THE NEW ZEALAND MEDICAL JOURNAL
Vol 119 No 1229 ISSN 1175 8716

Can schools contribute to mosquito surveillance? A New Zealand pilot study

Improvements in mosquito surveillance systems may be necessary in countries subject to changing mosquito distributions from anthropogenic land-use change, climate change, and introduction of exotic mosquito larvae and adults (e.g. in imported car tyres or aircraft). We report on a pilot study that used a novel source for mosquito collection—primary schools. This work was part of a larger study that developed a school-based health promotion project around mosquito-borne disease risks in New Zealand.

Methods—An initial part of the project involved the development of a health promotion resource for use in primary schools. The design of this resource was partly based on a booklet called "Flytrack" that was developed for schools to help monitor the spread of an agricultural pest, the Australian green blowfly (*Lucilia cuprina*).[1] The new mosquito resource developed ("Mosicatch"), included booklets for students and teachers that were designed to contribute to four learning objectives of the national "New Zealand Schools Curriculum". Of relevance from a surveillance perspective were the components of the resource that included: identifying larvae and adult mosquitoes, information about their habitat, building ovitraps and collecting specimens, and how to post these off to a central location (i.e. the Wellington School of Medicine and Health Sciences [WSMHS]). A total of 348 schools selected on the basis of their geographical distribution were emailed or posted invitations. The response rate indicating interest was only 14% and so a more intensive promotion in the Wellington region was employed. It achieved a higher 77% response rate (17/22 schools). Altogether, a total of 72 resource kits were sent out to these primary schools in the summer seasons of 2002 and 2003.

Results—A total of 16 schools that received the resource kit implemented the "Mosicatch Health Promotion Project" as part of their schools' science curriculum. These were from around New Zealand (in 11 out of a total of 75 districts nationally). Of these schools, nearly all (n=15), sent mosquito samples during the first terms of 2002 and 2003 (summer in New Zealand) to the national collection site (WSMHS). A total of 135 samples containing mosquitoes (both larvae and adults) were received and specimens commonly arrived alive and in water-filled specimen jars provided in the resource kit. The majority of samples arrived in good condition and species identification could be established for all but one of the samples. Overall, a total of five species were identified, two exotics *Culex quinquefasciatus* Say and *Ochlerotatus notoscriptus* Skuse (which are able to transmit diseases in other countries[2–5]), and three endemics (*Culex pervigilans* Bergroth, *Ochlerotatus antipodeus* Edwards, and *Opifex Fuscus* Hutton). The majority of schools only collected a single species in a sample, however two schools provided three species. Only a minority of samples contained other insects such as crane-flies (tipulids).

Discussion—This pilot study identified that the participating schools were able to successfully use the resource kit provided to collect local mosquitoes and post them to a central agency. As far as we can ascertain, this approach to mosquito surveillance

has never been attempted before (though schools in some countries have specific educational interventions around mosquito control[6–8]). Anecdotal reports from teachers involved in this project indicated that the resource materials and equipment worked well and that the students enjoyed the educational experience. The only problem reported from the school not providing specimens was that the ovitraps that the students had set up were damaged by vandalism and they failed to collect any mosquitoes by other methods specified. Site visits by one of us [AS] to three participating schools also indicated that ovitraps had been set up and that there was apparent student enthusiasm in the project.

The "Mosicatch Health Promotion Project" did not become routine for the schools involved as this was only a pilot programme and it did not have long-term funding support. Nevertheless, this experience suggests that such a programme could potentially be piloted on a larger and longer-term scale. Having well-developed resource material and learning objectives that are integrated with the science curriculum appeared to be important. Also regular telephone or email contact between the relevant teachers and surveillance system personnel may help ensure their long-term participation.

A potential advantage of integrating schools into a routine system for mosquito surveillance is their widespread distribution (especially primary schools). The running cost of such a system may also be fairly minimal if resource kits can be mass-produced or use low-cost materials. A more focused surveillance system might just use schools near potential entry points for exotic species (e.g. near air and shipping ports). It could also provide modest rewards to minimise such "sentinel schools" dropping out of the programme. Ultimately, however, any surveillance system using schools to collect mosquitoes needs to be compared to other systems that utilise adult volunteers or trained environmental health professionals.

Acknowledgements: The authors thank the students and teachers involved and particularly Allen Heath and Christine Harrison who contributed to the development of the resource booklet. This project was supported by a grant from the Wellington Medical Research Foundation. The authors have no conflicting interests.

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