CONTROL AND ELIMINATION OF *PLASMODIUM VIVAX* MALARIA

A TECHNICAL BRIEF

World Health Organization

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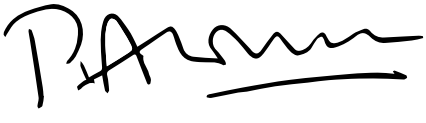
Foreword

The *Global Technical Strategy for Malaria 2016–2030* sets the most ambitious targets for malaria since the eradication era, namely to eliminate malaria from at least 35 countries and reduce case incidence and mortality rates by 90% globally. *Plasmodium vivax* presents a major challenge to achieving these targets. In 2013, it was estimated to be responsible for 16 million cases globally, and almost half the cases of malaria outside of Africa. It predominates in countries that are prime candidates for elimination, accounting for more than 70% of cases in countries with less than 5000 cases of malaria each year. Not only does *P. vivax* present a barrier to elimination, it is also increasingly recognised that *P. vivax* infections can be as debilitating as *P. falciparum* malaria, causing severe disease and death.

The principles for controlling *P. vivax* malaria are the same as those for *P. falciparum* malaria but programmes face challenges when deploying available tools against *P. vivax*. In many areas where *P. vivax* malaria is common, mosquitoes bite early in the evening, obtain blood meals outdoors and rest outdoors. Therefore, insecticide-treated mosquito nets (ITNs) and indoor residual spraying (IRS) may be less effective in reducing the transmission of *P. vivax* parasites. Blood-stage infections of *P. vivax* often occur with low parasite densities and can be missed using routine microscopy or rapid diagnostic tests; the dormant hypnozoite stage in liver cells, which can cause multiple relapses, is entirely undetectable with current diagnostic methods. Furthermore, gametocytes are often produced, and the parasite transmitted to the mosquito, before symptoms appear. There is only one option for treating the liver stage, primaquine, which requires a treatment course of 14 days to which patients may not fully adhere. Primaquine is contraindicated in patients with severe forms of glucose-6-phosphate dehydrogenase (G6PD) deficiency and cannot be given to pregnant women or children under 6 months of age.

Current tests to determine whether or not patients are G6PD deficient are generally not suitable for use in the peripheral health facilities where most patients seek treatment.

More effective control of *P. vivax* malaria, and its eventual elimination, will require a better understanding of how existing tools can be best deployed against *P. vivax* and how their coverage can be extended to populations who currently do not benefit from them. It will also require the development of new tools that will help to reduce *P. vivax* transmission, and increase the ability of malaria programmes to detect and treat infections. International donors and domestic governments need to invest in the additional measures needed to extend the fight against *P. vivax* malaria, and in the research required to develop new tools. A comprehensive response to *P. vivax* malaria will relieve some of the most vulnerable populations of a significant illness that causes disruption to schooling and work, and can be fatal. If *P. vivax* malaria is conquered, not only will international targets to eliminate malaria from 35 countries by 2030 be achieved, but a pathway will be set for the eventual eradication of this ancient disease.



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Abbreviations

ACT	artemisinin-based combination therapy
CFR	case fatality rate
CI	confidence interval
CYP2D6	cytochrome P450 polymorphysm
G6PD	glucose-6-phosphate dehydrogenase
G6PDd	G6PD deficiency
GMP	Global Malaria Programme, WHO
ICD	International Classification of Diseases
ICU	intensive care unit
IM	intramuscular
IQR	interquartile range
IRS	indoor residual spraying
ITN	insecticide-treated mosquito net
IV	intravenous
MPPT	mass primaquine preventive treatment
NADPH	nicotinamide adenine dinucleotide phosphate
NMCP	national malaria control programme
OR	odds ratio
P.	*Plasmodium*
PART	presumptive anti-relapse therapy
PCR	polymerase chain reaction