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Networks of Care in Rural Madagascar for Achieving Universal Health Coverage in Ifanadiana District

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ABSTRACT

Health care is most effective when a patient's basic primary care needs are met as close to home as possible, with advanced care accessible when needed. In Ifanadiana District, Madagascar, a collaboration between the Ministry of Public Health (MoPH) and PIVOT, a non-governmental organization (NGO), fosters Networks of Care (NOC) to support high-quality, patient-centered care. The district's health system has three levels of care: community, health center, district hospital; a regional hospital is available for tertiary care services. We explore the MoPH/PIVOT collaboration through a case study which focuses on noteworthy elements of the collaboration across the four NOC domains: (I) agreement and enabling environment, (II) operational standards, (III) quality, efficiency, and responsibility, (IV) learning and adaptation. Under Domain I, we describe formal agreements between the MoPH and PIVOT and the process for engaging communities in creating effective NOC. Domain II discusses patient referral across levels of the health system and improvements to facility readiness and service availability. Under Domain III the collaboration prioritizes communication and supervision to support clinical quality, and social support for patients. Domain IV focuses on evaluation, research, and the use of data to modify programs to better meet community needs. The case study, organized by the domains of the NOC framework, demonstrates that a collaboration between the MoPH and an NGO can create effective NOC in a remote district with limited accessibility and advance the country's agenda to achieve universal health coverage.

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Introduction

Madagascar's Ministry of Public Health (MoPH) envisions that "by 2030, the population of Madagascar will be in good health, living in a healthy environment, leading better and productive lives."[1] The MoPH's Health Sector Strategic Plan presents six strategic objectives to achieve this vision: improving the availability of quality services at all levels of care, increasing service utilization at all levels of care, strengthening governance and management of the health system, improving maternal and child health, strengthening the fight against communicable and non-communicable diseases, and promoting healthy behaviors.[1] The plan is part of the MoPH's strategy for achieving the Sustainable Development Goals by 2030, including through the implementation of Universal Health Coverage (UHC).

Madagascar's GDP per capita has steadily risen since 2014—when democratic elections were held for the first time following a 2009 coup—creating an opportunity to transform the health system and improve care coordination to fulfill the vision of the MoPH. In 2017, total per capita spending on health care in Madagascar was 25 USD, an increase from 14 USD per capita in 2014.[2] Notwithstanding improvements in health financing and health conditions in recent years, Madagascar has stark health indicators: in 2018, the under-5 mortality rate was 59 deaths per 1,000 live births and the neonatal mortality rate was 21

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deaths per 1,000 live births.[3] The national averages mask internal disparities; most health indicators are significantly worse in rural areas of the country.[3]

The district of Ifanadiana, in the Vatovavy Fitovinany region, is representative of the challenges and opportunities for improving health outcomes in Madagascar. Ifanadiana is a rural mountainous district with an estimated population of 183,000 in 2020 (Figure 1). It is comprised of 15 communes, which are administrative units ranging in population from 4,300 to nearly 18,000. Per MoPH norms, one public sector referral hospital (*Centre Hospitalier de Référence de District* [CHRD]) serves the district. Each commune has one primary health center level II (*Centre de Santé de Base [CSB II]*), and the larger communes have an additional more basic CSB level I. Long distances and travel time to a health facility greatly affect people's ability to access care; in Ifanadiana District, 70% of the population lives at least 5 km from a health facility and 49% of the population lives more than 10 km from a health facility.[4] To reduce geographic barriers to care, Ifanadiana has one village-based community health site for each of its 196 fokontany (the smallest administrative unit in Madagascar that is composed of one or several villages). Per national policy, each community health site has two community health workers (CHWs), who provide basic health services and ensure a communication link between communities and the health system.

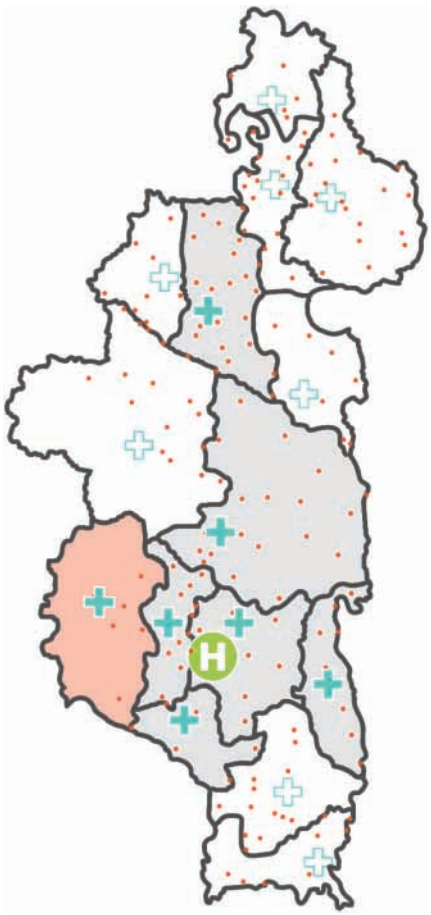

Figure 1. Map of Ifanadiana district with CHRD (green), CSB I (blue), CSB II (white with blue outline), and community health sites (red) denoted across the district's 15 communes. The communes which receive PIVOT support for the CHW program are shaded in gray; the commune which piloted the new approach to community health is in red.

Various measures of mortality and care-seeking were worse in Ifanadiana than national averages. In 2014, a population-based household survey estimated maternal mortality in Ifanadiana at 1,044 deaths per 100,000 live births; under-five mortality was 145 deaths per 1,000 live births.[5] Only 18% of births occurred in a health facility.[5,6] Fewer than a third of children under age five sought care for an illness and only 35% of children were fully vaccinated by 12 months.[6] Approximately half (51%) of children were stunted.[7] In the district, there were 1.6 health-care workers per 10,000 people and only 15% of primary health centers met Ministry of Public Health (MoPH) staffing norms.[8]

In 2014, PIVOT, an international nongovernmental organization (NGO), began a partnership with the MoPH to build a district-level model health system based on integrating clinical care, system readiness, and scientific innovation at all levels of the health system in Ifanadiana District. PIVOT provides technical and financial support at the direction of MoPH leadership. We apply the Networks of Care (NOC) framework to analyze the MoPH/PIVOT partnership and demonstrate the creation of effective NOC with the support of this collaboration. The MoPH/PIVOT collaboration begins at the household level with a focus on community health, extends through primary and secondary care in the district, and on to tertiary care when needed, facilitating comprehensive quality care and linkages between levels of care for those with complex conditions. The MoPH/PIVOT collaboration

uses new strategies and innovations to improve the availability of and access to high-quality care for the population of Ifanadiana.

In this case study of the MoPH/PIVOT collaboration in Ifanadiana District, key components of the collaboration are described using the NOC framework and the following four domains: I: Agreement and Enabling Environment; II: Operational Standards; III: Quality, Efficiency, and Responsibility; and, IV: Learning and Adaptation. We focus on innovations and best practices that support NOC in a rural district with limited financial resources (Figure 2).

Domain I: Agreement and Enabling Environment

As a central part of the collaboration, PIVOT developed strong relationships with the Government of Madagascar and with local communities in Ifanadiana. The foundation of the MoPH/PIVOT partnership is based on purposeful agreements that clarify common objectives and specify each party's responsibilities; this clarity fosters an enabling environment for the NOC. Community engagement is continuously stewarded through support and communication with local leaders.

Purposeful Arrangements

The NOC are established through a collection of Memoranda of Understanding (MoU) with the central MoPH, and project-specific regional and district agreements. In 2020, PIVOT revised the MoU with the MoPH to better reflect its alignment with the MoPH Strategic Plan for 2020 to 2024 and to focus on UHC. The new MoU outlines specific projects and details the roles and responsibilities of national, regional, and district collaborators to increase accountability and buy-in to the MoPH/PIVOT collaboration. In addition, PIVOT engages in annual joint planning with district MoPH officials and actively participates in their monthly and quarterly reviews. The MoPH, including CHRD and CSB leadership and district health officials, establish annual priorities and seek financial and technical support from PIVOT.

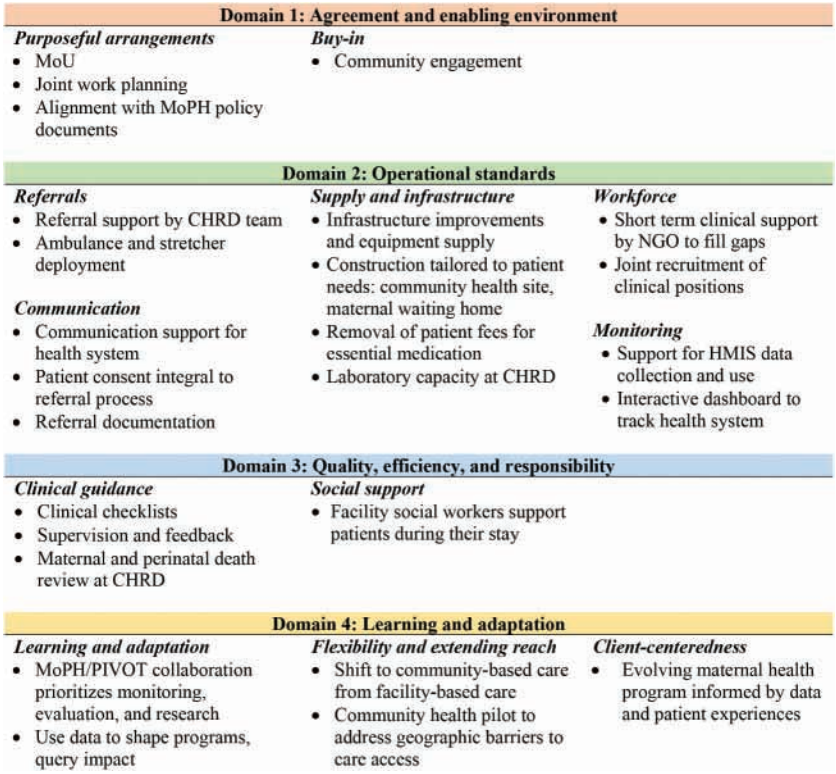

Figure 2. Components of the NOC in Ifanadiana district, Madagascar as described in the case study of the MoPH/PIVOT partnership.

At the local level, the NOC require the buy-in of various civil authorities. Some health system activities (e.g. the election of community health workers and construction of certain health infrastructure) fall under the purview of civil administration, not the MoPH. These relationships are governed by informal relationships.

Community Engagement

The MoPH posits community care as the base of the health system. In support of this, PIVOT actively engages the community in the development and execution of its work. CHWs play a central role in care delivery, coordination, and community engagement. Per national norms, communities nominate their CHWs, who are respected local residents. The MoPH and PIVOT support the elected CHWs with training and supervision and require that CHWs demonstrate proficiency in providing clinical care in accordance with protocols. In the district, the CHW program is being reformed to align with the Community Health Impact Coalition's best practices in program design and care delivery and to better meet the needs of the community.[9] Changes include the professionalization of CHWs, enhanced supervision, and an emphasis on disease surveillance and management through proactive care. PIVOT also collaborates with communities by providing materials for the construction of a community health site. The community health site, located in a central location in each fokontany, is staffed by a CHW who provides basic primary care services. Community health sites are a means of fostering community engagement in health care and provide a physical location for service delivery.

Domain II: Operational Standards

PIVOT invests in health system readiness at all levels to improve quality of care and meet MoPH minimum standards. By strengthening pillars of the health system such as human resources, medical services, infrastructure, communication, transfer services, and information systems, the NGO supports the development of the operational components needed for functional NOC and the achievement of the MoPH vision for health-care delivery.

Referral System

The health system in Ifanadiana strives to deliver high-quality basic primary care as close to the community as possible, while also developing secondary care services for complex health-care needs. PIVOT began supporting the referral system in 2014 as one of its first activities, by standardizing referral criteria and providing additional options for patient transport. The Ifanadiana health system manages urgent and non-urgent referrals for primary and secondary care within the district, as well as referrals to tertiary care to the regional hospital in Fianarantsoa, located approximately 85 km from the CHRD, and specialty hospitals in the capital.

To initiate a referral, CSBs must call the CHRD emergency call center, staffed by the referral team, to request an ambulance transfer. The CSB communicates the patient status, vital signs, and other information necessary for the CHRD to approve or deny the transfer by ambulance. The ambulance is managed and financed by PIVOT, but the authority to dispatch it resides with the CHRD MoPH team.

For urgent referrals, PIVOT has equipped two ambulances that are based at the CHRD and staffed by twelve paramedics and eight drivers. Because fewer than a third of CSBs can be reached by road, relay protocols are used; referred patients are brought to a CSB or other accessible point for pickup. The ambulance staff includes a referral nurse who remains in contact with the CHRD referral team regarding the patient's condition throughout the patient transfer process. In 2019, there were 2,217 referrals from CSBs to higher levels of care, 38% of which were transported by ambulance.

For non-urgent referrals, the CHRD may determine that the patient can be seen during normal consultation hours and can travel independently. The CSB clinician informs the patient of the CHRD consultation hours and instructs the patient to take public transport. While public transport only costs 1000 ariary (0.26 USD), this

can still be a barrier to accessing care. Therefore, in 2019, PIVOT began covering the costs associated with non-urgent approved referrals via public transportation for patients traveling within the district.

If a transfer is not determined to be necessary by the CHRD, the referral team provides guidance to the CSB on case management. Moreover, the CSB can also call the CHRD emergency call center if they are uncertain if a referral is urgent. The call center also provides general counseling by phone on complex cases.

Because ambulances are only available to transfer patients from CSB to CHRD, communities and CHWs must oversee the transfer of patients from their homes to the CSB. In Ifanadiana, people typically build handmade stretchers to transport the very ill to the CSB, which can delay referrals. After consultation with the communities, PIVOT distributed "rolling stretchers" (a bicycle with a stretcher on top) to CSBs to ease patient transport across difficult terrain. Patients' family members are responsible for transporting the patient in the rolling stretcher and for returning it to the CSB and completing any cleaning and maintenance. Evaluation of this pilot program showed that deploying normal stretchers without wheels to other access points in the community would be as effective as the rolling stretcher and allow increased coverage.

Communication

PIVOT has worked closely with the MoPH to improve coordination of patient care across levels of care by maximizing communication among facilities throughout the referral process (Figure 3). Given low connectivity and network coverage in Madagascar, PIVOT donated cell phones and equipped all facilities in the district with an internal communication network, enabling them to communicate with CSBs, the CHRD, and the district health office at no charge (up to 60 minutes call time and 25 SMS per month). More recently, areas in the district with poor network connectivity were equipped with a "Village Phone." This is an antenna that amplifies the available networks and connects to a landline telephone, enabling facilities to call the CHRD regarding referrals and to communicate with the district health team for general coordination of activities. This has also proven useful during outbreaks to facilitate epidemiological tracking and the dissemination of information.

PIVOT has also found that communication with patients and their families is an essential step in the referral process and fosters trust in the health system. Specifically, it has introduced a consent form that presents a patient's rights. While reviewing the paper consent form with the patient and family, the provider explains the reason for the referral and ensures that they understand the referral process; this can include the mode of transport, anticipated upcoming medical care, eligibility for social coverage through PIVOT, logistics (including materials to bring), and what is expected of accompanying family members to support the patient.

Referral Documentation

The MoPH/PIVOT have worked to strengthen the documentation which accompanies the referral and counter referral process. For both urgent and non-urgent referrals, the referring facility sends a referral form with the patient; this document includes patient identifiers, the patient's clinical state, medical history, clinical exams completed at the facility, and the diagnosis. This information is supplemented by additional data on care administered during ambulance transport. This facilitates the transfer of critical medical information to ensure a complete patient file and accelerates a patient's care at the referral facility.

Ensuring that information about the referred patient's case is communicated back to the referring facility in a timely manner is equally important. A system has been put in place to support the return of information throughout the referral process. This counter referral process includes completion of a form which summarizes the patient's care, discharge details and follow-up dates. This counter referral process typically depends on a health facility, like the CHRD, communicating the information back to a lower level facility, that then passes it on to the patient's family or the CHW. However, relying on this manual exchange can lead to a communication breakdown. To

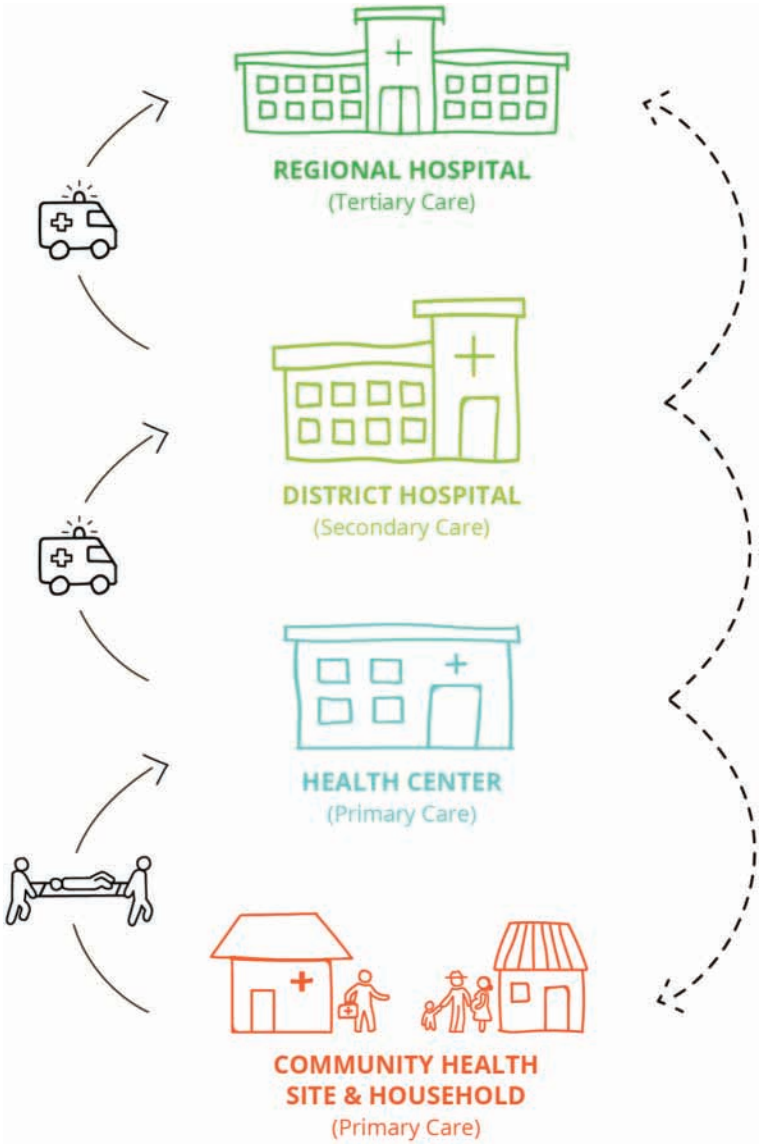

Figure 3. The MoPH/PIVOT partnership supports the movement of patients from household and community health site, to health center, and the district hospital. If necessary, patients are transferred to a regional hospital for tertiary care. The movement across levels of the health system (solid line) are facilitated by stretcher, ambulance, and other means of transport depending on urgency. Information about patient cases flows up and down levels of the health system (dotted line).

mitigate those risks, the hospital call center acts as an intermediary in the communication chain in addition to the form.

Supply and infrastructure

The MoPH/PIVOT have worked to improve the overall readiness of health facilities in Ifanadiana. Since 2014, PIVOT has provided infrastructure support to the CHRD, many CSBs, and community health sites. Efforts to improve existing health facilities, either through renovations or new construction, have been financed by PIVOT once needs have been established in consultation with the district health office. Community health sites and maternal waiting homes are constructed through community mobilization efforts supported by PIVOT. Once facilities are renovated, they also receive equipment and materials necessary for primary care; support may also include solar panels or another alternative energy source depending on the availability of utilities. As of mid-2020, PIVOT has helped the MoPH to renovate the CHRD and five health centers and has

supported the construction of 58 community health sites and two maternal waiting homes. PIVOT is currently developing plans to support some level of infrastructure improvements to all public health-care facilities in the district by 2022.

Alongside improving general infrastructure, the MoPH/PIVOT have a vision of enhanced diagnostic capacity at all levels of care. Basic diagnostic capacity has been set up at CSBs to include a glucometer, pregnancy test, and urine test strips. Moreover, PIVOT also helped the CHRD laboratory develop its capacity to run tests for prevalent infectious diseases (e.g., hepatitis B and C, and schistosomiasis), and established a blood bank in 2019. Previously, a patient requiring a blood transfusion received it via patient-to-patient transfusion or was referred to tertiary level of care. PIVOT provided financial management of the laboratory at the CHRD for a year and continues to support the technical operations of the lab and blood bank. Other partners have also invested in improving diagnostics at the CHRD, for example, making a GeneXpert machine available, which is used in diagnosis of tuberculosis and COVID-19.

One of the major barriers to accessing care throughout Madagascar, like much of sub-Saharan Africa, is the fees for drugs and consumables, and frequent stock outs; this plagues care at all levels of the health system. Nationally, commodities are procured through the MoPH's procurement agent, SALAMA, and sold through the national supply chain. PIVOT works with the MoPH to strengthen the district's supply chain, an essential component of a NOC, and, in extreme instances, responds to stock outs with a medication donation or funds to procure additional medications. To eliminate financial barriers to accessing care, PIVOT reimburses health facility pharmacies for the costs of certain medications and other commodities, so patients are not charged. The removal of these point-of-care user fees led to a threefold increase in utilization for maternal and child health services in the district.[10] Currently, PIVOT provides financial coverage for medicines in 6 (of 21) CSBs and in the CHRD. Following the inclusion of Ifanadiana as one of the first pilot districts for the UHC national strategy, the MoPH and PIVOT are working to achieve access to medicines at no cost to patients throughout the entire district by 2022.

Workforce

As in many remote rural districts, human resource availability is a major challenge in Ifanadiana District. MoPH staffing norms stipulate for CSB I, one nurse and one midwife and for CSB II, one each of a general doctor, nurse, and midwife. However, due to funding challenges, only four communes in the district have doctors at CSB IIs. Nurses or midwives thus commonly fill doctors' roles in health facilities. Clinicians' reluctance to accept remote placements is also a challenge. Supporting human resources is a pillar of PIVOT's health systems strengthening approach. As a short-term solution, PIVOT sometimes places its own clinical staff in health facilities to fill MoPH vacancies. However, a more sustainable solution has been the deployment of joint recruitment programs, whereby PIVOT pays the salaries of clinicians who are formally integrated into the MoPH workforce after 2 years. Health-care workers are further incentivized to provide care at remote locations through the provision of necessary equipment (e.g. stethoscope, blood pressure cuff, thermometer) and by being actively included in capacity building initiatives. Results from 2016 showed that each additional health-care provider at a facility in Ifanadiana was associated with a 10% increase in service utilization.[10] This increase in utilization provides evidence that when care is available and accessible (geographically and financially), patients seek health care.

Monitoring

The MoPH has implemented a health management information system (HMIS) that captures system inputs and utilization at all facilities in the district. The HMIS includes epidemiologic tracking that varies in frequency depending on disease outbreaks. PIVOT has further developed an extensive dashboard for Ifanadiana District to measure the intervention's effects on health system processes and health outcomes (Figure 4).[8] The dashboard incorporates MoPH HMIS data and data collected by PIVOT. The interface allows

Figure 4. A sample of PIVOT's dashboard, which includes more than 800 indicators and geo-located information on utilization, coverage, and population health.

staff to assess change over time, hone in on one facility or a subset, and to compare facilities receiving full PIVOT support with those that receive only a basic support package. To improve the quality and timeliness of data collection, PIVOT developed electronic data collection forms for the various activities it implements at every level of the health system. The dashboard provides a comprehensive picture of the district's health system at every point in time, showing over 800 indicators including routine data for key indicators of every program implemented across the NOC. In addition to utilization per health service and proxy measures for quality of care, the dashboard also includes information on per patient cost, stock out rates, and patients lost to follow-up.[8] All program managers have access to the dashboard with core indicators for programmatic decision-making and program management targets.

Domain III: Quality, Efficiency and Responsibility

High-quality health systems are essential,[11] and an important component of NOC. PIVOT support to clinical programs, with a focus on child health, maternal and reproductive care, and infectious diseases, have resulted in significant improvements in the coverage and quality of care at facilities.[12,13] Specifically, PIVOT has accompanied the MoPH in the improvement of clinical programs such as Integrated Management of Childhood Illness (IMCI) at community- and CSB-level, malnutrition and tuberculosis, particularly through clinical skills building for health-care workers of each cadre and improved readiness, as mentioned above.

Quality and Clinical Guidance

The MoPH/PIVOT collaboration prioritizes a culture of quality improvement. Clinical care is guided by national and international protocols on diagnosis and treatment at all levels of care. Official MoPH guidelines and checklists are used to determine if providers follow clinical protocols and to identify when support, such as refresher trainings or clinical mentorship, is needed. The MoPH leads clinical supervision activities; PIVOT accompanies them and provides financial and technical support to ensure there is routine feedback on clinical care.

CHWs are supervised twice monthly, once in the community and once at the CSB. Theoretically, CHWs should be supervised by the head of the

CSB—but in practice, time and resources for dedicated CHW supervision are scarce. Therefore, a cadre of health workers was created by PIVOT, with approval from the MoPH, to act as an extension of the CSB. CHWs are supervised by ACCs (*agents cliniques communautaires*). This cadre does not exist in other districts in Madagascar. The ACCs observe CHWs providing care to sick children under 5 years old based on the integrated community case management (iCCM) protocol. Using a protocolized checklist, the ACC provides real-time feedback on the CHW's diagnosis, treatment, and referral practices, as well as the quality of the counseling provided by the CHW to the caregiver. Under this supervision model, there have been improvements in the utilization and quality of care provided by the CHWs. ACCs also provide intensive supervisory support for the care of people with medically complicated malnutrition and tuberculosis. Once a month, CHWs convene as a group at their commune's CSB; the ACCs, district health office and NGO representatives are also present. During these meetings, participants share feedback on activities, discuss difficulties encountered, and communicate information that needs to be disseminated to all providers. Each meeting also focuses on a current clinical or management issue, for example, an anticipated rise in the expected number of malaria cases during malaria season.

MoPH and PIVOT staff conduct joint supervision at the CSBs. Supervision is specific to a program area and includes reviewing registers, consultation sheets, and the quality of HMIS data. Joint supervision is an opportunity to focus on a clinical area while in the health facility, and to give focused attention to the providers. Group quarterly meetings are held by the district with the heads of the CSBs to review data, targets, and results. Meetings with other partners working in the district are also held regularly. District leadership is working with PIVOT to develop a new model of supportive supervision in which clinical teams are placed throughout the district and rotate among facilities to support clinicians by addressing questions, identifying and rectifying challenges, and providing hands-on mentorship.

At the CHRD, a protocol developed by MoPH/PIVOT has been instituted to determine whether providers are following guidelines for clinical services and if refresher training is required. Trainings are led by the CHRD Medical Director, staff from the regional hospital, or specialists. The CHRD holds maternal and perinatal death reviews (MPDSR), led by the head of the hospital. The MPDSR includes a review of deaths, factors associated with the death, and areas for intervention or improvement. Clinical reviews are intended to improve care and management of cases. For example, following the introduction of the reviews, the hospital has seen a reduction in c-section initiation time.

Social Support

PIVOT has advocated for the integration of social support as part of clinical care and as a way of strengthening the NOC. PIVOT's social team supports patients through two main avenues. First, PIVOT provides material and financial support by covering the costs of transport, lodging and food when seeking health-care services. Secondly, PIVOT offers psycho-social accompaniment of patients and their families throughout their journeys. The social team acts as patient advocates and ensures that patients understand their rights and that their needs are met during hospitalization. If patients are lost to follow up, the social team works with CHWs to find them, understand their challenges and support their reentry into the health-care system as necessary. In addition, PIVOT's social work team pays bi-monthly visits to patients referred for follow-up at home and provides psycho-social support.

Domain IV: Learning and Adaptation

One of the components that sets the work in Ifanadiana apart from that being implemented by collaborations worldwide is the extensive effort to build an environment that prioritizes learning and innovation through the integration of data systems with implementation. Since its inception, PIVOT has invested in a data and analytics platform that allows for extensive monitoring and evaluation, rigorous quantitative epidemiology and operations research, technological tool development, and qualitative inquiry. These are essential for developing

a functional NOC that can constantly improve and optimize its impact on population health. PIVOT's research answers pressing questions identified by the MoPH/PIVOT collaboration about what impact their work has, who does and does not benefit from it, and what changes are needed to improve care delivery. Rigorous research addresses questions about financial sustainability of the collaboration (i.e. through a costing analysis of the district health system) and about which programs should be scaled up due to demonstrated uptake and impact.

Learning for Adaptation

The MoPH/PIVOT collaboration uses monitoring, evaluation, and research to shape health-care delivery and envision its evolution. The routine monitoring described in Domain II is complemented by evaluation activities. Every 2 years, the MoPH and PIVOT jointly conduct a facility assessment using a modified version of the World Health Organization's Service Availability and Readiness Assessment (SARA).[14] The data are used to measure impact of the MoPH/PIVOT collaboration on facility infrastructure and readiness over time, while also providing information on priorities for joint work planning. Other evaluation activities are determined by clinical and organizational priorities. Recent evaluations have included an assessment of the rolling stretcher pilot, a qualitative evaluation to understand care-seeking for maternity care and decision-making, and an ongoing evaluation of the community health program and the impact of care delivery model on utilization and quality of care.

PIVOT combines facility-based information with population-based and geographic information system data to carry out rigorous research on the drivers of disease, health-care access, and the impact of the interventions implemented since 2014. Prior to the start of the health system strengthening intervention, PIVOT initiated a district-representative longitudinal cohort of 1,600 households (~9000 individuals) to follow the evolution of health-care coverage, health outcomes and socio-economic information every 2 years.[6] This permits a rapid feedback loop between population-based research and program implementation in Ifanadiana, while simultaneously generating evidence of intervention impact. The focus on implementation science has generated rigorous evidence on the impact of health system strengthening interventions.[12,13,15,16] PIVOT therefore also collaborates with a network of researchers to create a broad field-based research agenda for sustainability.[7,17] Two examples demonstrate how the process of learning through monitoring, evaluation and research is contributing to flexibility and extending the reach of the health system in Ifanadiana, as well on prioritizing patient-centeredness:

Example 1—Flexibility and Extending Reach

Although PIVOT initially focused its efforts on supporting the MOPH's facility-based care (via the CHRD, CSBs, and the referral network), evaluations of health-care access in Ifanadiana showed that while coverage of most essential health services rapidly improved over time, major geographic barriers to care left remote communities with persistent unmet primary care needs.[12,18] It was clear that PIVOT's financial and technical support needed to shift to include community-based care delivery via community health sites. Yet, the geography in Ifanadiana is such that many communities have poor geographic access to community health sites.[18]

To respond to this persistent challenge, and at the request of the MoPH, an innovative pilot to more actively meet the primary care needs of clients in their homes and communities was designed. The commune of Ranomafana has piloted a two-pronged approach to service delivery: one CHW is available at the community health site, while other CHWs travel a circuit of households throughout the fokontany to proactively identify sick children and provide basic care following a roster. As part of the pilot, additional CHWs were recruited and CHWs were financially compensated. Three months after implementation of the pilot, PIVOT conducted focus groups on the new approach and found that CHWs were enthusiastic about the new model and their ability to provide high-quality care where the need was greatest. The impacts of the community health pilot on utilization, quality of care, and patient

satisfaction are being studied to generate lessons for local and national scale-up.

Example 2—Client Centeredness

The evolution of the MoPH/PIVOT collaboration has been shaped by the needs of the community. In the district, women tend to deliver at home due to the distance to facilities; some live 10 to 15 km away from the closest CSB. Cultural norms and perceptions of the quality of care at facilities also play roles in the decision to give birth at home. Indeed, results from the longitudinal cohort showed that improvements in the coverage of maternal health services lagged behind most other primary care services where progress had been achieved,[12] and coverage in remote populations was particularly low (2020 Jul 16 e-mail from A Garchitorena).

Consequently, PIVOT instituted a mobile antenatal care (ANC) program with ACCs who offer the first two ANC appointments in the community and then refer pregnant women to the CSB for the remaining ANC visits and delivery. The ACCs are equipped with the same material for ANC as is available at the CSBs. Another initiative seeks to motivate matrons, unlicensed but respected community-based maternal health providers, to accompany pregnant women to facilities for delivery. Maternal waiting homes at CSBs constructed in collaboration with communes, also encourage facility delivery. At the maternal waiting homes, up to two family members may accompany the pregnant woman, who stays for one to two weeks before the birth and for a minimum of 3 days (and up to a week) following the birth. The social support team provides food during stays at the maternal waiting home. PIVOT has conducted interviews with women and trusted sources of maternal health information, learning how decisions are made about where to give birth and what factors are most important for those decisions, which the MoPH is using to improve its approach to maternal care. In addition, an evaluation is underway to understand the impact of these activities on the evolution of geographic access to maternal care services in the district.

Conclusion

Strong NOC are essential in order to deliver on the promise of UHC in a poor and rural context. The NOC created through the MoPH/PIVOT collaboration have strived to provide care that is accessible to all, responsive to patient needs, adaptive to system failures, and timely and efficient. During the first 2 years of the MoPH/PIVOT collaboration in Ifanadiana District, under-five mortality declined 19% and neonatal mortality by 36%.[12] From 2014 to 2016, care-seeking for childhood illness increased by 51% in PIVOT-supported areas and fell slightly in the rest of the district; attendance at four or more ANC visits increased for all areas of the district.[13]

Beginning with a foundation of agreement and an enabling environment (Domain I), the NOC have been established within a health system where the vision is understood, and roles and responsibilities are delineated across levels of care and between NGO and state actors. Second, the NOC have sought to equip each level of the system with appropriate operational standards (Domain II), including the critical infrastructure necessary for service delivery, and the creation of linkages across the continuum of care. Beyond this, however, delivering on UHC for a rural population requires a patient-centered strategy, one that is focused on ensuring that appropriate care happens where and when it should, and in which care is continuously evaluated for quality, efficiency, and responsibility (Domain III). This patient-centered approach requires a NOC strategy with structured engagement with the social determinants of health, and every consideration is made to promote the patient's right to care throughout the system. This is why, in large part, the removal of user fees for all patients throughout the NOC was one of the collaborative's earliest initiatives.[10] For the rural population of Ifanadiana District, this has also meant bringing care as close to communities as possible through establishing new sites and deploying more CHWs. The NOC rest upon the principles of learning and adaptation (Domain IV) with a grounding in monitoring, evaluation, and

research, which encourages the NGO and the partnership to evolve as community needs change.

The MoPH provides comprehensive care through a network of CHWs, CSBs, and the CHRD. PIVOT's work in Ifanadiana District began with focused attention on the CHRD and four health facilities and has progressively expanded. The MoPH, championing UHC, collaborates with PIVOT to develop a district-wide strategy that brings enhanced support to all facilities in the district. Over the course of their collaboration, MoPH/PIVOT have seen an increase in use of services, particularly among those living within 5 km of a health facility. The network of facilities within the district supported by the project has been progressively expanding, with a target of reaching the entire population of the district through 15 model health centers (CSB IIs) and providing community health care by 2022.

The institutionalization of UHC is a major priority of the Government of Madagascar. As PIVOT works to operationalize the principles of UHC in Ifanadiana by ensuring the provision of high-quality free services, the NGO supports the government in this initiative and is actively engaged in the national UHC dialogue. Early evidence on the implementation of fee removal in Ifanadiana District demonstrated an increase in use of services by 65% for all patients, 52% for children under 5, and over 25% for maternity consults.[10] These results were achieved at an average cost for medicines and consumables (that patients would have otherwise had to pay directly) of 0.60 USD per patient.[10] Currently, PIVOT is completing a costing study to estimate the per capita cost of delivering care in a strengthened district health system accounting for all financial actors, including MoPH, PIVOT, bilateral donors, and other partners.

The MoPH/PIVOT collaboration in Ifanadiana District has demonstrated what can and needs to be done to strengthen the health system and build a robust NOC. This case study reveals that NOC can be supported in an impoverished rural district through attention to the four NOC domains and a vision for the delivery of high quality, patient-centered health care. Findings from these NOC can be used to inform the development of similar arrangements in other rural areas of Madagascar.

Disclosure of Potential Conflicts of Interest

LC, RJLR, LR, JH, AM, Lm, MGM, ATA, BR, BR, TL, FI, MHB, and KF receive salary support from PIVOT.

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