indonesia: An Integrated U.S. Government Strategy” (January 19, 2007) describes goals, which are activities to be accomplished, but does not provide any guidance on the results expected or related indicators.

USAID has an M&E plan that lays out goals, sub-goals, and intermediate results. Ten indictors are reported on regularly to headquarters through the USAID AI Monitoring, Evaluation and Budget Analysis (AIMEBA) system. Specific project targets and indicators do exist that allow tracking, such as the WHO grant from USAID for Integrated Surveillance for Avian Influenza. Some of the targets are rather process oriented (numbers of meetings conducted, equipment purchased), but others provide a more substantive way of assessing the capacity of the new DSOs, such as the efficiency of reporting on and responding to disease outbreaks. For the CBAIC Project, a system appears to be in place to assess the impact of the communications material with the pre- and post- knowledge, attitudes, and practice (KAP) surveys, but for the village volunteers there is more ambiguity about what the final outcomes should be of training and fielding a large number of DSOs.

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6 “Options for the Use of Human H5N1 Influenza Vaccines and the WHO H5N1 Stockpiles,” WHO Scientific Consultation, October 227.
The team did not see evidence of similar M&E systems from other agencies. In the case of the smaller activities funded by USDA, for instance, the activity outcome is simply the conduct of a workshop or development of a manual, in which case monitoring results is not very meaningful.

The reports to CDC/Atlanta on the Surveillance and Response to Avian and Pandemic Influenza Project from MOH-P2M (MOH-CDC) consist of the status of activities rather than outcomes. For the CDC-funded AI training program for dealing with the news media, it is not clear what the outcomes were expected to be or how they would be measured. Because the team did not have the time to explore each project in detail, and because many activities were still fairly new, it was not possible to go beyond saying that each program needs a careful M&E plan at the outset to ensure that collectively the contributions to the AI program in Indonesia can be assessed.

**Research Capacity:** Despite efforts over the past three years, there is still an alarming incidence of sporadic, and sometimes clustered, cases of human H5N1 virus infection. Sources of infection have not been well elucidated, but it has often been difficult to relate the cases to known direct contact with sick or dead poultry. A better understanding of risk factors for human infection needs to be established to effectively reduce human exposure.

Few scientific publications about AI are emerging from all the work in Indonesia. Mechanisms for reporting findings in peer-reviewed scientific publications or in publicly available formats such as Health Bulletins should be incorporated into the terms for renewal of AI programs. Further, the implementation of such public reporting requirements should be required for all new programs, and USG staff should be made available to assist with the drafting of the reports and manuscripts, irrespective of formal authorship. In the long run it is very much to Indonesia’s advantage to open itself to collaboration with international scientists.

**Limited Testing:** It appears that many fewer patients are being tested for H5N1 by PCR of respiratory samples (throat and nasal swab) than might be expected based on exposure to potentially infected birds and ILI symptoms. For example, of 511 patients with ILI in January 2008 at a former NAMRU-2 ILI-surveillance center the team visited near Yogyakarta, none reported exposure to poultry (unggas) in questions # 6 and 7 on the standardized questionnaire being used at the ILI-center (reportedly from NAMRU-2). Thus, none were tested for H5N1. On several occasions we heard similar reports of persons denying any exposure to poultry, healthy, ill, or dead. Thus, if the epi-link to poultry or other animals in terms of the case definition for suspect cases of H5N1 in humans is lost or significantly diminished, testing for H5N1 in humans will be insufficient and cases will be missed.

In an NIHRD PowerPoint presentation for the team on the MOH ILI-surveillance program, 1,695 suspect H5N1 patients were identified from July 2005–May 2008. Of these, 22 percent were confirmed by lab testing to have some type of influenza A or B. Of these 7.9 percent had H5N1 infection, 6.0 percent had H3 human influenza, 3.7 percent had H1 human influenza, and 1.5 percent had influenza B. Importantly, however, 2.6 percent were given the diagnosis of “influenza A, unidentified subtype.” It was suggested by another MOH scientist, in response to our inquiry about this group of patients, that they might have an H7 or H9 influenza A virus, or possibly a mutated H5 influenza virus. Of note, any of these three possibilities could be very important in terms of affording a clue to one or more influenza viruses circulating in Indonesia that were not previously recognized to be doing so. Indeed, H7, and previously H9N2, influenza viruses have been seen as candidate pandemic flu viruses.

**Private Health Sector Excluded from H5N1 Resources:** The private health care sector does not routinely receive any oseltamivir (Tamiflu) antiviral stockpiles, onsite PCR H5N1 diagnostic testing, dedicated isolation wards, PPE, intensive care unit equipment, or medical ventilators for H5N1 preparedness and response. Because more than half (52 percent) of confirmed H5N1 cases presented first at private hospitals and clinics, this is a serious issue. Furthermore, in public
facilities, given the low number of H5N1 suspects and underutilization of the H5N1 PCR labs, it is likely that some oseltamivir (Tamiflu) and lab reagents will reach their expiration dates before being used. A key issue is thus that stockpiles of antiviral drugs are being kept in government facilities, whereas H5N1 cases are presenting in private facilities, and the linkages between the two are almost nonexistent at this juncture.

**High Case Fatality Rate (CFR):** The CFR of H5N1 human cases is among the highest in the world at over 80 percent. In contrast, Egypt has a 44 percent CFR (22 fatalities among 50 patients). This is a complex and almost certainly a multifactorial issue. In Egypt the time from onset of illness until hospitalization and presumably first dose of oseltamivir (Tamiflu), particularly for young children, has been reported to be much shorter. Importantly, however, only 22 percent of the initial 133 lab-confirmed H5N1 cases first presented to a health care facility where oseltamivir (Tamiflu) was likely to be available.

A major contributing factor is the lack of specific clinical symptoms or signs early in the course of the disease, or a routine lab test that reliably and quickly distinguishes H5N1 from other more common diseases with which it is easily confused, such as dengue, typhoid, TB, and other causes of pneumonia. Lack of early suspicion of H5N1, lack of early referral for testing, lack of early administration of Tamiflu, and in some cases perhaps suboptimal medical management of a rare and new disease are some of the other likely factors contributing to this very high CFR. It should be noted, however, that the CFR in China is 20/30 (66 percent), in Vietnam for the 61 patients with confirmed clade 1 infection it is 75 percent,\(^8\) and in Cambodia it is 7/7 (100 percent).

### iv. Analysis of Constraints and Lessons Learned

**Epidemiology Skills:** One well-recognized constraint affecting all disease surveillance and disease outbreaks in Indonesia is a shortage of qualified epidemiologists with the necessary skills, especially at the provincial and district levels but even in the central MOH. The current Field Epidemiology Training Programs (FETP) at the University of Indonesia in Jakarta and Gajah Mada University in Yogyakarta, continue to produce graduates, but an assessment in 2007 of the FETP programs estimated that roughly 900 graduates are needed for the country. Gajah Mada University has been fairly successful in attracting students supported by local government budgets but the availability of scholarships through the new WHO EC-funded project may act as a further disincentive for allocating government funds. In addition to the two-year master’s degree courses, shorter courses have been held for nurses (Nurses Field Training Program, NFTP) and for field assistants (Medical Field Assistant Training Program, PAEL) at Gajah Mada. Gajah Mada FETP officials feel that it is important for a “critical mass” of staff to be trained in each province and district so that over time, more staff are speaking the language and maintaining and practicing the skills acquired during training. The same applies to veterinarians in the MOA, where skills in epidemiology are even thinner.

**Program Sustainability:** Sustaining programs beyond the period of donor funding in Indonesia is a major problem, especially in the era of the decentralization of MOH budgets to the provincial and district levels. Laboratories are likely to function well when the reagents and equipment maintenance contracts are supplied from projects. Travel stipends and money for cell phone use supplied to DSOs, for instance, will keep activities on track until the project is completed, but unless the local governments have a level of commitment to the activities to ensure that they are included in their budget request to the Governor’s offices, activities are very likely to cease or slow down significantly once the external support is finished. Enthusiasm for pandemic preparedness may wane quickly once donor support is no longer there. It is critically important for USG agencies with their counterparts to plan from the beginning of each activity for the

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\(^8\) *New England Journal of Medicine*, 358: 261–73, Table 1 in footnote on page 265.
eventual take-over of funding from GOI sources. It is equally important for programs to be designed based on realistic expectations about what the GOI will be able to afford to take over and phase in GOI funding for each year. The “emergency” (short-term) designation of a majority of the funds presents challenges for ensuring sustainability.

**Limited Number of AI Patients and Lack of Human Pandemic:** The perception that H5N1 is not a major health risk today is common. The number of H5N1 patients is many-fold less than other diseases, such as dengue, typhoid, TB, and typical bacterial pneumonia. TB classically is spread via the respiratory route. Management of TB typically requires respiratory isolation rooms when available, prior to administration of effective therapy. Yet many new H5N1 isolation rooms are being built not for the TB pandemic already among us but for the rare H5N1-infected patients and the future threat of a human influenza pandemic. The fewer H5N1 patients that are seen in coming years and the longer time interval until the next human flu pandemic the more “preparedness fatigue” will set in. It is therefore important to build skills and provide other AI inputs that are more broadly useful and can more broadly strengthen the capacity for infectious disease surveillance and outbreak response.

**C. SOCIAL MOBILIZATION, BEHAVIOR CHANGE, AND COMMUNICATION**

Social mobilization, behavior change, and communication activities have been directed toward promoting community awareness for, and participation in, controlling HPAI and preventing human H5N1 exposure. The principal target groups have been backyard poultry keepers (sector 4), and urban and rural consumers of poultry products, with a geographic focus on nine provinces in Java (6), Sumatra (2), and Bali (1).

**i. Key Results and Achievements**

The USG has made important contributions to promoting community awareness and participation through the following mechanisms:

- Production of media and messages
- Community participation strategies
- Training and training materials
- Monitoring and evaluation

**Production of media and messages:** Calendars, training booklets, flipcharts, posters, banners, stickers, flyers, guide-books, T-shirts, and videos have been produced (approximately 4.6 million units by CBAIC), mostly to be used and distributed by trained village-based volunteers. Standard messages have been developed and published in a booklet (KOMNAS/CBAIC) for use by government staff.

Televisioned announcements about AI in the early phase of the outbreaks in 2005 and 2006 (sponsored by USG?) appeared to have the greatest residual impact on people. USG-supported activities have been supplemented by those of UNICEF, JICA, IOM, and the MOH, all primarily directed at prevention of human exposure to H5N1 virus.

**Community participation:** Since early 2007 more than 20,000 village-based AI volunteers (VAICs) have been trained in very basic surveillance, prevention, and communication skills (CBAIC Project). Another USG-supported project trained village AI committees and approximately 470 volunteers from the Community Welfare Organization—the Women’s Community Network (PKK) (CDC-CARE). The US and Singapore Governments funded AI pilot
project training and established village AI task forces (two persons per village) to assist the PDSR in Tangerang City and district.

The VAICs are managed by two major mass organizations (Indonesian Red Cross [PMI], and Muhammadiyah) with different management structures. PMI has a hierarchical structure with defined roles and relationships from each level—village, subdistrict, district, province, and national. Muhammadiyah’s management coordination occurs directly between subdistrict coordinators and national managers. Selection of volunteers differed between the two organizations; in Muhammadiyah the age range of volunteers was broad (18 to 60 years, selected from active organization members). In PMI the age range was narrower—most were of ages that enabled them to discuss and lead initiatives in their villages (apparently selection was largely by the village head). The PMI Central Java Coordinator estimated, based on reports received from the field, that those who were most recently trained were still active (70 percent). Muhammadiyah of Bantul, whose volunteers were trained during the pilot phase more than a year ago, estimated only about 30 percent of its volunteers had remained active.

Changes in community behavior appeared to vary. In some cases villagers responded to poultry deaths immediately by burning or burying dead birds (Bantul, Central Java), while in others they reported the deaths to the PDS/R (Bandung). Awareness of what to do in these cases appeared to be a result of televised national alerts in 2005 and 2006 rather than other communication means.

CBAIC has instituted an incentive grant scheme to motivate volunteers and communities to implement AI awareness raising, surveillance, and prevention and control activities. Only 198 proposals have been submitted by volunteers from six provinces in 2008; 24 volunteers/villages had received grants.

**Training and training materials:** USG-supported FAO training of PDSR staff (approximately 2,000 in 300 districts), including production of training materials and guidelines. As noted above, training booklets were produced and training of community- based volunteers conducted. Training in basic biosecurity practices of small-scale poultry vendors has commenced in Tangerang (CARE). Training packages have been produced on public relations management for senior district and provincial MOH officials.

**Monitoring and evaluation:** Basic M&E systems for volunteers have been recently established (CBAIC). However, in the sites visited there was no regular monitoring of performance on work plans or changes in community-level practices by program managers.

A number of KAP surveys have been or are being conducted by USG-supported projects and other agencies. A USAID baseline KAP survey was conducted in October 2006 by AED and repeated again by AED in March 2008. Another is planned for 2009. These should provide the basis for knowing whether there have been significant changes in the knowledge and practice of AI-related behaviors. Other surveys include a KAP survey for the MOH Disease Control division and surveys by CARE, UNICEF, and the Tangerang AI Pilot Project.

**ii. Changes/New Information**

Two changes have taken place over the last 12 to 24 months that influence the selection of target groups, the information to be disseminated, and key practices and behaviors to be changed:

- Crisis/emergency fatigue
- Recognition of the need to target participants in the commercial poultry sectors
With the relatively small number of recorded human deaths from H5N1 infection, people no longer perceive it as an emergency, and public and private institutions are dealing with other concerns of high social importance. Interventions designed for emergency situations are no longer appropriate, and community interventions need to have a longer-term development focus. CARE’s village volunteer model and the Tangerang pilot project (both USG-supported) provide some insights into how such activities could function.

iii. Emerging Gaps

As strategies are developed by animal health authorities to address HPAI prevention and control in the commercial poultry production sectors and the marketing chain, areas will be identified in which behavior change is needed to improve biosecurity in production units and hygiene measures to prevent spread of HPAI. Promotion of improved market hygiene and marketing of processed product rather than live birds will be greatly facilitated by targeting consumers. As they change their preferences to processed products of higher food hygiene standards, and for shopping in a cleaner market environment, they will drive market restructuring.

The surveillance role of the village and subdistrict government officers is currently not well recognized. Over the last three years the MOH has started to roll out the Alert Village (Desa Siaga) program in order to prepare for and deal with local health emergencies and crises. However, this initiative does not seem to be used for reporting outbreaks of either poultry disease or suspected human H5N1 cases.

iv. Analysis of Constraints and Lessons Learned

Although there has been considerable investment in producing print media, distribution has generally been poor due to lack of supply or inadequate distribution. People in village-based institutions often cannot define key messages for HPAI prevention and human exposure avoidance, indicating a failure in communication. Surveys indicate that people are not convinced of the hygienic value of hand-washing.

Some prevention and control activities have had adverse consequences. There are indications that people are reluctant to report suspected human H5N1 cases because of perceived stigmatization, exacerbated by shock communications. Other messages are inappropriate, such as proposing cooking temperatures to communities that do not use thermometers.

A major weakness of the community-based volunteer program is the lack of clear village-level action plans and job descriptions for volunteers. Volunteers were not able to express specific results to be achieved within specified timeframes. There was a lack of follow-up mentoring, technical support, and supervision by the volunteer coordinators, local PDSR officers, or DSOs. The management structure of Mohammadyiah does not engender technical follow-up, mentoring, and sustainability.

As noted above under “Achievements,” considerable progress has been made to increase awareness of AI. However, the following points illustrate some of the lessons learned to date and constraints in improving appropriate AI prevention and control practices and behaviors:

- The emphasis on prevention and control of HPAI H5N1 in sector 4 poultry may have been too narrow.
- Awareness-raising and behavior change activities have been spread too widely and too thinly. Volunteers have both insufficient capacity and unclear understanding to do a thorough job. Unless they are able to mobilize the community (a great portion of the volunteers are not able
to do this), they cannot be expected to do much beyond distributing printed communication materials.

- The language used in some of the information disseminated is inappropriate. Very little interpretation has been provided with the messages.

The volunteer approach is commonly adopted because it seems to offer low-cost opportunities for rapid rollout. However, as HPAI H5N1 outbreaks continue with no clear attenuation of the crisis, it has become clear that there is very little capacity (and willingness) to prevent and control the disease, and a potential pandemic. Thus a more sustained, development-oriented approach is required to address these underlying issues.

Volunteers, by their own admission, are not sustainable in the changing economic environment. Where volunteers function as part of existing village-based structures and institutions (e.g., community administrative divisions [RT/RW], PKK, and Dasa Wisma), there should be more clearly defined roles and responsibilities. There needs to be a more systematic approach to preparation and implementation of action plans, follow-up and mentoring by technical staff (PDSR/DSO), and targeting of commercial producers (sector 3 in particular).

Reporting and M&E of activities and performance have been inadequate, ad hoc, and un-systematic. Reporting channels often do not follow functional or management lines. Ownership of information and responses is lacking, with consequently poor coordination and support.

Muhammadiah has apparently realized the weakness of the current one-volunteer/one-village system and has designed a program and approach that call for more intensive participatory work with the community, similar to what CARE is doing. CBAIC management seems to concur and has designed a number of innovative interventions to correct the situation.
IV. RECOMMENDED AREAS FOR PRIORITY FOCUS IN FUTURE

A. PROPOSED VISION OF USG PROGRAM

The current objectives of the USG Indonesia strategy (dated January 2007) are as follows:

1. Contain and interrupt transmission of a new, highly pathogenic pandemic influenza A virus strain.
2. Prevent human infections with H5N1 virus now, and reduce the risk of human infection with H5N1 virus by controlling H5N1 among poultry, particularly backyard poultry.
3. Reduce vulnerability to new outbreaks of highly pathogenic AI in future through improved biosecurity in the agricultural and food-production sectors.
4. Mitigate the economic, social, and security consequences of AI.

Given the information in Section III, addressing H5N1 HPAI transmission in backyard poultry alone is no longer sufficient. Furthermore, given what is known today about the presence of the virus in poultry throughout the country, it would be difficult to take meaningful steps to mitigate the economic and social consequences of the disease in the poultry sector on a broad scale.

The assessment suggests a more focused vision or goal for the USG assistance program to Indonesia based on the experience of the past several years. The proposed vision or goal should be: to diminish the potential for the emergence of pandemic influenza in Indonesia by reducing the incidence of human and animal H5N1 infection. Prevention and control efforts should be proportionate to the geographic distribution of both animal and human H5N1 virus infection in Indonesia. In the event that a pandemic virus emerges, systems should be in place to detect and respond effectively to outbreaks. The primary focus for the USG program in Indonesia continues to be reduction of the risk of human infection.

It is also important from the US point of view to have access to the virus isolates in order to continue independent studies and monitoring of the progression of H5N1 in Indonesia. Because H5N1 is still a relatively rare disease in humans in Indonesia, particularly compared with other diseases that take a much larger toll of human lives, the primary focus should be on using the attention on H5N1 to both reduce the likelihood of a pandemic occurring and build Indonesia’s capacity to deal with such an event should it happen.

In order to direct resources most effectively and particularly to facilitate measuring the impact and outcomes of the assistance provided to the country, this assessment recommends that the USG program focus more narrowly on the provinces with the highest incidence of human infection to the west of Yogyakarta on Java rather than attempting to spread the program more broadly. If measurable results can be achieved in the provinces with the highest burden of disease, it will give the government and development partners valuable information about containment in other regions of the country. USG program monitoring and evaluation plans should be strengthened.

B. ANIMAL HEALTH PRIORITIES FOR THE USG PROGRAM

It is envisaged that the National Strategic Plan, currently being drafted for Phase 2, 2009–2011, should be generally supported, with USG funding being directed in particular to those components that most immediately address the need to reduce human exposure risk in the areas where the most human cases have occurred. This implies a geographic emphasis that should currently focus on the western half of Java, although this should not exclude other geographic initiatives of strategic importance.
Recommendation: There should be a major emphasis on HPAI prevention and control activities in western Java.

As recognized in current strategic planning, there needs to be a significant move from the primary focus of HPAI control on village-based poultry to a focus on HPAI prevention in the commercial production sectors and controlling the transmission of H5N1 virus through the value chain. Commercial production units are believed to be the main repository for H5N1 virus maintenance and reducing H5N1 virus transmission in the value chain can have benefits not only to HPAI reduction but to reducing human H5N1 exposure risk.

Recommendation: There should be a change in strategic focus for HPAI control away from village-based poultry and toward HPAI prevention in commercial poultry sectors and prevention of H5N1 virus transmission along the poultry market chain.

The priorities are considered in five components:

- Village poultry production—sector 4 and small sector 3 enterprises
- Commercial poultry production—sectors 1 and 2 and larger sector 3 enterprises
- Critical control points along the market chain
- Retail markets
- Support activities

1. Village poultry production: The investment in the nationwide PDSR program should be supported but negotiations should be undertaken with district Dinas to assume increasing responsibility for the program over the next few years. Other means should also be sought to embed the HPAI control program within the mainstream of government services at the national, provincial, and district levels to improve ownership and increase the likelihood of its maintenance as donor support declines.

Recommendation: Stronger efforts must be made to encourage district administrations to assume full technical and fiscal responsibility for the PDSR teams.

In the area of western Java, USG should support initiatives to increase the effectiveness of PDSR activities, including efforts to improve technical supervision at the district level and possibly recruitment of additional personnel in key areas in which an intensified field effort is being encouraged. While the national approach may be to extend the scope of PDSR to encompass other poultry diseases and even other poultry production issues, for the next three years in the focus area a strong emphasis on H5N1 HPAI prevention and control should be maintained.

Recommendation: PDSR activities should be increased in the focus area of western Java and subjected to greater technical supervision to intensify coverage and ensure that meaningful outcomes are achieved.

The CBAIC program should be restructured, with the same geographic focus, and supervision and reporting lines be revised to enable district poultry disease control staff to directly interact with village contact points. The main contribution of the CBAIC program should be in strengthening rumor reporting to PDSR teams, whose activities can be directed to disease investigation and prevention and control activities.

Recommendation: Village poultry surveillance activities, including PDSR and the CBAIC program, should be focused geographically on western Java, subjected to greater technical supervision, and linkages with disease control personnel improved.
While HPAI is entrenched in the commercial poultry sectors, efforts to undertake mass vaccination or extensive culling of sector 4 poultry are unlikely to have a significant impact on the disease. The current approach of encouraging villagers to accept focal (household unit) culling, with isolation and movement control of other poultry, will limit local spread of infection and minimize human exposure to H5N1 virus. More drastic measures should only be applied in outbreaks in otherwise unaffected areas to achieve a particular short-term objective.

2. **Commercial poultry production**: USG should support extension of HPAI prevention and control to commercial poultry production. The most effective approach is to engage the major producers in sectors 1 and 2 in improving biosecurity in their own operations and to assist in upgrading bio-security (in particular, bio-exclusion) of sector 3 producers in biosecurity and, where appropriate (such as in layer flocks), effective HPAI vaccination. The best opportunity appears to be in increasing the provision of technical support of USDA, in direct interaction with the industry, and in bringing together industry and regulatory authorities. Initial involvement of producers should be voluntary until benefits have been demonstrated, possibly supported by soft loans for upgrading biosecurity. Subsequently, minimum biosecurity standards could be a requirement for certification for poultry movement and possibly for eligibility for compensation in the event of HPAI introduction.

**Recommendation**: Improving biosecurity, particularly bio-exclusion, should be regarded as the best entry point for reducing HPAI incidence in commercial poultry flocks.

3. **Movement control**: The constraints to effective HPAI outbreak control dictate that additional interventions must be made to reduce human exposure risk to H5N1 virus. Accepting that HPAI outbreaks will continue to occur even in the area of intensive program activities, human exposure can be limited by reducing the opportunities for movement of virus along the market chain and into retail markets. Such interventions will also impact on control of the poultry disease by reducing transmission risk between production units.

Three critical control points exist for virus transmission risk in the movement of poultry in the market chain: (1) the activities of small traders; (2) the transportation of poultry to and from collection yards; and (3) check points on major transportation routes.

Although evidence is not available, it should be assumed that small traders represent a major transmission risk between villages. There is already evidence that collection yards are commonly contaminated with H5N1 virus. Proposals should be sought to support activities to reduce transmission risk at these points. This could include educating small traders in basic hygiene measures and routine decontamination of collection yards and vehicles moving through them. As voluntary compliance is increased, it could be strengthened by regulatory measures.

As progress is made in reducing H5N1 HPAI prevalence in target areas, they should be protected from neighboring areas by establishing check points on roads to control the entry of poultry. Their operation should be supported by regulatory authorities but may attract donor funding for short-term inputs to ensure their effectiveness in key locations.

**Recommendation**: Together with reducing HPAI incidence in commercial poultry flocks, interventions in the value chain to minimize virus transmission are likely to have the greatest impact on HPAI control.

4. **Slaughterhouses and retail markets**: There is enormous potential for improving human health, including reduction in H5N1 exposure risk, by addressing hygiene in slaughterhouses and markets. It is unlikely that attempts to do this in the myriad traditional markets in the major urban areas would be successful. It is therefore proposed that support for improving hygiene in existing markets and building and operating new markets should be considered as a major initiative, with
regulatory authorities imposing restrictions on traditional markets that have unsatisfactory hygiene standards as replacement capacity becomes available in the new facilities. Hygiene measures to be implemented should include:

- inspection of poultry on arrival and cleaning and disinfection of delivery vehicles;
- cleaning and disinfection of delivery vehicles;
- separation of slaughter and retail selling areas;
- proper waste disposal;
- cleaning and disinfection of facilities, possibly with rest days to break the H5N1 contamination cycle; and
- prohibition of live bird removal from the market.

The Government of Jakarta (DKI) has initiated a process to remove all poultry production from the city and relocate slaughterhouses and markets at its periphery. USG should consider support for this initiative by provision of technical assistance and possibly funding development of new facilities in partnership with commercial industry and government.

**Recommendation:** Improving hygiene in large urban markets and market restructuring initiatives in urban centers should be a key focus of the program.

5. **Support activities:**

**Laboratory support:** While there is clearly a need for continuing international support for laboratory diagnostic activities, other donors are providing most of the needs. However, it is so critical to the success of HPAI control that USG should be responsive to identified needs, including training, supply of consumables, and provision of reference laboratory services. There may also be a justification for supporting the cost of sample testing, particularly in the underserviced sector 4.

**Recommendation:** USG should continue its support of veterinary laboratories in coordination with other donors, especially with respect to training, provision of consumables, and providing reference laboratory services.

**Monitoring of field isolates:** There is intense international focus on the need to monitor H5N1 viruses for changes that may indicate development of increasing competence for human infection, and the need for poultry isolate monitoring is equally compelling. The USG should continue to support the OFFLU network, in the interests of control of the disease in Indonesia but also for broader reasons of international interest. These include monitoring of movement of different virus strains for epidemiological intelligence, comparison of prevalent field strains with available vaccine viruses, and monitoring for changes in host preference and pathogenicity.

**Recommendation:** USAID should continue its support of the OFFLU network in monitoring of HPAI virus isolates in Indonesia.

**Epidemiological studies:** With the paucity of hard evidence to support assumptions made in strategic planning it is necessary to undertake studies to progressively build a body of evidence to confirm or otherwise the validity of prevention and control interventions that are being implemented. The evaluation of disease control activities, including USG-supported projects, is also dependent on quantitative measures of progress in HPAI control, in order to determine project impact. Data collected by PDSR teams should be supplemented by structured studies, including sampling and surveillance along the value chain and studies relating to the contribution
of different production systems to maintenance and spread of H5N1 virus. Such studies need to be conducted by specialist personnel with the required skills to collect and analyze data to answer specific questions. Further elucidation of the role played by duck production systems is particularly important and ongoing studies may need to be complemented by others. Continuing attempts must be encouraged to trace human cases back to the source of infection in order to define exposure risk factors.

**Recommendation:** Data collection by PDSR teams should be supplemented by studies spanning all production sectors and along the value chain to characterize the epidemiology of HPAI in Indonesia and provide data for monitoring progress in disease control.

**Operations research:** The team was not persuaded that useful information will come out of the main part of the operations research being funded by USAID and World Bank. The work is directed at the backyard poultry sector, in which it is likely that neither blanket vaccination nor culling and compensation will be widely applied.

**Recommendation:** While recognizing that it is difficult to change the direction of work that is already funded and subject to contractual obligations, it is suggested that USG should take advantage of any opportunities to limit its ongoing investment in the planned operations research.

**C. HUMAN HEALTH PRIORITIES FOR THE USG PROGRAM**

The following are recommendations for priorities related to USG support for human health aspects of the AI program in Indonesia. This report lists several recommendations that are important for Indonesia but are unlikely to be feasible in the current MOH policy environment unless conditions change. The team believes, however, that a longer-term view of the current difficulties with the Minister of Health is warranted because the US and Indonesia have been collaborating for many years, and ultimately both countries stand to gain by working together. There are other recommendations that can be implemented because they build on existing programs or because they are not impeded by the current policy constraints (i.e., work with local government health services, academic institutions, private organizations, etc.)

**A. Recommendations not likely to be actionable in the current policy environment**

**Testing and use of H5N1 human vaccine, including Indonesia virus clade 2.1:** If requested, support field trials in Indonesia as human vaccines against the specific H5N1 virus (clade 2.1) become available. (The team is not advocating supporting new vaccine development in Indonesia.) Human H5N1 vaccines to date have been made using other clades of H5N1 (clade 1 initially, clade 2.2 more recently). These vaccines are unlikely to induce an immune response against the Indonesia clade 2.1 virus that will be as strong as the immune response induced by a vaccine made using the Indonesia clade 2.1 virus. Appropriate use of vaccines in prepandemic or pandemic containment could be critically important.

**Recommendation:** When feasible, support Indonesia on testing and appropriate use of human vaccines that induce an immune response against the Indonesian strain of H5N1.

**Regular national reporting of ILI surveillance data:** Reliable surveillance is needed for candidate pandemic influenza viruses. For example, rapidly characterize all new “unidentified” influenza A viruses found via the ILI-surveillance program, through patient isolates, or from any other sources that are initially found to be of an unidentified subtype. Strengthening laboratory capacity must also be a key component of strengthening ILI surveillance.
Recommendation: Ensure laboratory characterization of all influenza viral isolates because one could be the next pandemic virus. Establish automated, routine, and frequent national reporting of ILI surveillance data.

B. Recommendations immediately actionable

Support for pandemic influenza epicenter containment: In addition, support financially and via collaborators at CDC and WHO the further development of detailed operational planning not only for epicenter containment but also for the followup multisector pandemic preparedness already begun at the MOH subsequent to the April 25–27 Bali simulation (what might be termed the “second wave of pandemic preparedness” after the epicenter containment effort). The MOH is essential for leading this effort, but much of the capacity development must be done at the provincial and district levels. Both CDC and CBAIC (USAID) have important roles in this effort.

Recommendation: Increase support for the continued leadership of Indonesia in pandemic influenza epicenter containment and operational planning.

Clinical treatment protocols and case fatality rates: The critical intervention step is to minimize time from onset of illness until first dose of an effective antiviral drug (e.g. oseltamivir [Tamiflu]). Because of the high proportion of patients presenting with H5N1 symptoms at private health facilities, they must have access to antiviral medication and the latest clinical treatment guidelines. By expanding availability and use of pulse oximetry to measure blood oxygen saturation, clinical monitoring of lung function would be significantly improved and allow for earlier oxygen supplementation and earlier intubation of patients if needed (as with SARS). Clinical updates and training activities must include private hospitals and clinics in order to decrease the CFR. This can be built into work already underway supported by the REDI Centre.

Recommendation: Target private health facilities in areas with large numbers of suspect H5N1 patients to reduce the time between symptom onset and first dose of an antiviral drug. Update national clinical treatment protocols designed to decrease the case fatality rate by establishing an expert panel with international participation.

Application of a “point-of-care” rapid (< 3 hour) diagnostic test: The availability of a rapid diagnostic test for the H5N1 virus at the point of care, where a patient is first seen, is a very high priority. If widely deployed to where patients initially seek care, use of this test could sharply decrease the time from onset of illness until the first dose of an effective antiviral drug is given. The CFR should be decreased as a result. Given the current contracts issued by CDC/Atlanta for the development of a low-cost test, one is likely to be available and the USG should support evaluating its practical application in Indonesia.

Recommendations: When available, support the assessment and use, if appropriate, of a non-PCR rapid diagnostic test for H5N1.

Field epidemiology training: With the EC funding through WHO for strengthening and expanding the FETP training programs in the country, and with the opportunity for shorter-term courses for staff at several levels in the health and agriculture services, the USG has an important opportunity to contribute to improving long-term capacity in this area. Skills in epidemiology are still very short in the local government health system and even less available in the veterinary services of the MOA. Support for training is badly needed. At the same time care will be needed to ensure that the GOI is able to assume full responsibility for continuing to support training programs over time.

Recommendation: Initiate support for FETP and short-course epidemiology training for staff in the Health and Agriculture ministries.
Disease surveillance and disease response capacity: Case investigation of ILI diseases, and especially of clusters of unexplained respiratory disease, needs to be improved and systems established. Epidemiologic studies to determine the modes of transmission in humans now increasingly being classified as resulting from indirect or inconclusive exposure to the H5N1 virus are also needed. The volume of testing with reliable laboratory support needs to be increased and strengthened through continued support to the National Influenza Center. Laboratory strengthening must include support for institutionalizing quality assurance systems, which are currently weak (Annex D). The USG should increase support for programs that improve the capacities of Dinas health offices to deal with infectious disease surveillance and response, especially for prompt investigation of disease clusters. The evaluation of the USAID/WHO IS-AI program should provide useful information about how to further improve the program, particularly with respect to its long-term sustainability at the district level. The program will have a better chance of financial support in the future if it is clear that the skills and systems developed will be more broadly useful than just for AI programs.

Recommendation: Increase support disease surveillance, studies, and response capacities, including rapid investigation of disease clusters, by supporting the DSO system and FETP training for provincial and district staff. Increase support for development of the National Influenza Center, including improving laboratory capacity and expanded testing.

D. SOCIAL MOBILIZATION AND BEHAVIOR CHANGE PRIORITIES FOR THE USG PROGRAM

Media and behavior change communications: The practices of poultry producers, marketers, and consumers are critical in prevention of transmission of the HPAI H5N1 virus. Existing capacity of CBAIC volunteers and subdistrict coordinators could be used in conjunction with PDSR and DSOs to improve biosecurity and hygiene practices of producers, marketers, and consumers to reduce the spread of the virus.

In the light of programs supported by other donors, the USG should focus its support for media materials that are to be used directly by the trainers, village-based institutions (village heads, RT/RW, and Dasa Wisma), and sector 3 poultry producers, vendors, collectors, and abattoirs. It should target producers and market chain people (collectors, vendors, distributors) to ensure specific behavior changes in these people to reduce transmission and exposure, and work to improve biosecurity behaviors and practices by sector 3 poultry producers and at critical points in the market chain.

Recommendation: Target commercial producers, marketers, and consumers for behavior change communications to improve biosecurity and hygiene practices to reduce the spread of HPAI in poultry and human exposures.

Social mobilization for surveillance and reporting: Social mobilization will continue to be important. Village level training should be prioritized initially for villages that have had positive AI cases (either animal or human), followed later by other villages. In order to achieve optimum results, we suggest combining the current USG-supported CBAIC and CARE approaches but go further by suggesting targeting of existing formal and informal community-based institutions such as the village head, RT/RW, PKK, and Dasa Wisma organized in a village committee rather than using ad hoc volunteers. The village committee should define a village vision, for example an “AI-Free Village” or something similar. The village committee should use existing networks to improve surveillance and reporting of outbreaks and breakdowns in biosecurity.
Recommendation: Build capacity of existing community-based institutions under village committees for AI surveillance and reporting as well as biosecurity, with the aim of establishing an “AI-Free Village.”

Mobilization of stakeholders for behavior change: The majority of sector 3 producers (contract and independent) operate in the village. Marketers (collectors and vendors), and slaughterhouse staff are predominantly based in rural or peri-urban villages. The poultry industry makes a significant contribution to these economies. It is important from both the health and economic point of view that high standards of biosecurity are established and maintained. Communities that are able to demonstrate they operate enterprises that are free of AI (and other diseases) provide a premium to consumers. Efforts should focus on the development and promotion of “local AI-free poultry products, providers and markets.”

Recommendation: Build partnerships between village committees, the poultry industry, and animal and human public health providers to promote “local AI-free poultry products.”

Advocacy for decentralization of national policy on HPAI H5N1: Provincial and district governments have enormous influence on the function of, and funding for, local agriculture (animal) and health departments. Mass organizations like Muhammadiyah, NU, PMI, the Poultry Association, and various professional bodies (medical and midwifery associations, etc) have the potential to contribute constructively to increase HPAI H5N1 surveillance, control and pandemic mitigation. Muhammadiyah and PMI are already actively involved in these efforts in collaboration with CBAIC. With the programmatic shift from use of volunteers to strengthening institutional capacity, there is potential to work in partnership with the mass organizations to advocate for local government regulations covering producers, vendors, collectors, and consumers.

Recommendation: Build partnerships between mass organizations, industry stakeholders, and professional bodies to advocate for provincial and district regulations to prevent and control transmission of HPAI H5N1.

E. POLICY AND COORDINATION

There is continuing concern with the lack of GOI commitment to HPAI H5N1 control at the national level. The most difficult and potentially damaging policy issue related to H5N1 in Indonesia today is the Minister of Health’s attempts to keep the international community out of the flow on H5N1 information and her decision to prohibit sharing of samples. There also appears to be a growing effort to keep the information away from the media and in some cases, (reportedly) away from even family members. In the long run this will not only damage Indonesia’s reputation and standing in the international community but also isolate its scientists at a time when they badly need contact and open interaction with their peers.

There are also questions about the real level of political support for programs related to AI, which to most senior officials appears to be a relatively insignificant problem. Health officials with whom the team spoke did recognize the potential for viral mutation and the possibility of a pandemic that could begin in Indonesia. But it is understandably difficult for them to muster political support for what may or may not happen when confronted with so many infectious diseases that take a much higher economic and social toll, such as MDR TB, a growing problem in the country.

There are also institutional issues that affect AI pandemic preparedness programs in Indonesia, particularly in relation to the difficult job of coordinating multiple government organizations that must play a role. The special commission established by the government to coordinate AI activities (KOMNAS) has a senior and very capable leader, but he is also leading many other
important government initiatives. KOMNAS has not been able to direct the development of a common vision among the key government agencies or development partners about priority interventions needed to contain H5N1. Multiple experts supported largely by donors have visited Indonesia and made recommendations that have not been consistent, so there is little to ensure a consistent understanding of government priorities.

Development partners meet frequently to discuss AI issues, but meetings with KOMNAS officials are often with those not empowered to make critical decisions. For example, a communications subcommittee of KOMNAS has been tasked with reviewing all media and educational messages; however, their approval is seen as a rubber stamp rather than functioning as a way of ensuring technical consistency or ensuring that materials support strategic priorities. Several donors are providing support to KOMNAS, including USAID, for meetings and operating expenses, which may be a political necessity but the true value of the inputs is questionable. Line ministries like the MOA and MOH have been surprisingly frank about their views that KOMNAS represents little added value.

Two major weakness of the KOMNAS system are the following:

- Despite the President of Indonesia’s appointment of KOMNAS, the political aspirations of the key ministers (health and agriculture) and their parties has direct impact on the capacity of KOMNAS to coordinate activities.

- Decentralization has resulted in structural, functional, and financial impediments (though in some cases advantages) for centrally administered programs. At provincial and district levels there appears to be reasonable coordination between departments responsible, largely due to local networks and relationships. KOMDAs, however, do not appear to be functioning.

Coordination and collaboration among donors and between donors and most government agencies appears to be good. However, coordination among government counterparts appears to be a major constraint at national level, though less of a problem at regional levels.

Recommendation: Current levels of USG support to KOMNAS should continue but should also foster leadership from and priority-setting by provincial and local officials.
V. SUMMARY OF KEY STRATEGIC RECOMMENDATIONS

The following is a list of the key recommendations:

OVERALL RECOMMENDATIONS
USG support for control of HPAI H5N1 in poultry should shift from attention mainly to backyard poultry to a strategy that includes prevention and control of the disease in commercial poultry and the market chain.

Building capacity for H5N1 surveillance and outbreak response and reducing the 80 percent case fatality rate should be the primary areas of focus for the USG program. Steps must also be taken to broaden surveillance for pandemic influenza viruses, improve laboratory capacity, and expand support for pandemic epicenter containment.

USG support to Indonesia for AI prevention and control must be more geographically focused in the western half of Java to improve the impact of the programs on animal and human health.

Current levels of USG support to KOMNAS should continue, but should also foster leadership from and priority-setting by provincial and local officials.

All USG agencies should have project M&E plans to facilitate measuring progress toward prevention and control of H5N1. USAID has the most complete M&E plans.

RECOMMENDATIONS FOR ANIMAL DISEASE CONTROL
There should be a change in strategic focus for HPAI control away from village-based poultry and toward HPAI prevention in commercial poultry sectors and prevention of H5N1 virus transmission along the poultry market chain.

Stronger efforts must be made to encourage district administrations to assume full technical and fiscal responsibility for the PDSR teams.

PDSR activities should be increased in the focus area of western Java and subjected to greater technical supervision to intensify coverage and ensure that meaningful outcomes are achieved.

Village poultry surveillance activities, including PDSR and the CBAIC program, should be focused geographically on western Java, subjected to greater technical supervision, and linkages with disease control personnel improved.

Improving biosecurity, particularly bio-exclusion, should be regarded as the best entry point for reducing HPAI incidence in commercial poultry flocks.

Together with reducing HPAI incidence in commercial poultry flocks, interventions in the value chain to minimize virus transmission are likely to have the greatest impact on HPAI control.

Improving hygiene in large urban markets and initiatives to restructure markets in urban centers should be a key focus of the program.

USG should continue its support of veterinary laboratories, in coordination with other donors, especially with respect to training, provision of consumables, and provision of reference laboratory services.

USAID should continue its support of the OFFLU network in monitoring HPAI virus isolates in Indonesia.
Data collection by PDSR teams should be supplemented by studies spanning all production sectors and along the value chain to characterize the epidemiology of HPAI in Indonesia and provide data for monitoring progress in disease control.

While recognizing that it is difficult to change the direction of work that is already funded and subject to contractual obligations, it is suggested that USG should take advantage of any opportunities to limit its current investment in the planned operations research.

**RECOMMENDATIONS FOR HUMAN HEALTH**

Leverage the concern about and resources for H5N1 and pandemic preparedness to improve the country’s ability to identify, investigate, and contain infectious diseases. Take a longer-term view on the current difficulties with the Minister of Health because the US and Indonesia have been collaborating for many years, and ultimately both countries stand to gain by working together.

**A. Recommendations not likely to be actionable in the current policy environment**

When feasible, support Indonesia in testing and appropriate use of human vaccines that induce an immune response against the Indonesian strain of H5N1.

Ensure laboratory characterization of all influenza viral isolates, because one could be the next pandemic virus. Establish automated, routine, and frequent national reporting of ILI surveillance data.

**B. Recommendations immediately actionable**

Increase support for the continued leadership of Indonesia in pandemic influenza epicenter containment and operational planning.

Target private health facilities in areas with large numbers of suspect H5N1 patients to reduce the time between symptom onset and first dose of antiviral drug. Update national clinical treatment protocols designed to decrease the case fatality rate by establishing an expert panel with international participation.

When available, support the assessment and use, if appropriate, of a non-PCR rapid diagnostic test for H5N1.

Initiate support for FETP and short-course epidemiology training for staff in the Health and Agriculture ministries.

Increase support for disease surveillance studies and response capacities, including rapid investigation of disease clusters, by supporting the DSO system and FETP training for provincial and district staff. Increase support for development of the National Influenza Center, including improving laboratory capacity and expanding testing.

**RECOMMENDATIONS FOR SOCIAL MOBILIZATION AND BCC**

Target commercial producers, marketers, and consumers for behavior change communications to improve biosecurity and hygiene practices to reduce the spread of HPAI in poultry and human exposures.

Build the capacity of community-based institutions under village committees for AI surveillance, reporting, and biosecurity with the aim of establishing an “AI-Free Village.”

Build partnerships between village committees, the poultry industry, and animal and human public health providers to promote “local AI free poultry products.”
Build partnerships between mass organizations, industry stakeholders, and professional bodies to advocate for provincial and district regulations to prevent and control transmission of HPAI H5N1.
ANNEX A: STATEMENT OF WORK

Assessment Team
United States Government Avian Influenza and Pandemic Influenza
Prevention and Control Efforts in Indonesia
(Final: 05-14-08)

I. SUMMARY
Indonesia leads the world in human Highly Pathogenic Avian Influenza H5N1 (AI) infections with 129 confirmed cases and 105 deaths as of February 26, 2008. From a public health standpoint, Indonesia has made minimal progress in control of epizootic disease and early detection and clinical management of humans with disease. Despite efforts to increase public awareness and the triage of suspected patients reporting to reference hospitals, the monthly number of cases remains constant. Indonesia’s case fatality rate—88 percent in 2007—is the highest in the world. The heaviest concentration of reported human cases has occurred in western Java, particularly in Jakarta and its suburb Tangerang. Indonesia lacks basic procedures to limit public health risk. Despite evidence of limited unsustained human-to-human transmission, the Government of Indonesia's (GOI) Ministry of Health (MOH) has been slow to characterize the epidemiology of H5N1 infection and institute effective prevention measures.

International research on risk assessment, virus mutation, and vaccine development has been stymied since Minister of Health Supari blocked human sample sharing in January 2007. Since then, Indonesia has shipped samples from only 6 of 49 patients. Of these, only one virus was isolated and characterized.

Challenges abound in the agriculture sector as well. AI has been rampant in the country since July 2003, with AI poultry outbreaks reported in 31 out of 33 provinces and firmly entrenched in a number of those provinces. With the support of the United States Government (USG) and others, surveillance in nine of the most endemic provinces is providing reliable outbreak reports, yet control and containment of the virus continues to disappoint. International veterinary experts agree that controlling the virus in poultry would take five to ten years of sustained efforts. Decentralization of government authority and budgets to local governments and weak regulatory and monitoring policies across the board further limit the authority of central government to tackle this issue. The GOI has inadequate control over commercial poultry producers, poultry markets, and movement of poultry around the country. Veterinary capacity is also severely limited.

The Ministry of Agriculture (MOA) has not released poultry virus samples to international laboratories since June 2007, despite promises to the contrary. The Mission, along with other partners, is actively engaging the MOA to contribute samples as part of a USG- and AusAID-funded project to develop a new poultry vaccine for Indonesia. The sample-sharing debate is delaying the project and may affect the quality of the output.

II. PURPOSE OF EVALUATION
The GOI’s response to the AI threat has fallen short of previous expectations, both among the international community and within GOI. Although USG efforts to address the issue in Indonesia are up and running, we should assess the efficacy of these efforts in the broader context of Indonesia’s response. This Scope of Work outlines plans to conduct a review of all USG activities to combat AI and Pandemic Influenza (PI) conducted between FY06 to present. The overall
The objective of the assessment is to review USG investments in Indonesia and to make recommendations that could be used to prioritize efforts and establish a road map for future USG assistance.

USG AI control programs have been guided by the U.S. National Strategy for Pandemic Influenza and by emergency supplemental funding from Congress for an emergency push to contain the H5N1 virus. A secondary activity, where possible within the emergency context, is to contribute to a long-term sustainable system for pandemic prevention. The assessment will analyze the situation in Indonesia objectively as detailed in section III below. Findings and recommendations from the assessment will serve as the basis from which the USG will build upon previous efforts and plan future investments to meet the challenges ahead.

Recent changes in the epidemiology of disease transmission and data from selected program activities have raised areas of particular interest to the U.S. Mission in Indonesia that should be addressed in the assessment:

1. Data from confirmed human AI cases indicate that most cases are occurring in western Java and more specifically in Jakarta and Tangerang. Should this region be a priority focus for USG assistance?
2. As a counter point, data from poultry outbreaks indicates that the virus is endemic across most of Java and Bali and parts of Sumatra and Sulawesi. Should USG resources support programs across these areas to reduce the viral load and pandemic threat broadly across Indonesia?
3. Should USG investments remain primarily focused on containment of H5N1 in poultry or transition to a focus on long-term sustainable systems for pandemic prevention (within the limitations of the U.S. National Strategy)?

It is proposed that this assessment take place no later than June 2008.

III. PROPOSED SCOPE OF WORK
A. Background: In order to draw conclusions and propose recommendations, the Team will need to have an understanding of the Indonesian context. Although the Team will not be expected to produce deliverables on this background information, the U.S. Mission in Indonesia expects the Team’s findings and recommendations to be grounded in the realities of what can reasonably be accomplished within a two-to-three-year timeframe in Indonesia and what can position Indonesia for longer-term AI control and pandemic prevention. Thus, the Team will establish:

1. An understanding of AI epidemiology in Indonesia (both poultry and human); and
2. An appreciation for the specific context within Indonesia for AI control programming, including decentralized governance structure, political issues/sensitivities, cultural context, and operational complexities in a country of this size and population.

B. Output: The team will assess all supported AI activities (listed in Section XIII) and efforts to date from other stakeholders for AI/PI control and prevention with a view to documenting the following:

1. Detail and describe constraints, results, effects, and lessons learned from USG and other stakeholder-supported activities.
2. Identify gaps in AI control and pandemic preparedness and prevention, including programmatic, leadership, funding, and geographic gaps.
3. Review current USG goals and objectives and their applicability in the context of GOI and other stakeholder objectives and activities, AI epidemiology in Indonesia, and the political context within Indonesia.

4. Assess level of coordination among USG, GOI, and other stakeholders.

C. The Team will then make recommendations focusing on the following areas:

1. Given the current climate and level of effort by the GOI, as well as support from other donors, recommend and prioritize key areas for USG resources and program support to have the greatest effect on prevention and control of AI/PI.

2. Provide specific program-level recommendations to enhance program results.

3. Outline recommendations for improved coordination among USG, GOI, and other stakeholders.

IV. TEAM COMPOSITION
The Team shall consist of seven international public health and veterinary experts, including:

- Medical epidemiologist with influenza/avian influenza experience
- Laboratory expert with human influenza and/or avian influenza experience
- Veterinary epidemiologist or virologist with avian influenza/poultry disease experience
- Animal health laboratory expert with avian influenza experience
- Behavioral scientist or behavior change expert
- Poultry sector economist
- Team leader.

In addition, the contractor will recruit Indonesian public health and veterinary counterparts to advise and accompany team members in the field. These counterparts will include:

- Indonesian medical epidemiologist with avian influenza experience
- Indonesian laboratory expert with human influenza and/or avian influenza experience
- Indonesian veterinary epidemiologist or virologist with avian influenza experience
- Behavioral scientist or behavior change expert (Indonesian or experience working in Indonesia is strongly preferred).

The USG Avian Influenza Working Group (AIWG) in Jakarta will submit a list of international and Indonesian technical experts to GH Tech for recruitment to the Team. GH Tech may need to supplement this list with GH Tech-recruited experts. In either event, given the importance of filling the team with experts experienced in AI, GH Tech will coordinate with the AIWG in selection of Team members.

The Team Leader should have proven experience as a Team Leader for assessments and evaluations. He/she should be fluent in English and have strong communication, writing, and presentation skills. He/she should have at least 10 years of international development experience. A familiarity with Indonesia development conditions and experience in avian influenza is highly preferable.
The team members should have the following areas of expertise among them:

- Behavior change communications
- Community development
- Implementation of avian influenza human and animal surveillance activities
- Statistical analysis for research and evaluation supporting development projects
- Working knowledge and experience in laboratory assessment of human and/or animal AI virus including animal vaccine development
- Economics related to disease, disease control, and risk reduction
- Indonesian culture, political structure, and economics.

All Team members should have the ability to interact with people from many different social and economic backgrounds. They also should possess excellent writing and presentation skills. The Team will have combined skills and experience in rapid appraisal methodologies (interviews, focus groups, minisurveys, etc.). All Team members must be willing and able to travel to remote areas of Indonesia. AIWG representatives will be available as per a roster to provide background information and history on their specific agency programs for FY06 and FY 07.

V. METHODS

1. Draw on international and national literature and experience.
2. Review background materials and program documentation (see appendix XIV).
3. Review animal and human surveillance data.
4. Attend a 2-day assessment launch workshop. The workshop will be organized by the AIWG with requested participation of a representative from all agencies represented in the AI Action Group (AIAG). The workshop will provide the platform for the assessment a) to engage all USG stakeholders fully; b) to clarify the purpose and expected outcome of the assessment; c) to ensure that all USG stakeholders and assessment Team members are starting from the same frame of reference on the Indonesia situation; and d) to allow for open and transparent discussion of USG concerns.
5. Conduct in-depth interviews, focus groups, semistructured discussion, and interviews, meetings, and field visits as appropriate (see XV).

VI. DELIVERABLES AND ACTION ITEMS

Midpoint briefing to AIWG/U.S. Mission: Halfway through the Team’s visit, discuss any major questions, issues encountered, etc., to apprise the AIWG and other relevant personnel on the Team’s progress.

Debriefing to Mission staff: An exit brief, including presentation of main findings and recommendations, will be presented both orally and in writing (preferably PowerPoint) in bulleted-text format to AIWG.

First draft: The first draft of the final report will be due at the end of the team’s visit prior to departure from the country. The length should not exceed 30 pages (not including appendices, lists of contacts, etc.). This draft will include findings and recommendations for AIWG review.
**Final report:** Based on input and sections drafted by other Team members, the Team Leader will prepare the final draft of the report for submission and processing to the AIWG Jakarta and solicit further input from the AIWG Jakarta staff before issuing the final edited report. The AIWG will have 2 weeks to provide consolidated comments to the draft report left in country. The Contractor will then have 1 week to submit the final revised report. GH Tech will provide the edited and formatted final document approximately 30 days after the AIWG provides final approval of the content. The AIWG would like 25 hard copies and 25 electronic versions (CD) of the final report. The contractor/Team Leader will be responsible for completing the final report on time and for the cost of printing and producing sufficient copies for the AIWG and the AIAG. The report shall include the following sections:

- An Executive Summary (1–3 pages) containing a clear, concise summary of the most critical elements of the report, including recommendations
- A Table of Contents
- Assessment findings following the format described above in the proposed scope of work section (no more than 20 pages)
- Recommendations (no more than 10 pages).

**VII. LEVEL OF EFFORT**

It is estimated that the level of effort (LOE) for this assessment will roughly be as follows:

<table>
<thead>
<tr>
<th>Activity</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Background Reading</td>
<td>2 days</td>
</tr>
<tr>
<td>Travel Days</td>
<td>4 days</td>
</tr>
<tr>
<td>Field Work and Report Writing</td>
<td>17 days</td>
</tr>
<tr>
<td>Editing–Team Leader</td>
<td>5 days</td>
</tr>
<tr>
<td>Team Members</td>
<td>1 day</td>
</tr>
</tbody>
</table>

**TOTAL Estimated LOE:**

- Team Leader: 38 person days
- Other Team Members: 24 person days

While in country, the Team is expected to work a 6-day week.

**VIII. TIMELINE**

The AIWG anticipates that the entire review would be completed within a 5-week period. This would include preparation days, in-country work in Jakarta, and report writing and finalization. The assessment will begin no later than June 2, 2008 in Jakarta, Indonesia.

**IX. LOGISTICS**

1. **Travel:** In general, in-country travel will be the responsibility of the contractor with assistance from USG in-country. There is abundant taxi service in Jakarta, rental vehicles with drivers in most cities in Indonesia, and air travel to regional hubs. Land transportation in the field (local airport to regional offices, regional office to communities) will be the responsibility of the Contractor.
2. Support: The Contractor will be responsible for providing its own workspace (some Jakarta hotels, such as the Borobudur, offer meeting rooms as part of their guest services), office supplies, computers, communications (cell phone rental), and clerical services required. The Contractor will be responsible for employing interpreters to support the team throughout the assessment (the AIWG will provide recommendations for interpreters with AI program experience). The AIWG will supply the necessary contact information and appropriate introductions. The AIWG shall arrange for an administrative assistant to work with the team in arranging in-country travel and transportation, lodging, assistance with providing key documents, scheduling meetings and appointments, and arranging additional resources when required; however, ultimate responsibility for these tasks rests with the Contractor. GH Tech and/or the Team Leader will work with the AIWG Administrative Assistant (AA) to prepare for the assessment prior to arrival in country. The Team Leader will be GH Tech’s primary point of contact with the AIWG and the AIWG AA will be the AIWG’s primary point of contact. Once in country, the Team shall schedule additional meetings as appropriate. The AIWG shall be available to the Team for consultations regarding sources and technical issues during the assessment process.

X. SPECIAL PROVISIONS

1. Direction and Management: The team will work under the direction of the AIWG as the U.S. representative body for the U.S. Ambassador to Indonesia. Contracting and all contracting-related question are the responsibility of the USAID/W Contracting Officer.

2. Six-Day Work Week: A six-day work week while in Indonesia will be authorized under this GH Tech Technical Directive assignment, with no premium pay.

XI. ESTIMATED BUDGET

TBD.

XII. BACKGROUND

Objectives of the USG program (from USG Indonesia Strategy, January 2007)

A. (SBU) Primary U.S. goals regarding avian (AI) and pandemic influenza (PI) in Indonesia:

1. Contain and interrupt transmission of a new, highly pathogenic pandemic influenza A virus strain.

2. Prevent human infections with H5N1 virus now and reduce the risk of human infection with H5N1 virus by controlling H5N1 among poultry, particularly among backyard poultry.

3. Reduce vulnerability to new outbreaks of highly pathogenic avian influenza in the future through improved biosecurity in the agricultural and food-production sectors.

4. Mitigate the economic, social, and security consequences of avian influenza.

B. (SBU) Strategies for achieving these goals:

1. Energize and augment GOI leadership and institutions at the national and sub-national levels, including the private sector, to organize, plan, and execute AI/PI programs, and to assume full responsibility for these efforts over time.
2. Reinforce to the GOI the critical global requirement for transparency and sample analysis, especially regarding human outbreaks, and help the GOI comply with the standards of the revised International Health Regulations.

   - Encourage the GOI to continue and widen the distribution of AI samples taken from animals and humans, and join the World Health Organization (WHO) and the Food and Agriculture Organization of the United Nations (FAO) efforts in this regard; and

   - Strengthen and expand laboratory and epidemiologic surveillance across Indonesia to detect rapidly human and animal infections with influenza A viruses, including H5N1.

3. Develop Indonesia’s core competencies for AI disease mitigation/eradication and PI prevention.

4. Improve the epidemiologic capacity of Indonesian Government units for the detection, investigation, rapid response to, and early containment of human infection with avian influenza A virus and case clusters;

5. Promote community awareness and participation in AI/PI prevention, detection, and control efforts.

6. Promote collaboration between GOI and the private sector to develop and utilize essential infrastructure for AI/PI programs effectively.

7. Promote sustained international cooperation and coordination in the effort to confront AI and the PI potential in Indonesia.

**USG Programs**

1. Department of Defense (DOD)/Naval Medical Research Unit-2 (NAMRU-2)

   a. Technical staff/program management

   b. Influenza surveillance network

   c. DOD Global Emerging Infections Surveillance and Response System (DOD-GEIS)

2. Department of Health and Human Services (DHHS)/U.S. Centers for Disease Control (CDC)

   d. Technical staff/program management

   e. MOH National Institute of Health Research and Development (NIHRD): Surveillance for H5N1 and seasonal flu

   f. MOH CDC Community-based surveillance for AI

   g. MOH CDC Zoonosis program
h. MOH CDC Respiratory disease program: Pandemic planning, epidemic containment
i. CARE International community activity
j. Tangerang Trilateral Project

3. State Department/Embassy Jakarta
k. Policy and diplomacy
l. Technical staff management/coordination

4. USAID
m. FAO—Surveillance and response to AI in poultry, targeted and intensified disease control efforts, poultry vaccine evaluation and development
n. Development Alternatives, Inc. (DAI)—Community-Based AI Control (CBAIC) program
o. International Livestock Research Institute (ILRI)—Operational research on AI control efforts in poultry
p. John Snow, Inc. (JSI)—Logistics support for personal protective equipment (PPE) and decontamination kit distribution and poultry vaccine and related equipment procurement.
q. WHO—active human surveillance
r. Supply of commodities (PPE and decontamination kits)
s. NAMRU-2—Expand human surveillance network
t. Academy for Educational Development (AED)—Behavior change communications and knowledge, attitudes, and practice (KAP) survey
u. Winrock International—Mobile phone- and computer-based rapid reporting system for animal quarantine officers (GDA public-private partnership with subcontractor Voxiva)
v. Technical staff/program management

5. USDA/Animal and Plant Health Inspection Service (APHIS)
w. Technical staff/program management
x. Wet market workshops
y. Veterinary epidemiology workshops
z. Vaccine workshop
aa. Tangerang Trilateral Project

Documents
The AIWG will provide to the Team Leader a list of background and other relevant materials to be duplicated and distributed to Team members. The Team members will be expected to review the materials prior to arrival in Indonesia and will be given two (2) days of preparation time prior
to departure from the United States. The materials (see Appendix) will include, but not be limited to:

- GOI National Strategic Plan for Avian Influenza Control and Pandemic Influenza Preparedness 2006–2008
- National Strategic Work Plan for the Progressive Control of Highly Pathogenic Avian Influenza in Animals
- Avian and Pandemic Influenza in Indonesia—an Integrated U.S. Government Strategy
- National Strategy for Pandemic Influenza Implementation Plan, May 2006
- USAID, USDA/APHIS, CDC, NAMRU2 individual program documents
- The National Committee on Avian Influenza Management and Pandemic Alert (KOMNAS) spreadsheet of AI funding
- AusAid assessment
- World Bank project document
- 2005 USG assessment
- WHO mission: Assessment of Communicable Disease Surveillance Program, 2004
- WHO mission: Assessment of Field Epidemiology Training Program in Indonesia [date?]
- Guidelines and operational plans for rapid containment of epicenter of avian influenza

**Interview/Meeting List**

- GOI National Commission for AI and Pandemic Prevention
- Ministry of Agriculture (Livestock/Animal Health, Quarantine, AI Campaign Management Unit)
- Ministry of Health (CDC, Surveillance, Respiratory, Zoonotic Diseases, NIHRD)
- Provincial and district government leaders, health officials, and agriculture officials
- Government and private laboratories (Balitvet—Agriculture, Yogyakarta Disease Investigation Center (DIC) Laboratory—Agriculture, Eijkman Institute—Health)
- Tangerang Trilateral Secretariat
- UN (WHO, FAO, United Nations Children’s Fund [UNICEF])
- Donors (World Bank, AusAID, Japan International Cooperation Agency [JICA], Canadian International Development Agency [CIDA], and the European Union [EU])
- Program implementers (DAI, ILRI, FAO, Regional Emerging Diseases Intervention [REDI] Centre, CARE)
• Commercial Poultry Producer Association

• Program beneficiaries (animal and human surveillance officers, Indonesian Red Cross, farmers, hospital surveillance sites, etc.)
ANNEX B. LIST OF PEOPLE INTERVIEWED AND SITES VISITED

GOVERNMENT OF INDONESIA
Dr. Endang R. Sedyaningsih Mamahit, Director, NIHRD
Dr. Gindo M. Simanjuntak, Head of Secretariat, Tangerang Pilot Project
Dr. Nyoman Kandung, Director General, Communicable Disease Control, Ministry of Health
Dr. Heru Setijanto, KOMNAS
Dr. Memed Hassan, KOMNAS
Dr. Pendy, Head of Agriculture, Tangerang
Drh. Suhardono, Balitvet
Drh. Susan Noor, Balitvet
Dr. Tjeppy Soedjana, Director General of Livestock Services
Dr. Bagoes, Director of Surveillance, DGLS
Dr. Elly Sawitri, Director of CMU, DGLS
Dr. Daryati, Head of Livestock Services, Yogyakarta Provincial Office
Tri Wahana Adiwidaya, Coordinator, LDCC Yogyakarta
Dr. Walujo Prijono, Vet. Pathologist, DIC Wates
Dr. Tri Bhakti Usman, DIC Wates
Dr. Hadi Jusuf, Hasan Sadukin Hospital, Bandung (phone)
Dr. Budi Mulyono, Medical Services, MOH
Dr. Yekti Proptiningsih, Sub-directorate for Respiratory Diseases, MOH
Dr. Welfred, Zoonosis Sub-Directorate, CDC, MOH
Dr. Elvieda S., Surveillance Sub-Directorate, CDC, MOH

GOI COUNTERPARTS FOR ASSESSMENT
Dr. Anas Ma’ruf, NIHRD
Dr. Agus Wiyono, Head, Sub-Directorate of Bio-security, Directorate of Livestock Services
Dr. Syahrial Harun, NIHRD
Dr.Noeri Widowati, HPAI Campaign Management Unit, Directorate of Animal Health, DGLS, MOA
Dr. Bachtiar Moerad, KOMNAS
US GOVERNMENT
Dr. Petrus BimoWicaksana, USDA Jakarta
Mr. Fred Kessel, Agricultural Counselor, US Embassy
Dr. Andrew Clements, USAID Washington
Dr. Dennis Carroll, USAID Washington
Ms. Lisa Kramer, USAID Jakarta
Dr. Artha Camella, USAID Jakarta
Dr. Frank Mahoney, CDC Jakarta
Mr. Philip Smith, CDC, Jakarta
Ms. Lisa Wagnes, USDA
Dr. Trevor R. Jones, Commanding Officer, NAMRU 2
Dr. Patrick Blair, NAMRU 2, Jakarta
Dr. Patrick Rogers, NAMRU 2, Jakarta
Ms. Joan Mahoney, Dept. of State, Jakarta
Mr. Walter North, USAID Mission Director, USAID/Jakarta
Ms. Collette Marshall, Dept. of State, US Embassy
Dr. Percy Hawkes, Director, USDA Indonesia HPAI Office
Dr. Baso Darmawan, USDA
Dr. Henry Masur, US National Institutes of Health (NIH) Bethesda (phone)
Dr. John Beigel, US National Institutes of Health (NIH) Bethesda (phone)

UN AGENCIES
Dr. Subhash R. Salunke, WHO Representative to Indonesia
Dr. Rick Brown, WHO/Indonesia
Dr. Graham Tallis, WHO/Indonesia
Dr. Gina Samaan, WHO
Ms. Suzanne Dayne, UNICEF
Ms. Lou Scoura, World Bank/Indonesia
Dr. Ivo Claassen, Indonesian-Dutch Partnership Program on HPAI Control
Dr. Lynleigh Evans, AusAID Emerging Infectious Diseases Coordinator
Ms. Robyn Alders, FAO
Mr. Eric Brum, FAO
Mr. James McGrane, FAO
NGOS, UNIVERSITIES, AND OTHER INSTITUTIONS
Dr. Hardianto Soebono, Dean, Faculty of Medicine, Gadjah Mada University
Dr. Sofia Muburika, Gadjah Mada University, Yogyakarta
Dr. Haripurnomo Kushadiwijaya, Chief, FETP, Gadjah Mada University
Mr. Jerry Martin, DAI
Mr. Arie Parikesit, Program Development Officer, CBAIC, DAI
Ms Mayang Fajarwati, Program Development Officer, CBAIC, DAI
Mr. Jonathan Bell, Senior Technical Advisor, CBAIC, DAI
Mr. Getureta, Chief of Party, CBAIC, DAI
Mr. A. Md. Jumari, PDSR Officer, DAI
Dr. Nyoman, PDSR Chief Trainer, DAI
Ms. Maria Busquets, Incoming COP, DAI
Dr Tristan Jubb, Veterinary Consultant, ACIAR project
Dr. Ian Patrick, Project Director, ACIAR project
Mr. Frank Page, Care DAP Project, Tangerang
Dr. Rodney Hoff, Exec. Director, REDI Centre, Singapore
Dr. Bernard Bett, ILRI
Dr. Yirhan Sim, International Sales Manager, Medion (vaccine company)
Mr. Suparman Sastrodimedjo, CP Group
Mr. Anton Supit, Chairman, Association of Indonesian Poultry Producers (GAPPI)
Mr. Don Utoyo, Chairman, Forum Masyarakat Perunggasan Indonesia
Dr. Hartono, Chairman, Pinsar Unggas Nasional
Siti Masyitah Rahma, Community Health and Welfare Division, Muhammadiyah
Dr. Siti Moetmainah Prihadi SPOG. MARS, Deputy Director for National Muhammadiyah
Health and Welfare Council.
Sularno, Community Health and Welfare Division, Muhammadiyah
Dr. Sularno, Deputy Director, for National Muhammadiyah Health and Welfare Council.
Dr. Lita Sarana, Social Service Division, Indonesian Red Cross
SITES VISITED

Tangerang—Banten Province
Poultry market
Tangerang Pilot Project
Tangerang Referral Hospital
CARE Project—GSP Community AI Group, Mecharsari Village, and GRAVIK Community AI Group, Karangsan Village.

Bandung, West Java Province
Dinas Livestock Office
Local Disease Control Center
Medion, Animal Vaccine Company
Poultry market
Poultry slaughterhouse
PDSR urban community site
Dinas Provincial and City Health Offices
Urban Puskesmas (health clinic)
CBAIC volunteers, Bandung Kota, Muhammadiyah

Yogyakarta, Yogyakarta Province
Provincial Dinas Health Office
City Dinas Health Office
Dinas Agriculture Office
Referral hospital
Urban Puskesmas (ILI Surveillance Site)
Wates Dins Health Office
Wates Puskesmas
Wates DIC
PDSR visit
Yogya Public Poultry Market
Bethesda Hospital (private facility)
CBAIC volunteers—Bantul (Muhammadiyah) and Magelang (Indonesian Red Cross)
**Jakarta Hospitals**
Rumah Sakit Penyakit Infeksi (Infectious Disease Hospital)
Persahabatan Hospital

**Labs Visited**
NIHRD Laboratory
Eijkman Institute of Research
Bandung Provincial human health laboratory (Balai Pengembangan Laboratory)
Bandung Provincial human health care hospital (SR. Hasan Sadikin Hospital)
ANNEX C. DOCUMENTS REVIEWED


Avian and Pandemic Influenza—Integrated US Strategy

Avian Influenza Stock Taking Retreat in Jakarta, May 2008 (full set of documents).


CARE International Indonesia: AI Training Modules (poultry, community surveillance, community extension).

CBAIC Project Documents: Project Description, The Avian Influenza Roundup, April 2008; flip charts for training, posters and banners, public service announcements for TV (Lapor, Bakar Kubur).

CBAIC: Community Based Avian Influenza Control, a slide presentation by the Indonesian Red Cross; The Role of Muhammadiyah in Avian Influenza Control & Pandemic Preparedness in Indonesia (Power Point slides by Muhammadiyah).

CBAIC: The Avian Influenza Roundup, a quarterly review of avian influenza control in Indonesia, April 2008; and CBAIC reporting forms.


Development of Influenza Virology and Epidemiological Surveillance Network in Indonesia [CDC-supported project] Progress Reports.


MOH Standard Operating Procedures for the Containment of Avian Influenza Pandemic Epicenter Manuals (9), February 2008 (English translation)


Review Meeting, OFFLU Project, June 18-19, 2008, Jakarta, DepTan (agenda and PowerPoint).

Summary of CDC-Funded Influenza-Related Projects in Indonesia.


UNICEF Public Service Announcements for TV, brochures, and leaflets.


ANNEX D. SOCIAL MOBILIZATION, BEHAVIOR CHANGE, AND COMMUNICATION (DETAILED REPORT)

The aim of social mobilization, behavior change, and communication is to produce improved practices among target groups based on better knowledge and understanding of the situation. An important part of achieving the objectives of the USG Avian Influenza Strategy in Indonesia has been the promotion of community awareness and participation in AI/PI prevention, detection, and control efforts. The principal target groups initially included backyard poultry and live-bird keepers (sector 4), and urban and rural consumers of poultry products. The USG-supported community behavior change and communications activities have been focused on nine provinces in Java (6), Sumatra (2), and Bali (1). This section of the report focuses on projects or project components that have dealt with community mobilization and communication.

KEY RESULTS AND ACHIEVEMENTS

The USG has made important contributions to promoting community awareness and participation through the following mechanisms:

- Production of media and messages
- Community participation strategies
- Training and training materials
- Monitoring and evaluation

**Production of media and messages:** Calendars, training booklets, flipcharts, posters, banners, stickers, flyers, guidebooks, T-shirts, and videos have been produced (approximately 4.6 million units by CBAIC), mostly to be used and distributed by trained village-based volunteers. Standard key messages have been developed and published in a booklet (KOMNAS/CBAIC) for use by relevant government staff. A different version of the booklet was designed by CBAIC for use in the training of village avian influenza coordinators (VAIC).

Production of print media appears to be good but distribution is generally poor. Some posters and leaflets (the “Hand”) were observed at the subdistrict level. Volunteers had received an initial kit of a banner, a few leaflets, and posters. However, there were insufficient quantities to distribute throughout their villages, and not even enough for people who kept backyard poultry. In contrast, piles of posters were observed stacked in the corners of rooms in district health or agricultural offices.

Televised announcements about AI in the early phase of the outbreaks in 2005 and 2006 appeared to have the greatest residual impact on people. In a number of locations people reported that after initial outbreaks and enforced culling of birds (without compensation) there had been reluctance to continue to rear poultry (thus reducing their risk of exposure). Others were afraid to report outbreaks since they did not want to lose all their birds, or cause the loss of their neighbors’ birds. In Yogyakarta, there appeared to be some reluctance of people with suspected AI to report that they had had contact with poultry since it would stigmatize them in their community. (One group of volunteers had used a National Geographic video on the consequences of a pandemic to ‘shock’ the community into action.) Women from the PKK in Tangerang could define the key messages but many others could only say they had heard of AI but were unable to say anything else about it or how to prevent it.
Some VAICs have been creative by making use of “community radio” in their village. Community radio is a low-cost communication means that can be used interactively. It tends to be very popular among local community members. People often appear willing to contribute to its establishment and operational costs, literally increasing their ownership of the service.

Some information in the messages is inappropriate, e.g., “38 degrees C.” Outside urban areas few public health service providers have thermometers, and almost no community members have a thermometer. Hand-washing promotion is a general “healthy” message, but previous surveys indicate that people hand-wash only to “feel good” about their hands (cleaner, smell better) rather than to prevent disease, and soap is only used when the hands are physically dirty to wash out the dirt (Rimbamadja, 2007).

UNICEF was heavily involved in production of the Tanggap Flu Burung (the “Hand”) and the four key messages, as well as the TV public service announcements. In addition it has also been involved in production and dissemination of IEC posters, leaflets, and other materials used by the MOH. JICA and IOM have also sponsored some media production and dissemination. Some directorates in the MOH (e.g., P2M) have developed and produced their own range of media.

Community participation: Since early 2007 more than 20,000 village-based volunteers (VAIC) have been trained in very basic surveillance, prevention, and communication skills (CBAIC Project). Another USG-supported project trained village AI committees and approximately 470 volunteers from the Community Welfare Organization, PKK (CDC-CARE). The US and Singapore Governments funded AI Pilot Project training and established Village AI Task Forces (2 persons per village) to assist the Participatory Disease Surveillance / Response (PDSR) staff in Tangerang City and district.

A major weakness of the community-based volunteer program is the lack of clear village-level action plans and job descriptions for volunteers. Volunteers were not able to express specific results to be achieved within specified timeframes. There was a lack of follow-up mentoring, technical support, and supervision by the volunteer coordinators, local PDSR officers, or DSOs.

The VAIC are managed by two major mass organizations (Indonesian Red Cross [PMI] and Muhammadiyah). Two management models are used. One has a hierarchical structure with defined roles and relationships from each level—village, subdistrict, district, province, and national level. The second management model is one where management coordination occurs directly between subdistrict coordinators and national level managers. This second model does not engender technical follow-up, mentoring, and sustainability.

Selection of volunteers differed between the two organizations; in one the age range of volunteers was broad (18 to 60, selected from active organization members). In the other the age range was narrower: most were of ages that enabled them to discuss and lead initiatives in their villages (apparently selection was largely by the village head).

Managers and coordinators had difficulty in stating how many of their volunteers were currently active. As expected, a higher proportion of those who were most recently trained were active (70 percent) compared to those who had been trained more than a year before (30 percent).

Changes in community behavior appeared variable. In some cases villagers responded to poultry deaths immediately by burning or burying dead birds (Bantul, Central Java), while in others they reported the deaths to the PDSR (Bandung). It is not clear how many poultry deaths were identified by vigilant volunteers but not reported. Awareness of what to do in these cases appeared to be a result of televised national alerts in 2005 and 2006 rather than a product of the volunteer activities.
CBAIC has instituted an incentive grant scheme to motivate volunteers and communities to implement AI awareness-raising, surveillance, and prevention and control activities. Only 198 proposals have been submitted by volunteers from 6 provinces in 2008; 24 volunteers/villages had received grants. This grant scheme is going to be expanded as it is considered effective.

*Training and training materials*: USG-supported FAO training of PDSR staff (approximately 2,000 in 300 districts) including production of training materials and guidelines. As noted above, training booklets were produced and training of community-based volunteers conducted. Training in basic biosecurity practices of small-scale poultry vendors has commenced in Tangerang (CARE). Training packages have been produced on public relations management for senior district and provincial level MOH officials.

*Monitoring and evaluation*: Village volunteers report outbreaks to local coordinators, who in turn are supposed to report to the local PDSR and Disease Surveillance Officers (DSOs) for follow-up testing (PDSRs are attached to the local Livestock Department and DSOs are attached to the local Health Department). Subdistrict volunteer coordinators are supposed to submit reports monthly and whenever notified of poultry deaths by the village volunteer. However, we were unable to view any of these reports. Oral feedback indicated that follow-up was often late. Coordinators and project managers were unable to identify the total number of outbreaks reported, the proportion of reports made by volunteers, or the proportion that were confirmed as AI positive. Routine and outbreak reports are often made to the volunteers/coordinators line manager rather than directly to the PDSR or DSO. Basic M&E systems for volunteers have been recently established (CBAIC). However, in the sites visited there was no regular monitoring of performance on work plans or changes in community-level practices by program managers.

A number of KAP surveys have been or are being conducted by USG-supported projects and other agencies. If repeated again in a few years, they should provide the basis for knowing whether there have been significant changes in the knowledge and practice of AI-related behaviors. These include the baseline survey for CBAIC, a KAP survey for the MOH Disease Control Division, and surveys by CARE, UNICEF, and the Tangerang AI Pilot Project. There is little coordination and sharing of questions, sampling formats, and implementation of KAP surveys.

**CHANGES AND NEW INFORMATION**

Two changes have taken place over the last 12 to 24 months that will influence future selection of target groups, information for dissemination, and key practices and behaviors to be changed. These changes include:

- **Crisis/emergency fatigue**
- **Inclusion of the commercial poultry sector as a source of, and critical for prevention and control of, AI**
- **Endemic status of AI in several provinces in Indonesia**

With the relatively small number of human deaths people no longer perceive AI as an emergency (in one subdistrict of Yogyakarta there had been 412 cases of dengue in the first five months of 2008 and not a single case of sporadic human HPAI H5N1). Public and private institutions are dealing with new crises (fuel, food, inflation, and elections). Interventions designed for an emergency are no longer appropriate (creating awareness of AI in the shortest possible time). Community interventions need to have a longer-term “development” focus. CARE’s village volunteer model and the Tangerang pilot project (both USG-supported) provide some insights into how such activities could function.
Veterinary experts now suspect that AI outbreaks in back-yard poultry are the result of spill-over of AI infection in the commercial poultry sectors (1, 2, and 3). This has clear implications for targeting changes in biosecurity practices and behaviors in those sectors (including vendors and market systems). Commercial poultry workers such as owners, collectors, market vendors, managers, and abattoirs should implement standard operating procedures / practices / behaviors agreed on by the industry to contain other possible, but as yet unconfirmed, means of virus transmission, such as soil, feces, feathers, etc.

EMERGING GAPS

The selection of appropriate standard practices and behaviors to be applied in future depend on understanding of:

- Transmission of AI among poultry (the market chain)
- Transmission mechanisms from poultry to humans
- The interaction between the commercial and backyard poultry sector and urban and rural household economics
- The role of village and subdistrict government officers in partnerships with the commercial sector
- The role of provincial and district governments in prevention of HPAI H5NI in the poultry sector, and pandemic preparedness.

Since our understanding of these issues is still relatively crude, behaviors and strategies to address hypothesized production and market chain problems need to be relatively broad or generic. Some market chain studies have been completed by FAO and the Ministry of Agriculture (MOA). Further studies should illuminate more definitively the point sources of AI and the means by which the virus is transported to other bird populations. Adequate and effective control and monitoring systems (poultry health inspections at various points in the market chain) and registration of ‘actors’ in the market chain are currently not in place.

Registration, regulation, and improvement of the operating standards of poultry markets, abattoirs, and vendors (collectors) are currently not widely practiced. District governments could take advantage of opportunities to promote AI-free poultry products (and increase their tax base). The complex cultural and economic behaviors of traditional “wet” and other informal markets mean that these will be difficult to regulate in the short term; however, introduction of improved practices can start immediately, which will contribute to improvement of the sector in the long term.

Improved understanding of the mechanism by which humans become infected with AI will enable implementation of more effective practices and behaviors for those most at risk of infection.

The surveillance role of village and subdistrict government officers is currently not well recognized for animal health. Over the last three years the MOH has started to roll out the Alert Village (Desa Siaga) program in order to prepare for and deal with local health emergencies and crises. The presence of community-based disease surveillance capacity in the village is one of the Desa Siaga criteria. However, very few of the volunteers knew about Desa Siaga, and very few of the village and subdistrict level health staff knew about the relationship between Desa Siaga and prevention and notification of HPAI outbreaks in birds, or sporadic human cases of H5N1.
The important role of decentralized government in Indonesia does not appear to have been fully appreciated or utilized in the AI crisis. This is partly understandable because the central government assumed a “command” role to manage and coordinate surveillance, prevention and control systems. However, if progress is to be made at district and provincial levels there needs to be much greater involvement and responsibility of regional government.

An example of how influential mass organizations and professional bodies are able to advocate for direct involvement of local government was demonstrated by one of CBAIC’s subcontracting partners. Muhammadiyah took the initiative to advocate to local governments for the issuance of local regulations or laws about AI (Peraturan Daerah – Perda). In Lampung province the governor issued a Perda (we were unable to determine what the regulation covered).

### ANALYSIS OF CONSTRAINTS AND LESSONS LEARNED

As noted above under “Achievements,” considerable progress has been made to increase awareness of AI. However, the following points illustrate some of the lessons learned to date and constraints in improving appropriate AI prevention and control practices and behaviors:

- The emphasis on prevention and control of AI in sector 4 poultry may have been misplaced.
- Awareness-raising and behavior change activities have been spread too widely and too thinly. Volunteers have both insufficient capacity and unclear understanding about how to do a thorough job. Unless they are able to mobilize the community (a great portion of the volunteers are not able to do this), they cannot be expected to do much beyond distributing the printed communication materials.
- The language used in some of the information disseminated is not “user friendly,” e.g., the 38 degrees requirement. Very little interpretation has been provided with the messages.
- Most of the types of media produced so far has been passive (flyers, posters, banners, booklet, leaflet, T-shirts, etc.) rather than interactive.

The volunteer approach is commonly adopted because it seems to offer low-cost opportunities for rapid rollout. However, as HPAI H5N1 outbreaks continue with no clear attenuation of the crisis, it has become clear that there is very little capacity (and willingness) to prevent and control the disease and a potential pandemic. Thus, a more sustained development-oriented approach is required to address these underlying constraints.

Volunteers, by their own admission, are not sustainable in the changing economic environment. Where volunteers function as part of village-based structures and institutions (e.g., RT/RW, PKK, and Dasa Wisma), there should be more clearly defined roles and responsibilities. There needs to be a more systematic approach to preparation and implementation of action plans, followup and mentoring by technical staff (PDSR/DSO), and targeting commercial producers (sector 3 in particular).

Reporting and M&E of activities and performance have been inadequate, ad hoc, and unsystematic. Reporting channels often do not follow functional or management lines. Ownership of information and responses is lacking, with consequently poor coordination and support.

Muhammadiyah has apparently realized the weakness of the current one–volunteer/ one-village system and designed a program and approach that calls for more intensive participatory work with the community, similar to what CARE is doing. CBAIC management seems to concur and has designed a number of innovative interventions to correct the situation, such as the grant reward scheme and plans to train RT/RW.
RECOMMENDED AREAS FOR PRIORITY FOCUS IN FUTURE

(a) Media and behavior change communications

The practices of poultry producers, marketers, and consumers are critical to preventing transmission of the HPAI H5N1 virus. Existing capacity of CBAIC volunteers and subdistrict coordinators could be used in conjunction with PDSR and DSOs to improve biosecurity and the hygiene practices of producers, marketers, and consumers to reduce the spread of the virus.

In the light of programs supported by other donors, the USG should focus its support for media materials that are to be used directly by the:

- Trainers
- Village-based institutions (village heads, RT/RW, and Dasa Wisma)
- Sector 3 workers: producers, vendors, collectors, abattoir staff.

Target producers and market chain people (collectors, vendors, distributors) to ensure specific behaviors are changed in these people to reduce transmission and exposure. Behaviors and practices for biosecurity by sector 3 poultry producers and at critical points in the market chain should be improved.

Considerable investment has been made in training and mobilizing the CBAIC volunteers. These people are a valuable resource to be used over the short and medium term, in partnership with poultry industry managers and PDSR, to deliver IEC materials to producers and market chain people. Systematic planning, targeting, and enhanced monitoring and supervision is likely to result in a greater access to and use of IEC materials for behavior change.

Recommendation: Target commercial producers, marketers, and consumers for behavior change communications to improve biosecurity and hygiene practices to reduce the spread of HPAI in poultry and human exposures.

Recommendation: The choice of media used should not be limited to the conventional ones; alternative media, such as “community radio,” that can be very interactive and popular among the community should be seriously explored.9

(b) Social mobilization for surveillance and reporting

Social mobilization will continue to be important. Village level training should be prioritized initially for villages that have had positive AI cases (either animal or human), followed later by other villages as the budget allows.10 In order to achieve optimum results, we suggest combining

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9 The cost for making community radio is between Rp 5–10 million (less than $1,000) and a community radio can cover one kecamatan. Normally they are funded by community self-help or at least have community contribution. There is already a community radio association that can be mobilized to collaborate in the AI cause.

10 The number of villages in West Java and Banten is about 6,500, Yogyakarta has only about 450, and the west part of Central Java probably has about 5,000, for a total of about 12,000 villages. If we take 50 percent of them (that may need to be prioritized), it makes 6,000 villages. In the CARE project the training costs per village (4 days training for up to 30 participants) is between Rp 3–4 million.
the current USG-supported CBAIC and CARE approaches but go further by suggesting targeting of formal and informal community-based institutions, such as the village head, RT/RW, PKK and Dasa Wisma organized in a village committee rather than use ad hoc volunteers. The village committee should define a village vision, for example, an “AI-Free Village” or something similar. The village committee should use existing networks to improve surveillance and reporting of outbreaks and breakdowns in biosecurity among commercial players that reside in the village.

The following points should be considered:

- Establish provincial Master Trainers’ Teams (number of teams based on size of province, i.e., number of districts/towns).

- Master Trainer Team trains Subdistrict Training Teams (number of teams is based on size of subdistrict, i.e., number of villages)

- Subdistrict Training Team members may be selected from those currently in the CBAIC project and/or from local nongovernmental organizations (as individuals) selected from among those with proven performance or with training and facilitation experience, and as much as possible possess animal health or AI technical knowledge.

- Subdistrict Team members are compensated based on what training they have conducted rather than on a routine salary scheme.

- Subdistrict Teams approach and work with village leaders/elders to activate or revive or form PKK’s Dasa Wisma (groups of ten households) and plan for AI training for the Dasa Wisma leaders (chairpersons) and other village leaders.

- The Subdistrict Team conducts village-level training for Dasa Wisma chairpersons/leaders and other willing village leaders; all trained individuals will become members of a village committee (can be the AI village committee or whatever they aspire to) on voluntary basis. The Subdistrict Team also facilitates formation of the Village Committee.

- Dasa Wisma leaders/kaders should conduct both household level surveillance (animal and human) and behavior change promotion efforts, reporting to the village committee. With only 10 households that are usually close to each other, the task should not be too much of a burden.

- The village committee, in coordination and collaboration with the local (sub-district) Animal Health Office (Puskeswan) should assist in keeping an eye on commercial operations that may be located in the village to ensure that they follow the recommended practices (biosecurity, etc).

- The village committee shall be registered and acknowledged by the district government. Thus “legalized,” the village committee should have the power to watch over sector 3 farmers, village-based slaughterhouse owners, and poultry vendors and invite them periodically to committee meetings so that it has good rapport with them and maintains knowledge of their practices (biosecurity, etc.).

- Subdistrict or district-level special training on biosecurity for sector 3 farmers, slaughterhouse owners, and poultry vendors should be conducted.

Recommendation: Build capacity of community-based institutions under village committees for AI surveillance and reporting as well as biosecurity with the aim of establishing an “AI-free fillage.”
(c) Mobilization of stakeholders for behavior change

The majority of sector 3 producers (contract and independent) operate in the village. Marketers (collectors and vendors) and slaughterhouse staff are predominantly based in rural or peri-urban villages. Consequently, the poultry industry makes a significant contribution to the village economy. It is important from both the health and economic point of view that high standards of biosecurity are established and maintained. Thus mobilization and changes in practices and behaviors of these stakeholders are central to successful reduction of HPAI outbreaks and diminished risk of an H5N1 pandemic. Communities that are able to demonstrate they operate enterprises that are free of AI (and other diseases) provide a premium to consumers. Efforts should focus on the development and promotion of “local AI-free poultry products, providers and markets”.

Recommendation: Build partnerships between village committees, the poultry industry, and animal and human public health providers to promote “local AI-free poultry products.”

(d) Advocacy for decentralization of national policy on HPAI H5N1

Provincial and district governments have enormous influence on the function of, and funding for, local agriculture (animal) and health departments. Mass organizations such as Muhammadiyah, NU, PMI, the poultry industry (Poultry Association), and various professional bodies (IDI, IBI, and PPNI), have the potential to contribute constructively to increased diligence in HPAI H5N1 surveillance, control, and pandemic mitigation.

Muhammadiyah and PMI are already actively involved in these efforts in collaboration with CBAIC. With the programmatic shift from use of volunteers to strengthening institutional capacity, there is potential to work in partnership with mass organizations to advocate for local government regulations covering producers, vendors, collectors, and consumers.

Muhammadiyah has claimed that it is preparing to launch a nationwide movement throughout the organization to battle AI. It is set to adopt AI control as its national program. Many of its members and leaders have important positions in government (including local parliament) or otherwise have good contacts with government officials. Muhammadiyah and similar mass organizations are therefore strategically placed to advocate the government for local government regulations covering producers, vendors, collectors, and consumers.

Recommendation: In partnership with mass organizations, industry stakeholders, and professional bodies, advocate for provincial and district regulations to prevent and control transmission of HPAI H5N1.
ANNEX E. HUMAN HEALTH LAB ASSESSMENT REPORT

June-2008
Jakarta, Indonesia

OBJECTIVE:
This report is concerned with assessment of the laboratory capacity of the government of Indonesia (GOI) for human avian influenza (AI) virus research and diagnosis to identify areas of strength, constraints, gaps, and areas of improvement for enhancement of the GOI laboratory role for better control of the AI virus.

BACKGROUND:
Indonesia consists of five major islands and about 30 smaller groups. The total number of islands is 17,508; over 3,000 of them are inhabited. The country is on a crossroads between two oceans, the Pacific and the Indian, and bridges two continents, Asia and Australia. The distance from one end of the country to the other is approximately the same as the width of the continental United States, although about 81 percent of the total area of Indonesia consists of water. The land area is generally covered by thick tropical rain forest, where fertile soils are continuously replenished by volcanic eruptions like those on the island of Java. Total population is about 200 million, concentrated in only 7 percent of the land area. The government system in Indonesia has central, regional/provincial, and local/district/municipality governments. The central government is headed by the president. There are 33 provinces and 441 districts.

The health care system under the Ministry of Health (MOH), among other sectors, has been decentralized. The MOH laboratory system consists of a central body, the National Institute of Health Research and Development (NIHRD), 8 major provincial labs, and 33 district labs. These laboratories are the only MOH labs concerned with diagnosing human AI infections and constitute the major segment of laboratories that can support the human health care sector in case of an influenza pandemic. MOH in collaboration with national and international research and funding agencies participates in a variety of research activities. Influenza-like illness (ILI) surveillance is one of the major research projects conducted in collaboration with the U.S. Naval Medical Research Unit No.2 (NAMRU-2). Bilateral collaboration between MOH and the Eijkman Institute of Research on AI diagnosis and genetic characterization is also part of the government national plan for the control of AI. NIHRD supervises and supports the 8 provincial and 33 district laboratories in human AI diagnosis.

LABORATORIES VISITED:

1. NIHRD
2. Eijkman Institute of Research
3. Bandung Provincial human health laboratory (Balai Pengembangan Laboratory)
4. Bandung Provincial human health care hospital (SR. Hasan Sadikin Hospital)
National Institute of Health, Research, and Development (NIHRD) Jakarta

Background
The National Institute of Health, Research, and Development (NIHRD) of Indonesia is the part of the MOH that is responsible for all human research activities conducted by the government. The virology lab is the component of NIHRD responsible for all viral disease research activities and diagnosis of viral pathogens. Current research activities in collaboration with national and international bodies include the poliovirus project in collaboration with WHO and CDC, a measles research project, ILI surveillance in collaboration with NAMRU-2, and human H5N1 diagnosis (acting as the national reference laboratory for human AI diagnosis). Lab capacity includes virus isolation measles, polio, and human influenza) using biosafety level 2 facilities, PCR, RT-PCR, real-time PCR, DNA sequencing, serology (HA, HAI, ELISA), AI H5N1, and seasonal influenza PCR assays (following the CDC protocol). Sequencing of HA gene or partial gene is done only to confirm real-time PCR-positive human cases.

Laboratory visited: Virology lab

Areas of Strength: The virology laboratory has some old and some renovated rooms; there are separate rooms for PCR diagnosis of different diseases and separate processing rooms for each step of PCR work (reagent, nucleic acid extraction, and amplification and gel detection). DNA sequencing is performed in a separate room.

The laboratory is well equipped with top technology equipment: DNA sequencing (3 machines; one 16-capillary 3130XL and tow 4-capillary ABI 3130), real time PCR machines (BioRad and Applied Biosystems 7300), conventional PCR machines, computers in every room, ELISA readers, washers, biosafety cabinets, PCR work stations with HEPA filters, microscopes, inverted microscopes, freezers (-30C and -80 REVCO).

Staff working in the virology lab consists of the 15 medical technicians in virus isolation labs, 5 techs for PCR work, 3 bachelor degree technologists who will go for master’s degree study in the USA this year, and one PhD with a background in molecular characterization of viruses and DNA sequence data interpretation.

On the data management level, the laboratory has a WHO accessioning system for polio work; it uses primary computerized forms for lab work, a simple lab worksheet for results archiving, manual log books for sample data accessioning, and DNA sequence data software for editing.

Constraints:

1. Education for lab personnel is limited compared to the level of work being done.
2. Lab space and equipment for surge capacity are limited.
3. Data management system is not up to date.
4. Safety and biosafety program is not up to date.
5. Standard operating procedure and worksheet system does not help in good lab practice and troubleshooting of lab results.
6. Reporting system is not well defined.
7. Lab system for confirming human AI cases is not optimal. It is being performed internally by parallel and separate testing of two samples within the virology lab.
8. Funding for reagents and laboratory supplies is limited.
9. There is a lack of a well-trained and experienced scientist for BSL-3 facility activity.

**Gaps:** The following are topics where gaps were identified and require attention for improvement:

1. Confirmatory system for human cases of H5N1
2. Data management system
3. DNA contamination containment
4. Safety and biosafety program
5. DNA sequence data management and interpretation
6. Good lab practice
7. Laboratory space insufficiency for number of personnel
8. QA/QC program
9. BSL-3 facility plan of maintenance and experience

**Areas for improvement:**

1. Collaboration with other research institutes like NAMRU-2 and Eijkman research institute
2. Lab data management
3. Local or international training for lab personnel on DNA sequence data analysis, archiving, and reporting
4. Bioinformatics training for bachelor’s degree personnel
5. Safety and biosafety program enhancement
6. Good lab practice and sterile technique training for all technician and bachelor degree lab staff
7. Laboratory physical environment for equipment and personnel
8. QA/QC advanced program
9. Funding for laboratory supplies and reagents
Eijkman Institute of Research, Jakarta, Indonesia

Background:
Eijkman institute is a well-reputed research facility in Jakarta. It has been involved in medical research of a collaborative nature with national and international bodies. It is considered, by agreement (MOU) with MOH, as the confirmatory laboratory and virus isolate archiving for human AI H5N1 positive cases. It contains top scientists from Indonesia in various areas of medical research, including viral diseases, bacterial, genetics, pathology and histopathology, fungal diseases, and forensic medicine. I did not have time to inspect various administrative issues, such as standard operating procedures (SOPs), the reporting system, and the safety and biosafety program during this visit.

Laboratory visited: Virology lab

Areas of strength:
1. Well-constructed facility and designed for the research activities within the scope of the work being done
2. High-caliber researchers and lab personnel.
3. Well-equipped laboratory space
4. Advanced laboratory techniques: ELISA, PCR, real time PCR, DNA sequencing, IFA, electron microscopy, pathology and immunohistopathology, in situ hybridization assays, sequence data analysis
5. Well-defined laboratory SOPs and electronic data archiving
6. New BSL-3 facility

Constraints:
1. Limited government funding
2. Lack of enough supplies and reagents for AI work
3. Limited number of lab personnel with background in AI work
4. Limited number of researchers with extensive scientific knowledge on influenza viruses
5. Limited amount of equipment for surge capacity
6. Limited activity in influenza virus research activity, controlled and directed by MOH

Gaps:
1. Limited role in influenza virus research activities
2. Lack of influenza virus experts
3. Lack of influenza virus genetic data interpretation experts
4. Shortage of funds for AI work (reagents, supplies, staff)
Areas for improvement:

1. Funding for AI work
2. Specialized training on AI virus characterization and data interpretation
3. Safety and biosafety advanced training
4. Equipment maintenance
5. QA/QC advanced training

**Bandung Provincial Laboratory: Balai Pengembangan and RS. Hasan Sadikin Provincial Hospital**

Background:

Bandung is the capital of West Java province, located about 180 km (112 miles) southeast of Jakarta; it is the third largest city in Indonesia with a population of over 2.6 million population. There are over 6.7 million people in the greater Bandung regency and metropolitan area. Bandung is rated the fastest-growing urban region in Indonesia. Balai Pengembangan is the referral laboratory and RS. Hasan Sadikin is the referral hospital for the West Java region. Both are equipped for PCR diagnosis of human AI H5N1 and supplied with reagents from NIHRD. Patients referred to the hospital for suspect AI, are being tested at the hospital lab and the provincial lab; regardless of the result, samples are shipped to NIHRD for confirmation of the PCR finding.

Areas of Strength:

1. The laboratory facility in both laboratories (hospital and lab) is well constructed and designed for a variety of lab examinations including blood chemistry, parasitology, mycology, bacteriology, and serology examinations.
2. Both labs are well equipped for AI PCR detection using reagents supplied by NIHRD.
3. Both labs have the minimum number of technical staff needed for the volume of testing previously reported (29 cases in 2007; only 2 were positive).
4. The hospital lab is involved in research activities with national and international bodies but is not yet collaborating on ILI surveillance.

Constraints:

1. Limited funding for operations capacity (reagents, supplies)
2. Lack of research activities for sustained level of performance
3. Limited number of staff (2 technicians and 1 MD clinical pathologist)
4. Limited capacity for a role in surveillance
Gaps:
1. Experience limited in molecular detection of AI
2. Safety and biosafety program
3. Data management
4. QA/QC program
5. Equipment maintenance
6. Lack of capacity to culture viruses for ILI surveillance

Areas for Improvement:
1. Enhancement of laboratory management
2. Addition of a BSL-2 virus culture capacity for ILI surveillance activity
3. Recruitment of with experts in AI diagnosis
4. Specialized training on molecular diagnosis of AI
5. Participation in ILI surveillance activity to maintain a standard level of practical experience

SUMMARY OF RECOMMENDATIONS AND AREAS OF IMPROVEMENT FOR THE MOH LABORATORIES
1. Strengthen core functions of the National Influenza Center capacity, including
   a. Surveillance networks for seasonal influenza
   b. SARI surveillance
   c. Development of lab capacity
   d. Epidemiology capacity enhancement
   e. Identification and characterization of circulating viral strains
2. Enhance the role of the eight regional influenza laboratories:
   f. More active role in front-line testing and identification of AI cases
   g. Seasonal flu surveillance
   h. QA/QC program
   i. Standardized SOPs for all laboratories
   j. Identify a full-time expert for supervising regional lab activity
   k. Provide surge capacity for pandemic situations
   l. Intensify their role in supervising the 33 district labs
3. Increase laboratory surge capacity for surveillance and pandemic situations.
4. Build human resources:
m. Identify a senior epidemiologist for supervising national influenza surveillance activity who should be an international expert or a local scientist who receives extensive training from an international influenza research body like one of the WHO collaborating centers.

n. Train a national scientist to manage the BSL-3 facility in NIHRD and the Eijkman institute of Research.

o. Develop bench strength at the NIHRD for replacement of those who are departing for a master’s degree program.

p. Identify a focal point for QA/QC national program management:
   i. This person should be certified by an international body
   ii. The program should be disseminated to and activated in the regional labs through a training of trainers program on the provincial level. This may need to be extended to the district level as part of a long-term plan.

q. Procure a senior influenza expert with specific expertise in influenza virus evolution, genetic characterization, and bioinformatics.

5. Update data management/information systems on the national/provincial/district levels:
   r. Enhance the accessioning system.
   s. Standardize case investigation forms.
   t. Make the laboratory information system comprehensive.
   u. Develop a feedback bulletin for ILI surveillance results using an Internet-based website implemented locally, with the vision of incorporating it into a global influenza network.

6. Enhance laboratory management capacity:
   v. Require a general GLP course for NIHRD and referral lab key personnel.
   w. Offer QA/QC training courses.
   x. Create a GLP course specific to molecular biology diagnostic labs.

7. Support a national safety and biosafety training program:
   y. Organize regional safety and biosafety training for lab directors.
   z. Formulate a national safety and biosafety program for all laboratories.
   aa. Organize another training for key lab managers on the provincial and district levels (training of trainers).
   bb. Establish a national committee for safety and biosafety to supervise national program implementation on the provincial and district levels.

8. Enforce the role of NIHRD in providing reagents for human AI suspect cases in district labs and hospitals and in remote areas.
For more information, please visit
http://www.ghotechproject.com/resources/