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Achieving malaria elimination in China



China was certified malaria-free by WHO on June 30, 2021, a remarkable achievement and the culmination of decades of dedicated effort by the national malaria programme and its partners.¹ China's accomplishment is an important milestone on the path toward eliminating malaria in the Asia-Pacific region by 2030, and reaching global malaria eradication within a generation. The continued spread of drug and insecticide resistance, the effect of climate change, and the ongoing threat of the COVID-19 pandemic mean that countries will be designing and implementing malaria elimination strategies in increasingly challenging environments, with many competing health and development priorities.² Deliberate and responsive planning, evidence-based adaptation, and strong leadership will be key for navigating these complexities. China's experience in moving a nation of 1.4 billion people from malaria control to elimination and prevention of re-establishment over the past 10 years provides important lessons for other countries on how to manage and implement an adaptive malaria programme.

Malaria incidence in China rapidly declined in the mid-2000s, dropping by about 60% between 2006 and 2008 (from 0.46 per 10 000 people to 0.2 per 10 000 people). However, areas in central China were still prone to large *Plasmodium vivax* outbreaks, and local transmission of *Plasmodium falciparum* remained in the southern part of the country.³ The decision to transition the malaria programme's focus from controlling morbidity and mortality to eliminating local transmission was made carefully and deliberately. An elimination programme requires major shifts in strategy, personnel skillsets, infrastructure, partnerships, and predictable funding, and success depends on active participation of government leaders; thus, any technical, financial, or political barriers had to be identified and addressed before embarking on elimination. Pilots of intensified control and elimination were done in 12 counties, the results of which were used for the development and roll-out of national-level plans, technical guidelines, an intranational coordination mechanism, and strengthened collaborations with neighbouring malaria-endemic countries. A cost-effectiveness analysis compared ongoing malaria control with time-limited elimination in select provinces and established that the high short-term costs of elimination

were worth the long-term savings.⁴ Then, recognising that elimination was not solely a health issue but one influenced by, and with influence on, a range of social, political, and economic conditions, China's Ministry of Health (MOH) consulted with many other government ministries to ensure that all were supportive of elimination and willing to have a role in strategy development, implementation, coordination, advocacy, and funding. After years of planning, coordination, and generation of evidence, and with the malaria burden down to 7389 cases (0.06 per 10 000 population), China launched its National Malaria Elimination Action Plan in 2010, with a goal of elimination by 2020.⁵

Once the elimination plan was underway, China continuously modified its strategy as the malaria situation evolved and programmatic gaps were identified and subsequently filled. The Action Plan reflected WHO's global guidelines for elimination while incorporating strategic adaptations that would allow for more cost-efficient, targeted, and tailored approaches reflecting local transmission dynamics.⁵ For example, compared with other elimination programmes, China used smaller administrative units for stratification and had more stringent criteria—the achievement of an annual incidence of less than one case per 10 000 population—before shifting to elimination-specific activities. Furthermore, the 1-3-7 surveillance and response strategy done in China, beginning in 2012, expanded on WHO's recommendation of transforming surveillance into a core intervention.⁶ China's approach required that case reporting occur within 1 day of case detection, case investigation and classification within 3 days, and targeted and tailored response activities within 7 days; it was supported by a real-time, web-based malaria elimination reporting platform based on the system developed for severe acute respiratory syndrome in 2003.⁷ To facilitate case detection, a network of national reference labs were created to build and maintain capacity for rapid malaria diagnosis and quality assurance, and the MOH hosted regular microscopy competitions to encourage local teams to strengthen surveillance activities and maintain their microscopy skills. Small monetary incentives were also given to health-care staff for completing case reporting and investigation, improving quality and effectiveness.⁷

China reported its last local malaria case in April, 2016, just 6 years after it set its sights on elimination, but imported malaria will remain a threat to China's malaria-free status until global malaria eradication is reached. China's neighbours in the Greater Mekong subregion have made considerable progress in reducing transmission in recent years and are on track to achieve elimination by 2030,⁸ but border surveillance and collaboration will need to continue until that goal is met. In response to this challenge, the National Malaria Elimination Action Plan⁹ was updated with new guidelines on foci classification and a three defensive lines strategy for cross-border 1-3-7 surveillance, receptivity and importation reduction, and collaboration in border health facilities. In addition, increasing business and overseas worker travel between China and high-burden countries in sub-Saharan Africa will sustain the risk of importation throughout the country well beyond 2030.^{10,11}

China's achievement in eliminating malaria is momentous, considering that less than three generations ago the country reported 30 million malaria cases per year.¹ China's approach and programme could serve as a model to other malaria-endemic countries of how to adapt global guidelines to suit local contexts and continuously update the elimination strategy in response to evolving conditions. It is important to move away from a one-size-fits-all approach and to respond to local malaria situations with targeted and tailored interventions. Responsive and adaptive malaria programmes, such as China's, are essential for achieving a malaria-free world.

We declare no competing interests.

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