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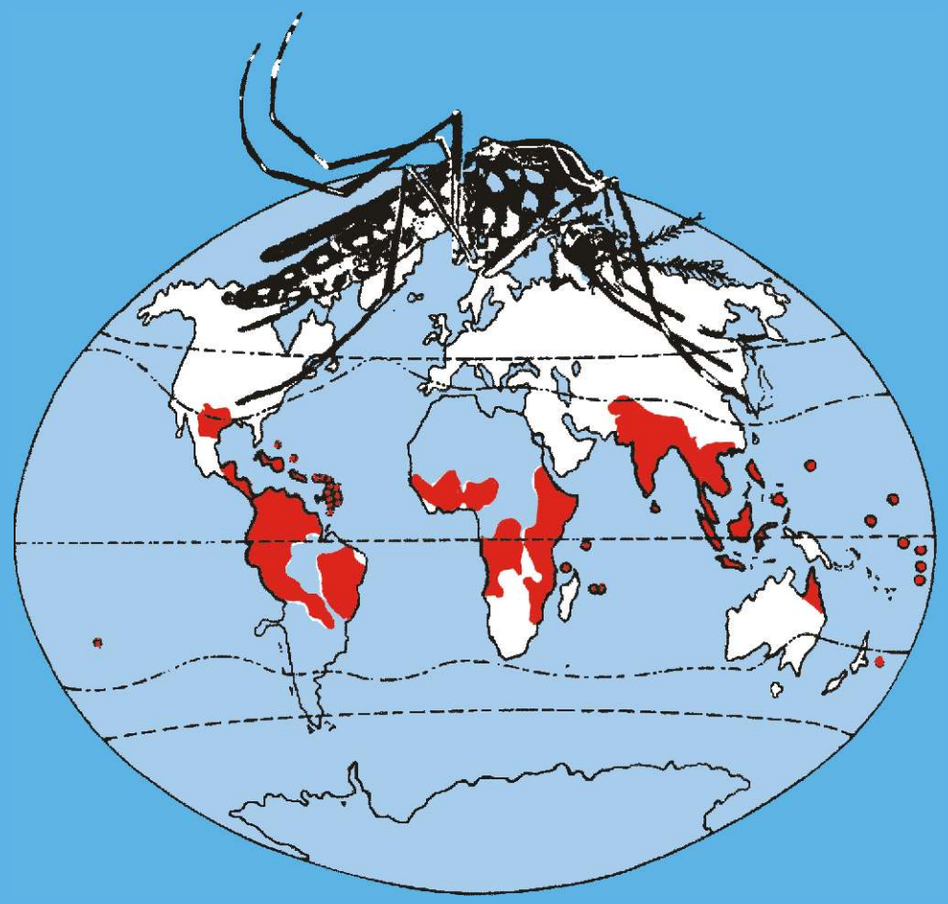

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International Experiences in Social Mobilization and Communication for Dengue Prevention and Control

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Abstract

There is a growing body of evidence that social mobilization and communication are critical to sustainable dengue prevention and control. This paper summarizes key features of 12 national case studies of dengue-related social mobilization and communication initiatives (presented in this Special Supplement). The case studies were originally commissioned to illustrate key points in a WHO guide on planning social mobilization and communication for dengue prevention and control (Parks and Lloyd 2004). The paper contains the original case studies modified only to keep each reasonably brief and to facilitate cross-case comparisons. As a collection, the case studies provide unique insights into a new generation of dengue programmes.

Keywords: Social mobilization, behavioural impact, *Aedes aegypti*, dengue prevention and control.

Introduction

In the tropics and subtropics, population growth, unplanned urbanization and its commonly associated deficiencies of water supply and solid waste management, together with increasing international travel and diminishing health budgets are among the factors that have contributed to a re-emergence of epidemic dengue fever/dengue haemorrhagic fever (DF/DHF) as a major public health problem[1,2]. The

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only strategies to prevent mortality and to control DF/DHF are ensuring prompt diagnosis of fever cases and providing appropriate clinical management, and reducing human-vector contact, using vector control and personal protection methods, with particular emphasis on the management or elimination of larval habitats in and around people's homes, work settings, schools, and in other less obvious places such as informal dump sites and playgrounds, respectively[3].

Adequate prevention and control methods exist but many national DF/DHF programmes are unable to deliver them effectively[4]. Most programmes struggle to achieve and sustain behavioural impact at household, workplace, urban planning, and policy levels[5-12]. Carefully researched and meticulously planned advocacy, mobilization and communication initiatives with high levels of community engagement are fundamental to the promotion of healthy behaviour and social change. To date, however, few national DF/DHF programmes and international funding agencies have invested soundly in such initiatives[13].

Nevertheless, there is a growing body of evidence that social mobilization and communication are critical to sustainable dengue prevention and control[14-22]. Over the last two decades, a new approach to dengue prevention and control has evolved in which: resources and decision-making are decentralized; emphasis is placed on negotiating behaviour and social change as opposed to education for knowledge change; targeted government and private sector advocacy is deployed to increase political and financial commitment; extensive partnerships and support networks are developed through intensive mobilization; and greater focus is given to environmental improvements such as better urban planning and services including refuse disposal and water supply management with the active involvement of communities[7,23-33].

Case studies

The basic components of sustainable prevention and control were proposed in 1992[34]. A Global Strategy was established in 1995 to focus and coordinate efforts to prevent and control DF/DHF[35]. In 2002, the 55th World Health Assembly adopted Resolution WHA55.17 thereby creating a political environment to support international, regional and national DF/DHF activities[36]. A WHO and TDR guide on planning social mobilization and communication for dengue prevention and control was published in 2004 (in English and will soon be available in Spanish and Portuguese)[37]. Based on WHO's Communication-for-Behavioural-Impact (COMBI) planning model, draft versions of the guide have been used as the key resource during a 3-year international training programme involving multidisciplinary teams from over 20 dengue-affected countries. The training has been sponsored by the US Centers for Disease Control and Prevention (CDC), with additional support from PAHO, USAID, and the Inter-American Development Bank. Further capacity building activities are planned and an evaluation of several national COMBI initiatives developed out of the training programme will be conducted in 2005.

In the process of developing the WHO guide, 12 country teams were invited to write short case studies describing innovations in DF/DHF prevention and control, with a focus on social mobilization and communication. Sections from these case studies were used to illustrate key points in the guide. Considered together,

however, the case studies provide unique insights into a new generation of dengue programmes. Publishing them as a collection was therefore considered an appropriate means by which these rich experiences could be shared. This Special Supplement contains the original 12 case studies, modified only to keep each reasonably brief and to facilitate cross-case comparisons.

A brief overview

The studies included in this Special Supplement provide an interesting and inspiring mix of experiences and lessons learned. Almost all discuss the value of social science research and theory in guiding initial designs and facilitating ongoing monitoring and subsequent evaluation of mobilization and communication activities. The utility of social science research in dengue prevention and control is already well documented in the international literature[7,10,12,25,31,38-49].

The case studies from Cambodia, the English-speaking Caribbean, the Dominican Republic, Honduras, Indonesia, Mexico, Vanuatu, and Viet Nam illustrate the worth of engaging communities from the very start of a programme's planning phase. Experiences in Cambodia and Viet Nam in particular reveal the need for strong relationships between community groups and government services, especially if novel vector control interventions are to be adopted and maintained.

The Dominican Republic and Honduran studies highlight a relatively new and exciting social mobilization approach – behavioural trials or trials of improved practices (TIPS) – in which householders become programme consultants and provide feedback on newly introduced vector control measures modeled on existing practices[50]. Negotiation, co-learning, and empowerment are just some of the vital processes that occur as a result of these trials, which, in both the cases presented here, have now been taken to scale.

More imaginative communication is another characteristic of recent initiatives. The significance of local creativity is clearly shown by experiences in Colombia, Malaysia, and Puerto Rico. The power of incorporating culturally appropriate modes of communication to relay dengue messages is no more apparent than in the case study from Mexico.

The need to mobilize social networks beyond individual householders is amply demonstrated in Colombia, Indonesia, Malaysia, Puerto Rico, Vanuatu and Viet Nam to ensure that simple messages transmitted via the mass media are also delivered through intensive face-to-face dialogue, although the challenges to doing this in modern urban environments is touched upon in the Mexico study. Mass mobilization of school children is another exciting feature of several initiatives (e.g., Colombia, English-speaking Caribbean, Malaysia, and Puerto Rico).

Many of the case studies touch on the importance of political support and the need for organizational change within dengue programmes. In some cases (e.g., the English-speaking Caribbean and Honduras), institutional change was one of the key outcomes of innovative social mobilization and communication. Much greater attention needs to be paid to the restructuring of dengue programmes and to the building of new competencies among programme staff if social mobilization and communication initiatives are to prosper and contribute significantly to dengue prevention and control.

Each study stresses the need for robust monitoring and evaluation, not only to ensure that activities are kept on track but also to demonstrate impact. Expanding the current evidence-base is crucial if additional resources to intensify social mobilization and communication efforts are to be generated. Standard entomological indicators are not ideal measures when assessing the effectiveness and efficiency of social mobilization and communication[51]. A few projects are now investigating innovative ways to determine behavioural results associated with vector control, but further exploration of how best to gauge social mobilization and communication outcomes in relation to dengue prevention and control is needed[52,53]. In particular, more studies are required that examine the need for and influence of social mobilization and communication on patient treatment-seeking behaviours and clinical management by health workers[54].

Conclusion

Social mobilization and communication for behavioural impact as described in the following case studies, cannot work on its own. Improvements to public health infrastructure, epidemiological and entomological surveillance, effective clinical management, and emergency preparedness are all needed alongside intersectoral coordination, active community involvement, and reinforcement of health policy and legislation for more effective vector control[7,35].

The case studies in this Special Supplement capture the vision, creativity and dedication of a few national teams. It may be discouraging for some to discover that we are only just beginning to comprehend the level of investment that effective social mobilization and communication requires in terms of research, planning, organization, time and social, political and financial support. Yet, given the global epidemiological trend of dengue, it is evident that maintaining the *status quo* is not an acceptable option. A new paradigm for sustainable dengue prevention and control is emerging and with it, we are learning more effective ways to engage the general public and other key stakeholders in the task of controlling this disease.

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The Development and Testing of Water Storage Jar Covers in Cambodia

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Abstract

This paper describes how community-based, participatory action research in Cambodia led to the development of an innovative mosquito-proof cover for the most important larval habitat of *Aedes aegypti*, concrete jars commonly used to store water in Cambodian households. Made from long-lasting insecticide-treated materials, the jar cover is now undergoing field trials organized by the national Dengue Fever Control Programme in Kampong Speu Province, Cambodia.

Keywords: *Aedes aegypti*, dengue, water storage jars, covers.

Country setting and background

Cambodia is situated in South-East Asia and shares borders with Thailand, Viet Nam and the Lao People's Democratic Republic. It is considered a homogeneous society with 90% of the 12.5 million people being of Khmer origin and sharing the same religion, Buddhism. Cambodia is predominately an agrarian society with 85% of the population living in rural areas. The tropical climatic comprises two seasons: the rainy season from May to October and the dry season from November to April.

The first case of dengue haemorrhagic fever (DHF) was reported in 1962 and the country has since experienced frequent DHF outbreaks[1]. These mostly affect children in areas with concentrated populations, particularly Phnom Penh and Battambang. Epidemics throughout the 1980s and 1990s resulted in high DHF case fatality rates, ranging from 3.6% to 15%. Dengue has become a major public health problem in the country.

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The Government began intensive control efforts as a result of the 1995 epidemic. The National Dengue Fever Control Programme (NDCP) was established and had two goals: (i) to improve early detection of and response to outbreaks; and (ii) to educate communities to participate in the reduction of mosquito vector breeding. The programme combined vector control (application of the larvicide temephos to water-filled containers to control immature stages, and insecticide space spraying to kill flying adult mosquitoes) with case management, public education (mass-media campaigns), and strengthening of epidemiological surveillance.

In 1998 there was an unprecedented epidemic of DHF, mainly affecting the capital, Phnom Penh and neighbouring Kandal Province[2]. The NDCP mobilized resources, with assistance from the International Federation of Red Cross and Red Crescent Societies (IFRC), and carried out extensive vector control measures including the distribution of 56 tonnes of temephos 1% SG to 560,000 households over a period of three months. A new Geographical Information System (GIS) for dengue proved helpful in identifying the priority areas for control interventions. Despite the large-scale response, transmission spread to 12 provinces that were previously unaffected, including those in rural areas. It became clear, especially after the 1998 epidemic, that a long-term strategy for vector control was needed, as well as an effective emergency response. This paper describes how participatory action research led to the development of an innovative mosquito-proof cover for the most common and productive larval habitat of *Aedes aegypti* in Cambodia, the concrete household water storage jar.

Planning innovation for dengue prevention and control

Utilizing lessons learned from the 1998 epidemic, the NDCP began to focus on more sustainable environmental management methods of vector control. One method under consideration was a water jar cover or lid that would allow harvesting of rainwater but would not permit entry of egg-laying female *Ae. aegypti*, or other mosquitoes, including the secondary vector of dengue, *Ae. albopictus*.

In an initial Participatory Rural Appraisal (PRA) conducted in Kandal (November 1999) and Kirivong Provinces (February 2000), villagers were asked about their use of and preferences for jar lids or covers. The research showed that people use various types of covers to keep debris and dust out of their jars and to exclude light in order to prevent the growth of algae. The need for covers to be mosquito-proof was not rated highly, although in villages with dengue-related fatalities, residents were very interested in keeping mosquitoes out of their water jars. The communities in Kandal were found to be economically better off than those in Kirivong. This was reflected in the quality of the covers; in Kandal, concrete slabs were commonly used to cover the jars, whereas in Kirivong, lids were less common, and more often made of ill-fitting material, such as wood. Concrete lids, however, were preferred because they were perceived to be cheap, long-lasting and effective in keeping out debris and light. Nevertheless, several respondents mentioned that concrete lids were cumbersome and difficult for children to use. Metal lids were more likely to be stolen or

used by children as playthings. The reason most often given for not covering jars was simply forgetfulness.

Drawing on an understanding of local water storage practices, a Jar Lid Development and Testing Programme was established, involving leaders from the National Malaria Centre, NDCP and a consultant from the World Health Organization. The programme used an action research approach to design jar covers and lids and to test their performance and use in Kandal Province. The aim was to develop a robust jar cover that prevents the entry of mosquitoes, but is also convenient to use so that family members will replace it after use.

Implementing the new project

Initial design work resulted in 19 jar lid prototypes made from different materials, e.g., wood and concrete. The prototypes included lids allowing various means of access to jars and lids that allowed water to drain through mesh or cloth screens. The designs were based on a combination of ideas generated by discussions with local villagers, analysis of the literature and discussions with experts, many of whom had worked on this problem in other cultural settings. To identify the lid design most suitable for local production, an assessment scale was created with various parameters such as cost, 'mosquito-proofness', 'theft-proofness', durability and the ability and willingness of artisans in the village to manufacture the lids. Also, the size of the lid was considered important for cloth and mesh covers, with a larger circumference providing better cover of the jar opening; however, villagers preferred smaller and more compact models because of their convenience.

Based on the assessment, one jar cover in particular stood out from the other designs as appearing to be the most suitable. It comprised of a simple rattan hoop, with a slightly larger circumference than the rim of the jar, and supporting a fine mesh net. A stone attached to a string was hung from the centre, anchoring the lid so that it would not blow off in strong winds. Attaching the stone also proved to be useful when taking water from the jar, as the lid could be moved aside and the stone prevented it from falling off, thus making it easier to reposition.

Of the 19 different designs tested by programme staff, a smaller number were then selected for use in community-based trials in Ksaach Kandal:

- Polypropylene hoop with netting, held down by a centrally suspended weight;
- Hoop as above but with aluminium netting;
- Wooden rack with cloth beneath;
- Hinged wooden rack with cloth beneath;
- Iron sheeting with a segment or section that hinged open;
- Concrete with a smaller section for lifting and replacing.

Monitoring and evaluating the project

For these jar cover and lid designs, pre-testing represented the next step so that the number of potentially suitable lids could be

further reduced, and then used in a formal trial. The results of the PRA surveys indicated that full acceptability may not occur until the people are familiar with a particular design so that its advantages and disadvantages can be fully appreciated. During the trial period NDCP staff carried out monthly cross-sectional mosquito larvae surveys to confirm the efficiencies of the various lids. Lids that rated highly in terms of acceptability, including 'affordability' and efficiency, were then rated with respect to the feasibility and prospects for developing a social marketing strategy. The outcome of this community-based trial in Ksaach Kandal was the final selection of the polypropylene hoop with netting. Subsequent design work and risk assessment studies resulted in the use of long-lasting deltamethrin-treated polyester netting (PermaNet®) so that the jar lid would not only physically prevent adult mosquitoes from entering the jars, but would also kill newly emerging adults and kill or deter gravid females attempting to oviposit in them. Initial field trials in three villages of Kampong Speu resulted in a substantial reduction in the densities of immature stages over the 12-week study period. The impact on adult mosquito populations was less evident. Full details of the field trials will be published elsewhere. There was widespread enthusiasm for and acceptance by the communities of the jar cover intervention (Figure) A larger scale field trial using covers incorporating further modifications (including a drawstring design and incorporation of an ultraviolet protectant to extend the duration of effectiveness of the insecticide) are under consideration.

Figure. ***Jar cover design with PermaNet ® netting used in the field trials***

Lessons learned

This initiative shows that even apparently simple interventions require extensive dialogue with community groups and multidisciplinary research. Locally appropriate solutions such as jar covers can be designed or adapted to keep mosquitoes from water containers but substantial improvements can be made during the design and trial phases if participatory research is used to actively engage intended end-users. Participatory field trials yield important information on the attitudes of villagers and their requirements for jar covers. They may also contribute to the development of new solutions.

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Community Participation in Environmental Management for Dengue Vector Control: Experiences from the English-speaking Caribbean

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Abstract

This paper describes an initiative on community mobilization and organizational change implemented through the Caribbean Cooperation in Health (CCH)/Government of Italy Integrated Vector Control Project. The project involved 15 island countries and territories of the English-speaking Caribbean between 1992 and 1997. One of the most significant changes arising from this initiative was the shift in many national programmes from a top-down approach to environmental health management towards community dialogue, negotiation and partnership to resolve vector control and sanitation problems.

Keywords: DF/DHF, *Aedes aegypti*, environmental health management, community, partnership, Caribbean.

Geographical setting and background

The 15 English-speaking island countries and territories that were engaged in the project are part of the wider Caribbean Community, CARICOM. They have a tropical to sub-tropical climate with a wet season between May and November. Their combined population is approximately 5.1 million. Whereas the majority of the population in most of the islands is of African descent, East Indians constitute the largest ethnic group in Trinidad and Tobago.

Dengue in the islands is characterized by sporadic outbreaks or epidemics, usually occurring in the latter half of the year. Increasing numbers of dengue haemorrhagic fever cases have been reported in the last 10-15 years. *Aedes aegypti* is the only incriminated vector of dengue in the islands. Until recently, dengue prevention and control in these countries was mostly organized through highly centralized management structures established by national governments during the period of the hemispheric eradication campaign (1950s to mid-1980s). Larviciding was the

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main vector control intervention, with temephos 1% sand granules being the insecticide and formulation of choice since the 1960s. Coverage was often incomplete, infrequent and geographically limited. A few programmes applied residual adulticides and in approximately half of the islands space spraying was carried out using vehicle-mounted or hand-held machines, typically in response to public complaints of mosquito nuisance, reports of dengue cases, increased risk of transmission or in areas with high vector densities[1]. In many of the islands, water was stored by householders because of an unreliable public supply system or, in some cases, no public supply at all; in over half of them, larvivorous fish were reportedly used for larval control in larger domestic water storage containers. There were some source reduction efforts including the overturning of small containers by field workers during house inspections, and the organisation of communities to carry out 'clean-up' campaigns. Print and mass media activities and the distribution of posters, pamphlets and other educational materials typically supported the latter. With some notable exceptions, the majority of field workers were semi-skilled and employed on a weekly or monthly basis.

By the 1980s it was evident that these approaches were not adequately suppressing vector densities nor were they improving the epidemiological situation. Moreover, the earlier and significant gains that had been achieved (e.g., elimination of the vector and no dengue transmission in several Caribbean island countries and most Central and South American countries) were rapidly eroded whenever programmes suffered funding cutbacks. Decentralized, community-based approaches emphasizing environmental management were considered the only way of achieving sustainable gains, particularly in the context of health sector reform and stagnating health budgets.

Planning innovation for dengue prevention and control

In mid-1992 funds were mobilized from the Government of Italy to implement the 'Caribbean Cooperation in Health (CCH)/Government of Italy Integrated Vector Control Project'. The main objective of the project was to reduce densities of *Ae. aegypti* through community-based integrated vector control measures with an emphasis on larval source reduction in project areas of 15 islands of the English-speaking Caribbean. A broad-based environmental sanitation strategy was developed, based in part on the results of a Knowledge, Attitude and Practice (KAP) study conducted in Trinidad and Tobago[2].

The project was overseen by a Project Advisory Committee which comprised of key Ministry of Health (MOH) officials and relevant experts from several participating countries. The Pan American Health Organization (PAHO) provided technical support. Each country appointed a project liaison officer from the MOH, established a national inter-sectoral committee, and undertook a KAP survey and an entomological baseline survey as pre-requisites for national project development and release of funding. Country projects typically spanned a period of 3-4 years from baseline surveys to final evaluation. The national inter-sectoral committees were chaired by a MOH officer and typically included representation from the Ministries of Education and Environment, and within the health ministry from Environmental Health, Health Education and Vector Control

departments, as well as nongovernmental organizations and other civic groups.

Implementing the new project

A summary of the results of each baseline KAP and larval survey were discussed with the project communities at initial community meetings. Through a process of negotiation, and in the context of environmental sanitation and mosquito/ vector/pest control, priorities were identified addressing the concerns of both the community and the institutions responsible for project implementation. Key behaviours to be addressed were specific to each pilot project. During these initial community consultations, other likely resources to be mobilized were also identified.

Children as potential change agents were a major focus of programme activities. In five countries an environmental health module on Reducing Pests, Insects and Vectors was developed with the intention of integrating it into the existing Health and Family Life Education curriculum. The environmental health module included short educational videos, lesson plans and activities. The module was pre-tested and revised before wider dissemination. The behaviours to be addressed by teachers were school-specific, ranging from litter control and garbage separation/recycling/ composting, to larval source reduction, vegetable gardening utilizing the compost, and horticultural enhancement of the school environment.

Training was a major component of the project, with emphasis given to capacity building within ministries of health. Based on appraisals of national programme activities, it was readily apparent that there was need to improve not only technical skills but also the skills of negotiation and community engagement. To address these needs, local, national and international courses, seminars and workshops were conducted.

A media and communications specialist was recruited to support project management. Messages and materials were developed for use at many levels, ranging from person-to-person communication between field workers and householders, to communication via radio, TV and print media. Public meetings within pilot communities were also a critical social mobilization component of most national projects.

Behavioural messages typically focused on source reduction strategies such as disposal or storage of unwanted consumer items that could provide mosquito larval habitats. Depending on local circumstances, the use of covers that physically excluded adult mosquitoes, the introduction of local larvivorous fish or the regular emptying and cleaning of water containers were all encouraged.

Direct demonstration of the environmental sources of nuisance mosquitoes, notably *Culex quinquefasciatus*, was found to be a powerful motivating factor for householders to repair and seal septic tanks or, in one project, to apply expanded polystyrene beads to the water surface of 'wet' pit latrines to control the mosquitoes[3] and to engage in other project activities.

Monitoring and evaluating the new approach

Evaluation was based primarily on changes in KAP and entomological indices in the pilot project communities and on the extent to which different agencies and organizations including schools, became

involved. Periodic visits were made to national programmes and selected project communities by external technical advisors and national project managers were obliged to provide regular progress reports.

At the community level, feedback was channeled through community meetings organized by the local environmental health officer. National journalists and broadcasting stations were encouraged to provide feedback to the wider community on project progress. The national inter-sectoral committees met regularly for project updates and to make key management decisions. Overall programme feedback mechanisms were established at the international level to ensure regular information flow to and from the Project Advisory Committee and the national authorities.

Lessons learned

The most significant change resulting from this project was the way national vector control teams approached and worked together with communities and other key agencies to resolve problems of mutual concern. There was a shift away from an exclusively 'top-down' approach to one of dialogue, negotiation and partnership to resolve environmental sanitation and vector control problems. One consequence of this change was that some national dengue programmes broadened their responsibility beyond *Ae. aegypti* control, and adopted a more flexible, problem-based approach to programme management.

Although KAPs were favourably altered and vector larval indices were reduced in most project communities, the magnitude of these changes was modest and unlikely to have been of major epidemiological significance. Given the complexities and demands of managing a multi-component, multi-country project, a strengthening of overall project management would have facilitated improved delivery of the technical support.

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Social Mobilization Using Strategies of Education and Communication to Prevent Dengue Fever in Bucaramanga, Colombia

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Abstract

This paper describes a dengue prevention initiative developed in the City of Bucaramanga, northeastern Colombia. The authors explain how qualitative and quantitative research, including formative research, and data analysis based on the Stages of Change Model, was used as the basis for planning of an integrated social mobilization and communication approach. The programme focused on one day a week (i.e. Thursday) when residents were to seek and destroy the sites where the *Aedes aegypti* mosquito might occur. On this day, communication and educational actions were used to mobilize and motivate the people. Following this approach, innovative printed materials were designed and disseminated which resulted in a massive mobilization of students, housekeepers and other publics. The programme also produced materials and a methodology of interpersonal communication that generated partnerships with the private sector and community groups. Another innovative feature included a mobile dengue exhibit with interactive educational games.

Keywords: Dengue prevention, social mobilization, behavioural change.

Country setting and background

A dengue prevention initiative was developed in the city of Bucaramanga, capital of the Department of Santander, northeastern Colombia. Bucaramanga is situated 1,000 metres above sea level with an average annual temperature of 24 °C and relative humidity ranging from 65% to 100%. The city has a population of 500,000, residing in 100,000 premises.

In 1991, Colombia reported its first case of dengue hemorrhagic fever (DHF)[1]. The following year the Department of Santander reported 2,034 cases of dengue and 342 cases of DHF. The number of reported cases of dengue increased in subsequent years, in 1997, 456 cases of DHF and 16,345 of dengue were reported.

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Most (85%) of cases in the Department were reported from Bucaramanga and the adjacent metropolitan area. In 1998 the number of dengue and DHF cases increased to 22,934 and 874, respectively[2].

Until 1997, the Dengue Control Programme in Bucaramanga was operated mainly by the Secretary of Health of the City, with the Malaria Eradication Service (under the national Ministry of Health, Bogota). There were interactions with the Department of Santander's Secretary of Education and private enterprise but limited financial resources were provided for social mobilization and communication.

Planning innovation for dengue prevention and control

In 1986, the Secretary of Health of Bucaramanga began promoting activities with residents to assume responsibility to find and destroy containers that might harbour mosquito larvae around their houses, schools and workplaces as a substitute for government agents who did this work. In 1993, the Rotary Clubs of Bucaramanga-Chicamocha and San Juan, Puerto Rico, in collaboration with the Secretary of Health of Bucaramanga and staff from the Division of Vector-Borne Infectious Diseases of the US Centers for Disease Control and Prevention (CDC) submitted a 3-H (Health, Hunger and Humanity) grant proposal to the Rotary Foundation. This request was approved in 1998 to continue strengthening the Dengue Prevention Programme previously established in Bucaramanga, and this year a new phase of the programme began. Funds from the Rotary Foundation were used to finance mass media communications, educational materials and equipment. The CDC provided additional financial support. As a result of this external support, an agreement was signed between the Secretary of Health of Bucaramanga and the Tres-H Corporation of the Rotary Club of Bucaramanga-Chicamocha to promote dengue prevention. The initial phase of the programme was for three years but was later extended to five.

The main goal of the new programme is to prevent dengue fever epidemics and DHF through educational and communication strategies encouraging citizens to locate and eliminate *Aedes aegypti* breeding sites in residences, workplaces and schools. Formative research was first conducted to gain information on residents' current behaviour patterns in reducing *Aedes* vector breeding sites. A qualitative investigation utilizing 100 personal interviews with housewives was undertaken with consideration for the socioeconomic distribution of residents in Bucaramanga. The 'Stages of Change Model' was used to classify housewives' behaviours in identifying and eliminating containers with *Ae. aegypti*. The Stages of Change Model classifies individuals according to where they fall in the behaviour change process: (i) pre-contemplation – the person is not thinking of changing his or her behaviour (21% of housewives were in this stage); (ii) contemplation – the person begins to think about the action (50% were in this stage); (iii) preparation – the person plans to change the behaviour; (iv) action – the person implements the plan to change the

behaviour (29% in this stage); and (v) maintenance – the person continues to practice the new behaviour[3]. Stratified focus groups also investigated the housewives' perception of the Dengue Prevention Programme in Bucaramanga.

The research showed it would be necessary to continue to monitor the housewives in the action stage and aim to elevate them to the maintenance stage. This research also confirmed that the target audience for the communication and educational actions are mainly housewives, as they deal directly with most of the containers where immature *Ae. aegypti* are present. However, the programme found that other segments of the public (i.e., children, fathers, and others) can help housewives promote and generate a healthy environment.

Implementing the new approach

Students in Colombia are required to perform community service before graduating from high school. Building on this service, educational materials such as books, manuals and videos were designed specifically for school-age students. Students receive 20 hours training on conducting visits and interacting with householders. Eleventh grade students are then mobilized to visit 20%-30% of the premises of Bucaramanga twice a year. To help the students in their household visits and face-to-face communication, specific educational materials were designed to serve as a reminder for residents about the two main sources of the *Ae. aegypti* mosquito.

In 2003, the programme had the same budget and personnel as in previous years and was faced with the challenge of needing to involve more people so a massive, multi-faceted and creative social mobilization effort was developed. The main target group was housewives but it was necessary to direct the message to other groups in order to generate massive social mobilization. Each intervention was carefully planned and implemented and the impact on the behaviour of each group, including the target group, was measured. A key part involved one day a week as the focal point for concentrating the communication and educational actions with a slogan "On Thursday, YOU CAN put the "*tatequieto*" (stop) to Dengue" (in Spanish it rhymes). The slogan demonstrated what action was being promoted and was included in an innovative mix of mass media strategies. A new, short approach for face-to-face communication by students was designed and incorporated a reminder for residents to focus on the two or three main places where the mosquito occurred. A sticker was placed on the walls of the "*pilas*" (concrete washbasins) as a reminder of their responsibility to diminate mosquito breeding. An attempt was made to create a healthy environment by involving more segments of the public than just housewives. The last component of the new programme, and perhaps the one with most impact, involved two kinds of calendars. One was put in public buildings, stores, and supermarkets and the other was designed for all students throughout the city. The other calendar was tailored to students in grades 1 to 5 and, with a slightly different design, to grades 6 to 11.

The calendars were distributed to teachers who quickly learned how to use it. Every Thursday, in around 500 classrooms across the city, nearly 200,000 students spent 5 to 10 minutes learning in a humorous way how to "Put the *tatequieto* (stop) to dengue."

Prior to selecting the radio stations for the prevention programme, listenership surveys were conducted by companies specializing in this activity, in order to learn which stations our target audience listened to. Every Thursday morning, announcers on the selected radio stations in the city talked about "How to put the (*tatequieto*) stop to dengue" using a communication strategy called social modeling. Every week, we sent the announcers the message that was to be used that week. With that, they were free to use their own words to transmit the message. Many announcers assimilated the messages and continued promoting them Thursday for a year without being paid to do so. Before and after the announcer shared each message, a theme song identifying it as a dengue prevention message was played. All materials and messages were pre-tested with a sample of individuals from the target audience (e.g., children, teachers and housewives).

A key feature of this new initiative is an interactive exhibit on dengue prevention (a 24m long x 3m tall, mosquito-shaped tent). Through interactive games, visitors can learn about dengue fever, vector control methods and how to identify and eliminate or control containers with *Ae. aegypti*. Another innovative component has been the annual "Dengue Prevention Day" in which interested groups and individuals from Bucaramanga and other cities in Colombia share their dengue prevention experiences. Individuals and institutions participating in the programme are recognized for their efforts in dengue prevention. Students give theatre, songs, puppet and others shows and the interactive exhibit is placed in Bucaramanga's main plaza.

Monitoring and evaluating the new approach

The calendars for the students were evaluated 8 months after they were distributed. It was found that 94% of the teachers and 96% of the students knew about the calendar and 88% of the teachers and 77% of the students used it. The impact on households of messages broadcast on radio from 2002–2003 was evaluated. Twenty-seven percent of the people recognized Thursday as Dengue Prevention Day and the same percentage knew about and practiced specific actions to look for and control *Ae. aegypti* breeding sites on Thursday.

A sample of elementary school students' homes participating in the initiative was visited and the *Ae. aegypti* House Index was established before and after the intervention. This procedure was also followed at the schools. In all cases, the number of houses and schools with immature *Ae. aegypti* was fewer in the post-intervention evaluation compared to the pre-intervention survey. To monitor behavioural impact among housewives and the rest of the population, the House Index was measured every three months. Results showed the index decreased from 18% in 1998 to 5% in 2003.

Lessons learned

The three most important lessons learned from experiences in Bucaramanga City are: (i) communication objectives should be based on results from research that combine appropriate qualitative and quantitative methods; (ii) it is necessary to generate a critical mass of committed persons acting in different roles to prevent dengue; and (iii) to develop a behaviour change project, it is necessary to have at least three years of continuous work before any significant changes are observed.

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NEgociación de PRÁcticas Mejoradas – NEPRAM (Negotiation of Improved Practices): The Development of a National Behaviour Change Strategy for Community-based Prevention of Dengue Fever in the Dominican Republic

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Abstract

Social scientists working with the national dengue programme in the Dominican Republic developed NEPRAM as a research method and as a behaviour change strategy. As a formative research tool, NEPRAM is a form of behavioural trial that emphasizes negotiation with householders who act as programme consultants on more than one behavioural option, in this case, two novel uses of household bleach. As an implementation process, NEPRAM involves communities and health planners in the joint development of effective and feasible behaviour change interventions through negotiation and continuous feedback, in this case, through individualized home visits by volunteer members of community groups and organizations.

Keywords: DF/DHF, NEPRAM, communities, health planner, behaviour change, Dominican Republic.

Country setting and background

"We are a small opening between the sea and the sky 500 years later; an ignited race, black, white and taino, but who discovered whom?"[1]

This is how a contemporary poet and vocalist describes the Dominican Republic (DR) where Christopher Columbus landed first when he discovered America, roughly 500 years ago. Today, the abundant natural beauty and a rich history and culture make the DR a top international tourist destination.

Santo Domingo is known for its deficiencies in the water supply system. Out in the interior, newly established communities tend to lack any kind of

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services, water included. As a result, water collection and storage is a daily household routine. Fifty-five-gallon drums are the most frequently used storage containers, found in virtually every home of the popular classes.

Dengue is endemic with epidemic peaks typically occurring every 2-3 years, causing classical dengue and a variable number of dengue haemorrhagic fever[2]. In 1998 *Aedes aegypti* infestation indices were as high as 50% (House Index) and over 95 (Breteau Index) in major urban areas. That same year, the government launched an expensive anti-dengue mass media campaign, in addition to ultra-low volume spraying activities and clean-up campaigns. In retrospect, the effort lacked an overarching behavioural focus and promoted inadequate or unrealistic practices.

Hurricane Georges struck in September 1998 and was largely responsible for the impetus to innovate dengue prevention, as it caused further destruction of the water infrastructure and an increased need for water storage by the new homeless. The US Congress responded with an emergency relief fund. An interagency group was formed to oversee the new initiative.

Planning and implementing innovation for dengue prevention and control

The decision was made to focus on drums, because they were most frequently found infested with mosquitoes and no feasible and effective practice existed at the time to protect them from *Aedes.*

Planning began with formative research, conducted intermittently between March 1999 and March 2000, in Santo Domingo and Hato Mayor. The study focused on drum management behaviours that would build on existing practices, prove efficacious in the entomology lab, and resonate with local people as feasible. First, in-depth interviews were conducted to better understand household knowledge, perception of dengue risk, and water sources, storage, maintenance, and use. Water container cleaning practices were documented by structured observation. Key findings included: maintaining clean stored water was of high priority for families; obstacles to thorough cleaning included lack of drains to vacate water, and inability to tilt let alone turn over these heavy containers; bleach, on the other hand, was widely available and commonly used in drum cleaning, as well as sprinkled into the freshly refilled water as a sterilizing agent.

Bleach mixed with detergent and dabbed directly on egg-infested drum walls had demonstrated ovicidal properties in earlier studies in Honduras[3]. Given the extreme scarcity of water in the DR and the need to thoroughly rinse the container to remove any residual detergent, the idea arose to experiment with bleach only, as a means of *Aedes* control. Trials conducted at the entomology laboratory found that bleach alone, when applied directly on the walls of infested drums and left for 15 minutes before washing off, caused very few eggs to hatch afterwards. Regular bleach treatment of eggs deposited at various water levels would eventually destroy all or most egg rings, before they had a chance to hatch.

Two efficacious behaviours were identified for a behavioural trial by NEPRAM with a small number of community members acting as the programme's consultants. One was a complete dabbing of straight bleach directly on the entire walls,

pouring some on the bottom of the empty drum, and waiting 15 minutes before refilling. When the drum could not be emptied for a thorough cleaning, householders would dab straight bleach on the exposed walls of the drum, above the water level only, rather than the entire wall. It was important that either type of bleach dabbing be practiced once a week. More important than the adherence to the ideal or complete cleaning was the adherence to a weekly frequency.

During the NEPRAM trials, the candidate behaviours were introduced as part of a negotiation process. A researcher visited a subset of the original study households and invited the householder to try the candidate behaviours as a way to improve water-related hygiene rather than strictly for dengue control. The householder was asked to be a consultant in trying the new behaviours and judge whether they were as feasible or as effective in a real life setting. The researcher discussed impressions, difficulties, and perceived advantages and disadvantages for each behaviour during return visits and negotiated solutions with the family.

Monitoring and evaluating the new approach

The results of the NEPRAM trials were positive: people thought that the behaviours were reasonable; they actually said that each one had its role, depending on the situation. The promotion of these behaviours then, complete with modifications and community-generated problem solving, became part of the new strategy for drum maintenance. Though not originally conceptualized as an intervention approach but rather a research approach to develop interventions, the very process of introducing the prevention options by negotiation with households was also integrated into the new strategy.

The next step was to test the behavioural and negotiation strategies in a small-scale trial in the urban community of Herrera, in Santo Domingo. A two-month intervention that included an interpersonal and a media component was implemented in 2000. Negotiation was extended to community groups and organizations which in turn conducted negotiation home visits. Interestingly, these volunteers spontaneously coined the dengue strategy as NEPRAM, so the term came to mean an implementation process as well. Despite some limitations in the interpretation of the evaluation findings, these seem to indicate that the subgroup of people who had had a chance to try the new behaviours out, had fewer infested drums.

The NEPRAM strategy was later implemented in several other provinces and, to date, continues to be part of the national dengue prevention and control strategy in the DR.

Lessons learned

One way to ensure behaviour change is to base prevention and control activities upon existing practices, while offering people behavioural choices. Through the process of negotiation, householders become programme consultants. If needed, promising behaviours should be tested for entomological efficacy. Ideally, a link should be made between recommended behaviours and locally perceived priorities which may not necessarily be dengue. And finally, in this case, negotiation was transformed from a formative research tool

into a social mobilization and communication approach to build alliances and strengthen interpersonal communication during household visits. These tools and approaches are now disseminated and implemented in other country settings.

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The Value of Social Science Research during the Implementation of Dengue Fever Prevention and Control Activities in Fiji

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Abstract

Drawing on experiences in Fiji, this paper illustrates the importance of using social science research both in the planning and during the implementation of dengue prevention and control activities.

Keywords: DF/DHF, *Aedes aegypti*, social science, planning and implementation, control, Fiji.

Country setting and background

Fiji is an independent Island State in the Southern Pacific. The main islands are Vanua Levu and Viti Levu with the capital Suva located on the eastern side of Viti Levu. Fiji's population (around 850,000) is ethnically and culturally mixed. Dengue is an emerging threat to Fiji due to increasing urbanization, the adaptability of the principle vector, and inconsistent mosquito control programmes. Since the late 19th century, Fiji has experienced at least 13 recorded dengue outbreaks. The first epidemic was in 1885[1]. The first reported occurrence of dengue haemorraghic fever (DHF) was in 1974-1975. In 1998 there was a widespread dengue epidemic with 24,000 cases and 13 fatalities[2].

Until recently, the National Vector Control Unit of the Ministry of Health ran a vertical dengue prevention and control programme, consisting of expensive, intermittent and largely ineffective insecticide spraying. The Unit was hampered by budget and manpower constraints, insufficient staff training,

transport and supply limitations. Limited resources also prevented effective community-based action and the development of meaningful partnerships between the Ministry of Health, nongovernmental organizations (NGO's), businesses, and other government ministries.

Planning innovation for dengue prevention and control

The Pacific Regional Vector Borne Diseases Project (1997-2001) was designed to assist governments and communities in Vanuatu, Fiji and the Solomon Islands in the prevention and control of vector-borne diseases. The project was funded by the Government of Australia's Agency for International Development (AusAID) and managed by the Secretariat of the Pacific Community. A major project goal was to strengthen national capacity to develop and implement effective vector-borne control and prevention programmes with innovative social mobilization.

The project supported the first national community Knowledge, Attitudes and Practices (KAP) research undertaken on dengue fever in Fiji between September-October 1998. The study's aim was to gain baseline information and guide recommendations for subsequent behaviour and organizational changes. A team of Fijian and Indo-Fijian researchers visited urban, peri-urban and rural villages and settlements throughout Fiji. This community-based research used a combination of quantitative, qualitative and participatory techniques to investigate why and how householders were dealing with mosquitoes and to gather their views on how local services were addressing the dengue fever problem[3].

The research findings identified important issues that had been previously overlooked. People surveyed took little action in reducing the most productive mosquito breeding sites – in Fiji, these are predominantly used automobile tyres and 44-gallon drums[4]. For example, people did not consider discarded tyres as garbage but used them in flower gardens. Tyres were therefore not removed during 'clean up' campaigns and no specific practices focused on the management of tyres in situ[5].

Baseline research findings were presented to representatives of Health and Education Ministries, the National Health Promotion Centre, media and advertising firms, other government departments, and NGOs in a four-day 'think tank' in June 1999. Think tank participants used the findings to identify priority behaviours, target groups and potential programme partners. Recommendations were made to build social mobilization and communication activities based on people's current practices in reducing potential breeding sites. National respect for religion and love of sport, especially rugby, resulted in the Sports Council, Rugby Union and religious groups being identified as important partners for advocating dengue fever prevention and control. Similarly, project and Ministry of Health staff worked with the Ministry of Education's Curriculum Development Unit and teachers to develop anti-dengue information packages for teachers and primary school children.

Working parties were formed with identified partners to develop educational materials and mobilization activities for their respective constituents. Multimedia and communication specialists, graphic designers and experts in the production of print materials and advertising assisted the National Centre for Health Promotion in the

pre-testing, production and delivery of key messages. Sponsorship from business companies, Fiji TV and daily newspapers allowed these messages to be delivered at a reduced price.

Implementing the new social mobilization and communication campaign

To build towards a national-scale campaign, new partnerships and communication activities were first piloted in Suva City in 1999. The lessons learnt from this trial, including the need to focus more on behaviours rather than just knowledge, were used to plan for a national campaign in all major cities between October 2000-March 2001. These months coincide with the rainy season and period of maximum dengue risk, when locals also perceive mosquitoes as a problem. The national campaign concentrated first on behaviour changes relating to tyre management in households. The main messages were:

"Fill tyres used for plants right up to the top with soil to make your plants grow well and punch holes in tyres in holes used for other purposes. If you can't do that, places tyres under cover out of the rain".

Monitoring and evaluation of the approach

Feedback between the Ministry of Health and the project staff was facilitated by phonecalls, letters, meetings and reports. Regular field reports were sent to the project office from the medical sub-division managers monitoring activities, especially monthly larval indices carried out by environmental health officers.

Social mobilization and communication activities were evaluated in several ways. First, random interviews with people in the street were conducted on a regular basis using a short, standard questionnaire to assess people's exposure to key messages and any subsequent action taken to manage tyres. Results were used to modify certain messages, channels, and activities. A structured observation survey on tyre management in 100 randomly selected households in two different urban areas (Lautoka and Suva) was also conducted before the national campaign (September 2000). Eighty-two of these households were revisited after the national campaign ended (July 2001). The number of tyres in the yard were counted and assessed as to whether they had been modified in any way. While the total number of tyres did not change, there was a significant shift in their usage. Before the campaign, 34% of the total tyres were 'well managed' (i.e. filled to the top with soil, punctured with holes or stored under cover). This percentage had increased to 61% ($P < 0.001$) when the survey was repeated at the end of the campaign. This particular survey reinforced the importance of focusing on key breeding sites and keeping behaviour changes simple.

Lessons learned

There were many lessons from this project but two can be highlighted. First, social science research should be 'pulsed' throughout a community driven-programme in order to make ongoing modifications and mobilize partners. Traditional use of research with baseline studies that are repeated at the close of a project or programme with no research 'in-between' leaves little if any room for fine-tuning during implementation[6]. The frequent use

of participatory research also transformed this project and allowed new networks to be created during research planning, research presentations and 'think-tanks'.

Second, the KAP survey revealed a lack of knowledge about dengue fever and concern about mosquito breeding in key containers. Behaviour change communication was approached with only a few behaviours and small incremental changes as campaign objectives. Communication during 2000-2001 only focused on management of tyres and prompted simple modifications to the existing behaviours. These lessons have been applied in subsequent dengue prevention and control initiatives in Fiji[7].

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Case Study 6

Social Mobilization for Dengue Control in Honduras

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Abstract

This paper describes how Honduras' national dengue control programme was innovated by an action research project carried out in El Progreso (1990-1996). One intriguing vector control measure discovered by this project was a locally acceptable method for cleaning large cement washbasins and metal drums, known as "the *Untadita*" or "little dab". A large-scale social mobilization and communication plan was developed in 1997 to promote the *Untadita* and several other vector control measures. The authors provide insight into how the social mobilization and communication plan has been implemented to date.

Keywords: DF/DHF, social mobilization, *Aedes aegypti*, *Untadita*, Honduras.

Country setting and background

Honduras is located in Central America, between Guatemala, El Salvador and Nicaragua. The 2001 national census recorded 6.5 million inhabitants concentrated along Tegucigalpa and the metropolitan Sula valleys, a central corridor between the Caribbean and the Pacific coasts. More than 50% of the population are under 18 years. The Honduran economy relies heavily on agriculture, especially in products such as coffee and banana, and also meat packing, dairy products, shrimps and recently, *maquilas*.

Honduras had its first dengue fever (DF) cases 25 years ago and dengue hemorrhagic fever (DHF) appeared about 12 years ago. In 1995, 27,560 DF and 35 DHF cases and 5 deaths were reported[1]. This activity has continued since 1997. Most recent cases have occurred in the capital Tegucigalpa but there has been a progressive spread to the rest of the country including rural areas. There has also been a shift in the age groups affected by both DF and DHF – from older than 15 years to younger than 5 years. *Aedes aegypti* is the vector responsible for dengue transmission. The main production sites of *Ae. aegypti* in Honduras are water reservoirs such as *pilas* (cement basins), drums and tyres.

The National Dengue Control Programme is part of the Vector Control Department. Funding from government has

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been insufficient to sustain adequate control. International agencies have supported mosquito control operations using insecticides (adulticides and larvicides) but these approaches have not been effective. Priority was not to generate articulate responses from the population but to help the vector control workers to carry out their routines. The programme vision isolated dengue control from other efforts in the area of water supply, sanitation, local and municipality development efforts. It was clear that a new, more integrated approach to vector control was needed and an education unit was created within the programme but at first had very little political support. This paper describes how Honduras' national dengue control programme was innovated by an action research project carried out in El Progreso (1990-1996).

Planning innovation for dengue prevention and control

The 1990–1996 Integrated Dengue Control Project in El Progreso, supported by the Rockefeller Foundation, Johns Hopkins University, Centers for Disease Control (Dengue Branch), University of Tulane and the Pan-American Health Organization, was used as the basis for a new national programme. The first goal of the new approach was to change the dengue programme from an institutional "imposition" model to a more participative model that would be more family- and community-centred.

Results of the El Progreso research provided evidence of the benefits of community participation in the design and promotion of technically effective and socially acceptable behaviours to improve the management of water reservoirs. Alongside options for treating tyres (removing, storing under roof or treating with salt or limestone), weekly larvicidal treatments of water reservoirs, and the elimination of discardable containers, another behaviour the new model offered was *La Untadita* or the "little dab" – a home-made ovicide. *La Untadita* built on existing scrubbing and rinsing practices for cleaning the large *pilas* found in the vast majority of households; addition of bleach to the detergent without water resulted in a paste which was smeared on the inside walls of the *pila* or drum, left for 10 minutes, and then the *pila* was ready to be scrubbed. *La Untadita* was shown to have a significant impact on *Aedes* larval populations in El Progreso (it lowered the number and the age of larvae in washbasins and in drums)[2,3,4].

To promote this new model, a large-scale social mobilization and communication plan was developed. This plan included a mass media component, the development of printed materials (posters, stickers, flyers), and direct communication with the community through mobilization of community organizations, local governments, nongovernmental organizations, educational institutions, and the private sector on a national level. Planning meetings were held with programme heads in the Health Ministry and with personnel to provide training and information about the dengue problem. Institutional committees were organized to coordinate the plan's implementation. A series of household visits by community volunteers to promote the *Untadita* were also arranged and supported by banners and radio broadcasts. Large

numbers of stickers with information about the *Untatida* were produced for volunteers to place near *pilas*[5].

Implementing the new approach

The programme commenced with administrative and private sector mobilization including meetings between dengue programmeme staff and community groups, government and nongovernmental institutions. At the same time, the National Health Minister held several press conferences with national media stations and journalists. Dengue fever soon became a health sector priority and personnel of the different health programmes were incorporated in the dengue programme's operations. Next, owners of tyre repair workshops were trained how to properly dispose of and prevent *Aedes* breeding in tyres. The national water company was also mobilized to provide water (through canneries or tank cars) to neighbourhoods with irregular water supply.

Community mobilization began with community leaders, volunteers and local authorities being contacted. Families were then visited regularly by health personnel and volunteers who distributed printed educational materials. A mass media campaign broadcast messages to support the information received by householders. In major cities, mayors and different civic, religious, and private groups agreed to take responsibility for solving sanitation problems. In various workplaces, health staff met with employers or supervisors and agreement was reached to run a series of workplace information sessions. School children and teachers were given general information on dengue and vector control. Each year they received more complete information and helped to develop a special module on dengue prevention (*Higiene doméstica y Salud Ambiental*)[6]. Children were mobilized to visit neighbours and provide information on dengue and *Ae. aegypti.* Agreement was reached with the Ministry Council to declare one day of community work for public servants to improve household breeding site control and visit neighbours to educate them on vector control measures.

Many of these community mobilization activities were initially carried out in one day ("D-day"), but it was found that more time was needed to successfully complete the various tasks. D-day was extended to a five-day week ("D-week"). Later, an agreement was reached to repeat D-week twice a year (in the beginning and in the middle of the epidemic season) generally in June and September.

Monitoring and evaluating the new approach

Monitoring included using classic indicators such as: house indexes; number of cases in the community; dengue morbidity rates and percentage of people knowing and participating in the project; the number of visited households; and the percentage of the population exposed to and understanding key messages. Vector personnel gathered entomological information. Epidemiological information was gathered by nurses, physicians and statistics clerks. Household visits were recorded in forms filled out by project participants: public servants; teachers; volunteers; and so on. Information about message exposure was gathered through

surveys conducted by health personnel. The formal structure of the Vector Control Programme was used to support supervision of field teams and volunteer work, and for the review of forms.

Currently, the regular programme has taken into account the experience of partnership with local governments, the need to appeal to grassroots organizations and the importance of providing school children with formal instruction on dengue fever and other related issues. In surveys during 2002 and 2003, around 35% of housewives in the sample were aware of the *Untadita* method but results also showed a need for periodical reinforcement in the method that could be provided through a school-based intervention or directly through community-based interventions[7]. At the beginning of 2003 a new social mobilization approach known as Communication-for-Behavioural-Impact (COMBI), supported by PAHO/WHO, was introduced to build on previous successes. This renewed emphasis on carefully planned communication actions is extremely important given the occurrence of dengue epidemics in Central America between 2000 and 2002, and the increasing risk of more dengue hemorrhagic fever cases.

Lessons learned

Experience in El Progreso and then on a national-scale in Honduras has generated many lessons. First, negotiate from the beginning for good political support for all stages of the programme, especially any formative research. Second, include from the outset expertise in education, communication, community organization and entomology. Finally, work hard at linking research with implementation and at moving from small-scale to large-scale implementation.

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"Together Picket": Community Activities in Dengue Source Reduction in Purwokerto City, Central Java, Indonesia

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Abstract

This paper looks at how dengue prevention and control in Indonesia has evolved from a vertical, government-controlled programme to a more horizontal, community-based approach. The authors illustrate how social mobilization has improved *Aedes* source reduction by drawing upon recent experiences in Purwokerto City, Central Java.

Keywords: Dengue, prevention and control, community-based, social mobilization, source reduction, Indonesia.

Country setting and background

The Indonesian archipelago consists of five large islands – Java, Sumatra, Kalimantan, Sulawesi, and Papua – and thousands of smaller islands. Approximately 60% of Indonesia's 210 million people live on Java island. There are 370 ethnic groups with 67 languages, but *Bahasa Indonesia* unites all citizens. The national economy is based on agriculture and industrial production of the country's natural resources.

The rainy season lasts from October to March and the dry season from April to September. High temperatures and humidity favour mosquito populations with a peak in mosquito abundance in the rainy season. The major dengue vector in urban areas is *Aedes aegypti* but *Aedes albopticus* is also present. The majority of houses in Indonesia have a cement water container located in the bathroom to store water for bathing, and a smaller container in the water closet (WC). Water containers made from clay or plastic barrels/jars are also kept in the kitchen for cooking or drinking purposes. Additional water containers may act as potential breeding sites both inside and outside houses.

The first reported dengue fever and dengue haemorrhagic fever (DHF) epidemic

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in Indonesia occurred in 1968, with 24 fatalities and a high Case Fatality Rate (CFR) of 41.3%[1]. Since then, dengue fever has become endemic in most areas of Indonesia with year-round transmission. DHF affects children under the age of 14 years but an increasing number of cases are being reported in older age groups. For example, 47% of all cases reported in 2000 were patients over 14 years of age.

The approach to DHF control in Indonesia has evolved considerably in the last 30 years. From 1968 to 1979, the Health Department operated a vertical programme that emphasized perifocal chemical spraying to reduce mosquito density in areas where cases of DHF were reported. A mass larviciding programme (1% temephos sand granules applied to mosquito breeding sites) was established between 1980 and 1985 but was effective only for three months of each year[2]. From 1986 to 1991, decreasing programme resources resulted in a shift to selective larviciding. An intensive physician training programme in clinical diagnosis and management of DHF has been in place since the 1970s. This programme has helped to reduce the CFR to 2%.

From 1992 until the late 1990s, attention was given to larval source reduction through increased community participation, health education and intersectoral coordination[3]. An inter-sectoral DHF Working Group (DHF-WG) was established at all administrative levels, from villages to sub-district, district, province and national level, in order to implement source reduction strategies under the guidance of local health personnel. Two programmes – *Pemberantasan Sarang Nyamuk* (DHF source reduction) and *Bulan Gerakan 3M* (*Menguras* = Cleaning; *Menutup* = Covering; and *Mengubur* = Burying) – were established with key health messages communicated through various media. Voluntary cadres, mostly women from the "PKK" (Family Welfare Empowerment Organization) were mobilized to conduct regular house-to-house inspections of potential *Aedes* breeding sites. Staff from health centres and district health offices also carried out inspections of public places every three months.

Several Knowledge, Attitude and Practice Surveys (KAP) conducted in the mid-1990s, however, showed that while the general public possessed knowledge of the 3M messages, few people were taking appropriate action. A social mobilization approach was needed that could achieve and sustain behavioural results. This new initiative, known as *Piket Bersama* ("Together Picket"), was first piloted in Purwokerto, Central Java. This paper focuses on "Together Picket" experiences in Purwokerto City (population of 220,000).

Planning innovation for dengue prevention and control

The initiative commenced with a pilot study in a hamlet in Purwokerto in 1996. This study suggested that *Pemberantasan Sarang Nyamuk* and *Bulan Gerakan 3M* programmes should continue but a new focus for community action was required. The study recommended the formation of *dasawisma* (*dasa* means "ten" and *wisma* means "house"). Each *dasawisma* was to have a leader, preferably a PKK representative, who would receive DHF training. Depending on their size, each urban neighbourhood was to organize approximately 1-5 *dasawisma*. Householders within each *dasawisma* were to be organized by their local leader to take turns

inspecting each others premises for larval habitats (Figure 1).

Figure 1: ***Monthly meeting of a* dasawisma *in Purwokerto City, in which they discuss the results of their activity and make a plan for the next month***

Additional planning in Purwokerto involved the establishment of partnerships between the local government, the Rotary Club, the PKK, and municipal health services. The "head" DHF Working Group, chaired by the mayor and consisting of members of the health, education and economic sectors, PKK representatives, village development units, and Rotary Club members, agreed to disseminate information and monitor source reduction activities. The Rotary Club acted as a funding agency for materials procurement and training.

Implementing the new approach

The new approach officially began in November 1997 with several meetings to inform and encourage several neighbourhoods in Purwokerto to undertake source reduction. Then, all members of the local Rotary Club received education on "Together Picket". Rotary members became role models for others by carrying out their own household inspections. Next, meetings were held with the heads of various DHF Working Groups, the PKK, and key stakeholders from government departments to gain their support.

Supported by their local PKK representative, *dasawisma* then arranged a roster whereby each house took turns to inspect the other nine houses for potential larval habitats (Figure 2).

Figure 2: ***Dasawisma's activity, weekly checking for larvae in a bathroom of one member of a* dasawisma *in Purwokerto City***

Each *dasawisma* was provided with a "source reduction" kit containing flashlights to check the presence of larva, forms to record basic information, and education booklets containing information on the "3Ms" (cleaning, covering, and burying). *Dasawisma* leaders were asked to monitor and supervise the implementation of "Together Picket" in their areas and to report results to the district office. Inspections of public places such as traditional markets, public gardens, places of worship, and offices were also carried out by health centre staff and district health officers every three months. Based on initial indications that the new approach was having a higher level of behavioural impact, social mobilization and communication activities were expanded to other areas of the city between 1998 and 1999.

Monitoring and evaluating the new approach

"Together Picket" is ongoing in Purwokerto. *Dasawisma* activity reports are classified into three categories (active, less active, not active) at monthly PKK sub-district meetings in a process known as the "*Dasawisma* Participation Map". The leaders of PKK neighbourhoods and hamlets attending these meetings are informed of the activity level of each *dasawisma*. Less active or inactive *dasawisma* are encouraged to improve and receive closer supervision. A local sociologist also monitors all *dasawisma* group activity in Purwokerto through random visits to neighbourhoods. Larval surveys are conducted every three months by local health staff and DHF hospital cases are tracked. Pertinent larval survey results and any DHF cases recorded at local hospitals are reported back to the relevant village head.

The early success of this new approach can be measured by the reduction in the house index from 20% before activities began to 2% once activities were fully underway. "Together Picket" has now been adopted as a local government programme with special funding through the health sector. The Ministry of Health and Rotary Club Indonesia, with support from Rotary Club International, have recently expanded this model to 14 other cities and towns throughout Indonesia (e.g. Palembang, Cirebon, Solo, Kudus, Surabaya, and Bali).

Lessons learned

Compared to previous efforts in Indonesia, the "Together Picket" approach has shown early signs of success in reducing larval indices mainly because a few, critical behaviours have been emphasized by mobilizing very local social networks (the *dasawisma*), supported by key stakeholders including government and nongovernmental organizations, community leaders and experts. The Purwokerto experience demonstrates the advantages gained when programmes establish effective partnerships with existing organizations such as PKK. Monitoring and evaluation of such community-based efforts, however, need to be carefully planned and must themselves be based on principles of community involvement. Finally, the Indonesian experience over the last 30 years has shown that community consultation, time, and money are all needed if we are to sustain behavioural outcomes in dengue prevention and control.

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Applying Communication-for-Behavioural-Impact (COMBI) in the Prevention and Control of Dengue in Johor Bahru, Johore, Malaysia

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Abstract

The Ministry of Health in Malaysia has used a variety of mass media interventions and community-based actions to prevent and control dengue fever in the past but with only limited success. In 2001, an innovative approach to planning and implementing social mobilization, known as Communication-for-Behavioural-Impact (COMBI), was piloted in Johor Bahru District, Johore State, with assistance from the World Health Organization. This paper provides highlights of the COMBI Plan. Results from intensive monitoring and evaluation suggest that the pilot project has contributed towards positive behavioural outcomes in Johor Bahru. COMBI has now been adopted as the national approach to social mobilization and communication for dengue fever prevention and control.

Keywords: DF/DHF control, social mobilization, COMBI, positive behavioural outcomes, national approach, Johor Bahru, Malaysia.

Country setting and background

Johore state is located at the southern end of the peninsula and shares a common boundary with Pahang and Malacca to the north. To the south, separated by the Strait of Tebrau, is the island state of Singapore. Covering an area of 18,986 km^2, the state of Johore is divided into eight administrative districts. The state's capital city is Johor Bahru, the second largest city in Malaysia after Kuala Lumpur. The estimated metropolitan population in 2000 was 1,264,547 with an estimated growth of 4.2% per annum. The population growth is partially due to the influx of people from other countries and other parts of Malaysia.

Dengue fever/dengue haemorrhagic fever (DF/DHF) imposes a significant social, economic, and medical burden in Malaysia. Since 1994, the incidence of DF/DHF has

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been on the rise[1]. Johore state is particularly affected with the district of Johor Bahru reporting more than half of the State's cases in 2000. The Ministry of Health in Johor Bahru (MOHJB) has used a variety of mass media interventions and community-based actions to prevent and control DF/DHF in the past but with limited success[2,3]. In January 2001, MOHJB decided to try a fresh approach to social mobilization and communication for dengue prevention and control in the city of Johor Bahru. The Social Mobilization and Training Team (SMT) of the World Health Organization provided technical assistance in the production of a Communication-for-Behavioural-Impact (COMBI) Strategic Plan. The pilot project was launched in August 2001 and lasted for 12 weeks. This paper provides highlights of the COMBI Plan together with results from intensive project monitoring and evaluation.

Planning innovation for dengue prevention and control

COMBI is an integrated marketing approach to social mobilization based on lessons learnt from over 100 years of consumer communication and 50 years of public health communication. The overall goal of the COMBI Plan in Johor Bahru (JB) was to: "contribute to the dramatic reduction in the incidence of dengue fever (DF) and deaths due to dengue haemorrhagic fever (DHF) in the state of Johor Bahru, Malaysia in the year 2001." The Plan focused efforts on the achievement of three behavioural goals:

(1) To prompt family members in every home in the city of JB to conduct a weekly, 30-minute Sunday inspection of their homes both inside and outside for potential mosquito larva sites over 12 weeks (August – September, 2001)

(2) To prompt, in every village/community/block in JB, the formation of a Dengue Volunteer Inspection Team (DVIT) which will conduct a weekly larva site inspection of the community surroundings (not within the definition of homes) and take specific action to rid the area of these breeding sites.

(3) To prompt every individual with a fever during the 12 weeks of the Plan's implementation to presume that it is DF and to come immediately (at least within a day) to the nearest health clinic for diagnosis and treatment.

Two simple but important messages containing the desired behavioural outcomes were composed and were to be repeated over and over again throughout the 12-week campaign: (i) INSPECT YOUR HOME. GET RID OF *AEDES* BREEDING SITES; and (ii) IF YOU HAVE FEVER SEEK IMMEDIATE TREATMENT. A minimum budget of US$ 100,000 was agreed upon. The WHO Regional Office for the Western Pacific (WPRO), provided three-quarters of this budget with the remainder borne by the Ministry of Health.

Implementation of the new approach

The following are highlights of the integrated approach:

(1) ***Advocacy/public relations/administrative mobilization.*** Advocacy and public relations activities (e.g., meetings and press conferences) rather than formal directives were applied to engage key stakeholders including local politicians.

(2) ***Community mobilization.*** (i) Dengue Volunteer Inspection Teams (DeVITs) were formed in 48 localities. Volunteers were either selected by their local community or came forward on their own accord. They were responsible for inspecting areas beyond the home such as vacant lots and community halls, and also encouraged house owners to carry out weekly house inspections. (ii) Local youths formed bicycle riding teams (D'RIDERS) to undertake promotional tours of the district each Sunday morning, accompanied by a van equipped with a public announcement system. At each location the team was greeted by the local community leaders and residents.

(3) ***Communication.*** (i) Two thousand vertical buntings measuring two by six feet were hung on the posts along selected streets of Johor Bahru. (ii) A single, two-sided self-instructional worksheet/checklist on how to deal with *Aedes* breeding sites at home were prepared in four major languages (Malay, Chinese, English, and Tamil). Worksheets were distributed to schoolchildren every week to take home to their parents. The worksheet encouraged families to inspect their home for mosquitoes breeding sites. (iii) Radio advertisements (30 seconds and 60 seconds) were broadcast in Malay and Chinese on four radio channels throughout the 12 weeks. The advertisements contained the two behavioural messages. Four mainstream newspapers also carried a series of half-page and quarter-page advertisements containing the two behavioural messages. (iv) Radio talk shows presented by local doctors promoted COMBI and gave listeners information on dengue. Listeners were encouraged to call in to ask questions. (v) All doctors, nurses and other staff in government clinics carried out "point-of-service promotion" by explaining the behavioural goals of the project to every patient who came to the clinic for whatever reason. Private doctors were also encouraged to do this.

Monitoring and evaluating the new approach

Project progress and impact was measured by various means. Two monitoring and evaluation processes and their associated results are worth highlighting.

(1) ***Pre- and Post-COMBI KAP survey.*** A post-intervention structured questionnaire survey was carried out at the end of the 12-week campaign with results compared against baseline data collected before the intervention. The survey used a multistage stratified sample. Respondents were either household heads or anyone over 18 years. Out of 1712 post-intervention respondents, only 926 were considered "paired" respondents i.e., they were the same respondents who were interviewed during the baseline survey. Selected results include: almost all (99%) the respondents interviewed in the post-survey claimed that they had carried out Sunday household inspections compared to 71% in the pre-survey ($p < 0.01$). Caution is needed, however, when interpreting whether this impact can be attributed to the campaign for two reasons. First, survey responses are self-reports, not observations. Second, many of those who self-reported carrying out

household inspections had not heard specific campaign messages. Nevertheless, field reports from members of DeVITs and local health workers who monitored the activities of residents in areas assigned to them indicate that the "majority" of the residents did carry out Sunday house inspections as promoted by the campaign.

(2) ***Treatment-seeking surveys.*** Short questionnaires were developed to elicit responses on treatment-seeking behaviours among patients admitted and diagnosed with dengue in all government hospitals throughout Johore State. Patients admitted to Sultanah Aminah Hospital and Kulai Hospital (government hospitals serving Johor Bahru district) were considered as "cases" while those admitted in hospitals in other districts served as "controls". It was assumed that people who resided in other districts did not have exposure to or involvement in all COMBI mobilization and communication activities. During the 12-week study period, a total of 134 patients admitted into the two government hospitals in Johor Bahru district and 146 patients admitted into government hospitals in other districts were interviewed. Patients admitted to private hospitals were not interviewed. Results show that 59% of those admitted to Johor Bahru government hospitals sought treatment within 24 hours of the onset of fever compared to 42% among those from control areas ($P < 0.01$). Apart from "exposure to COMBI", there were no associations between other variables and the time between onset of fever and admission to hospital. It was also noted that although the total number of cases reported in the study area did not show a dramatic reduction, there was a decline in the number of cases in areas where DeVITs were established. No decline was measured in the non-DeVIT areas.

Lessons learned

Many lessons have been learnt from the Johor Bahru experience. First, a small group of committed and dedicated people can plan and execute a project as well as, if not better, than a large committee. Second, communities and households will readily get involved if the behavioural targets set are reasonable and achievable. Third, sustaining the interest of the volunteers is fundamental. There were noticeable differences in areas where the volunteers are active compared to those where they were less active. Lastly, measuring behavioural impact and trying to determine the role of COMBI are not straightforward. Nevertheless, our results suggest the COMBI Plan did contribute towards positive behavioural outcomes. COMBI has now been adopted as the national approach to social mobilization and communication for dengue fever prevention and control.

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Case Study 9

Dengue Prevention in Mérida, Yucatán, Mexico: Use of Formative Research to Refine an Education/Communication Intervention Targeting Household Management of Key *Aedes aegypti*-producing Containers

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Abstract

The project described in this paper reflects on the use of ongoing formative research to identify and test appropriate household-based control methods for key *Aedes aegypti*-producing containers and the creation of an education/communication strategy for the dissemination of highly specific messages for the key containers.

Keywords: DF/DHF, key containers, communication strategy, Mexico.

Country setting and background

Mérida is the capital of the state of Yucatán; located in the southeastern region of Mexico. It lies eight meters above sea level and is the largest city in the Yucatán peninsula. Beginning in 1991, the Mexican Ministry of Health received funding from the Rockefeller Foundation to investigate and test appropriate community-based approaches for the household management of *Aedes aegypti*-producing containers. Staff with the Ministry of Health worked in partnership with the State and Municipal Health Departments and local professionals with expertise in the social sciences.

Planning innovation for dengue prevention and control

During the first phase of the project (1991-1994), the focus of community-based activities was on domestic hygiene, and the "Waste management, domestic hygiene and community participation in dengue control" project was established in 1991. The objectives were to: (i) describe and analyse the environmental conditions necessary for the development of the *Ae. aegypti* mosquito; (ii) analyze waste management practices at the household and community levels; (iii) identify possible alternative solutions to hygiene problems in the community;

(iv) develop educational materials to increase community understanding of dengue and its relationship with the environment; (v) identify appropriate communication channels for disseminating the messages and materials; and (vi) evaluate the impact of the intervention[1,2].

The project was conducted by a local team of social scientists, with participation of vector control staff from the State Health Department for the entomological surveys. Team members had expertise in anthropology, sociology, communications and epidemiology. Formative research was conducted, and included in-depth interviews, focus groups, structured observation studies of waste and water management practices at the household level, and pre- and post-intervention KAP and entomological surveys. Research on community networks and resident participation in community organizations revealed that there were few organized community groups and that residents in general did not belong to such groups. A "Mosquito Hunters" children's group ("*los Cazamosquitos*") was formed in 1992 by project staff, with a companion group formed for their parents in 1993. Most of the intervention activities were carried out by the children involved with the Mosquito Hunters group, with some participation from the parental group. Results of the intervention demonstrated that although the project had a positive impact on knowledge levels of individuals who participated in community meetings organized by the Mosquito Hunters, there were no significant differences in larval indices between the neighbourhood where the intervention was carried out and a control neighbourhood. The goal of encouraging residents to assume responsibility for neighbourhood surveillance of fever cases and *Aedes* breeding sites was not realized. Project staff attributed this to a loss of enthusiasm by group participants as a result of few tangible successes, a lack of perceived need for such surveillance by the community, and a lack of institutional support.

A reflection process on Phase I activities and results was carried out by project staff. Through this reflection process, staff identified factors that either facilitated or hindered the development of the project[1]:

Facilitating Factors	Barriers
• integrated analysis of the "problem" (i.e., dengue) • funder flexibility in project development • interest and availability of the children • interest of parents in their child's activities • personal growth through project activities	• lack of organizations through which large-scale community mobilization activities could be organized • dengue was not considered to be a problem by residents • weak and sporadic assistance from institutions for resident-led activities • adults did not view the children as legitimate sources of information or providers of a "service" (e.g., home inspections) • lack of motivation of adult participants • little to no response from institutions to problems viewed as priorities by residents

Using data collected through formative research and conclusions from the reflection process, Phase II of the project was developed[3]. Given that low levels of affiliation to community groups had also been found in other studies[1], the southern sector of the city was selected for a large-scale education/communications intervention that used mass media and interpersonal communication carried out through house visits and neighbourhood-level special activities. The southern sector was identified as the priority sector of the city due to the number of dengue cases, high entomological indices, and large numbers of key *Aedes*-producing containers.

Additional formative research was conducted to: (i) identify the key, productive containers using pupal indices in order to better target household efforts to the most productive containers, (ii) better understand specific behaviours linked with the presence of *Aedes*-producing containers on household premises and the management of these containers, and (iii) identify existing behaviours that could be modified to make them "mosquito proof". The four most productive containers, classified by function, targeted through the education/communication activities were animal water dishes (e.g., plastic containers, tires cut in half, old kitchen pots), diverse water storage containers (e.g., *piletas*, plastic buckets), tires, and miscellaneous containers with a future, undefined use[3]. Women were selected as the primary target audience given their key role in household water and waste management, as well health care responsibilities.

Implementing the new approach

Working with women, behaviours were field tested for feasibility, acceptance and efficacy. Once the final set of behaviours was selected, the benefits and costs for each were identified and slogans that summarized the key benefit of the recommended behaviours were tested with residents; the slogan selected through this pre-testing phase was "The serenity of your family is close at hand… and is in your hands." A key motivator for the women was the recognition and acknowledgement, by their family, of their many efforts to keep the household healthy. Using several data collection methods (review of Phase 1 results, focus groups, a media consumption survey), information preferences were identified including the characteristics of the spokesperson, specific shows and times for radio and television, and spokesperson qualities for effective interpersonal communication. As a result, the spokesperson selected was "Lela", a puppet representing a Yucatecan woman of Mayan descent known for her pointed and humorous commentaries on everyday life. The key to the spots was the humorous interaction between Lela and a physician, through which the action to be taken was demonstrated and described twice.

Over a period of five months, the communications/education campaign was conducted with one behaviour introduced every 4 to 6 weeks, depending upon the complexity of the behaviour; the final month of the campaign was dedicated to dissemination of a reinforcing message. On average, 24 radio spots per day were transmitted over three stations during the morning and 14 TV spots per week were transmitted on the leading national television station during the most popular soap operas in the evening. More complex messages were addressed through interpersonal contacts during school-based activities with fourth grade students and home visits. While the same messages were promoted, a variety of

materials and activities were used to enhance self-efficacy by skill building and discussion.

Monitoring and evaluation of the approach

Phase 2 was evaluated using a mix of qualitative and quantitative methods. KAP and entomological surveys were conducted pre- and post-intervention, and an in-depth qualitative analysis of interview and survey data was carried out. In general, a decline was seen post-intervention across all three entomological indices (house, container and Breteau); a decline that was also seen when only examining the key containers. A composite behaviour score was created to more accurately reflect whether the behaviour had taken place. There was a positive increase in the behaviour scores post-intervention, with a significant increase in the self-report of the behaviour for tyres (use of lime, 0.6% to 13%) linked with no mosquito breeding in tyres.

Lessons learned

This project developed a methodology for working with community residents in the identification and development of effective and practical household-based mosquito control methods. A key lesson learned is that as interventions are developed, the cost-benefit ratio of the intervention must be calculated taking into consideration not only the actual cost of the intervention but also the broader economic costs associated with dengue, such as work absenteeism due to illness, primary and tertiary care for individuals with dengue or DHF, and vector control efforts. *Ae. aegypti* control is not a problem that can be resolved by the health sector on its own; rather it is a problem of "shared responsibilities". The participation of municipal government and the education system along with household responsibility for domestic containers is vital for effective, sustained *Ae. aegypti* control.

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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 *Ae. aegypti* control to be achieved through social mobilization and communication[7]. 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[6,8]. 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[6,8].

Implementing the new programme

Mass media

A poster (*Sin Mosquitoes 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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Formation of Community Committees to Develop and Implement Dengue Fever Prevention and Control Activities in Vanuatu

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Abstract

Using experiences from an urban settlement near Port Vila, this paper illustrates how community mobilization to prevent and control dengue fever was achieved in Vanuatu and how unexpected innovations can occur when national programmes consult with community groups.

Keywords: Dengue prevention and control, community participation, social mobilization, Vanuatu.

Country setting and background

The Republic of Vanuatu comprises a chain of 83 Pacific islands with 68 of them being permanently inhabited. Vanuatu's population is over 187,000 with a growth rate of approximately 2.4%. Dengue epidemics have been reported in Vanuatu since 1971. In 1984, the Health Department reported over 3,300 cases affecting 2% of the population. Dengue haemorrhagic fever (DHF) developed in 54 of these cases resulting in 12 deaths. This epidemic had a major impact on the economy of the country. Several work and school days were lost and the government had to redirect resources from other sectors to combat the epidemic[1].

Until recently, the Department of Public Health ran a vertical programme largely funded by the World Health Organization (WHO) that responded to all vector borne disease outbreaks including dengue fever[2]. The programme was managed by a small team who concentrated their efforts on malaria control. Malaria control officers were responsible for applying temephos granules to all water containers in Port Vila during dengue epidemics. Often, the epidemic had already reached its peak and was in natural decline before this control measure was implemented. In the absence of a national dengue programme, there was

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no laboratory surveillance, minimal health education or community participation. Additionally, there was minimal partnership between the Public Health Department, the corporate sector, nongovernmental organizations and urban communities.

The majority of Vanuatu's population (79%) still lives in rural areas, but there is a trend towards urbanization, leading to the growth of illegal urban settlements without piped water and electricity services. With a population of more than 1,500, Manples is one such settlement on the outskirts of Port Vila (the national capital). In the absence of piped water, people collect water in large containers varying from 44-gallon drums to open 10,000-gallon concrete tanks. These containers provide the perfect breeding habitat for *Aedes* mosquitoes.

This paper considers innovations in social mobilization and communication for dengue prevention and control in Vanuatu that took place during the Pacific Regional Vector Borne Diseases Project (1997-2001) funded by the Government of Australia's Agency for International Development (AusAID)[1]. The experiences of community action in Manples are used to highlight key points.

Planning innovation for dengue prevention and control

The goal of the Pacific Regional Vector Borne Diseases Project was to strengthen the capacity in Vanuatu and several other Pacific nations to monitor and control mosquito-borne diseases such as malaria, dengue and filariasis. The five-year project was managed by the Secretariat of the Pacific Community. In Vanuatu the project worked with the National Malaria Control Programme to develop a national dengue surveillance and control programme as well as other activities related to malaria and filariasis. It was agreed early on that because potential *Aedes* breeding habitats are often in and around where people live and work, campaigning against the disease would only be effective through active community participation and partnerships with other agencies. A number of partners were identified to assist in advocacy and information dissemination while others assisted in mobilizing community groups. A well-known theatre company in the region, *Wan Smol Bag*, was involved in developing TV and radio spots for dengue fever. They also developed a dengue fever video, together with school handbooks on how dengue is spread and the control measures needed to interrupt transmission. All messages were based on initial community-based formative research and pre-tested with samples of intended audiences.

Implementing the new programme

A central part of the initiative in Manples was the formation of community committees. Each of the provincial and island groupings within the settlement had a chief representative who came together with youth and women's representatives to form a joint committee known as the 'Manples Community Project'. Assistance was sought from the National Malaria and Vector Borne Diseases Programme and the Pacific Regional Vector Borne Disease Project to provide direction on how the community could participate in the prevention and control of dengue fever.

At the start of the Manples Community Project in early 1998, a series of meetings and a workshop were organized for the community on dengue fever, its prevention and control. Vector Control staff facilitated the workshop while *Wan Smol Bag* performed plays during the workshop and in the evenings after many residents returned from work. The plays were also performed in local schools. The plays involved the audience walking around the village or school compound to identify and destroy breeding habitats, either by complete removal or by application of temephos. Information leaflets with key messages from the plays were supplied to schools, churches, provincial councils, health institutions and other NGOs to disseminate[1].

After the awareness in Manples was raised, the committee started to mobilize the whole community. Each house donated Vatu 100 (equivalent to 30 US cents in 2000) to the committee to purchase 25-litre plastic bags to collect small, discarded water containers that were potential breeding habitats for dengue vectors. Householders with old car tyres in their yards either placed them for disposal or were shown by volunteers to correctly fill them with soil so as not to retain water. National programme-community committee consultations also led to a team of young people being trained to use hand-held battery-operated drills to make water drainage holes in tyres that could not be removed. Community committees negotiated with business houses and municipalities in Port Vila and Luganville (Vanuatu's two main towns) to loan their lorries for the collection of discarded containers and unwanted tyres for disposal at municipal dumps.

The National Vector Control Unit also worked with volunteers within the community to apply temephos to larger water storage containers to kill mosquito larvae. It was found that the community was not receptive to temephos being applied to very large concrete water storage tanks (approximately 5,000 gallons in volume). A local water container manufacturer cooperated and started to manufacture mosquito waterproof storage containers.

Monitoring and evaluating the new approach

Social mobilization in Vanuatu was aimed at involving wider community participation in the destruction of dengue mosquito breeding sites. Continual larval surveys measuring household and Breteau indices were conducted by the vector control team at selected sites to reinforce community mobilization. Due to time limitations, it was not possible to formally conduct an evaluation of behaviour change of the community.

A small outbreak of dengue was detected in Port Vila in 1998. This was the first test of the capacity of the new national surveillance and control programme. All sectors of the surveillance and the mobilization of the community were engaged to combat the outbreak, which subsided and disappeared.[1] About 100 cases were recorded with no mortality[2]. Continued surveillance occurred with ongoing control measures implemented. Many activities within Manples and other urban settlements were sustained by the national programme after the project ended in June 2001. A recent circulation of dengue in the Pacific did not emerge in Vanuatu.

Lessons learned

This paper shows that vertical programmes run by the health sector without community participation will struggle to be successful. Instead, programmes that develop horizontal partnerships, for example, with community committees, will encourage community action and lead to more successful and sustainable outcomes. Unexpected but valuable innovations such as equipping and training youth groups with hand-held drills to improve the management of non-disposable, used tyres can result when the community is consulted on how they believe local problems should be tackled. Developing partnerships with other agencies and NGOs will further improve results.

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Community Mobilization, Behaviour Change and Biological Control in the Prevention and Control of Dengue Fever in Viet Nam

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Abstract

A unique nine-year collaborative programme between Vietnamese and international medical scientists and an aid organization has established an innovative and successful community-based dengue vector control programme in Viet Nam. The use of predacious copepods combined with new water management practices by nine communes in northern and central Viet Nam helped eliminate the main dengue vector mosquito, *Aedes aegypti*. The model was enthusiastically taken up by communities with apparent ease and a high level of acceptability as demonstrated by post-project sustainability and expansion. This paper describes how the use of community health volunteers helped DF/DHF prevention practices within the community and made an essential contribution to *Ae. aegypti* elimination.

Keywords: DF/DHF, community-based, copepods, *Aedes aegypti*, Viet Nam.

Country setting and background

From the first epidemic in 1959, dengue and dengue haemorrhagic fever (DF/DHF) incidence has increased to become a major endemic health problem in Viet Nam with an average of 77,057 recorded cases and 141 deaths per year between 1996 and 2003. The incidence is highest in the Mekong Delta (South) and on the central coast, where the common use of water storage containers has led to high densities of the main dengue vector, *Aedes aegypti*. As in other countries, DF/DHF control in Viet Nam has historically focused on adulticide ULV spraying to kill mosquitoes during epidemics. Used as a reactive

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measure, spraying is often too late to reduce epidemic transmission. Other control strategies, such as the use of lids on water containers, use of fish in water tanks and introduction of chemical larvicides into water containers, have been tried but did not prove to be effective or viable over the long-term.

In order to develop and test new, innovative methods of vector control, a unique collaborative effort of Vietnamese and international medical entomologists, health workers and nongovernmental organization development staff was formed during 1995. The resulting programme, which is continuing, was based on identifying key mosquito breeding containers, utilising local copepod predators of *Ae. aegypti* larvae and supporting dengue prevention practices in each household. Species of *Mesocyclops* copepods that are particularly effective predators of *Ae. aegypti* larvae[1] were found in natural water sources and, through transference or flooding, in up to 70% of drinking water containers in some rural communities. Combining *Mesocyclops* use with social mobilization and behaviour change, the programme subsequently demonstrated an effective and sustainable method for dengue vector control[2-5]. Since the entomological results have been described elsewhere, this paper focuses on the planning, implementation and lessons learnt related to supporting new community practices to prevent dengue.

Planning innovation for dengue prevention and control

The multi-disciplinary collaborative team, with members from the National Institute of Hygiene and Epidemiology in Hanoi, the Queensland Institute of Medical Research, the Queensland University of Technology and the international aid organization, the Australian Foundation for the Peoples of Asia and the Pacific, provided both an avenue for trying innovative approaches and the technical expertise to support communities and health authorities to implement it. The programme followed a strategy to establish successful models from which local authorities could later expand. To ensure relevance and effectiveness, vector surveys and KAP surveys of households were used to tailor programme activities to local conditions.

The programme used a structure that combined a bottom-up set of community activities with top-down training, monitoring and support as advocated by Gubler's review of vertical approaches to dengue vector control[6]. Commune management committees with representatives from local authorities, schools and community members were established which provided the key elements necessary for community empowerment and engagement: information and training on the local dengue risk and control; opportunities for community members to participate in programme decision-making; and accountability measures for activity performance and local expenditures.

KAP surveys of 100 households in each programme commune consistently showed that locals were much more likely to believe and act on health information when it was delivered face-to-face rather than through posters and brochures. As a result, a health volunteer or 'collaborator' network was formed in each commune to communicate

directly with households, assess household dengue risk, obtain consent and support DF/DHF preventive behaviours in households.

Implementing the new project

Political will and local leadership

Changing to a preventive approach from emergency response and a curative approach required careful consideration by the Ministry of Health (MOH). Since the dengue problem in Viet Nam was not getting better, the MOH faced implications if the new strategy did not work. The MOH response to encompass both a preventive and emergency capability was to increase the budget considerably. Secondly, someone in Viet Nam had to take responsibility for the local initiation of the embryonic programme – including the development of community programmes. The selection and training of health professionals down to community volunteers was an essential element to success.

Starting with a WHO-supported proof-of-concept study in 1995, the programme identified local leaders who were able to drive the implementation of three projects that successively expanded the methodology from northern to southern Viet Nam, covering 12 provinces by mid-2004. Refined by experience, the programme's vector control activities fell into four key areas: local breeding and introduction of *Mesocyclops* into water tanks and ceramic jars; removal of discarded containers through community clean-up campaigns; promoting dengue prevention practices through education campaigns supplemented with face-to-face reinforcement and motivation; and monitoring mosquito populations and household water practices. Education campaigns targeted the dengue-related needs identified by the vector and KAP surveys. Activities, often supported by schools and the Youth, Women's and Farmers' Unions, included open-air community meetings, radio and television broadcasts, loudspeaker announcements, travelling school drama performances, church meetings, a dengue football competition as well as posters, leaflets and billboards.

During their monthly household visits, the collaborators demonstrated and encouraged the adoption of relevant water management practices to prevent *Aedes* breeding including the maintenance of *Mesocyclops* in water jars that were being cleaned out, removing discards, using salt in ant-traps and regular emptying of vases.

Two years of on-going encouragement, motivation and monitoring by collaborators helped cement these practices into household habits. Measures used by commune management committees to sustain collaborator house visits beyond the life of the project included: income from project micro-enterprise schemes such as plastics recycling; provision of discounted health care, food and other benefits; integration with other health programmes; and support from national and provincial dengue programmes.

Monitoring and evaluating the new approach

Formative annual evaluations and regular monitoring of project impact were used to measure progress, address issues and adjust activities. Quarterly vector surveys by trained province-level health staff and monthly household visits by health volunteers measured mosquito and *Mesocyclops* populations and key breeding containers. The first project completed in 2000 achieved

full *Ae. aegypti* control in five out of six communes[4]. By 2003, the second project had reduced larval populations by 99.6-100%[5] in four communes and, an expansion out of first project communes by local authorities achieved control in 32 out of an additional 37 communes[7]. Collaborators measured the level of adoption of prevention practices through standardized ratings of dengue prevention behaviours in a sample of households during the first project. By the end of the project the proportion of households rated as showing an excellent or good level of dengue prevention practices almost doubled to 94%. Most of the remaining 6% faced severe poverty, had low levels of education or did not feel it was their duty to kill mosquito larvae. During focus group discussions, most participants indicated that the collaborator system and community campaigns were central in supporting them to implement and maintain household dengue vector control. The KAP surveys showed a significant increase in community knowledge of DF/DHF aetiology and transmission.

Lessons learned

When used in combination with DF/DHF prevention practices in the community, *Mesocyclops* can be an easy and effective method of *Ae. aegypti* control but to achieve community acceptance and maintenance requires several key elements. First, a sound knowledge base about DF/DHF and methods of vector control must be built amongst the community. Second, systems and campaigns to support long-term DF/DHF preventive practices together with the introduction and ongoing use of *Mesocyclops* must be developed in negotiation with community groups. Success of *Mesocyclops* adoption and use in Viet Nam has only occurred when dengue vector control activities were introduced at the household level through the collaborator system, which itself required community support. Lastly, political support for an approach that combines bottom-up and top-down strategies is vital.

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