New estimates of the global population at risk of Plasmodium vivax malaria

August 3 2010

A new evidence-based global distribution map of *Plasmodium vivax* malaria, published August 3 in the open-access journal *PLoS Neglected Tropical Diseases*, is used to estimate that 2.85 billion people lived at risk of infection with this parasite in 2009. The map, created as part of the Malaria Atlas Project (MAP), a multinational research collaboration funded mainly by the Wellcome Trust, reviews a host of information that challenges the dogma that *P. vivax* transmission is absent through large swathes of Africa and uses novel methods - including new global maps of the protective Duffy negativity blood condition - to estimate global populations at risk.

The study concludes that of the almost 3 billion people exposed to some risk of *P. vivax* transmission in 2009, 91% of them live in Central and South East Asia. Importantly, more than half of those exposed to this risk live in areas where *P. vivax* malaria transmission is extremely low or unstable and where prospects of sustained control and elimination are relatively good.

The authors used the most recent obtainable *P. vivax* case-reporting data for all malaria-endemic countries in efforts to classify risk into three classes: malaria free, unstable, and stable. Risk areas were further refined using temperature and aridity data based upon their relationship with parasite and vector bionomics. Medical intelligence was used to modify risk in specific areas where transmission was reported as absent (e.g., large urban areas and malaria-free islands). The human population at risk under each level of transmission was then derived by combining

the categorical risk map with a high-resolution population surface adjusted to 2009 and a global map of Duffy negativity prevalence. Duffy negativity is the absence of the Duffy blood-group antigen in red blood cells, which translates into partial protection against infection with *P. vivax*. A high Duffy negativity prevalence in a population indicates increased protection against *P. vivax* infection, and vice versa.

"This study represents the first step in our efforts to provide the malaria control and research community with an evidence-based cartography of *P. vivax* malaria," says co-author Dr. Simon Hay of the University of Oxford. "We can now focus on trying to model the endemicity of the disease to provide more detailed global burden estimates, although this is complicated by the unusual biology of *P. vivax*".

Co-author Dr Carlos Guerra adds: "New evidence shows that *P. vivax* malaria is not as benign as was thought, and yet, as our study shows, remains the most widespread form of human malaria. Understanding where transmission of this parasite occurs at the global scale is fundamental in planning strategies for the control of this debilitating, and often lethal, disease".

More information: Guerra CA, Howes RE, Patil AP, Gething PW, Van Boeckel TP, et al. (2010) The International Limits and Population at Risk of Plasmodium vivax Transmission in 2009. PLoS Negl Trop Dis 4(8): e774. doi:10.1371/journal.pntd.0000774

Provided by Public Library of Science