



[www.ivcc.com](http://www.ivcc.com)



# IVCC: The Innovative Vector Control Consortium

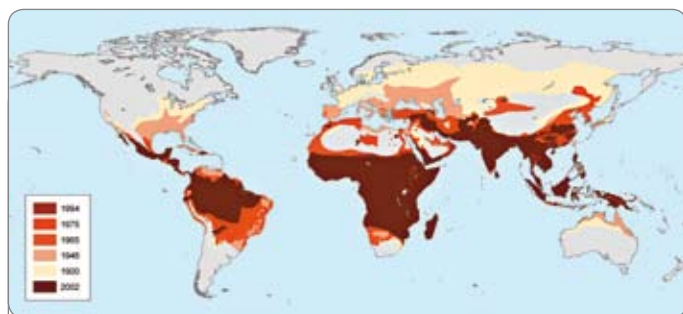


# Why do we need IVCC?

“The role of the IVCC is to stimulate and support innovation in vector control products and information systems.”



Mosquito vector control is capable of spectacular results. The malaria eradication campaigns of the mid 1900s eliminated malaria in much of the world. It was driven out of the USA, most of Europe, Latin America and Asia, and even in Sub-Saharan Africa the disease burden was reduced substantially. The eradication campaigns were discontinued because of concerns about drug and insecticide resistance and problems with sustainability.

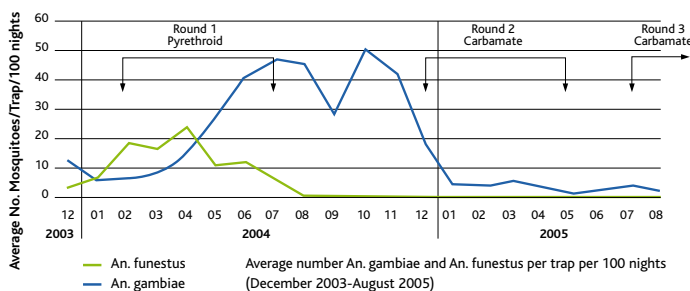


### Historical spatial limits of malaria

Historical endemicity map provided by the Malaria Atlas Project (MAP, <http://www.map.ox.ac.uk>), funded principally by the Wellcome Trust, UK.



The impact of insecticide resistance is illustrated in the well studied case of Bioko Island where pyrethroid resistant *An. Gambiae* mosquitoes were not controlled by the spray campaign of 2004 but a switch to an alternative in 2005 brought them under control.



Graph adapted from data produced by Medical Research Council Durban, South Africa.

Dengue is spreading rapidly in many parts of the world. The strategy of mosquito larval source reduction and space spraying to eliminate dengue epidemics has been largely ineffective and is not sustainable. It is clear that we need to respond to potential dengue outbreaks more rapidly and efficiently than is possible at present.

### Effective Vector Control requires:

- A choice of insecticide products free from resistance
- Information about which insecticides are effective in the local population

Insecticides for mosquito control are in short supply. In the 1980s a move away from contact toxicity and persistence has meant that many modern agricultural insecticides are not so easily re-purposed. High regulatory costs for new active ingredients and the relatively small market for public health insecticides makes their development uneconomic. No new active ingredients have been registered for the mainstream adulticide malaria PHP applications since the mid 1980s.

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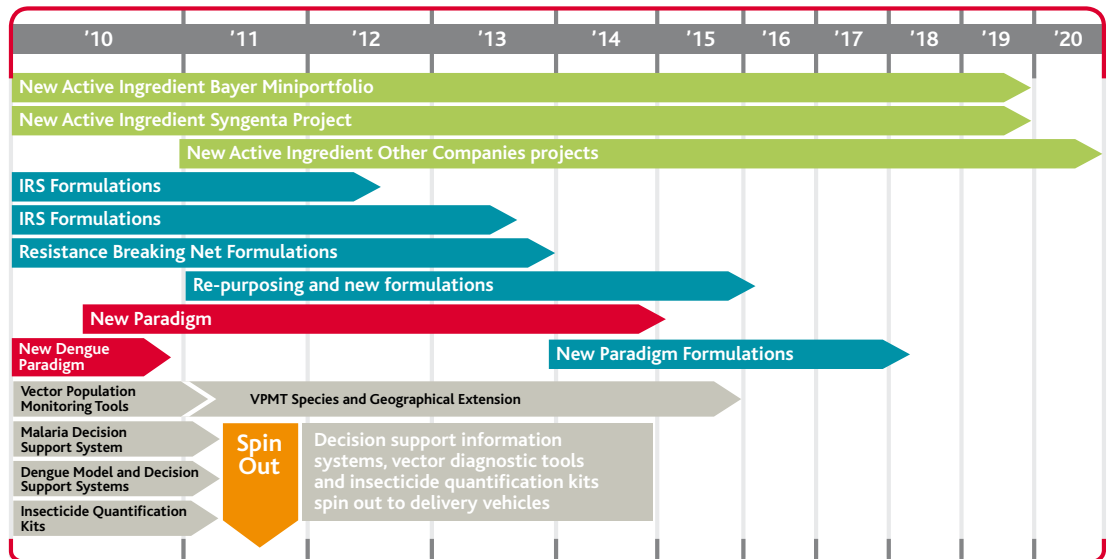
The indoor residual spraying (IRS) of insecticides and the widespread use of insecticide treated bednets (ITNs) have been successful in reducing the burden of malaria but both interventions are at risk from developing resistance. Currently only one insecticide class – pyrethroids – is licensed for ITN use, leaving the intervention vulnerable to resistance. High levels of pyrethroid resistance have already been detected in west and southern Africa.

While insecticide choice is wider for IRS, only four classes of insecticide are registered for IRS use and resistance is already present to all classes in some mosquito populations.

# IVCC strategic objectives and organisation

In order to meet the strategic needs identified to achieve sustainable vector control as a key component of malaria control and eventual elimination, IVCC has set the following core objectives:

- 1 Creation of 3 new Active Ingredients with new modes of action by 2020.
- 2 Reformulation and repurposing of current Als to maximise efficiency and provide opportunities for resistance management.
- 3 Elucidation of the target product profile for user driven vector control products.
- 4 Extension of vector control information systems and tools and creation of delivery vehicles for them.



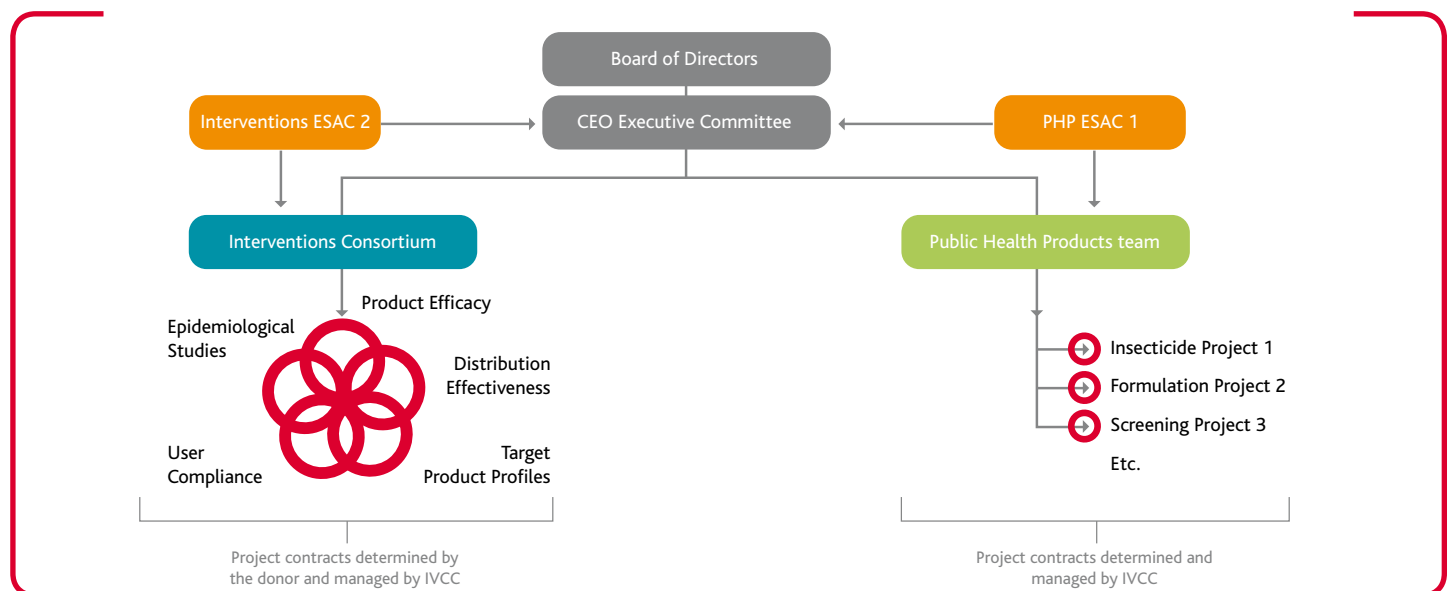
The IVCC is overseen by a Board of Trustees with fiduciary responsibilities and financial and audit oversight. Two specialist External Scientific Advisory Committees advise the IVCC Executive on project inception, progression and termination.

The IVCC professional staff, who make up the Executive Committee, are responsible for strategic and day to day management of the programme, high level project monitoring and stakeholder liaison. The COO and Portfolio Manager were both recruited from the chemical industry with specific track records in successful portfolio management.

IVCC publishes Target Product Profiles (TPP) for development products and solicits proposals for projects to achieve them from industrial partners or academic entities with an industrial partner. Technical

probability of achieving the TPP is assessed by the ESAC and, on their recommendation, project and global access contracts negotiated by the IVCC staff.

In order to ensure that we develop new products that are appropriate for, and actually reach the countries with the highest burden of disease, the IVCC negotiates legally binding agreements with our development partners under which the industrial partners undertake to develop, manufacture and distribute the products developed at a price, volume and format that is appropriate to the disease endemic countries. Management of IP is a critical part of these agreements which commit the partners to protect foreground IP created within the project and to use it, along with the relevant background IP, for the delivery of the product.



# Public health pesticide portfolio

## The opportunity

The core objective of the IVCC is to develop a new range of public health products that enable vector control programmes to effectively control the insects that transmit disease. In order to achieve this the IVCC has defined a public health pesticide portfolio that includes the following:

- A new range of long lasting indoor residual spray formulations that maximises the number of insecticidal classes available to allow vector control programme managers to cost-effectively manage resistance.
- New long lasting nets that contain an insecticide with a mode of action different from pyrethroids.
- New vector control active ingredients with novel modes of action that are unaffected by known vector resistance mechanisms.

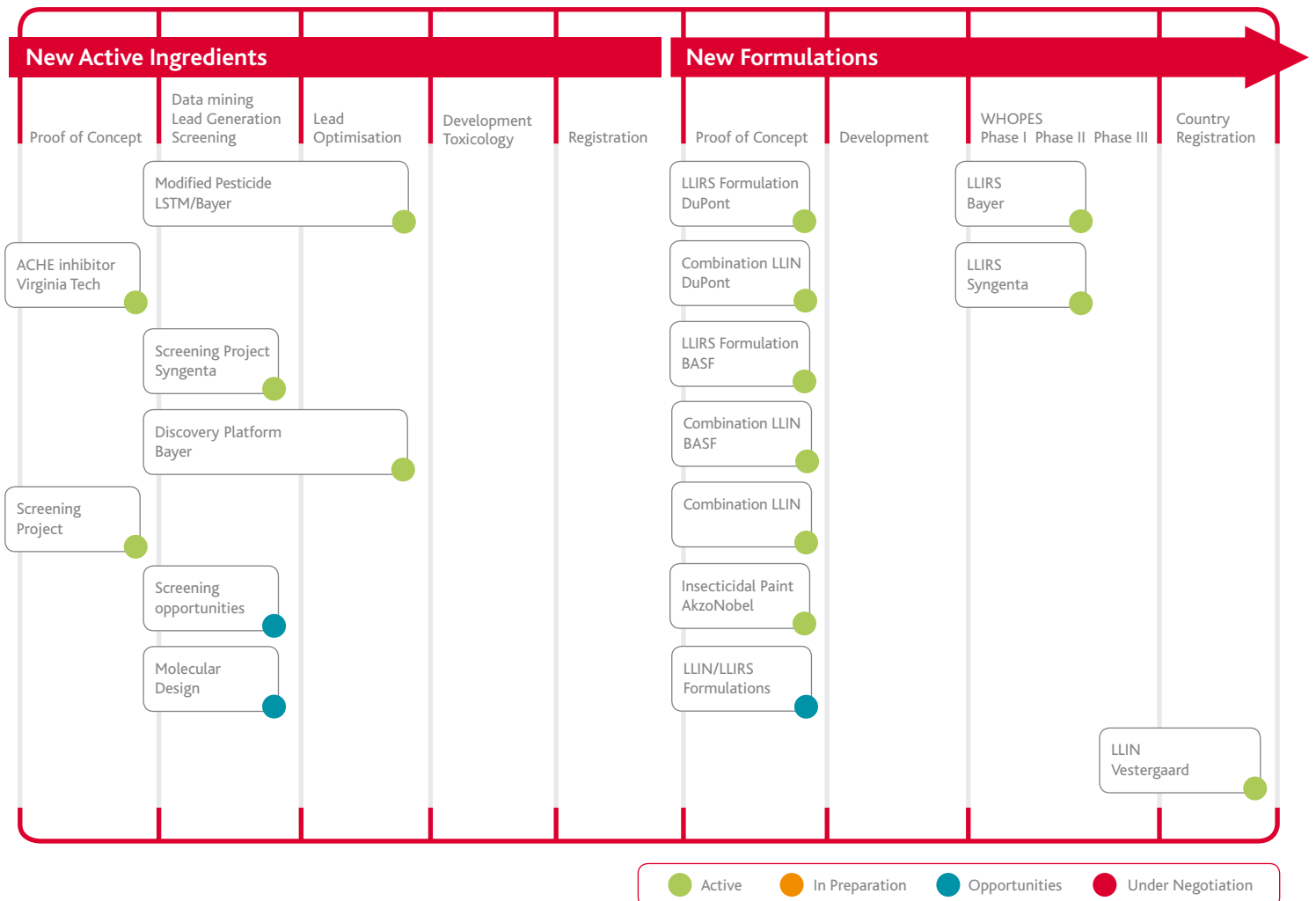
## Our current portfolio needs

The Indoor Residual Spray formulation portfolio is almost complete. We will consider projects that propose new long lasting IRS formulations based on approved agricultural active ingredients currently not used in vector control.

There is still an urgent need for Long Lasting Insecticidal Nets that have a non pyrethroid mode of action. Projects in this area, which may contain existing approved agricultural Active Ingredients on their own or in mixtures with pyrethroids, will be considered for inclusion in our portfolio.

The New Active Ingredient portfolio is far from complete and is the focus of the next round of projects. We are looking for new data mining and screening projects to provide potential hits to develop into the next generation of vector control active ingredients.

## Our current portfolio



# Information systems and tools projects

“IVCC is developing a range of systems and tools to support decision making in vector control programmes.”



To effectively control insect vectors of disease, policy makers and programme managers must have the information that allows them to choose the right control strategy for each situation. To achieve this, the IVCC is developing a range of systems and tools to support decision making in vector control programmes.

## Checking insecticide concentrations are still effective

Insecticide treated bednets and the treatment of indoor surfaces with insecticides are central to our fight against insect borne diseases – principally malaria. To ensure these vital interventions are effective, nets must be replaced or re-treated when the insecticide concentration becomes too low, and treated surfaces must be monitored regularly. The Insecticide Quantification Kits (IQK) being developed by the IVCC will provide a quick, simple and affordable means of measuring insecticide concentration, allowing programme managers to ensure that bednets continue to provide the protection needed.

## Determining resistance to insecticides in mosquitoes

One of the greatest potential threats to the control of insect vectors is the development of insecticide resistance among target populations. Resistance can reduce the effectiveness of control measures and lead to an increase in disease rates. Left unchecked, resistance can become so widespread that products vital to vector control can be rendered completely ineffective, undermining efforts to control insect borne diseases. Quick and reliable systems for monitoring resistance are therefore a vital tool for programme managers. The IVCC's Vector Population Monitoring Tool (VPMT) project is developing kits that can be used in disease endemic regions for monitoring resistance. These kits will also allow programme managers to quickly identify the vector species present and the diseases they are carrying.

## Improving vector control with integrated monitoring and evaluation software and protocols

To help those deciding when and how to act in vector control, the IVCC is developing Decision Support Systems (DSS). Our Malaria DSS is now complete, while the Dengue DSS is in the final stages of development. We also have plans for other vector borne diseases. Operated through a user-friendly computer based interface, the DSSs will hold a range of relevant data, including disease incidence, the spread and density of insect populations and insecticide resistance. The systems will then present geographically based analysis of the data. This will help policy makers and programme managers ensure that resources are used most effectively.

## Improving disease control through better modelling and forecasting

Modelling software is being developed that will use a wide range of parameters to forecast the spread and growth of insect vector populations and the likely rates of disease development. This model will integrate with the DSSs to provide programme managers with important information on the predicted need for intervention and the likely outcome of any proposed intervention.



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