

Investing in Malaria Elimination in Papua New Guinea

Malaria elimination in Papua New Guinea can yield health, social and economic benefits nine times greater than the associated costs.

Overview

- Papua New Guinea (PNG) is aiming to eliminate malaria by 2030—a goal aligned with the commitment for a malaria-free Asia Pacific by the same year.
- Malaria elimination in PNG is estimated to cost USD 425 million over 15 years or an average of USD 28.34 million per year. With roughly USD 8.36 million in malaria financing available for 2016–2021, PNG faces a USD 41.60 million financial gap.
- Given PNG’s fiscal challenges, malaria elimination may not be financially feasible in the short-term. PNG should ensure that current interventions are sustained to prevent reversing the gains made in the last 15 years. Approximately USD 1.90 per capita per year was spent on malaria in 2015.
- Compared to a status quo of malaria control, malaria elimination in PNG by 2030 can generate an estimated USD 1.92 billion in economic benefits by increasing productivity and reducing malaria deaths, cases, and household and healthcare spending.

- Malaria elimination in PNG is a public health “best buy.” With a return on investment of 9 to 1, malaria elimination can save lives, improve health, and ensure long-term prosperity.

Eliminating malaria in Papua New Guinea by 2030 can lead to:

- **Over 7,000 lives saved**
- **3.86 million cases averted**
- **9:1 return on investment**



Though the burden of malaria in Papua New Guinea (PNG) remains significant (Figure 1), the lower-middle-income country has achieved notable gains over the last 15 years. Malaria cases have been reduced by 63%, and deaths due to malaria have been cut by more than two-thirds since 2000 (Figure 2). Through the joint efforts of the National Malaria Control Program (NMCP) and its partners, and with support from the Global Fund to Fight

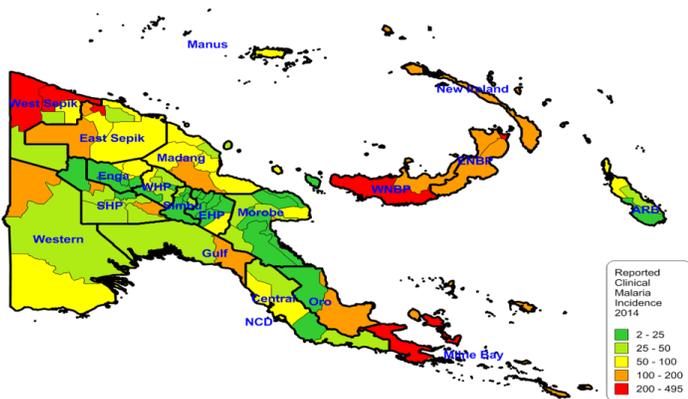
AIDS, Tuberculosis and Malaria (Global Fund), coverage and access to effective diagnosis, treatment, and vector control interventions – particularly coverage and access to long-lasting insecticidal nets (LLINs) – were greatly expanded. However, because the entire population of PNG is at risk for malaria transmission, malaria is still a public health threat and remains a leading cause of illness.

Papua New Guinea At a Glance*

533,103	Total cases of malaria^a (78.4% <i>Plasmodium falciparum</i>)
163	Deaths from malaria^a
7,619,321	Population at risk^a (100% of population)
18.3 billion	Gross domestic product^b (current USD)
Lower-middle -income	Country income classification^c
39.9	Population living in poverty^d (%)
92.36	Total health expenditure per capita, per year, 2014^a (current USD)

*Data are from 2015 unless specified otherwise
^aWorld Health Organization
^bPapua New Guinea Department of Treasury
^cThe World Bank
^dAsian Development Bank

Figure 1. Malaria incidence map of PNG, 2014*



*Source: Rotarians Against Malaria

Building on the Momentum

Aligning with the Asia Pacific Leaders Malaria Alliance’s goal of a malaria-free region, PNG aims to eliminate the disease by 2030 to save lives and benefit from associated economic gains and healthcare savings.

To maintain progress and accelerate towards national elimination, PNG will require adequate financial resources and unwavering political commitment from country leaders and donors. Funding gaps for malaria efforts may seriously affect PNG’s progress. Studies show that ill-timed downsizing of malaria programs is associated with costly and deadly resurgences in many settings. In the 1980s when indoor residual spraying activities were halted, PNG suffered from such a resurgence that left communities worse-off than before the initiation of malaria control measures. In Simbu Province, for example, parasite prevalence was 30% in 1981 compared to 19% in the mid-60s.¹

Developing an Investment Case

To assess the economic rationale for malaria elimination in PNG, the Malaria Elimination Initiative at the University of California, San Francisco Global Health Group in collaboration with the NMCP, developed an investment case for malaria elimination in PNG. The investment case estimates the costs and economic and financial returns of malaria elimination through 2030 and explores feasible and sustainable financing options for malaria efforts in PNG.

This study has a number of limitations. The transmission model was designed with a single homogeneous patch for the whole of each country. Thus, spatial heterogeneity within each country was not modeled including malaria transmission and intervention. The full-length report with detailed methods and findings is accessible through shrinkingthemalariamap.org.

Figure 2. Malaria cases and deaths in PNG, 2000–2015*



Table 1. Projected malaria elimination financial gap in PNG, 2016–2021 (millions USD)

	2016	2017	2018	2019	2020	2021	Total	Average
Financing available	8.80	4.75	9.13	9.14	9.16	9.18	50.16	8.36
Financing needed	20.30	28.00	66.57	64.57	64.54	55.78	299.75	49.96
Gap	11.50	23.25	57.44	55.42	55.37	46.60	249.59	41.60

The country-specific evidence generated by the investment case can inform malaria program budgeting, strategic planning, and advocacy for domestic and donor resource mobilization.

Costing Current Malaria Control and Elimination

Using data from the NMCP, malaria program implementers, and seven sample provinces, the annual cost of current malaria interventions was estimated to be USD 14.96 million or USD 1.90 per capita in 2015. This figure includes spending on malaria by national and provincial governments, donors such as the Global Fund, and development partners. The top expenditures are consumables such as LLINs and antimalarials (40% of total), followed by health system costs associated with testing and treatment (24%), and LLIN distribution costs (7%).

When private healthcare expenditures, lost wages, and lost productivity due to illness and death are accounted for, the total economic burden of malaria in PNG in 2015 is about USD 90.57 million (0.49% of gross domestic product).

To estimate the costs of malaria elimination, a dynamic transmission model was used to determine the minimum interventions required to interrupt malaria transmission in PNG. The model predicted that high LLIN coverage, increased surveillance, and multiple rounds of mass drug administration (MDA) can significantly reduce the malaria burden towards elimination by 2030. The total cost of this scenario is USD 425 million for 2016–2030 or an average of USD 28.34 million per year, which is roughly USD 13.38 million more than the direct health system cost of malaria in 2015 (USD 14.96 million). This large cost difference results from the high coverage of existing interventions (e.i., LLIN distribution) and new interventions (e.g., MDA) required to eliminate malaria in PNG.

Malaria Elimination: What Are the Benefits?

Successful malaria elimination in PNG by 2030 can avert over 7,000 deaths and 3.86 million malaria infections, generating economic benefits of about USD 1.92 billion

over 15 years.

About 2.1% (USD 41.62 million) of these benefits are health system savings that can be reallocated to other health programs.

Comparing the benefits and estimated costs of achieving malaria elimination yields an average return on investment of 9 to 1; every additional dollar spent on malaria elimination can generate USD 9 in economic and financial returns.

Malaria elimination can lead to other development benefits that were not included in the economic evaluation. Eliminating malaria will thwart any opportunity for drug-resistant malaria to arise. Evidence has also demonstrated that reducing malaria incidence can also improve children's school performance and cognitive ability, and increase their chances of getting better jobs and higher incomes in the future.² Investments in malaria surveillance can also improve the capacity of health systems to identify and quickly respond to emerging infectious disease threats.³

Estimating Financial Gaps

Current donor and government funding for malaria does not meet the amount of financing required to eliminate malaria in PNG. Given the projected available financing for malaria for 2016–2021 (USD 50.16 million), the estimated funding gap is USD 249.59 million or an average of USD 41.60 million per year (Table 1).

Mobilizing Resources

To meet the financial requirements of malaria elimination, PNG will need to concurrently mobilize additional domestic and donor resources and maximize the impact of current financing through improved efficiency.

In 2015, total malaria expenditure was roughly 2% of total government health expenditure. Given current efforts to repay outstanding debts and an anticipated slowing of PNG's economic growth, the government may not be in a position to allocate more resources for

malaria in the short term. External support will therefore remain critical as PNG aims for malaria elimination. Using the economic evidence for malaria investments, PNG has an opportunity to engage its current donors and development partners, as well as new and emerging funders in the Asia Pacific region, to make a case for malaria investments. Innovative financing mechanisms such as “sin taxes” on alcohol and tobacco products, debt conversion, and regional funds may also help PNG bridge funding gaps.

Multilateral development banks are increasingly expanding health portfolios to include lending for health security and universal health coverage. These new mechanisms, coupled with blended financing options that include loan interest and/or principal buy-downs from traditional donors, can provide additional resources for malaria in PNG.

Beyond these options for new financing, PNG can boost the impact of current funding through improved efficiency, which will decrease implementation costs. Reducing the cost of antimalarial procurement and distribution and mitigating stock-outs in health facilities are short-term goals that PNG can target. PNG can also implement interventions other than LLINs where appropriate. PNG also has an opportunity to improve the predictability, sufficiency, and accessibility of funding to health facilities; this will ensure prompt testing and treatment of malaria cases. Robust monitoring and evaluation systems coupled with operational research will allow PNG to realize some of these efficiency gains.

References

- 1 Mueller I, Tulloch J, Marfurt J, et al. Malaria control in Papua New Guinea results in complex epidemiological changes. *PNG Med J* 2005;48(3-4):151-157
- 2 Thuilliez J, Sissoko MS, Toure OB, et al. Malaria and primary education in Mali: a longitudinal study in the village of Donéguébougou. *Soc Sci Med* 2010;71(2): 324-34.
- 3 Cao J, Sturrock HJW, Cotter C, et al. Communicating and monitoring surveillance and response activities for malaria elimination: China's “1-3-7” strategy. *PLoS Med* 2014;11(5):e1001642.

The **Malaria Elimination Initiative (MEI)** at the University of California San Francisco (UCSF) Global Health Group believes a malaria-free world is possible within a generation. As a forward-thinking partner to malaria-eliminating countries and regions, the MEI generates evidence, develops new tools and approaches, documents and disseminates elimination experiences, and builds consensus to shrink the malaria map. With support from the MEI's highly-skilled team, countries around the world are actively working to eliminate malaria – a goal that nearly 30 countries will achieve by 2020.

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