Cape Verde reported just 24 local malaria cases in 2014, and is on track to meet its goal of malaria elimination by 2020.

Overview
Cape Verde is a 10-island archipelago in the Atlantic Ocean, approximately 600 kilometers from the coast of Senegal. Nine of its ten islands are inhabited. The country has reduced its malaria burden from 129 cases in 2000 to just 24 cases in 2014, and has been categorized in the pre-elimination phase by the World Health Organization (WHO) since 2007. Only 12 malaria-attributable deaths have been recorded since 2000.\textsuperscript{1,2} In 2014, 100 percent of malaria cases in Cape Verde were due to \textit{Plasmodium falciparum}. While \textit{P. vivax} transmission is possible in Cape Verde, no cases have been reported since 1994.\textsuperscript{1,2} Anopheles arabiensis is the primary vector responsible for malaria transmission and the only member of the \textit{An. gambiae} species complex present in the archipelago; \textit{An. pretoriensis} has been documented as a potential secondary vector.\textsuperscript{3,4}

Only two islands, Santiago and Boa Vista, have indigenous malaria transmission as well as vectorial capacity; the majority of cases, both in recent years and historically, have occurred on Santiago, where about half of the country’s population resides. Fogo, Maio, Santo Antao, Sao Nicolau, and Sao Vicente islands have the Anopheles vector but lack indigenous transmission, and Sal and Brava islands lack both vectorial capacity and transmission.\textsuperscript{5,6} Transmission is unstable in

Malaria Transmission Limits
\textit{Plasmodium falciparum}

At a Glance\textsuperscript{1,2}
- 24 Reported cases of malaria (100% \textit{P. falciparum})
- 0 Deaths from malaria (Last deaths reported in 2011)
- 60 % population living in areas of active transmission (total population: 0.5 million)
- 0.04 Annual parasite incidence (cases/1,000 total population/year)
- 0.21 % slide positivity rate

\textit{P. falciparum} malaria risk is classified into no risk, unstable risk of <0.1 case per 1,000 population (API) and stable risk of ≥0.1 case per 1,000 population (API). Risk was defined using health management information system data and the transmission limits were further refined using temperature and aridity data. Data from the international travel and health guidelines (ITHG) were used to identify zero risk in certain cities, islands and other administrative areas.
Cape Verde; the wet season from July–November is characterized by short, irregular rainfall and malaria incidence tends to peak between September and November. Because overall endemicity and transmission in the archipelago has been low for decades, there is no acquired population immunity and all age groups are affected when outbreaks occur.\(^5\)

As Cape Verde reoriented its programmatic focus from malaria control to elimination in 2007, effective case management, epidemic responsiveness, and the use of focal interventions emerged as vital components to its malaria strategy.\(^6,7\) The country implemented its pre-elimination strategic plan beginning in 2009, and after a comprehensive review of the malaria program’s successes and challenges in 2013, released a National Strategic Plan for Malaria Elimination 2014–2017.\(^8,9\) The new strategy centers on building institutional capacity for elimination, strengthening surveillance, ensuring proper management of all malaria cases, and improving community awareness, sanitation, and environmental health, with an ultimate goal of malaria elimination by 2020.\(^10\)

### Progress Toward Elimination

The Cape Verde archipelago was uninhabited and malaria-free until Portuguese explorers arrived in the 15th century. Historical records indicate that malaria caused by both *P. falciparum* and *P. vivax* has been a major health problem since the early 16th century, responsible for several serious epidemics over the centuries.\(^11\) Medical entomology surveys were first initiated in the 1920s after *An. gambiae* mosquitoes were detected on the islands, and the earliest epidemiological records date to the 1930s when the Instituto de Medicina Tropical, Lisbon began conducting disease prevalence surveys.\(^3,4\) In 1938, the country reported 13,865 cases and 291 deaths due to malaria, and during the period 1938–1954, the average incidence across all nine inhabited islands was 800 cases per 10,000 population, primarily due to *P. falciparum*.\(^4,12\)

By 1943, cases had increased to 16,725 with 400 reported deaths, and a malaria elimination campaign was initiated in 1948 on Sal Island. Interventions included annual indoor...
From 1950 to 1955, malaria was the fourth highest cause of mortality in Cape Verde, accounting for 19 deaths per 10,000 population. However, the elimination program activities were sustained throughout the WHO’s Global Malaria Eradication Program era, and by 1967, zero local malaria transmission was achieved across all islands. This led to the disbanding of Cape Verde’s IRS programs by 1969, followed by the cessation of all routine malaria activities shortly after. However, frequent population movement by air and by sea between islands and mainland West Africa left most of the Cape Verde population at risk for resurgence, and by 1973, transmission had been re-established on Santiago. Between 1977 and 1980, in the midst of a major drought, two epidemics gripped the entire archipelago. In response, chloroquine prophylaxis, IRS, and chemical and biological larval control activities were reinstated through 1982, leading to the successful interruption of malaria transmission between 1983 and 1985.

Nonetheless, local transmission returned in 1986 in the absence of malaria control activities, when Santiago reported 30 malaria cases. From 1987 to 1988, a predominantly Plasmodium falciparum epidemic surged through Santiago, with 434 malaria cases, averaging approximately 200 cases annually; the majority of these occurred on Santiago, with only minimal, sporadic cases reported from other islands. Since 1990, fewer than 1,200 malaria cases have been confirmed in Cape Verde for an average of about 60 cases per year. Approximately 94 percent of these cases were documented on Santiago and deemed autochthonous; all other locally transmitted cases since 2003 have been detected on Boa Vista. The National Integrated Disease Surveillance and Response (IDSR) program began in 2003, classifying malaria as a disease that necessitated weekly reporting and systematic case investigation. By 2007, Cape Verde released a technical guide for malaria surveillance, specifying the need to distinguish autochthonous cases from those that were likely imported.

Larval control has served as Cape Verde’s main intervention against malaria in recent years, using Gambusia affinis, occasional draining of reservoirs, and application of larvicides and petroleum derivatives to water sources. IRS is now only implemented in localized areas in Santiago and in response to malaria outbreaks. Chloroquine remained Cape Verde’s first-line antimalarial drug until 2007, when the program replaced it with artemether-lumefantrine, an artemisinin-based combination therapy (ACT), along with a single dose of primaquine as the new first-line treatment for uncomplicated malaria. Cape Verde’s guidelines for case management were updated in 2008 to include testing of all suspected malaria cases with rapid diagnostic tests (RDTs) and microscopy.

Launched in 2009, the Cape Verde National Strategic Plan for Pre-Elimination of Malaria 2009–2013 focused on reducing malaria transmission to less than one case per 1,000 population. However, formal malaria elimination activities were temporarily postponed when a serious dengue epidemic occurred in 2009. In October 2011, Cape Verde was awarded a Round 10 grant from the Global Fund; the grant supported integrated vector control for malaria, improved case management, and establishment of an IDSR unit to improve the monitoring and investigation of malaria cases. A 2013 programmatic review of performance under the pre-elimination strategic plan recommended the following: improve human resources capacity, particularly epidemiological and entomological surveillance; increase community engagement in elimination activities through advocacy and social mobilization; strengthen outbreak preparedness and response through geo-referenced surveillance and case investigation; create guidelines for integrated vector management and insecticide resistance monitoring; and expand collaboration
with government sectors and other stakeholders.\textsuperscript{9} These recommendations were incorporated into the National Strategic Plan for Malaria Elimination 2014–2017, which reiterated the goal of malaria elimination by 2020.\textsuperscript{10}

**Challenges to Eliminating Malaria**

**Prompt responses to malaria outbreaks**

With the islands’ high propensity for epidemics, progress toward malaria elimination in Cape Verde largely depends on the surveillance system and its ability to respond to emerging malaria outbreaks. Cape Verde’s malaria surveillance activities are currently hindered by incomplete and delayed reporting of cases, inadequate monitoring of parasitological and entomological trends, and frequent stock-outs of RDTs and ACTs. In addition, inequalities of access to medical care persist across islands, challenging Cape Verde’s ability to detect spikes in cases and to prevent resurgences in malaria-free areas. Nearly all malaria program activities revolve around Santiago, which has the highest malaria burden in Cape Verde, but this singular focus poses a risk for reintroduction to the six other islands with potential for malaria transmission.\textsuperscript{7}

**Importation of malaria from mainland Africa**

Cape Verde’s small population and isolation from West Africa’s intense malaria transmission has helped the country maintain a low endemicity and make progress toward elimination. Nonetheless, outbreaks have occurred frequently in Cape Verde, and have been attributed to increased immigration to Cape Verde from mainland Africa and international traffic from tourism. Because of the archipelago’s distance from West Africa, international visitors arrive by air rather than by sea. Four of the islands operate international airports, and inter-island transport is facilitated by domestic flights as well as limited ferry service.\textsuperscript{5} For Cape Verde to reach elimination, intensified surveillance at international airports to detect imported malaria, particularly flights originating from endemic countries, and thorough, prompt case investigations to prevent onward transmission will be critical. The current strategic plan also outlines opportunities for cross-border collaboration with West African neighbors to improve advocacy and harmonization of malaria interventions.\textsuperscript{10}

**Sustained financial commitment**

Cape Verde currently receives funding through a New Funding Model grant from the Global Fund to pursue malaria elimination.\textsuperscript{18} The grant amount—US $1.3 million for the period 2014–2017—is unlikely to cover all of the costs needed to achieve malaria elimination. As a result, Cape Verde will need to determine ways to consistently sustain the country’s financial investments for malaria elimination. Resource mobilization is a priority of the current strategic plan.

**Conclusion**

Cape Verde has been able to maintain a relatively low burden of malaria over many decades despite periodic outbreaks and the constant threat of reintroduction from mainland Africa. Through enhanced surveillance systems, collaboration with West African neighbors, and sustained financial support, Cape Verde can achieve its goal of malaria elimination by 2020.
Sources


Transmission Limits Maps Sources

Eliminating malaria in CAPE VERDE

About This Briefing

This Country Briefing was developed by the UCSF Global Health Group's Malaria Elimination Initiative in collaboration with the Cape Verde National Directorate of Health. Malaria transmission risk maps were provided by the Malaria Atlas Project. This document was produced by Gretchen Newby; to send comments or for additional information about this work, please email Gretchen.Newby@ucsf.edu.

The Global Health Group at the University of California, San Francisco (UCSF) is an ‘action tank’ dedicated to translating new approaches into large-scale action that improves the lives of millions of people. Launched in 2007, the UCSF Global Health Group’s Malaria Elimination Initiative works at global, regional and national levels to accelerate progress towards eradication by conducting operational research to improve surveillance and response, strengthening political and financial commitment for malaria elimination, and collaborating with country partners to shrink the malaria map.

The Malaria Atlas Project (MAP) provided the malaria transmission maps. MAP is committed to disseminating information on malaria risk, in partnership with malaria endemic countries, to guide malaria control and elimination globally. Find MAP online at: www.map.ox.ac.uk.