

Letter to the Editor

The importance of impregnated mosquito nets and the case of Papua New Guinea

Dear Editor,

The campaign against malaria in Africa has necessitated the intensification of existing prevention and control approaches, which have yielded substantial results, including preserving approximately 11 million lives, primarily those of young children [1]. Various preventive strategies have been deployed, encompassing insecticide-treated nets, residual spraying for indoor use, case management, and intermittent preventive therapy for vulnerable individuals [1]. In addition, Cameroon's recent feat of incorporating malaria vaccination into its national immunisation program serves as a benchmark for improving preventive efforts. Using long-lasting insecticidal nets (LLINs) has remained a year-long malaria control strategy, contributing to a 68 % reduction in malaria incidence since 2000. However, recent findings in Papua New Guinea (PNG) have raised concerns regarding the effectiveness of these nets, leading to a resurgence in malaria cases for four consecutive years (Fig. 1) [2]. The efficacy of these bed nets has been questioned in a recent study and could have contributed to this resurgence. In 2022, malaria cases escalated by 88 % in PNG, resulting in an alarming rise in malaria-induced febrile illnesses and associated complications. It was recently reported that the composition of the mosquito net was changed to a cheaper coating, which could have rendered the insecticide less effective, as confirmed by the study of Bubin et al. [3]. The study found that nets manufactured after 2012 contained low polymer fluorine with an average of 0.04 g/kg, reflecting a shift in the coating composition of the fluorocarbon (FC) towards a non-FC. This protective coating alteration during production resulted in a considerable drop in bioefficacy [3] and could have consequently caused the rise in malaria cases, together with factors such as COVID-19 disturbance of malaria control activities, climate change, mosquito insecticide resistance, and behavioural change.

This outcome has raised significant public health concerns, particularly in PNG, where the resurgence of malaria highlights the urgent need for stringent quality control measures and post-market surveillance of insecticidal nets. To combat this emerging resistance and surge, advocacy must be made for increased investments in manufacturing, procuring and distributing verifiable, quality and effective LLINs to endemic areas [4]. Furthermore, with robust control measures, intensifying measures towards completely eradicating malaria in line with the WHO Elimination Framework should be prioritised [5]. This calls for accelerating the manufacturing and delivery of novel vaccines and anti-malarial medications to high-risk populations. It is crucial to reduce morbidities and mortalities due to malaria, maintain the progress made against malaria, and ensure long-term global health security [4]. To address the persistent malaria burden, the emphasis should be shifted from treatment to global efforts to intensify control methods to reduce malaria-related cases and fatalities. In Papua New Guinea, the reintroduction of malaria vaccinations into national immunization programs

has become increasingly important, especially with the diminished efficacy of insecticidal nets [5]. Vaccines provide a proactive approach to malaria prevention by increasing immunity to the parasite, regardless of the efficacy of other measures such as bed nets.

Establishing a post-market monitoring strategy to improve the effectiveness of LLINs has been recommended. National malaria control programs should assess the functional quality of the nets with each shipment. Regular head-to-head comparisons between different LLIN brands should be conducted to foster effectiveness and push producers to focus on quality and durability. Academics and policymakers should design strategies that factor effective coverage, bioefficacy, net durability, and residual transmission into the grand scheme. In PNG, addressing the specific challenges related to net quality and effectiveness is crucial to reversing the recent rise in malaria cases and ensuring the long-term success of malaria control efforts. Advocating for more global malaria control funding is also proposed to meet WHO targets while keeping up with population growth and rising expenditures [4,5].

In conclusion, recent malaria infection rates, particularly in Africa, underscore the critical need for a holistic approach, including rigorous monitoring of LLINs quality, prioritising effective interventions such as the national malaria vaccination program, and advocating for more global financing to sustain developments and prevent the resurgence of malaria. The situation in PNG provides a clear reminder of the need to maintain and preserve the integrity of malaria control tools, and integrating malaria vaccines into routine immunization programs becomes imperative for comprehensive and sustainable malaria control efforts across Africa.

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Ethical approval and consent to participate

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Consent for publication

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Availability of data and materials

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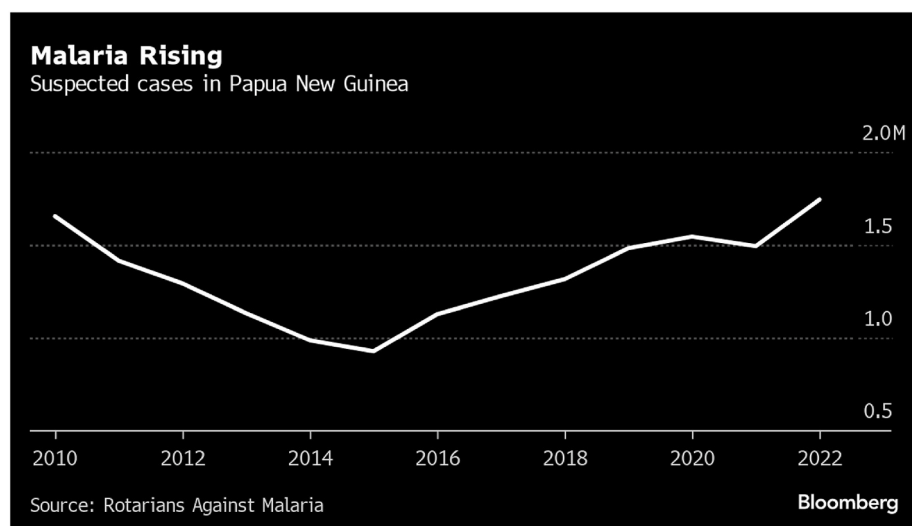


Fig. 1. Malaria cases in Papua New Guinea between 2010 and 2022 [2].

CRediT authorship contribution statement

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Declaration of competing interest

Authors declares that there is no conflict of interest.

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