The Feasibility of Eliminating Malaria on the Island of Hispaniola, with a Focus on Haiti

Key Messages
• Malaria elimination on the island of Hispaniola is technically feasible by 2020 with the addition of a few key strategies, strengthened operational capacities, and increased financial resources.
• The additional strategies required for Hispaniola to achieve elimination need to be spatially coordinated and include: active case detection, aggressive and targeted vector control, parasite-focused interventions, and prompt response to outbreaks.
• Malaria elimination will require strengthening the current malaria program, especially national governance, surveillance, diagnosis and treatment, community outreach, and coordination between Haiti and the Dominican Republic.
• A robust surveillance system will need to be put in place to mitigate potential post-elimination resurgence.
• New sources of funding are required to achieve elimination in Haiti, which could cost approximately $US10–15 million per year for five to seven years.

Introduction
The island of Hispaniola has reduced its malaria burden, with parasite prevalence below 1% in Haiti, and fewer than 1,000 cases reported in the Dominican Republic in 2012. The two governments are cooperating on a bi-national strategy for malaria elimination by 2020. An in-depth feasibility assessment with a focus on Haiti— which carries most of the malaria burden— was conducted in 2013 to provide evidence-based guidance on the technical, operational and financial requirements for eliminating malaria.

Technical Feasibility
With specific improvements to the current malaria programs, elimination is technically feasible. The risk of imported malaria cases to the island of Hispaniola appears extremely low, e.g., fewer than 10 infections were imported from outside Hispaniola to the Dominican Republic in 2012.

Based on test positivity rates at health facilities and a set of environmental and demographic factors, researchers created an initial map of malaria risk in Haiti (Figure 1). This map suggests that one third of Haiti’s population live in areas of no or negligible transmission risk, while one quarter (over two million people) live in areas of medium or high risk with a substantial level of heterogeneity.
Operational Feasibility
There are substantial operational constraints to achieving elimination in Haiti (Figure 3). Programmatic realignment and coordinated support from partners will be required to strengthen and reorient the current control program towards elimination. Specific requirements in Haiti include:

- Strengthened passive and active surveillance systems that promptly identify, treat, and report malaria infections.
- Systems to identify and target malaria interventions at transmission foci.
- Organizational systems that facilitate scaled-up intervention coverage.
- Improved capacity in the national malaria program to lead and coordinate the elimination effort.
- Development of more detailed operational plans.
- Community outreach to ensure engagement, acceptability and compliance.

Financial Feasibility
The costs to maintain the current malaria control program were estimated to run an annual average of US$9 million in Haiti. Researchers modeled two different scenarios for the financial requirements to achieving elimination:

1. Converting to an elimination program which will aggressively attack all parasites is estimated to cost an average of US$18 million per year for five years.
2. An increased initial investment in defining transmission foci could increase costs for the first two years to approximately US$23 million per year, but such up front expenditure would be rewarded by lower costs of approximately US$10 million per year for the following three years to cure infections in these high risk foci.

The majority of costs in both scenarios is related to purchasing drugs and diagnostic tests, as well as large scale communication campaigns.

Costs are estimated to fall dramatically after elimination is achieved, given the assumption that importation of new malaria infections is very low. It is plausible that elimination could reap net cost savings within a decade.

Conclusions
Further field testing and validation of findings will be required, but malaria elimination is deemed technically feasible in Hispaniola by the target year of 2020 if substantial resources can be devoted to strengthening the malaria program in Haiti and reorienting it towards elimination.