Perspective Piece

Interagency and Commercial Collaboration during an Investigation of Chikungunya and Dengue among Returning Travelers to the United States

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Abstract. Public health investigations can require intensive collaboration between numerous governmental and nongovernmental organizations. We describe an investigation involving several governmental and nongovernmental partners that was successfully planned and performed in an organized, comprehensive, and timely manner with several governmental and nongovernmental partners.

Public health investigations can require intensive collaboration between numerous organizations, including governmental agencies in multiple jurisdictions and nongovernmental entities. This can create challenges due to the different rules, regulations, priorities, and resources of those who are participating; all of these challenges must be considered and addressed before, during, and after the investigation. In addition, successful coordination of such an effort requires clear definition and designation of roles, establishment of communication channels between partners and leadership, and proper management of tasks. Establishing strategies that address these challenges and lead to successful coordination is an essential part of such an investigation. Further, previous investigations can be helpful resources when planning and conducting future efforts.

In the wake of several recent high-profile large-scale outbreaks, the importance of such cooperation and coordination cannot be underestimated.^{1,2} Additionally, positive and successful interactions between different groups are also needed for smaller-scale outbreaks and focused response efforts related to a larger ongoing outbreak situation.³ A recent study by Millman and others, reporting efforts to assess chikungunya and dengue infections in a group of U.S.-based volunteers temporarily living in the Dominican Republic (DR), serves as an example demonstrating the latter. This investigation was successfully planned and performed in an organized, comprehensive, and timely manner with several governmental and nongovernmental partners.⁴

The investigation was initiated after a request for assistance from a private, Texas-based organization to the Centers for Disease Control and Prevention (CDC) and the Texas Department of State Health Services (TX DSHS). At the time of the request, during Summer 2014, the organization was responsible for more than 140 of their volunteers/staff who were working in the DR, where a large outbreak of chikungunya was occurring. As of May 2014, the Pan

American Health Organization had reported more than 38,000 suspected cases of chikungunya in the DR; by the end of August 2014, this number increased to more than 400,000.⁵ The organization reported to CDC and TX DSHS that five supervisory staff members in the DR were suspected of having chikungunya. Because only a few months had elapsed since the first cases of local transmission of chikungunya were reported in the Caribbean, and the risk to travelers were still being determined, the TX DSHS and the CDC initiated a public health investigation to assess the incidence of chikungunya and dengue in these volunteers/staff. The challenges of this investigation and how they were successfully handled by the various parties involved can serve as examples for subsequent public health investigations involving public and private partners.

Several logistical challenges for this investigation required creative problem solving on the parts of the involved governmental agencies and nongovernmental organizations. The first of these was to address the logistics of conducting a public health investigation in the DR. In addition to obtaining governmental approvals, it would be necessary to coordinate blood sample collection, specimen storage and shipping, and interviews of participants within 3 weeks of initial notification, since that was the first group's scheduled return to the United States. To solve this problem, the Miami International Airport (MIA), rather than an in-country DR site, was chosen as the investigation location, since all volunteers and staff would transit through MIA on three specific days and with a single commercial airline carrier for their return. With this scenario, onsite governmental partners (CDC Division of Global Migration and Quarantine [DGMQ] and U.S. Department of Homeland Security Customs and Border Protection [CBP]) were able to ensure that participant safety and adherence to investigation protocols would be followed in their entirety. In addition, conducting the investigation while the participants were in transit ensured that the blood collection was done in a timely and logistically simpler manner, rather than having to organize the collection and transport of samples and supplies to the participants' home jurisdictions (e.g., local health departments) in the United States.

The second challenge was to obtain the required consents/assents from participants. Because most potential

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FIGURE 1. Passenger flow, participation, assessment steps, and collaborating organizations at Miami International Airport during an investigation of chikungunya and dengue infections in U.S. service volunteers returning from the Dominican Republic, 2014.

participants were minors (< 18 years), it was necessary to obtain consents from parents and assents from the volunteers themselves. This effort was coordinated by the service organization, with assistance from the CDC, and accomplished while the volunteers/staff were still in the DR. This simultaneously allowed participants the opportunity to communicate with their parents about the investigation and reduced the time required in MIA for this process.

The third challenge was that the number of returning volunteers and staff varied for each return date. On all dates, participants were asked to complete a questionnaire and provide a blood sample; however, the process needed to be completed within 45 minutes to ensure participants made their flight connections. To accommodate this tight timeline, it was necessary to match the passenger flow patterns and numbers of participants with investigation personnel/resources for each date. The number of phlebotomists needed was calculated using the number of potential participants, with the assumption that each phlebotomist could complete 4–6 blood draws per hour inclusive of time for preparing equipment, verifying participant identity, labeling specimens, and clean up. The number of CBP officers needed was calculated based on the number of potential participants and available computer stations. Further, CDC calculated the number of personnel needed to escort and organize the participants for blood draws and questionnaire completion at MIA since airport regulations require escorts at all times for all non-airport staff in nonpublic areas. Together, CDC, CBP, the airline, and the service organization optimized the participants' time during

the investigation and in transit by creating a passenger flow plan (Figure 1). This plan capitalized on the availability of a private immigration-processing area in the airport where both immigration and investigation activities could be conducted. If a volunteer and/or a parent did not assent or consent, respectively, to participation in the investigation, the volunteer traveled through the normal immigration processes of incoming airport passengers and bypassed the investigation in the private immigration-processing area.

For the three investigation dates combined, 106 participants completed questionnaires, 102 provided blood samples, and none missed their connecting flights. Tight flight connections did not allow for the blood collection for four participants. Blood samples were transported to the state of Florida's Bureau of Public Health Laboratory in Miami for processing and temporary cold storage before shipment to the CDC for testing. In total, for all 3 days, the investigation involved personnel from the CDC (DGMQ, 12 persons; Division of Vector-borne Diseases, five persons), CBP (10 officers), a commercial airline (four agents), the Texas-based service organization (three headquarters staff), the state of Florida (two persons), and the state of Texas (one person). Results of this investigation indicated that more than 40% of participants showed serologic evidence of recent infection with chikungunya virus, providing needed seroprevalence information on U.S. travelers visiting the DR during an ongoing mosquito-borne outbreak of chikungunya.

Through this collaborative effort, the investigators were able to address all challenges successfully and complete

the investigation in a manner that allowed for the majority of the returning volunteers to be included. Further, the investigation demonstrated how multiple agencies and organizations can collaborate successfully in a public health investigation; all entities communicated extensively before, during, and after the investigation. Although the scale of the investigation was limited, a large number of persons supported numerous moving parts due to complex and changing passenger flow and processing, as well as tight timelines. This model can be successfully applied to future public health investigations. In addition, the investigation benefitted from having CDC infrastructure and staff (MIA Quarantine Station) onsite to coordinate the public health response during an outbreak situation. Such facilities could be of use for future public health investigations and other similar efforts in which trained public health staff are needed at U.S. points of entry.

Threats to the public health and organized responses to such threats remain a reality in public health and tropical medicine as exemplified in recent responses, whether they are large scale or more focused. Moreover, with increasing numbers of people traveling overseas and a significant number traveling through organizations or programs, collaboration and coordination between governmental and non-governmental partners is an essential component of public health efforts aimed toward assessment and protection of the health of both travelers and residents. Therefore, it is important that future public health investigations involving multiple partners from both the public and private sector collaborate and coordinate efforts and resources. This strategy will lead to better science and, more importantly, better practices to protect the health of the public.

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