A spatial decision support system for guiding focal indoor residual spraying interventions in a malaria elimination zone

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A customized geographical information system (GIS) has been developed to support focal indoor residual spraying (IRS) operations as part of a scaled-up campaign to progressively eliminate malaria in Vanuatu. The aims of the GIS-based spatial decision support system (SDSS) were to guide the planning, implementation and assessment of IRS at the household level. Additional aims of this study were to evaluate the user acceptability of a SDSS guiding IRS interventions. IRS was conducted on Tanna Island, Republic of Vanuatu between 26 October and 5 December 2009. Geo-referenced household information provided a baseline within the SDSS. An interactive mapping interface was used to delineate operation areas, extract relevant data to support IRS field teams. In addition, it was used as a monitoring tool to assess overall intervention coverage. Surveys and group discussions were conducted during the operations to ascertain user acceptability. Twenty-one operation areas, comprising a total of 187 settlements and 3,422 households were identified and mapped. A total of 3,230 households and 12,156 household structures were sprayed, covering a population of 13,512 individuals, achieving coverage of 94.4% of the households and 95.7% of the population. Village status maps were produced to visualize the distribution of IRS at the sub-village level. One hundred percent of survey respondents declared the SDSS a useful and effective tool to support IRS. The GIS-based SDSS adopted in Tanna empowered programme managers at the provincial level to implement and asses the IRS intervention with the degree of detail required for malaria elimination. Since completion, SDSS applications have expanded to additional provinces in Vanuatu and the neighbouring Solomon Islands supporting not only specific malaria elimination and control interventions, but also the broader public health sector in general.
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