The New Malaria Maps.

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In this issue of the Lancet ID, the MAP team presents the new malaria maps[1,2]. These tools are the result of a considerable effort and will undoubtedly be well received by those interested in malaria. Several novelties and improvements from earlier versions are noticeable: the data on *P. falciparum* now covers the entire endemic world and includes 5 x 5 kilometer pixel-level maps of mortality. Importantly, these are the first dynamic maps on *P.vivax* and for both plasmodial species, they include time series spanning from 2000 to 2017.

Overall the new malaria maps confirm the decline in morbidity and mortality of both malaria species worldwide but also point towards problematic regions where malaria transmission persists, or even increases[3].

Maps revealing spatiotemporal variations in endemicity of both parasite species are useful for estimating the disease burden, quantifying the impact of control efforts and assessing the achievability and progress towards elimination. The enthusiastic reader looking at these colorful interactive high-resolution maps, will be tempted to quickly zoom-in at a particular area of interest. But caution is required for several reasons. Firstly, the data presented are only the results of complex mathematical models and do not necessarily represent the actual "truth" on the ground. Secondly, the user must pay attention to the statistical uncertainties around the estimates and carefully examine the corresponding uncertainty maps provided. A quick look at the malaria incidence in the WHO reports shows large and unexplained variations from year to year in some regions[3] and some recent modelling gave different estimates for the Greater Mekgong Sub-region[4]. Thirdly, the well-known heterogeneity of malaria transmission is difficult to visualize on global maps and these are only the best compromise possible. Country-level maps, scaled by local data should be available on the Malaria Atlas Project website soon (www.map.ox.ac.uk). Finally, one will need to digest the unusually large amount of information contained in the supplementary material, to fully comprehend the limitations of the information provided.

Examples of limitations include amongst others, the absence of accessible data in some countries, the role of the private sector in treating malaria cases, the border effect when visualizing data from two different countries, as well as the difficulties in estimating the burden of *P. vivax* in Africa where data were not usually collected until recently, and where there is uncertainty with Duffy positive populations which are susceptible to *P. vivax* malaria.

The data provided for *P. vivax* is truly novel and important. However for Africa, the numbers are derived by converting *P. falciparum* incidence using the species ratio from the World Malaria Report, assuming that the spatial pattern of transmission is broadly similar for two species. This is a clear limitation outside of the Horn of Africa where subnational surveillance data is available. The authors do acknowledge that these new malaria maps could under-estimate low density infections not detected by conventional diagnostics as well as liver stage infections of *P.vivax*.

Researchers, policy makers, national programs, funders and the media will undoubtedly find these maps and associated tools useful for monitoring spatial and time trends and for planning purposes. How useful they are for targeted interventions is less clear. This is because of the above mentioned limitations but also because of the lack of good quality data at subnational levels. Not unlike on the battlefield, good intelligence is key in the fight against malaria, especially in the context of elimination of *P.falciparum*. But data on disease burden is intractably linked to funding and the temptation to manipulate numbers can be great.
Let's hope, with the authors of this magnificent work, that these maps will stimulate more data sharing from all those involved, so that the accuracy, precision and usefulness of these tools continue to improve in the coming years.

1. Battle K.E, Lucas TCD, Nguyen M, et al. Mapping the global endemicity and clinical burden of Plasmodium vivax 2000-2017. *Lancet Infect Dis* 2019.
2. Weiss DJ, Lucas TCD, Nguyen M, et al. The global landscape of Plasmodium falciparum prevalence, incidence, and mortality 2000-2017. *Lancet Infect Dis* 2019.
3. World Health Organization. World Malaria Report 2018.
4. Maude RJ, Mercado CEG, Rowley J *et al.* Estimating malaria disease burden in the Asia-Pacific [version 1; peer review: 1 approved with reservations] *Wellcome Open Research* 2019; **(4)**59.