



Published in final edited form as:

*Clin Infect Dis.* 2014 April ; 58(7): v–vi. doi:10.1093/cid/ciu101.

## Regional partnerships for communicable disease detection and response in the U.S.-Affiliated Pacific Islands

Tai-Ho Chen\*, Eric Nilles\*\*, and Yvan Souares†

\*Division of Global Migration and Quarantine, U.S. Centers for Disease Control and Prevention

\*\*Division of Pacific Technical Support, Western Pacific Regional Office, World Health Organization

†Public Health Division, Secretariat of the Pacific Community

The U.S.-Affiliated Pacific Islands (USAPI) are composed of three U.S. Territories (American Samoa, Guam, and the Commonwealth of the Northern Mariana Islands) and three independent countries (the Federated States of Micronesia, the Republic of the Marshall Islands, and the Republic of Palau). These three countries are affiliated with the United States through Compacts of Free Association, which enable their citizens to travel to, and live and work in the United States without visas or additional screening.<sup>1</sup>

These island jurisdictions experience a number of endemic (tuberculosis, Hansen's disease, enteric diseases such as hepatitis A) and introduced communicable disease threats. Since 2000, the region has experienced outbreaks of cholera (2000–01 in the Federated States of Micronesia<sup>2</sup> and the Marshall Islands<sup>3</sup>), measles (2003 in the Marshall Islands<sup>4</sup>), and a number of emerging vector-borne disease outbreaks, caused by dengue (2004 in FSM, 2011–13 in the Federated States of Micronesia<sup>5</sup> and the Marshall Islands), Zika (Federated States of Micronesia in 2007<sup>6</sup>), and chikungunya viruses (Federated States of Micronesia in 2013). The vulnerability to outbreaks in the U.S.-affiliated and other Pacific islands is heightened by limited epidemiologic and laboratory surveillance capacity,<sup>7</sup> travel patterns that facilitate disease translocation, geographic remoteness that may delay and limit external assistance, small populations with limited specialized human resources, and health care systems with limited surge and tertiary care capacity. Moreover, the introduction of new pathogens into immunologically naïve island populations can result in high attack rates.<sup>6</sup> Increasing rates of noncommunicable diseases, including diabetes and associated conditions,<sup>8</sup> further threaten the resiliency of these communities to communicable disease threats.

The World Health Organization (WHO), the Secretariat of the Pacific Community (SPC), and the U.S. Centers for Disease Control and Prevention (CDC) each support national and territorial health authorities in the USAPI in strengthening detection and response capacity for communicable diseases. A key framework for coordinating technical assistance in the region is the Pacific Public Health Surveillance Network (PPHSN). This network was established in 1996 as a collaborative partnership between 22 Pacific Island countries and territories and technical assistance partners to strengthen communicable disease detection and response capacity.<sup>9</sup> SPC, WHO, and CDC representatives currently serve on the PPHSN

Coordinating Body, along with members from Fiji National University, the Pacific Island Health Officers Association, and representatives from Pacific Island health ministries and departments.

The response to a dengue outbreak in the Republic of the Marshall Islands during 2011–12 highlighted the benefits of enhanced regional coordination among PPHSN and other partners. In October 2011, dengue virus-type 4 was detected by Marshall Islands Ministry of Health (MOH) physicians and laboratory staff. Early detection was enabled by clinical knowledge of dengue and the local availability of dengue rapid diagnostic tests pre-positioned by WHO in public health laboratories throughout the Pacific. Following notification of CDC, WHO, and SPC, daily support conference calls were convened with Marshall Islands health authorities. At the request of the MOH, Hawaii-based CDC staff assumed a coordinating role to guide external partner assistance in support of the extensive MOH outbreak response efforts. A total of 33 formal coordination teleconferences were conducted during October 2011–February 2012. Through these teleconferences, interagency partnerships and assistance from the U.S. Embassy in the Marshall Islands were engaged to coordinate additional support from the U.S. Agency for International Development, U.S. Department of State, U.S. Department of Defense, U.S. Department of Interior, the Association of State and Territorial Health Officers, the Hawaii State Department of Health, U.S. Coast Guard, and the Pacific Island Health Officers Association.

The coordinated international and interagency support enhanced the robust Marshall Islands government response to the outbreak. The MOH established dedicated hospital dengue wards, implemented enhanced epidemiologic and laboratory surveillance, and worked with other government agencies and community partners to reduce mosquito breeding sites and conduct community education for preventing and responding to dengue. CDC and WHO staff provided epidemiologic and entomologic technical assistance and conducted dengue clinical management training. CDC provided reference laboratory testing. CDC, WHO, and SPC provided laboratory supplies, including dengue rapid diagnostic test kits. U.S. Naval Medical Research Unit 2 deployed a five-person vector-control team, including personnel from Navy Environmental and Preventive Medicine Unit 6, to support Marshall Islands government pesticide application efforts. The vector-control team was later augmented by three Japan-based personnel from U.S. Army Public Health Command Region-Pacific.<sup>10</sup> Epidemiologic investigation guided vector-control activities. U.S. Coast Guard aircraft on unrelated missions transported the Department of Defense vector-control team from Hawaii to the Marshall Islands and assisted with transport of diagnostic specimens. The Hawaii Department of Health donated mosquito larvicide that was transported at no charge by United Airlines. The Association of State and Territorial Health Officials worked with a nongovernmental organization (Direct Relief USA) to facilitate donation and shipping of insect repellents (valued at \$100,000) for the Marshall Islands and Federated States of Micronesia (which was experiencing a discrete but concurrent dengue outbreak). Of the more than 1,600 suspected dengue cases reported among persons in the Marshall Islands during this outbreak, 10% were hospitalized and none were fatal.

Large disease outbreaks can quickly overwhelm the capacities of small Pacific island health departments and coordination of external organizations and agencies can be a challenge to

manage effectively. More than fifteen external organizations and agencies were involved in the RMI dengue outbreak response and, because of the large number of partners, the Marshall Islands MOH requested CDC assistance to coordinate external partner support. The regular teleconference calls between the MOH outbreak response team and all external partners assured that gaps were identified and communicated, facilitated smooth and well-coordinated external partner response activities, and enabled timely external partner updates. When compared to other large disease outbreaks in the Pacific that lacked a dedicated external partner coordination mechanism, the external partner response in Marshall Islands was smooth, effective, and efficient and provides a model for responding to future large outbreaks in the Pacific and beyond.

## References

1. Feasly, JC.; Lawrence, RS., editors. Institute of Medicine. Pacific partnerships for health: charting a course for the 21<sup>st</sup> century. Washington, DC: National Academy Press; 1998.
2. Kirk MD, Kiedrzyński T, Johnson E, et al. Risk factors for cholera during an outbreak in 2000: lessons for Pacific countries and territories. *Pac Health Dialog*. 2005 Sep; 12(2):17–22. [PubMed: 18181490]
3. Beatty ME, Jack T, Sivapatingam S, et al. An outbreak of *Vibrio cholerae*O1 infections on Ebeye Island, Republic of the Marshall Islands, associated with use of an adequately chlorinated water source. *Clin Infect Dis*. 2004; 38(1):1–9. [PubMed: 14679441]
4. Hyde TB, Daya G, Langidrik JR, et al. Measles outbreak in the Republic of the Marshall Islands, 2003. *Int J Epidemiol*. 2006; 35:299–306. [PubMed: 16299123]
5. Centers for Disease Control and Prevention (CDC). Dengue outbreak—Federated States of Micronesia, 2012–13. *MMWR Morb Mortal Wkly Rep*. 2013; 62:570–573. [PubMed: 23863704]
6. Duffy MR, Chen TH, Hancock WT, et al. Zika virus outbreak on Yap Island, Federated States of Micronesia. *N Engl J Med*. 2009; 360:2536–2543. [PubMed: 19516034]
7. Kool JL, Paterson B, Pavlin BI, et al. Pacific-wide simplified syndromic surveillance for early warning of outbreaks. *Glob Public Health*. 2012 Aug; 7(7):670–681. [PubMed: 22823595]
8. Hosey G, Aitaoto N, Satterfield D, et al. The culture, community, and science of type 2 diabetes prevention in the U.S. Associated Pacific Islands. *Prev Chronic Dis*. 2009; 6(3):A104. [PubMed: 19527576]
9. Pacific Public Health Surveillance Network. Available at: <http://www.spc.int/phs/pphsn/>.
10. Harrison DJ. NAMRU-2 responds to Marshall Islands dengue outbreak. *Navy and Marine Corps Medical News*. 2011 Dec.;4. Available at: [http://issuu.com/navymedicine/docs/mednews\\_december\\_2011](http://issuu.com/navymedicine/docs/mednews_december_2011).

### Editorial

The vulnerability of island countries and territories to new pathogens has been recently highlighted by the translocation of chikungunya virus in the northern Pacific (Federated States of Micronesia) and Caribbean and the introduction of Zika virus in French Polynesia. Regional coordination of technical assistance is an important approach to addressing the needs of island jurisdictions. In the featured case, interagency coordination among regional partners in support of the Ministry of Health enabled a broad and complementary array of resources to be deployed during a recent dengue outbreak without duplication of effort or deployment of unnecessary resources. This coordination allowed for providing epidemiology, surveillance, and laboratory resources specifically identified as needed to respond to the translocation of these vector-borne diseases in the region. Recent outbreaks of vector-borne disease in the Pacific and elsewhere also highlight the need for enhanced local capacity for mosquito surveillance and control. Partnerships such as the PPHSN can play key role in supporting such capacity development by coordinating efforts among numerous partners. In the Pacific, PPHSN has coordinated support for public health capacity development through joint epidemiology training workshops and laboratory networking, and by exploring new training models for the region, including field epidemiology training. Regional networks such as the Pacific Public Health Surveillance Network can facilitate enhanced coordination both during acute outbreak response and through ongoing public health capacity development activities.