Epidemiology of Dengue in St. Lucia 2006 to 2011: An Increase in Incidence

A Roess[1], N Puntambekar[1], Richard Skolnik[1], Alvin Caesar[2]

INTRODUCTION

Dengue is a viral disease and a major threat to public health, with more than 50 million people infected globally every year (1, 2). During the past three decades, the Caribbean region has confronted cyclical outbreaks of dengue occurring every three to five years (3). The control of dengue is a priority for the Ministry of Health (MOH) in St. Lucia but obstacles to its control include difficulty in controlling the vector population, lack of public awareness regarding risk factors, and a fragmented surveillance system for tracking cases and implementing outbreak prevention measures.

Keywords: Dengue, epidemiology, St. Lucia

From: [1]George Washington University, Washington, DC, USA. [2]Ministry of Health, Castries, St. Lucia

Correspondence: Dr A Roess, Department of Global Health, George Washington University, Washington, DC, USA. E-mail: aroess@gwu.edu

The Study

Information on dengue cases reported between 2007 and 2011 was collected from the St. Lucia surveillance system and trends were examined. The St. Lucia surveillance and reporting system receives reports of dengue cases each week from the island's two public hospitals (Victoria Hospital and St. Jude's Hospital) and the 33 regional health centers located throughout the island. The estimated population of the island of St. Lucia during the study period was just over 181,000 (4).

CASE DEFINITIONS

Many people who are infected with the dengue virus for the first time display mild or no symptoms. However, for those cases displaying clinical effects, symptoms can include headache, muscle aches, joint pain, or rash (5). The MOH tracks both suspected and laboratory-confirmed cases of dengue. Panbio® Dengue Early Rapid tests were used to confirm suspected cases, and all patients presenting with IgM positive rapid test results were included in the laboratory-confirmed tallies; however, positive IgG test results were excluded. This is significant to note because a positive IgG test result revealed that the patient has had a past exposure to the virus and the level of risk, but s/he was not necessarily in the disease state at the time of serum sampling. A positive IgM blood test represented the actual disease state or primary dengue infection. The Panbio® Dengue Early Rapid tests are used for detection of the NS1 antigen in serum, and should be used in conjunction with other dengue serology tests.

In order to verify viral exposure, an additional rapid test was completed after the fifth day of exposure in order to also rule out any false negative test results. If there were any uncertain test results produced by the laboratory at Victoria Hospital, these serum samples were then sent

on to Caribbean Epidemiology Centre (CAREC) for secondary testing and re-confirmation of results, and genetic typing. The majority of cases were reported during August and September. In 2010, the serotypes of DENV 1 (9 cases), DENV 2 (1 case), and DENV 4 (5 cases) were identified, and there were two cases of DHF, but no deaths were reported (See Figure 1).

Since 2006, the St. Lucia MOH has generally recorded an increase in the number of cases of dengue annually with surges in cases occurring in the middle of each year during the rainy season (See Figure 2), which lasts roughly from July through November. Beginning with 2006 through 2008, there appears to have been a marked increase in the number of cases. However, the prevalence decreased significantly the following year, 2009, even through the months of the rainy season months. In 2011, there were a record 758 confirmed cases of dengue in St. Lucia, which equates to a prevalance rate of 45.40 cases of dengue per 1,000 population. The MOH also keeps serology records. However, most of these records are incomplete with most of the serotypes remaining classified as "unidentified" or "unknown" in most official medical records.

There has been a significant increase in the number of cases, not only in St. Lucia, but also in other similar countries in the Caribbean region (3). For example, Puerto Rico is one of the Caribbean countries with the highest number of cases of dengue and it has seen an increase in the incidence since 2002 (3). This high incidence may be caused by Puerto Rico's extremely unpredictable precipitation and weather patterns, which affect mosquito vector populations, and therefore dengue transmission (6). Fortunately, the CDC's Dengue Branch is located in San Juan, and for the past 30 years, it has conducted laboratory-based passive surveillance for the Puerto Rico Department of Health. This is very similar to efforts being employed by the St. Lucia MOH (7). Thus, St. Lucia's population and health sector are not alone in their attempts to curb the spread of dengue; rather, there is a regional outbreak of this vector-borne disease.

Our results may underestimate the true incidence of dengue in St. Lucia because not every patient presenting with dengue-like symptoms is tested for the virus. In addition, more than half of those infected with dengue may be asymptomatic (2). This issue of misrepresentative reporting is not just an issue in the Caribbean region, but in many regions where dengue has become endemic in the past decade (8).

CONCLUSION

The increase in the number of dengue cases in St. Lucia is a clear indication that a dengue epidemic occurred in 2011. The increase in number of recorded dengue cases may have occurred due to increased rainfall and other ecological factors, or perhaps due to improvements in surveillance, improvements in clinical awareness of dengue, and better diagnostic testing. In order to reduce the incidence of dengue, the St. Lucia MOH has launched comprehensive multi-sectoral risk communications and vector management programs throughout its health regions (3, 9). Through various programming efforts, health officials have been encouraging community members to eliminate cans, bottles, tires, and other receptacles that can collect rainwater so they can prevent larval habitats from forming. In addition, in order to curb future spread of this disease, MOH officials and IT experts are working to establish a formal surveillance network to track and monitor these cases, and determine where incidence rates are highest on the island. They hope that this system may assist in taking a more proactive approach to controlling dengue and help the general population take preventative measures in helping to control the vector at the community level. It is critical to establish better national surveillance methods, and also to emphasize the impact of dengue in St. Lucia, which, in today's highly-globalized world, could affect countries beyond the Caribbean region.

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AUTHORS' NOTE

Authors declare no conflict of interest.

Biography for First Authors

Ms. Nisha Puntambekar completed this research as part of a Global Health Service Fellowship awarded for fieldwork to fulfill her MPH practicum requirement. Currently Ms. Puntambekar serves as a Research Associate for health policy research projects at the George Washington University. Dr. Amira Roess is an assistant professor at the Department of Global Health at George Washington University. She is an infectious diseases epidemiologist.

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Type	2006	2007	2008	2009	2010	2011
DENV 1	0	0	0	0	9	11
DENV 2	0	9	14	0	1	-
DENV 3	0	2	0	1	0	-
DENV 4	3	9	0	0	5	-
DHF	0	0	10	0	2	21
Unknown	13	32	83	17	78	726
Total	16	52	107	18	95	758

Fig 1: Serotype Distribution of Confirmed Dengue Fever Cases (2006-2011).

CAPTION: This table shows the tallies of serotypes of confirmed dengue fever cases that were analyzed by the MOH Epidemiology Unit. The annual number of cases of dengue fever occurring in St. Lucia has been increasing since 2006, with a dramatic increase in 2011. However, this may be due to the fact that surveillance and reporting has increased recently.

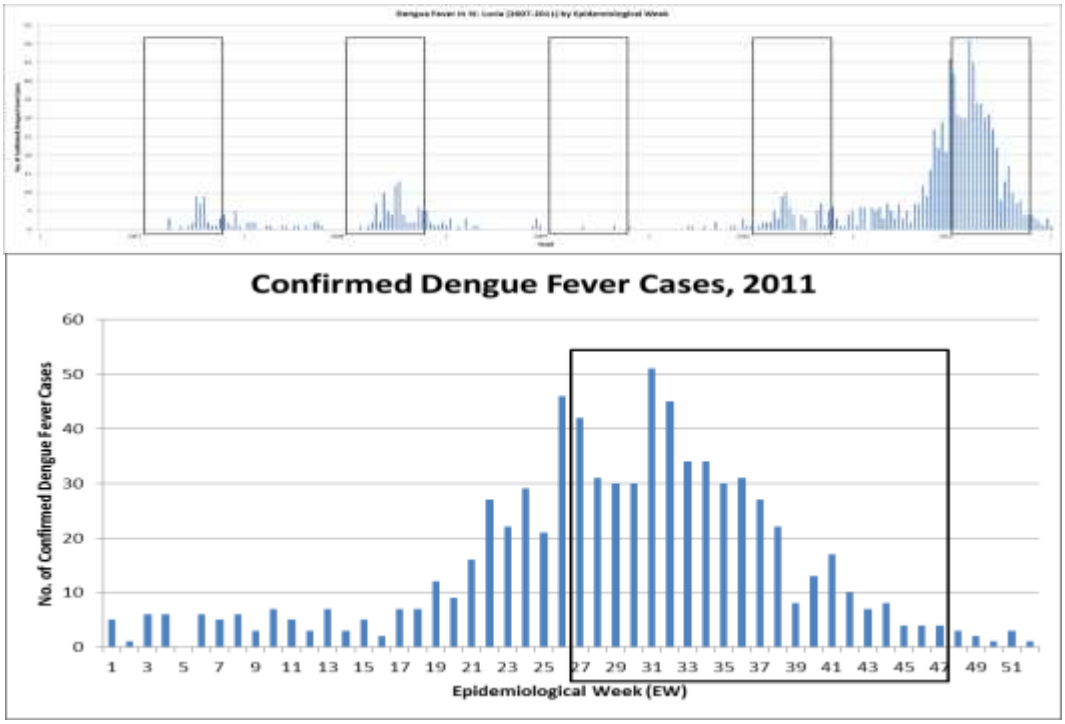

Fig 2: Annual Trends in Dengue Fever Cases (2007-2011).

CAPTION: Results from analysis of all dengue fever cases confirmed from the cohort of patients who were initially suspected cases. The graph above illustrates all confirmed dengue fever cases from 2007 through 2011, with the boxes outlining the rainy season (July through November) each year. The graph to the right is a magnification of 2011, when the highest incidence of confirmed dengue fever cases occurred in St. Lucia.