

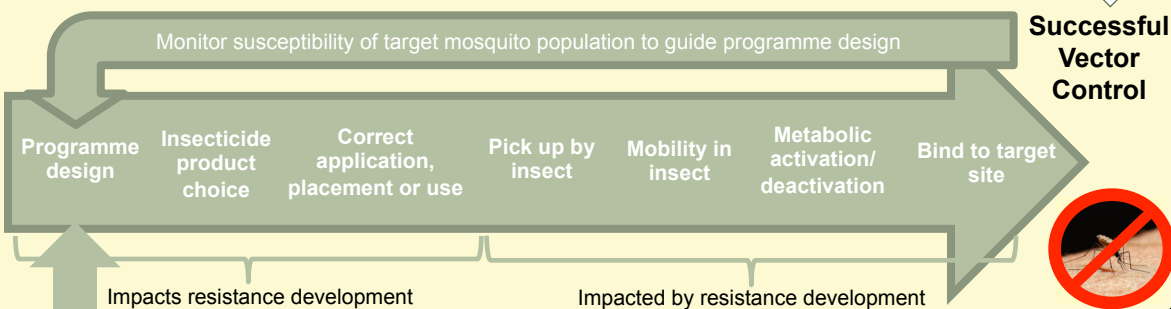
## The importance of Insecticide Resistance Management in the control of the mosquito vectors of malaria

Insecticides have been extensively used since the 1940s to control the mosquito vectors of disease, and have been a vital component in the fight against malaria. However, resistance has developed and is widespread in populations of the major mosquito vector species to the four classes of insecticide currently recommended for adult vector control. As insecticide resistance continues to develop and spread, there is a real danger that these valuable tools will be lost.



Resistance impacts Vector Control programmes here

Path of a mosquito adulticide from decision to implement a programme to successful vector control

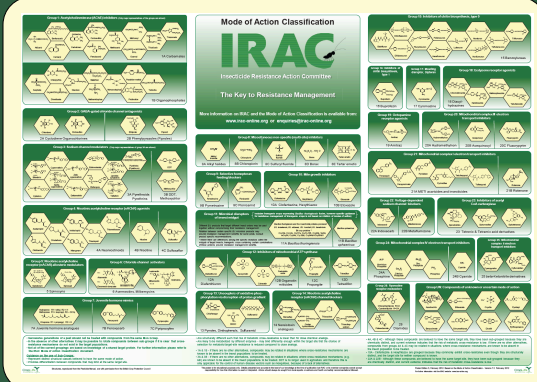


### Plan Insecticide Resistance Management here

IRAC defines resistance as “the selection of a heritable characteristic in an insect population that results in the repeated failure of an insecticide product to provide the intended level of control when used as recommended.”

IRAC strongly promotes Insecticide Resistance Management, IRM, as an integral part of all insect control programmes.

The aim of an IRM programme is “to take actions that reduce an insect population to an acceptable level, in such a way as to maintain the long term effectiveness of the control interventions employed”. Selection pressure for insects that carry genes conferring resistance to a given insecticide should therefore be minimised .



In the majority of cases, insecticide resistance develops against all members of a class of insecticide that share a common mode of action (MoA). It is therefore useful to talk about classes, or groups, of insecticide rather than individual insecticidal products. IRAC has worked extensively with industry and non-industry experts to classify all insecticides into a comprehensive MoA Classification Scheme. This groups all insecticides with a MoA, linked to a common target site, into numbered groups. The IRAC MoA classification is regularly updated and can be found at [www.irc-online.org](http://www.irc-online.org) and is available as a poster and booklet.

### Insecticide Resistance Management

- Plan: IRM should be considered an integral part of any vector control programme, and should be a prerequisite for programme funding.
- Monitor: The susceptibility status of the target mosquito population should be monitored during the planning phase to guide choice of intervention. Monitoring should be continued to identify changes in susceptibility profile.
- Rotation: Where possible, guided by susceptibility monitoring data, plan to rotate insecticides by MoA class, either temporally or spatially. In the absence of susceptibility data, the rotation of products between IRAC MoA classes will reduce selection pressure for resistance development. Include mosquito larvicides with alternative MoA where appropriate.
- To reduce resistance selection pressure from sub-lethal doses:
  - Use WHOPES approved products that conform to specification throughout programme cycle.
  - Ensure all spray applicators and LN distributors are fully trained and follow product labels.



### Conclusion

Insecticide Resistance Management must be an integral part of all vector control programmes. Using insecticides in such a way that their effectiveness is maintained, is a stewardship responsibility of the commercial companies that market them. It is also a stewardship duty of those who design and implement vector control programmes.

Further information the IRAC publication: Prevention and management of insecticide resistance in vectors of public health importance [www.irc-online.org](http://www.irc-online.org)

