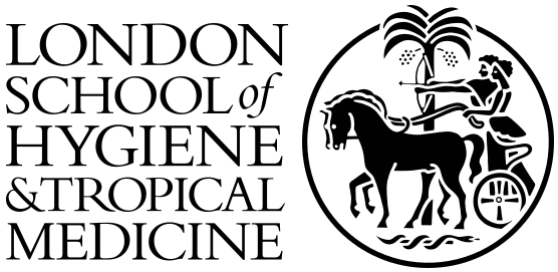

BMJ 2019;365:l2216 doi: 10.1136/bmj.l2216 (Published 21 May 2019)

EDITORIALS

Malaria control stalls in high incidence areas

We have a fight on our hands to regain lost momentum

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In 2015 the World Health Organization's annual *World Malaria Report* struck an optimistic note, reporting remarkable progress against malaria on all fronts since 2000.[1] The number of cases had dropped at speed. Mortality from malaria in Africa, the most affected continent, had fallen by 61% overall and 71% in children under 5 years old, with 57 countries reducing their malaria burden by over 75%. The prospect of eliminating malaria from some previously endemic areas had improved. New tools, drugs, and insecticides were being developed and funding for malaria had increased. This was all the more striking because during the decades before 2000, antimalarial drug resistance had risen, as had mortality, particularly among children in Africa.[2]

It may therefore surprise people reading the latest report, for 2018, to find a distinctly downbeat tone.[3] WHO's director-general, Tedros Ghebreyesus, also a distinguished malariologist, warned that progress against malaria had stalled, with increases in incident malaria in the highest burden countries.

As the details of the report make clear, in many areas progress against malaria continues. WHO estimates there were 435 000 deaths from malaria globally, compared with 451 000 deaths in 2016, and 607 000 in 2010.[3] This is 435 000 deaths too many for a largely preventable and completely treatable disease, but it is progress. Outside its heartlands in sub-Saharan Africa, malaria rates are now mainly low or falling.

The biggest improvement in numerical terms was in India, the country with the largest burden outside Africa. Malaria incidence is falling in South East Asia, the historical source of much antimalarial drug resistance, so important for global control efforts. China has reported no cases of indigenous malaria for the first time. *Plasmodium vivax* malaria globally is declining faster than many predicted. Some low incidence countries are closer to elimination. Sub-Saharan Africa contains a few areas of major progress, mainly in countries with atypical malaria epidemiology, such as Ethiopia, where incidence of malaria is still falling.

Unsurprisingly, in countries with substantial natural or human created disruptions, progress against malaria has reversed: Venezuela is a good example. In much of Africa—including most of east Africa and some countries in west Africa, such as Ghana and Sierra Leone—incidence now seems to be increasing but mortality is falling. This reflects improved diagnosis and delivery of services against a background of higher transmission.

Adverse trends

There are, however, serious adverse trends. The most important is that in several countries, including some with large populations, such as Nigeria, both number of cases and mortality are rising, having been on a downward trajectory. WHO is right to highlight this worrying change.

Several trends are occurring in sub-Saharan Africa, some that favour malaria and others favouring humans. The two most obvious biological trends favouring malaria are increasing rates of mosquito resistance to insecticides, including those used on bed nets,[4] and rising antimalarial drug resistance.[5] In an African context, insecticide resistance will tend to lead to a higher incidence of disease, while drug resistance is more important as a risk factor for mortality. It is not yet clear how much of the increased incidence is attributable to insecticide resistance, but some is and the pipeline for new insecticides is less well developed than the pipeline for new drugs.[6 7]

Any reduction in the push to ensure that children and adults are protected by insecticide treated bed nets and other antivector methods will inevitably lead to increasing incidence. WHO data show some evidence of decreasing enthusiasm among donor countries for supporting malaria control efforts, and good evidence now exists that this could erode some of the extraordinary gains that have been made in the past 18 years.

Although the threat of drug resistance is serious, particularly in South East Asia,[8] in Africa it is probably not (yet) a major reason for rising malaria incidence. Currently available artemisinin combination drugs still work across the continent, and even in regions with rising incidence, most countries have managed to continue to reduce mortality through treatment.

Long term perspective

Three long term trends are also relevant. The rising proportion of the population in mosquito unfriendly urban areas and more high quality housing will work against malaria.[9] In the longer run, the influence of climate change may prove important, increasing risks in some areas and decreasing them in others.[10] An underappreciated trend is that malaria in much of Africa is moving from a disease that is largely stable and mainly affects children and pregnant women, to one that will become epidemiologically unstable, with serious epidemics, including

in adults who no longer have the immunological protection of repeated infections.

Outside the malaria heartlands, steady success continues. But in high incidence countries, particularly in Africa, the assumption that everything for malaria would steadily continue to get better should now be abandoned. We are going to have to use all available tools, appropriately combined, in high incidence areas and mobilise all the needed resources to give a sustained push in settings close to durable elimination of malaria. We have a fight on our hands to regain the momentum of the first 15 years of the century.

Competing interests: We have read and understood BMJ policy on declaration of interests and declare that EA is a member of the WHO malaria policy advisory committee.

Provenance and peer review: Commissioned; not externally peer reviewed.

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