Development of Pilot Programmes for Dengue Prevention in Puerto Rico: A Case Study

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Abstract

This paper describes a child-focused social mobilization and communication approach to dengue prevention and control that has been an important component of a broader public health programme in Puerto Rico since 1985. The highlights include the introduction of dengue issues into a TV soap opera, establishment of a children's museum with dengue-related exhibits, and the close collaboration between the Departments of Health and Education.

Keywords: DF/DHF, Aedes aegypti, dengue-related exhibits, children, Puerto Rico

Country setting and background

Puerto Rico is an island in the Caribbean Sea southeast of Miami, Florida. It has one of the world's highest population densities at 1,124 persons per square mile. Seventy-one percent of the population lives in urban areas and 29% in rural areas[1]. It is a territory of the United States whose economy is supported substantially by federal funds.

In 1963, Puerto Rico experienced a major epidemic of dengue with 27,000 reported cases, followed by another large epidemic in 1969[2,3]. Beginning in 1975, frequent epidemics began to occur along with the appearance of sporadic cases of dengue haemorrhagic fever (DHF)[4,5]. In the 1970s and early 1980s, there was considerable dependence on the use of ultra low volume application of insecticides and inspection of households for epidemic control[6]. It became evident that these interventions did not provide a sustainable solution. A broad-based source reduction programme involving individual households and emphasizing elimination of peridomestic and domestic Aedes aegypti breeding sites was needed.

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The Centers for Disease Control and Prevention (CDC) and the Puerto Rico Department of Health (PRDH) responded by developing a public health approach to dengue prevention and control. Components included: (i) proactive, laboratory-based disease surveillance; (ii) rapid emergency response mosquito control plan; (iii) education of the medical community on clinical diagnosis and management of DHF; (iv) contingency emergency hospitalization plans; and (v) community-based, integrated Aedes aegypti control to be achieved through social mobilization and communication. This paper describes key aspects of the last component.

Planning innovation for dengue prevention and control

The main goals of the social mobilization and communication component initiated in the summer of 1985, was to increase public awareness about dengue, transmission, the mosquito vector, and actions that citizens could take to control or prevent production of the mosquito vector in their yards and patios. A medical anthropologist with prior knowledge of Puerto Rico conducted formative research on how to build the community's interest and involvement in dengue prevention. School children, the elderly and church groups were recommended as appropriate interpersonal communication channels to reach and sensitize adult householders about dengue prevention. The findings were used to develop new television and print messages for the public and led to the creation of a series of innovative educational materials and development of new programmes focused primarily on children.

Five sub-components of the pilot programme were developed in Puerto Rico: mass media; education in elementary schools; Head Start (an elementary school entry programme); a Children’s Museum exhibit; and mobilization of boy scouts. It was assumed that information on dengue and its prevention would cause children to take certain action and transmit information to their parents who would also take dengue prevention actions. Four partners were identified among government agencies or allied institutions that had ongoing programmes focusing on children and whose goals and activities were compatible with those of the CDC. Funding for the programme came initially as “in kind” donations from Rotarians from the Rotary Club of San Juan. In 1987, a Rotary International Health, Hunger and Humanity (3-H) grant for US$ 400,000 was awarded to this programme, of which about US$ 90,000 was used to initiate international dengue prevention projects in Honduras, Panama, Colombia and the Dominican Republic.

Implementing the new programme

Mass media

A poster (Sin Mosquitos No Hay Dengue – Without Mosquitoes There is No Dengue) was designed in 1985 and placed on public buses in San Juan. Public service announcements (PSAs), narrated by a popular Puerto Rican actor, were also prepared. Several segments in a popular early evening soap opera (novela) featured a
young patient with dengue and provided viewers with information about dengue and its treatment. When dengue epidemics occurred in 1986 (10,659 cases and 3 deaths) and 1994 (25,000 cases and 16 deaths), CDC staff worked closely with commercial and civic partners and their respective advertising agencies to develop new educational posters and flyers. In 1986 and again in 1998, when news of impending dengue epidemics were released, the Puerto Rico Department of Health, and partner agencies, including Rotary International, commissioned new PSAs that were shown on television stations, at movie theatres, and distributed to schools, civic groups, and other organizations for use in their educational programmes.

**Education in elementary schools**

A health educator associated with the medical anthropologist worked with elementary school teachers to develop an activity booklet for children. This booklet contained 28 activities about dengue and its prevention and was accompanied by a guide to aid teachers in the presentation of the various activities. A total of 28,500 booklets and 450 guides were printed in Spanish. After several years of use and following suggestions from teachers and external programme reviewers, the booklet and teacher's guides were revised. Since then, 113,000 booklets and 4,000 guides have been printed. Each year, an estimated 50,000 fourth grade students use the booklet in their social studies classes and it has now been incorporated into the public school curriculum. An important aspect of this programme has been the provision of training programmes for teachers, school nurses and school nurse supervisors by CDC staff throughout Puerto Rico.

**Head start**

This programme’s principal objective is to give children an educational ‘head start’ that will enable them to do well when they enter school. The Programme requires parental involvement with the Head Start centre and their children. A health educator worked closely with Head Start staff to develop a booklet with 8 activities for the children to colour in with crayons. A guide that provided background information was prepared to help teachers better understand dengue and its prevention and the key points made in the individual activities: 45,000 booklets and 2,500 guides were printed in Spanish. CDC staff facilitated implementation of this module and it is now used by Puerto Rico’s largest Head Start ‘grantee’ which serves 18,000 children in 65 municipalities. CDC staff has also provided training for teachers, as well as parents and centre staff throughout Puerto Rico.

**Children’s museum**

In 1993, the first and only Children’s Museum (Museo del Niño) in the Caribbean opened in San Juan. Museum staff were approached about the development of an *Ae. aegypti*-dengue prevention exhibit. At first, the exhibit consisted of a small house (casita) with the four stages of *Ae. aegypti*’s life cycle (i.e. egg, larvae, pupae, and adults) in the windows. Visitors entered the house and viewed a 7-minute video and then exited into a small patio where several containers typically found in and around Puerto Rico houses that produce *Ae. aegypti* were present; some of which contained larval mosquitoes. Children used small pipettes to collect larvae and to see what they looked like. The format of the exhibit changed in 1997 and now emphasises a
hands-on laboratory experience. Microscopes are provided so that visitors can examine different mosquito life stages more closely than before. Live mosquitoes are very popular and are provided twice weekly by CDC personnel. To support the exhibit, training is provided to new facilitators annually. A one-page, multi-colour brochure depicting a mosquito larva, the mosquito’s life cycle, typical containers, and the dengue transmission cycle was prepared for children.

**Mobilizing boy scouts**

A booklet outlining a community dengue prevention project for the boy scouts was developed. The project emphasised environmental management and inspection of residential yards or patios, and provided details on interacting with householders and conducting inspections. Pipettes for collecting water from containers and trays for examining the collection were provided. Support was also provided for the production of a community service badge which was presented to every scout who had inspected 10 premises in his area. The plan calls for this project to be used for a merit badge in environmental health but the desired level of implementation and success has not been achieved due to lack of commitment from senior scout officials and the competition between this badge project and other required activities.

**Monitoring and evaluation of programme components**

No formal monitoring or evaluation plan was developed at the time of implementation. An external evaluation of the first four sub-components was performed by public health specialists from the School of Hygiene and Public Health at the Johns Hopkins University\(^9\). Among the principal findings were that children, exposed to the elementary school, Head Start and Children’s Museum programmes had higher levels of correct knowledge and lower levels of incorrect knowledge about *Ae. aegypti* and dengue transmission. Exposure to the Head Start and elementary school programmes also increased communication between children and their parents. The evaluation concluded that the social mobilization and communication component of the dengue programme had raised awareness, generated some behaviour change, but had had only a limited impact on larval indices. Based on these results, greater emphasis is now being given to equip community members with the skills necessary to keep containers free of mosquito larvae.

**Lessons learned**

Many lessons have been learned but the following are among the most important. First, dengue programme managers need to have: a committee composed of key, committed agency/partner personnel; a strong commitment to the programme by prevention partners; and participants who know their roles and are adequately equipped and trained to accomplish assigned tasks. Second, members of the target community and all interested parties should be encouraged to participate in all phases of the process (i.e., planning, design, implementation, monitoring, and evaluation) to help create horizontally structured community programmes. Third, dengue is ‘our’ (public health agency’s) problem; the community has other problems and priorities which we should take into consideration. Fourth, work with the community is complex
and requires participation of social scientists to be successful. Fifth, community-based dengue prevention programmes require continuous education and feedback as the programmes evolve and are dynamic. Lastly, flexibility in approaches and programmes are required to adapt to changing circumstances and situations.

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