

## Notes from the Field

### Tuberculosis Control in the Aftermath of Hurricane Maria — Puerto Rico, 2017

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On September 20, 2017, Hurricane Maria made landfall in Puerto Rico as a Category 4 storm, with sustained winds of 130–156 miles per hour, and 15–40 inches of rain causing catastrophic flash floods. The storm destroyed electricity and communication systems, left large areas without water service, and caused widespread damage to critical infrastructure, transportation, health care, and agriculture. On the sixth day after the event, 58 (84%) of 69 hospitals on the island had no electric power or fuel for generators (1). The devastation led to declaration of a major disaster, just 10 days after a similar declaration for Hurricane Irma, a Category 5 storm that left 1 million Puerto Ricans without electricity after its center passed approximately 57 miles north of Puerto Rico (2,3). Although the island's entire population was affected by Hurricane Maria, the poorer, more remote, and economically disadvantaged communities, as well as those with larger numbers of bedridden and elderly persons, fared worse (4) because they had less access to already depleted health care services, more fragile homes, and no alternative means for electricity generation.

The Puerto Rico Department of Health Tuberculosis Control Program (PRTB) conducts tuberculosis (TB) surveillance and control activities through six regional clinics, directed by a central office in San Juan. PRTB uses directly observed therapy as the standard of care to ensure adherence to treatment. Beginning in mid-2016, PRTB had transitioned some patients from self-administered or directly observed therapy to video-observed therapy (vDOT) using a smartphone. However, the widespread and extended interruption in power and wireless communication made vDOT unavailable after the hurricane.

In anticipation of the hurricane, as specified in its preparedness plan, PRTB provided all patients receiving treatment for active TB with a 1-month supply of anti-TB medications before the hurricane and encouraged patients to tell health officers at shelters about their diagnosis if they had to be relocated from their homes. The Puerto Rico Department of Health recommended that shelters implement screening procedures for infectious diseases, such as rabies, TB, leptospirosis, and others, at the time of entry. PRTB resumed minimal operations on the fifth day after Hurricane Maria passed, with few staff

members able to report for duty, and prioritized contacting patients receiving treatment for active TB. Among 27 high-priority patients with active TB, 19 (70%) were accounted for within 15 working days and all 27 (100%) within 21 working days after the hurricane. Consistent with lessons learned after Hurricane Katrina, all patients with active TB received a 1-month supply of medication (5); therefore, no patients experienced an interruption in treatment, nor were any lost to follow-up because of the hurricane. PRTB notified two U.S. state health departments about noninfectious patients moving to their states; both patients were able to continue their treatment without interruption.

The PRTB laboratory was severely damaged. To maintain TB surveillance capacity, PRTB received assistance from CDC's Division of Tuberculosis Elimination, Laboratory Branch, the Association of Public Health Laboratories (APHL), three state APHL laboratories (Florida, Georgia, and Virginia), and the CDC Foundation to transport and test clinical specimens for *Mycobacterium tuberculosis*. The first package of *M. tuberculosis* specimens was sent on October 17, 4 weeks after the disaster (6), and the process continued until local laboratory testing resumed in July 2018.

This natural disaster led PRTB to strengthen its preparedness plan. Although PRTB patients fared better than did patients with acute and chronic conditions in terms of access to medications (7), PRTB identified that it is imperative to ensure that a minimum 2-month supply inventory of TB medication be available in each regional clinic to be able to anticipate postdisaster needs and delay of external aid in similar disasters (5). In addition, and complementary to the PRTB response plan, each regional clinic needs to develop its own emergency response plan, identifying resources, availability of health services and transportation, and potential needs, taking into consideration social and economic circumstances of its patients.

The unprecedented destruction in Puerto Rico caused by Hurricane Maria challenged TB control, but PRTB's limited personnel, in collaboration with partners, were able to maintain treatment and access to TB laboratory services. In addition, this multiagency collaboration, along with the successful preparedness plan, mitigated the impact on TB public health service delivery despite major societal and infrastructure disruption associated with possibly the worst natural disaster ever to hit the island.

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