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Malaria rapid diagnostic test use for the malaria elimination policy in the tropics.

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Editorial

Malaria is an infectious disease caused by blood borne parasites of the Plasmodium genus, so malaria diagnosis plays a pivotal role in the malaria control policy. Historically, examination of a small blood sample by microscopy has been the routine diagnostic method. Currently, a field adapted, point of care malaria rapid diagnostic tests (mRDT) has been developed to provide this key element, particularly in rural areas where laboratory support is often not available. We share herein our experience on mRDT use in the island of Madagascar during the last decade. The mRDT was first rolled-out to diagnose malaria among symptomatic patients in 2007 [1,2], to detect malaria infections among villagers (symptomatic and asymptomatic) in suspected malaria outbreaks [3] and to update indices of malaria prevalence at national level [4]. The path toward malaria elimination requires accurate, timely and usable parasitological data in all of these situations. For this deployment, quality must be the credo including the quality of the mRDT procured, the quality of the mRDT at the point of use, and the quality of care taken by the health workers as they employ the test.

As part of the sentinel surveillance of malaria in Madagascar, our recent survey revealed that 64.7% of health workers did not properly follow the manufacturer's recommendations for utilization of an mRDT. Often, the amount of blood and buffer and the duration of time allowed before reading the result were not respected. For example, we witnessed routine practice in an urban health center in 2016. A nurse initiated the test adding the buffer and the patient's blood sample, and gave the activated mRDT to the patient. The patient then took it, queued in front of the physician's office, entered with the mRDT and showed it to the physician. Not surprisingly, the specific time required between initiation and reading of the test was rarely met.

An mRDT is officially free of charge at the public primary health centers in Madagascar. However, some health workers (both physicians and nurses) do not fully trust mRDT results, especially if the test is negative; and quinine injection is prescribed to patients with a fever. Moreover, even those workers who fully accept the mRDT result suffer from stock-

outs, even in areas of high malaria transmission [3]. Thus, mRDT availability and accessibility are crucial, but mRDT procurement remains a real issue. This problem is compounded by the fact that Madagascar depends on international grants and funding for mRDT procurement. Is it not time for the health policy makers to shift to national budgetary support so that the malaria control program can continue to move toward malaria elimination?

The mRDT brands recommended by the Malagasy malaria control program are always chosen from those whose quality is assured by the WHO pre-qualification system. However, conditions of transport and storage can compromise the quality of particular mRDT shipments delivered to a country, so the quality of each new shipment must be controlled systematically. It is also of utmost importance to assess locally the performance of mRDTs that are used in the private sector [1] with particular attention to their sensitivity to detect all malaria parasite species infecting human.

Adopting the routine use of mRDTs is the first step to improve malaria diagnostics. However, sustainable introduction and scale-up of mRDTs should be supported by policy and by implementation frame works that promote correct mRDT use by addressing implementation issues. First, training expert trainers at least at the health district level so that they can instruct others. Then, the distribution down the supply chain, provision of clear clinical guidelines, and regular supervision coupled with refresher training on proper performance of the mRDT diagnostic test, how it works and why it is so important for correct malaria control. In line with this vision, our team has created a blood sample bank containing PCR-identified Plasmodium species for training on proper mRDT use. This resource can be used with a wide range of personnel including medical and pharmacy students, nurses, surveyors including non-medical people, health workers at the primary health centers and at hospitals, and the key persons in charge of the malaria program at the district level.

We add concluding remarks from a public health perspective. Many tropical developing countries have instituted efforts to achieve malaria elimination. Given that the microscopic testing of malaria has been limited in availability and performed with

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variable quality in many malaria endemic countries, the mRDTs and an upcoming new generation of high-sensitivity mRDTs are the key tools to test, to track and to treat malaria as part of the malaria elimination programmes. It is clear that the simplicity of the mRDT allows their use routinely by nurses, community health workers, teachers, and other laypersons. Nevertheless, a strengthened health system is needed to support continuous quality clinical care beyond malaria management.

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