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**Preparing for Pandemic Avian Influenza:  
Quarantine and Global Migration**

A White Paper

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## QUARANTINE AND GLOBAL MIGRATION

### INTRODUCTION

**A strong quarantine system focused on international travelers entering the U.S. will be the first line of defense against Pandemic Avian Influenza (PAI).** Although the system will probably not stop the epidemic from spreading to the U.S., effective screening—and quarantine, if needed—of international travelers entering the U.S. can do the following: Slow the entry of PAI into the U.S., decrease the number of entry points, and be a first point of notification. Strengthening the quarantine system should be an important objective of PAI planning, and should proceed in two phases. Phase I will be a near-term strengthening of the system and preparation for Phase II; Phase II will entail an extremely rapid increase in staffing of the stations and ramping up of associated functions. Our discussion is divided into the following seven strategies:

- ◆ Strategy 1: Strengthen Staffing of Quarantine Stations
- ◆ Strategy 2: Analyze Workflow and Design Associated Training
- ◆ Strategy 3: Improve Data Collection and Information Management
- ◆ Strategy 4: Develop Innovative Information Systems
- ◆ Strategy 5: Enable Powerful Health Communications
- ◆ Strategy 6: Promote Program Evaluation and Research
- ◆ Strategy 7: Simplify Acquisition and Management of Support

### STRATEGY 1: STRENGTHEN STAFFING OF QUARANTINE STATIONS

In the event of an epidemic, rapid staffing of quarantine stations with public-health specialists, medical personnel, administrative staff, and other support personnel (e.g., staff who will direct travelers through thermal scanning stations) will be needed. Now is the time to begin preparing for this rapid staffing by developing expedited hiring processes, immediate training and re-training, and assuring good work flow. In the past, obtaining security and customs clearances for staff to work in the non-public spaces in airports has been a major impediment to rapid hiring, delaying the process for weeks or months. Airports typically do not give private firms approval to have staff work at airports unless their staff are already prepared to apply for security clearances and begin work.

#### Recommendations:

1. Begin identifying candidate personnel immediately, and devise a system that will enable them to be brought on immediately during a putative or real pandemic.
2. Train personnel (now) in the use of thermal scanners.
3. Run drills at the quarantine stations, and assure that findings result in process improvement, new training, staff changes, etc.

4. Immediately send letters of recommendation to all airports with quarantine stations (excluding the 8 airports where there are currently contract staff) requesting that firms be allowed to apply for airport approval to have staff onsite in advance of security clearances being approved.

## STRATEGY 2: ANALYZE WORKFLOW AND DESIGN ASSOCIATED TRAINING

Training programs must dovetail with a thorough evaluation and, as required, a re-engineering of the quarantine functions, from the workflow point of view. Put another way, the training must fit the job, and vice-versa. This is necessary to assure that the relationships, handoffs, and communications channels are understood and synchronized; to make that work, the training programs should be fully integrated with each other. One way to accomplish this is to have the training programs put each type of responder into the larger context of influenza preparedness and related quarantine activities; drills (table-top and actual) should be part of assuring the different actors can work together.

There will be no time for training during a pandemic. Training should be started now, and be continually updated as new medical and epidemiologic knowledge is gained. Quarantine staff—in stations, in state health departments, and at CDC—will require a wide variety of training depending on their role(s) and responsibilities. In addition, it may be critically important for the U.S. to coordinate with—and assist in training—healthcare and public-health workers working in quarantine settings around the world. This training should take advantage of modern learning theory and be based on a clear understanding of the public health problem at hand; and should make best use of the most modern technologies, including Webcasts, satellite broadcasts, CD-ROM and printed materials, and films. Programs should be designed to be cost-effective and highly flexible, as the understanding of the epidemiology of PAI is evolving rapidly.

### Recommendations:

1. Evaluate and, as indicated, re-engineer the quarantine workflow.
  - Create a matrix of staff to be trained as a function of their roles in this workflow.
  - Identify particular staff to be trained, including:
    - Airport and seaport operations personnel in the U.S. and overseas
    - Airline staff and flight crews of U.S. and foreign carriers
    - Quarantine station staff
    - Emergency support staff (e.g., EMTs, police officers, firefighters, national guard)
    - Healthcare staff and state and local public-health staff at facilities accepting infected travelers and/or non-infected travelers subject to quarantine
2. Design curricula for the following:
  - The use of—and fit testing for—personal protective equipment (e.g., respiratory masks)
  - Identification and handling of persons to be quarantined
  - Processing of passengers through thermal scanning, including steps for handling passengers who meet the criteria for quarantine

- Enhanced data collection and management and associated analysis
  - Communications skills for dealing with travelers
  - Media skills for quarantine station staff charged with responding to media inquiries
3. Schedule and implement training for quarantine station staff now.
  4. Identify and reach out to partner agencies at WHO, USAID, and foreign governments; offer to participate in developing and administering training programs.
  5. Assure the most modern training modalities are employed; and evaluate the training with frequently repeated and evaluated table-top and actual drills.

### STRATEGY 3: IMPROVE DATA COLLECTION AND INFORMATION MANAGEMENT

New data collection and management challenges will be faced when screening and quarantining numbers of incoming travelers on an unprecedented scale. Moreover, it may become necessary to screen outgoing passengers (i.e., exit screening). Data will be needed to assess quarantine station activities (e.g., number of passengers screened, quarantined, and ill; station capacity; identification of new epidemic foci). Data will also be needed to drive decision making (e.g., re-routing of airplanes, closing ports, increased screening or automatic quarantine for travelers from certain cities or countries, or even barring entry). Passenger manifests and associated passenger locator data could become crucial adjuncts, and developing methods to acquire and process those data quickly and securely will be critical.

To meet this challenge, it will be necessary to develop innovative ways to rapidly collect and process large volumes of quarantine-related data. In addition to standard methods, consideration should be given to making increased use of portable devices (tablet PCs and PDAs) for collecting and transmitting data from quarantine stations to local, state, and Federal public-health authorities. Bar coding should be used to maximum advantage. In addition, innovative ways to identify and track possibly infectious individuals should be evaluated (fingerprint readers; retinal imaging; facial recognition; RFID). Finally, data standards should be developed for suppliers of outside data, including healthcare facilities, airlines and shipping firms, and vaccine manufacturers and shippers.

#### Recommendations:

1. Carry out formal requirements analyses for data collection on possibly ill people of unprecedented scale in challenging settings (busy airports, large groups of people, possible crowd control/cooperation issues).
  - Evaluate and field test new data collection technologies, including computers (tablets, PDAs), acquisition devices (fingerprint readers, etc.), and input modalities (e.g., bar coding, voice recognition).
  - Study the technical, cost-benefit, legal, and ethical issues related to tracking individuals with fingerprints, retinal scans, facial/voice recognition, and RFID or GPS bracelets).

- Develop and promulgate data standards for healthcare facilities, transport firms, and vendors.
- Equip and train staff in successful technologies.
- Carry out drills to test new methods and associated workflows.

## STRATEGY 4: DEVELOP INNOVATIVE INFORMATION SYSTEMS

It will be vital to quickly improve the information systems that will give meaning to the data collected above. The quickest way to do so will be to use the most modern approaches to information systems development. The most common reason that information systems fail is because the system does not do what the users need it to do, usually because users were not given the opportunity to express their requirements, or their requirements were misunderstood or even ignored—in whole or in part. One way to help assure that requirements are met is to convene facilitated session(s) that focus on defining the *use cases*—a range of scenarios—and requirements; this method is often called *Joint Application Development (JAD)*. The JAD session is attended by the key stakeholders; in this case, the public health community. The JAD leader (not the system developers) is charged with guiding the group through a series of exercises focusing on what information is required, how it is to be used, from whom it should be supplied, and how it will support decision making. By including all stakeholders, a broader solution emerges, which contrasts with the “stove-pipe” solutions which typically emerge within the sub-groups of an organization.

Unlike typical public health events, PAI events will be “managed” by very diverse groups who are not used to collaborating with each other, or, of course, sharing strategic information. A single event-management system designed to track an epidemic and guide response does not exist; such a system will be needed, and must be developed now (components of it may exist and can be building blocks). It will need to capture information such as the nature of events (outbreaks, crises), time, person(s), place, local response capabilities, amelioration strategies, follow-up of exposed and infected individuals arriving in the U.S., and lessons learned. It will have a very diverse population of users, including the following: Epidemiologists, Federal quarantine and other scientific authorities, state and local responders, DHS officials and other emergency management staff, CBOs, and spokespersons, to name a few.

### Recommendations:

1. Identify the classes of individuals who will be responding to PAI.
2. Define their roles and analyze their resultant information needs—probably an iterative and on-going process.
3. Begin—now—a use-case-driven requirements analysis that will allow responders to work together effectively.
4. Develop—now—the system that will be used to identify, track, and manage events.
5. Start testing the system now with drills; refine and re-test the system.

## STRATEGY 5: ENABLE POWERFUL HEALTH COMMUNICATIONS

Rapid and effective *public health-oriented* communications will be of critical importance to managing any epidemic; indeed, the ultimate effectiveness of public health measures such as quarantine, reducing contact, vaccination, and surveillance depend on how well information and messages are communicated and understood. Preventing mass panic and waves of absenteeism that could paralyze essential services—such as healthcare, transport, banking, power/gas, and communications—must be a priority. To that end, it will be essential to have information and messages that are targeted to specific audiences, but also reflect a coherent plan. Special audiences include the following:

- Quarantine-station staff
- Travelers (kiosks, electronic signage, broadcast e-mail alerts)
- Quarantined travelers (what to expect, where to go, how long they will be in quarantine, how to communicate with family, etc.)
- Travel agents and equivalent web sites (Travelocity, Expedia, etc.)
- Airline staff (domestic and possibly foreign)
- Airport and Port staff (quarantine issues)
- Laboratories
- Healthcare personnel (including emergency response personnel, who may have other primary affiliations) and quarantine facilities
- State and local public-health agencies and other government officials
- General public

The full panoply of media channels should be brought to bear, including press releases, PSAs, the Internet (Web sites, chat rooms, broadcast e-mail), and hotlines; considering the diversity of the U.S. population, much of this information will need to be customized for local languages, geography, and ethnic populations. The bottom line is that developing the right risk communication strategies could spell the difference between controlling PAI and an out-of-control epidemic.

### Recommendations:

1. Develop—now—an overarching, integrated plan that provides communications scenarios for various stages of a pandemic.
2. Develop segmented information and messaging for specific populations.
3. Assure a fit between medium, message, and target audience.
4. Begin testing those messages and modalities now; refine and re-test those messages and modalities.
5. Train spokespersons and other key personnel in media relations now.
6. Assure there are secure communications channels (Internet; dedicated phone lines) between Federal experts and policy makers and those who will implement plans.

## STRATEGY 6: PROMOTE PROGRAM EVALUATION AND RESEARCH

The measures described above—staffing and workflow changes, training and technical assistance, improved information handling, and communications—will require rapid evaluation of effectiveness and subsequent fine-tuning. For example, it will be important to assess the effectiveness and accuracy of airline crews in identifying ill passengers. It will also be important to know if data collection, management, and transmission of information are working as planned. There will probably not be time to do randomized trials of different approaches; evaluators will need to work closely with program staff to modify approaches on the fly.

On the other hand, voluminous data will be gathered during a potential pandemic, much of which will have epidemiologic value. Data may include airline flight routes, airport capacity, quarantine station screening results, and associated patterns of morbidity and mortality. Many of these data may be confidential and may be classified as Confidential or even Secret. If rapidly analyzed, these data could be used to measure the effect of public-health measures (e.g., quarantine, vaccination). Modeling and forecasting could be used to understand and help predict disease dynamics and help guide prevention programs.

### Recommendations:

1. Create a program evaluation environment—now—that will support the rapid assessment of programs.
2. Design programs in such a way that their effectiveness can be rapidly assessed, and design them so that they can be modified easily.
3. Foster an environment that will support enough variation in the programs to allow for natural experiments.
4. Establish a research environment—now—that will enable epidemiologic modeling, forecasting, and possibly measuring program effects.

## STRATEGY 7: SIMPLIFY ACQUISITION AND MANAGEMENT OF SUPPORT

During the preparations for a pandemic and during the pandemic itself, key government staff may be forced to divert valuable time away from planning and towards managing the firms and associations providing (or seeking to provide) services. Identifying one firm to serve as an integrator could relieve the government from selecting vendors, overseeing their activities, approving invoices, and other time-consuming tasks that could otherwise be devoted to preparedness planning. A single firm could select and hire, as subcontractors, a range of companies, public and private institutions (such as universities), associations (e.g., ASTHO), and individuals with required expertise, in the same spirit that DoD uses Systems Engineering and Technical Assistance (SETA) services. One could argue that military models and experience may be pertinent to managing PAI.



### Recommendations:

1. Explore alternative management and contracting mechanisms to help the government during an extraordinary period.
2. Investigate the SETA mechanism that DoD uses to manage very large projects.

## CONCLUSION

Quarantine has its practical (and etymologic) roots in the practice of keeping boats with possibly infectious passengers literally “at bay” for 40 days (Latin *quadraginta* forty, ultimately from *kwetwr*- the Indo-European root for *four*). Historically its useful application has been limited by our knowledge of infectious disease epidemiology. We now know a great deal about the period of infectivity of influenza, how it is transmitted, and how it can be locally controlled; and we can thus use modern quarantine practices to both protect the public and return people to work and their families as quickly as possible. Making best use of modern quarantine practices to help moderate PAI will require that we act now.