Insecticide resistance in public health vectors can profoundly affect public health through the possible re-emergence of vector borne diseases. Surveillance wherever possible is essential to proactively react once a change in susceptibility of a public health pest to an insecticide is observed. To this end the World Health Organization has published methods for the surveillance of resistance development to insecticides, e.g. by simple, rapid diagnostic dose bioassays for mosquitoes.

As with agricultural practices, the best option currently is the rotation of different modes of action rather than alternating members of one chemical class or different chemical classes addressing the same target site. The presence of kdr resistance renders DDT and pyrethroids less effective, whereas carbamates and organophosphates can still be used. If MACE (modified acetylcholinesterase) as a mechanism is not present, rotational use of organophosphates and carbamates can be considered where product labelling and local regulations permit. In addition, the use of larvicides in conjunction with pyrethroids can support resistance management through rotation of MoA across different life stages. Effective long-term resistance management is necessary, but many factors need to be considered (including regional availability of insecticides) to successfully implement strategies in order to effectively control insect vectors.

Biochemical mode of action of chemical classes of WHO-recommended insecticides for the control of mosquito larvae and adults, and their IRAC MoA classification group.

Note: The IRAC MoA Classification Scheme is regularly edited and updated to include new products. Please refer to: www.irac-online.org for the complete mode of action list.

Further information in the IRAC publication:
Prevention and management of insecticide resistance in vectors of public health importance.
Available on the website at: www.irac-online.org