Mosquitoes, malaria and maps

Good decisions rely on good information…

Malaria, a parasitic disease spread by mosquitoes, kills around a million people each year and causes illness in hundreds of millions of others. After decades of neglect, the war against malaria has entered an unprecedented era. The disease is high on the policy agenda and a huge surge in international funding has translated into widespread coverage of simple, but proven control measures, like bed nets and insecticide spraying, and increasing availability of effective antimalarial drugs.

Translating political will and financial commitment into real changes on the ground relies on many factors. Maximising the impact of international funding requires good decision-making at every stage: from the allocation of resources at the global level through to local planning by malaria control officers on the front line. At each level, good decisions rely on good information, and that information is often geographical in nature: how is malaria distributed globally, which populations remain at the highest risk, where is transmission most intense?

As recently as 2005, the answers to these questions were largely unknown. That year saw the establishment of the Malaria Atlas Project (MAP), an international collaboration of scientists with a base at the University of Oxford and core funding from the Wellcome Trust. The remit of MAP was to fill this information void and transform the mapping of malaria from an art to a science. The first task was to collate a huge volume of data on local malaria risk that had been generated over the preceding 30 years, resulting in the most comprehensive empirical resource on global levels of malaria infection assembled. These data were then combined with cutting-edge computational modelling to generate high-resolution maps detailing the likelihood of infection within every 5km pixel across the globe (see Fig. 1).[1] Critically, the statistical models used were able to measure the uncertainty associated with each pixel's prediction, providing decision-makers with a yardstick to gauge the strength of the local evidence base.

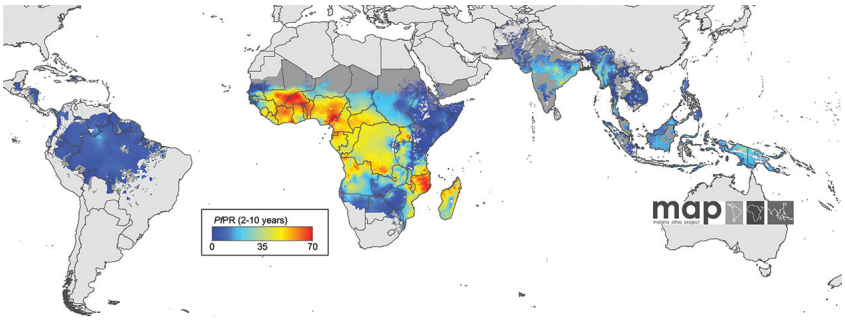

Fig. 1: Global malaria risk in 2010. The map shows the predicted percentage of children aged 2-10 infected with P. falciparum*, the more deadly form of the malaria parasite*

With a global picture of malaria risk established, the next target for MAP is to evaluate how this landscape is changing in response to the efforts of the international community. The history of malaria control in the 20th Century is one of unsustained efforts to coordinate global campaigns. Building on current momentum against the disease and avoiding a repeat of past failures will rely critically on the continuation of large-scale funding; a daunting challenge in times of global economic austerity. Of fundamental importance in advocating for sustained commitment to malaria control is the need to demonstrate that existing investments are cost effective; that donor dollars have meant measurable impact on reducing the burden of malaria illness and death in the poorest communities in the world.

Demonstrating this impact is not straightforward. It is an unfortunate fact that countries with the largest malaria problem also tend to be least well placed to collect reliable data on cases or deaths. Efforts to estimate the patterns of change have been ad hoc and vary widely in approach and reliability, limiting the availability of the standardised and reliable estimates needed to argue for multibillion dollar investments. By assembling huge databases of standardised and quality controlled data on changing malaria risk, and using the latest developments in modern computational modelling, MAP aims to overcome these challenges and establish a resource fit for fighting malaria in the 21st Century.

[1] Gething P et al., A new world malaria map: Plasmodium falciparum endemicity in 2010, Malar. J., 10, 378 (2011)

map
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