Perspective Piece

Why Did Zika Not Explode in Cuba? The Role of Active Community Participation to Sustain Control of Vector-Borne Diseases

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Abstract. As the global public health community develops strategies for sustainable Zika prevention and control, assessment of the Cuban response to Zika provides critical lessons learned. Cuba's early and successful response to Zika, grounded in the country's long-standing dengue prevention and control program, serves as a model of rapid mobilization of intersectoral efforts. Sustaining this response requires applying the evidence generated within the Cuban dengue program that active community participation improves outcomes and is sustainable and cost-effective. There is also a need for implementation science efforts to assess the transferability of lessons learned from Zika prevention and control to other pathogens and from one context to another in addition to how to take these efforts to scale.

Fueled by the increased movement of people around the world that is characteristic of globalization, arboviruses have spread rapidly in the Americas in recent years.¹ Zika virus is transmitted by the bite of an infected female *Aedes aegypti* mosquito, which also serves as the vector for yellow fever, dengue, chikungunya, and other viruses. The Zika virus can also be transmitted sexually.² Diagnosis is challenging due to the fairly generic symptoms (or absence of symptoms), short period of viremia, and limited sensitivity of diagnostic tests.¹ Zika virus is considered responsible for adverse fetal outcomes, such as microcephaly and congenital malformations of the brain, in infants who are infected by their mothers in utero.³ Zika virus has been associated with Guillain-Barre Syndrome, an autoimmune condition that causes paralysis.³

The emergence of microcephaly in Brazil initially raised global awareness of Zika virus, with the greatest number of suspected cases to date (200,465) followed by Colombia (95,793), Venezuela (58,591), Martinique (36,445), and Honduras (31,648).⁴ Increasing reports of locally transmitted cases of Zika in the United States and Asia suggest the potential for a global epidemic. In contrast, Cuba has only three confirmed cases of locally transmitted Zika.⁴ Approximately 30 cases of Zika identified in Cuba were initially imported among Cubans working abroad. A limited number of autochthonous cases was further reported.⁵ As the global public health community develops strategies for sustainable Zika prevention and control, assessment of the Cuban response to Zika provides critical lessons learned.

The Cuban response to Zika was early, driven by political will, and grounded in a universal health-care system, including a highly effective dengue prevention program.^{6,7} Cuban health officials declared a national alert for Zika in December 2015, before any cases had been detected.⁴ This early response, informed by World Health Organization guidelines for Zika control, facilitated the allocation of human and financial resources to mobilize a robust

prevention campaign.^{3,6,8} Key strategies of this intersectoral campaign included vector control, surveillance, training of health professionals, and communication and mobilization. Intense vector control began early in 2016 with comprehensive treatment with adulticides within and around residential areas and chemical ("themefos") and biological ("Bactivec") larvicides to eliminate breeding sites.^{3,4} Active surveillance of all cases of fever and all pregnant women (symptomatic and asymptomatic) was implemented along with intensified surveillance of symptoms, laboratory samples, and neurological and autoimmune consequences of Zika. A third critical component was training health professionals in all facets of Zika transmission and treatment. Lastly, risk communication and mobilization were used to raise awareness about Zika and facilitate participation.⁶ The existing arbovirus communication strategy was updated early in 2016 to support vector control and surveillance activities. This strategy included mass media communication with messages promoting preventive behaviors at the individual, family, and community level to eliminate or treat *Aedes* breeding sites. Specific messages were developed for target populations, such as pregnant women, health-care providers, and travelers. In addition to risk communication, community health forums were held to inform communities about vector control strategies, breeding sites, and suspected cases of Zika, and to collectively generate solutions to intra- and peridomestic risks and promote the adoption of preventive practices.

The integration of these strategies may have effectively stalled the entry of Zika into Cuba. Moving forward, sustaining Zika prevention and control efforts will require a shift from passive forms of community participation focused on individual behavior change, such as risk communication and information provision, to more active forms of community participation focused on generating greater autonomy in decision-making and a collective commitment to prevention and control at multiple levels of society.^{9,10} Active community participation requires a change in goals and values and entails program managers, communities, and other key stakeholders sharing in the process of decision-making.

Through a series of quasi experimental studies, randomized control trials, process evaluations, and cost analyses

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conducted in Cuba since 2000, researchers have documented that including active community participation in dengue prevention efforts contributes to controlling *Aedes* infestation levels, improving preventive behaviors, and reducing dengue transmission and attack rates.^{9,10} Additionally, community participation in dengue prevention is demonstrated to be cost-effective and sustainable.^{9,10} Although this evidence base was generated in the unique context of the Cuban health system, the lessons learned about the need for community capacity-building (e.g., on shared leadership and decision-making, strategic planning, designing local communication activities for behavioral changes) and organizing (e.g., identification of change agents and establishing teamwork mechanisms) to foster participation, can be transferred to other settings where, paradoxically, weaker health and social protection systems may create even greater opportunities for communities to play an active role.

Cuba's early and successful response to Zika serves as a model for the global public health community of rapid mobilization of intersectoral efforts. Sustaining this response requires applying the lessons learned regarding the critical role of active community participation in dengue prevention to sustain Zika prevention and control. There is also a need for implementation science efforts to assess the transferability of lessons learned from one pathogen to another and between different countries in addition to how to take these efforts to scale.

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REFERENCES

1. Stamm LV, 2016. Zika virus in the Americas: an obscure arbovirus comes calling. *JAMA Dermatol* 152: 621–622.
2. Oster AM, 2016. Interim guidelines for prevention of sexual transmission of Zika virus: United States, 2016. *Morb Mortal Wkly Rep* 65: 120–121.
3. World Health Organization (WHO), 2016. *Zika Virus, Microcephaly and Guillain-Barré Syndrome Situation Report*. Geneva, Switzerland: WHO.
4. Pan American Health Organization (PAHO), 2016. *Zika Suspected and Confirmed Cases Reported by Countries and Territories in the Americas Cumulative Cases, 2015–2016*. Washington, DC: PAHO/WHO.
5. Pan American Health Organization (PAHO), 2017. *Zika-Epidemiological Report Cuba*. Washington, DC: PAHO/WHO.
6. Gorry C, 2016. Cuba confronts Zika: all hands on deck. *MEDICC Rev* 18: 6–10.
7. Reardon S, 2016. Mosquito guns and heavy fines: how Cuba kept Zika at bay for so long. *Nature* 536: 257.
8. Pan American Health Organization (PAHO), 2016. *Zika Virus Infection: Step by Step Guide on Risk Communications and Community Engagement*. Washington, DC: PAHO/WHO.
9. Toledo M, Pérez D, Castro M, 2014. Contribuciones de la participación comunitaria en el control del mosquito *Aedes aegypti* y la prevención del dengue. Guzmán M, ed. *Dengue*. La Habana, Cuba: Editorial de Ciencias Médicas.
10. Pérez D, Castro M, Manuel Álvarez Á, Sánchez L, Toledo ME, Matos D, Van der Stuyft P, Lefèvre P, 2016. Traslación a la práctica de estrategias de empoderamiento en la prevención del dengue: facilitadores y barreras. *Rev Panam Salud Publica* 39: 93–100.