

A Way Forward for Healthcare in Madagascar?

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A healthcare utilization survey was conducted as a component of the Typhoid Fever Surveillance in Africa Program (TSAP). The findings of this survey in Madagascar contrasted with those in other sites of the program; namely, only 30% of the population sought healthcare at the government-provided healthcare facilities for fever. These findings promoted us to determine the drivers and barriers in accessing and utilizing healthcare in Madagascar. Here we review the results of the TSAP healthcare utilization initiative and place them in the context of the current organization of the Madagascar healthcare system. Our work highlights the demands of the population for access to appropriate healthcare and the need for novel solutions that can quickly provide an affordable and sustainable basic healthcare infrastructure until a government-funded scheme is in place.

Keywords. Madagascar; healthcare; insurance.

In rural Malagasy Andina (Figure 1), 270 km south of Madagascar's capital city, Antananarivo, a Malagasy nongovernmental organization (NGO) has constructed a new clinic and equipped it with basic diagnostic tools and medicines. This clinic is now staffed by trained medical personnel and had 60 patients with suspected plague queuing the day after opening to receive diagnoses and treatment. Like the majority of rural settings in Madagascar, Andina had previously been deprived of an accessible healthcare facility; this prototype local NGO investment, coupled with a novel way of financing, may be a sustainable way forward for Madagascar's failing healthcare system.

Between 2010 and 2012, the University of Antananarivo, in collaboration with the Ministry of Health (MoH) and the International Vaccine Institute, implemented the Typhoid Fever Surveillance in Africa Program [3] in the rural community of Imerintsiasosika as part of a larger fever surveillance program conducted across 10 African countries. Imerintsiasosika is located approximately 40 km west of Antananarivo. It is divided into 36 traditional villages, known as Fokontany. The total population in 2011 was 50 730 persons with almost half of them under the age of 15 years. Data gleaned from this surveillance program outline a significant burden of communicable diseases, with invasive bacterial infections accounting for 10% of all febrile disease; *Plasmodium falciparum* malaria is uncommon in this rural setting. A healthcare utilization survey conducted in the central rural setting revealed that only 30% of the population reported attendance at the study healthcare facilities for fever

[4]. Within countries found on mainland continental Africa with functional healthcare services, this visitation rate was typically up to 80% [4]. The healthcare survey additionally revealed that nonattendance was due to an inadequate healthcare system and a lack of confidence in the formal healthcare services currently provided. These findings prompted us to perform a qualitative study to identify drivers and barriers of healthcare utilization [5] and to determine to what extent the operational procedures, efficacy of service delivery, and general infrastructure at healthcare facilities affected patient visitation to healthcare facilities. From the findings of this investigation, we surmise that the poor quality of healthcare and the high costs for these services play a decisive role in patients' decisions to utilize a given facility [5].

Madagascar is an island nation in southeastern Africa and with a Human Development Index of 155/187 [6], placing it within the bottom 20th percentile of developing countries globally. The average life expectancy is 68.5 years [7], and the majority of Malagasy live below the poverty line on just US\$1.21 per day (Figure 1A), a quarter of the average personal income in sub-Saharan Africa [8]. The country is afflicted by a significant burden of several major infectious diseases, and vaccine coverage with standard Expanded Programme on Immunization vaccines is low (Figure 1C). Old-world infectious diseases still circulate and there have been several plague outbreaks over the last decade; in 2014, 119 plague cases were recorded, with a corresponding case fatality rate of 33.6% [9]. The groups of infectious diseases with the greatest estimated burden in Madagascar are lower respiratory tract infections, diarrheal diseases, malaria, neonatal sepsis, and syphilis, accounting for 36.7% of the years of life lost [10]. It has also been estimated that one-third of the population (6.9 million people) lives in lower-altitude settings, with high risk of *P. falciparum* malaria [11].

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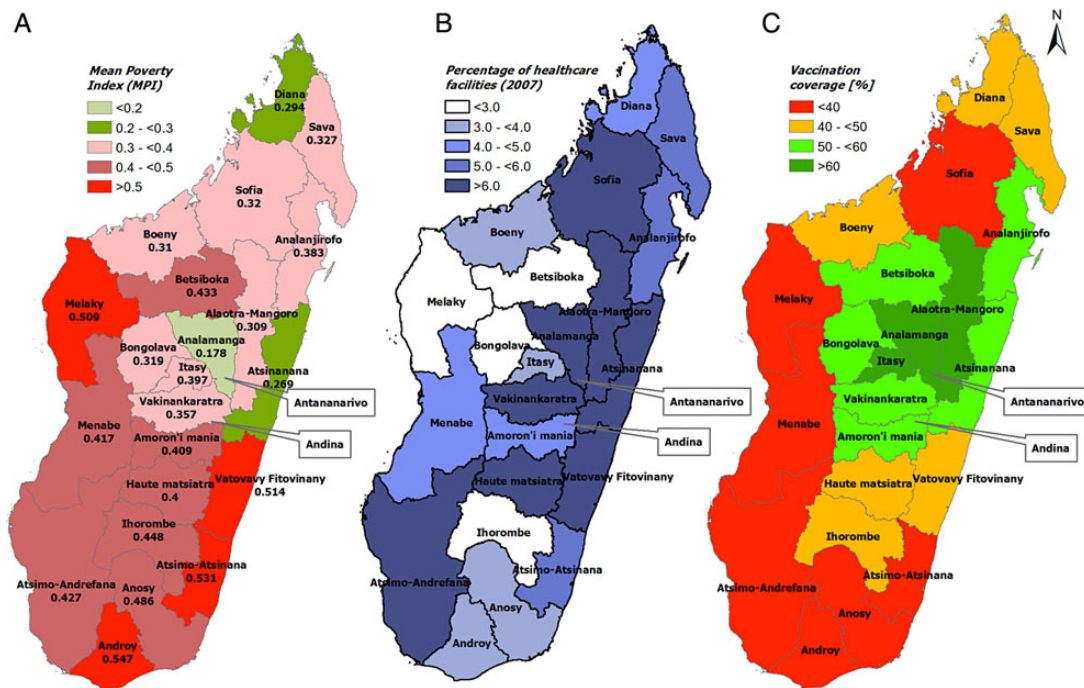


Figure 1. Poverty distribution, health center availability, and vaccine coverage in Madagascar. The maps show the localization of the capital, Antananarivo, and the rural village of Andina. *A*, Mean poverty index (MPI) distribution in Madagascar. Red indicates a higher MPI and therefore greater poverty, and green indicates a lower MPI, equivalent to less poverty. *B*, Distribution of healthcare facilities by region (2007). *C*, Vaccination coverage. The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the authors. Source: *A*, Adapted from [1]; *B* and *C*, Data obtained from [2].

Accordingly, in 2013 there were 2 142 620 suspected cases of malaria, 50% of which were identified using rapid diagnostic test kits and 5% confirmed by microscopy; the effectual antimalarial drug coverage is only 19.8% [11]. These are painfully low ratios, and the lack of an operational diagnostic infrastructure, together with the absence of broad effective treatment, is the reason for sustained high malarial incidence rates and may also play a substantial role in high case fatality rates for other infections, such as plague. We conclude that the island nation has suboptimal healthcare infrastructure with difficulties to provide required essential healthcare services to the general populace.

The current healthcare structure in Madagascar is complex; in 2013 there were 2536 primary healthcare facilities, comprised of 947 Centres de Santé de Base level 1 (CSB1), equivalent to health posts in anglophone African countries, and 1616 CSB level 2 (CSB2), equivalent to health centers. In Madagascar's healthcare system, CSBs are the primary point of contact and provide the lowest level of healthcare. An additional 86 district hospitals and 18 regional referral hospitals provide advanced diagnostics as well as surgical and obstetric services. Twelve university teaching hospitals offer the highest level of patient care. The MoH is the central coordinating unit of all the facilities at the different levels of the healthcare system in the country. This system is underfunded, and following the coup d'état in 2009 the government instituted severe cuts in social and healthcare services [12] (Figure 1B); expenditures on healthcare have

been sequentially reduced. Therefore, only 60%–70% of Madagascar's inhabitants have access to any form of primary healthcare, and travel distances of >10 km to the nearest health facility are not uncommon. This also has an impact on vaccination coverage, which is lower than in many comparable countries in Africa (Figure 1C).

According to data available through the MoH, influenza/pneumonia (15.4%), diarrheal diseases (11.3%), and tuberculosis (8.6%) are the top 3 causes of fatality, accounting for one-third of all deaths in Madagascar [8]. Despite the high burden of these diseases, access to appropriate laboratory diagnoses to support individual patient care and to augment prevention and control strategies is low. Frequently, the healthcare and laboratory services are inadequately staffed, with obsolete equipment and a constant lack of supplies [13]. Therefore, disease diagnoses are largely based on clinical algorithms and clinicians' intuition rather than standard laboratory diagnoses. In 2013, Madagascar had a physician–patient ratio of 1.6 per 10 000 people, declining from 2.25 per 10 000 in 2011, leaving the situation inferior to the average ratio of 2.5 per 10 000 in the sub-Saharan region of Africa [14]. The majority of doctors practice in larger municipalities, leaving most rural healthcare facilities without qualified medical personnel. The situation is further aggravated by a limited number of nurses and midwives [15]. The lack of adequately trained medical personnel is the primary reason for systemic inaccurate diagnoses and poor treatment outcomes

in facilities without access to appropriate treatment [16]. Moreover, the lack of medicines at healthcare centers frequently results in patients not seeking healthcare services and relying on self-treatment.

Despite the Malagasy government acknowledging that changes need to be implemented [17], a national policy setting priorities, providing countrywide coordination, and moving forward initiatives has not, as yet, been instigated. Currently, health efforts are largely fragmented, and aid has been directed to individual health centers and hospitals or to local NGOs rather than to, and through, the MoH. This has led to the development of a small private health sector that is supported by local NGOs and faith-based organizations, as well as private for-profit health centers and general physician offices.

Madagascar's finances do not allow the MoH to rapidly introduce sustainable basic healthcare services for the population. Any attempt to improve the *status quo* requires active contributions from many different stakeholders. Therefore, the provision of functioning healthcare is contingent on several activities. First, the CSB1s and CSB2s, the primary contact points for patients, need to be appropriately staffed. This includes governmental programs directed at attracting Malagasy physicians to work in rural areas and, more important, to return home after completing medical training abroad [18]. Second, these centers need to be equipped with a basic diagnostic capacity and first-line drugs to provide assurance to the population that they will receive adequate treatment. This approach should, at best, be augmented by the introduction of community-level cooperatives as a population-driven insurance system, whereby like-minded individuals voluntarily contribute fees for a pooled fund with the expected return of investment in case of their future healthcare expenditure for essential drugs. Sustainability of such a system would depend on transparency and trust among the participating populace. This could eventually give way to a private health insurance scheme as the country's health sector and market develop to an economy of scale, as well as the state-led healthcare subsidies for its population. Until then, the state could prioritize financing for the provision of higher-level referral services such as surgery, specialized diagnostics, complicated treatment, and provision of routine immunizations. In the long term, such a system could take several different forms. If subscriptions and premiums are sufficiently high and cost of services can be contained, the system will remain self-sustainable and independent from public or donor support and can be expanded to larger regions. The set-up of low-cost, no-frills systems are already operational in Kenya [19] and other African countries.

While the patients queue and receive treatment at the newly established clinic in Andina, other, more remote areas of Madagascar still await the set-up of similar facilities. This high and rapid acceptance of the clinic in Andina indicates the desire and need of the population for appropriate healthcare. Research

needs to be conducted to assess different forms of payment systems, and such "out-of-the-box" thinking might help establish systems that can quickly provide and sustain an appropriate basic healthcare infrastructure.

Notes

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