



USAID | **MADAGASCAR**
FROM THE AMERICAN PEOPLE

Ending Preventable Child and Maternal Deaths

10 Innovation Highlights from Madagascar



Introduction

Every day, 100 Malagasy children die- primarily from common and preventable illnesses.¹ And, every day 10 Malagasy women die from complications related to pregnancy and childbirth.²

Ending preventable child and maternal deaths is a priority for the United States Agency for International Development (USAID). To this end, USAID/Madagascar is fully committed to deliver high-impact, evidence-based maternal, newborn and child survival interventions that address the primary causes of mortality on a meaningful scale. To further our impact, USAID/Madagascar is actively advancing the USAID Forward agenda to identify and scale-up innovative breakthrough solutions to intractable development challenges.

For more than 20 years USAID has been a leading supporter of child health and nutrition programs in Madagascar. In recent years, the primary focus has been on increasing access to maternal and child health services and products in rural communities, supporting Community Health Volunteers (CHVs) with skills training, job aids, and life-saving health commodities. More recently, USAID/Madagascar has increased its focus on maternal and neonatal health with the aim of expanding access at the community level.

This document highlights some of USAID/Madagascar's current efforts to test, pilot, and ultimately bring to scale new and innovative approaches to advance Madagascar's progress towards achieving the Fourth and Fifth Millennium Development Goals (MDGs): to reduce child mortality, improve maternal health, and achieve universal access to reproductive health.

I would like to thank and acknowledge our partners and their commitment to improving the health and lives of the Malagasy people including UNICEF, UNFPA, WHO, Jhpiego, John Snow International Research and Training Institute, Population Services International, Marie Stopes Madagascar, Management Sciences for Health, Institute Pasteur Madagascar, and Abt Associates.

Finally, I would like to acknowledge the tireless efforts of the 17,000 Malagasy Community Health Volunteers supported by USAID; every day they deliver life-saving services and products to mothers, children, and families. They have stepped forward and selflessly committed themselves to building a better, healthier future for their communities and their country. Their commitment is extraordinarily humbling, admirable, and inspiring.



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¹ <http://www.unicef.org/madagascar>

² <http://www.unfpa.org/public/home/news/pid/14117>

Table of Contents

Introduction.....	3
Table of Contents.....	5
Child and Maternal Mortality in Madagascar.....	7

Part 1. Service Innovations

Child Health

1. Integrated Community Case Management (iCCM), Maternal Care, and Community- based Family Planning Services at Scale.....	10
2. Community-Led Total Sanitation.....	11

Neonatal Health

3. Chlorhexidine for Infection Prevention.....	12
4. Preterm Births Prevention.....	13

Maternal Health

5. Pregnancy Test Kits.....	14
6. Misoprostol for Prevention of Postpartum Hemorrhage (PPH).....	15
7. Pre-eclampsia Community Case Management.....	16

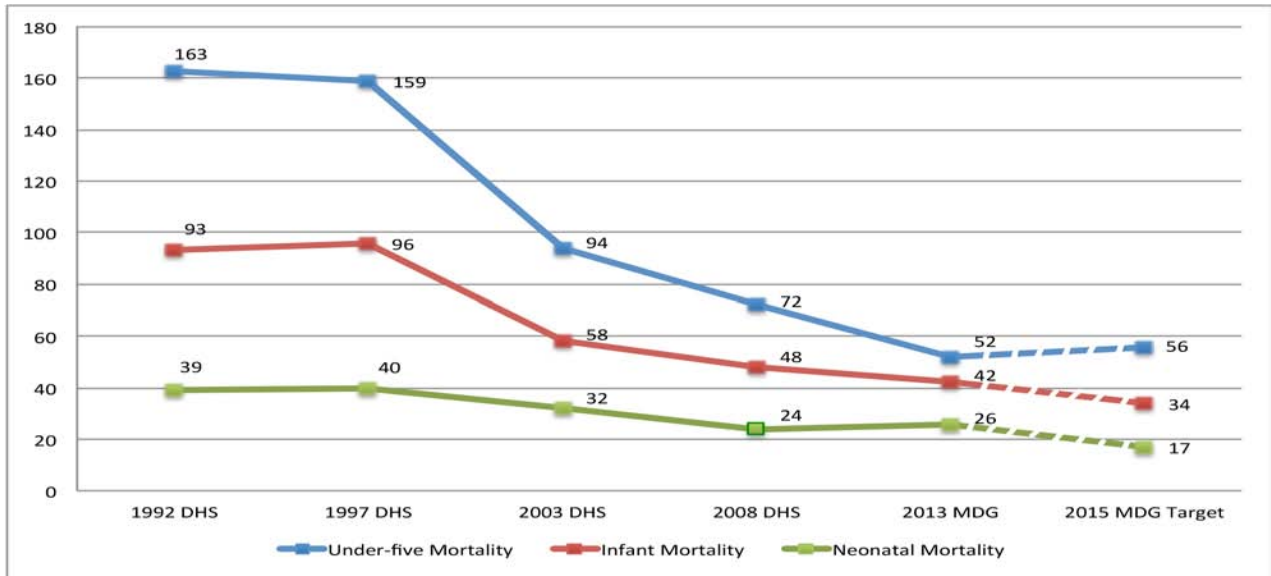
Part 2. Systems Innovations

8. Emergency Transport Systems.....	17
9. Hovercraft to improve commodity access and availability.....	18
10. Mobile Health (mHealth) to improve the commodity supply chain.....	19

Child and Maternal Mortality in Madagascar

Madagascar has made significant progress towards the reduction of child, neonatal, and infant mortality over the past 15 years. Under-five child mortality has fallen from 159 per 1,000 live births in 1997 to 52 in 2013: surpassing the Millennium Development Goals (MDG) target of 56 by 2015. Infant mortality, the death of a child less than one year of age, decreased from 96 per 1,000 live births in 1997 to 42 in 2013. Neonatal mortality, the death of a child less than 28 days of age, decreased from 40 per 1,000 live births in 1997 to 26 in 2013.

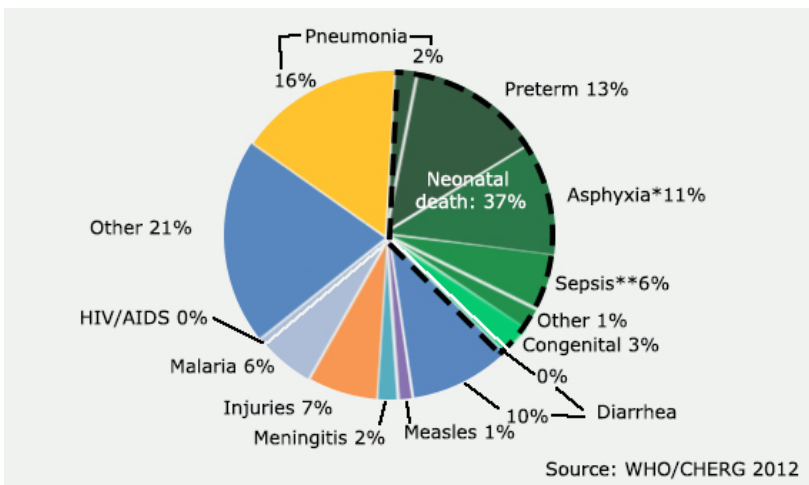
Graph 1. Under-five, Infant and Neonatal Mortality in Madagascar, 1992-2013



Sources: Madagascar Demographic and Health Surveys (DHS) and the Millennium Development Goals (MDG) Survey

Neonatal mortality, defined as a death during the first 28 days of life, has progressively decreased from 40 per 1,000 live births in 1997 to 24 in 2008. However, the 2013 MDG Survey revealed no further progress.

Chart 1. Causes of Under-five Deaths in Madagascar, 2010



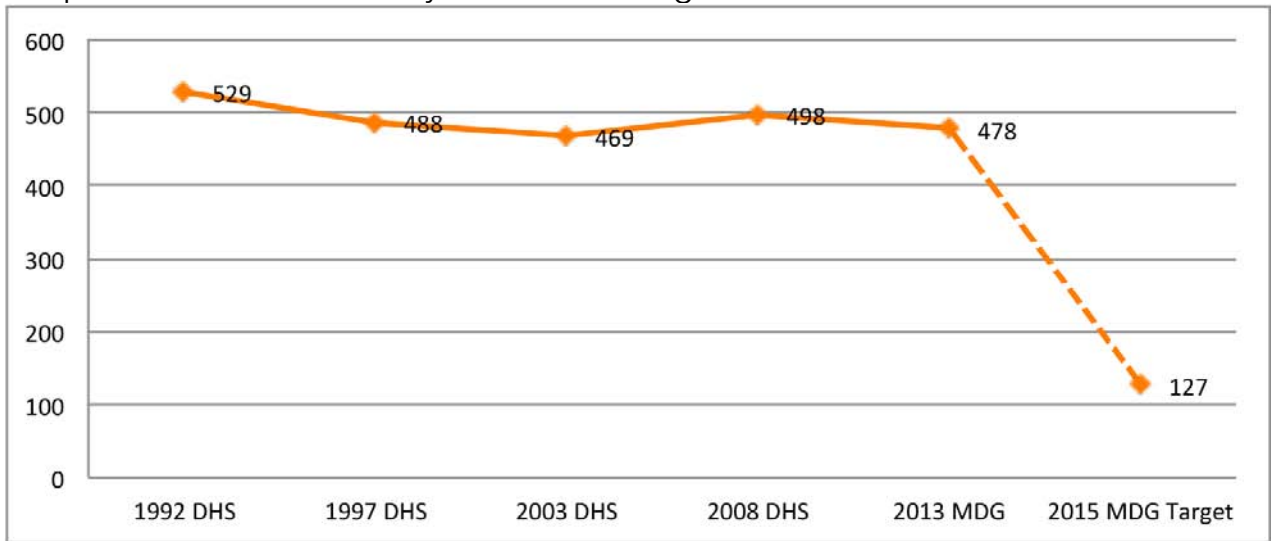
In Madagascar, 18 percent of under-five mortality is attributable to pneumonia, making it the single leading cause of child death. Thirty-seven (37) percent of under-five mortality occurs during the neonatal period, with preterm birth contributing to 13 percent of those deaths; asphyxia (11 percent) and sepsis (6 percent) are also significant contributing factors. Ten (10) percent of child

*Intrapartum-related events **Sepsis/meningitis/tetanus

death is caused by diarrhea with injury (7 percent) and malaria (6 percent) being significant contributors as well. Nutrition related factors are estimated to contribute to about 35 percent of all under-five child death (Lancet Maternal and Child Undernutrition series, 2008).

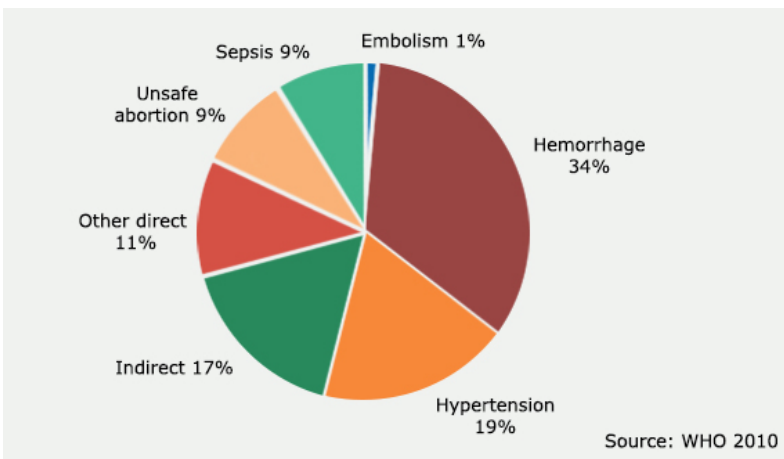
By sharp contrast, the Maternal Mortality Ratio (MMR), defined as the number of women who die during pregnancy or within 42 days of the end of pregnancy, has essentially stagnated over the last two decades. The 2013 national Millennium Development Goals (MDG) survey found 478 maternal deaths per 100,000 live births. Madagascar remains far from reaching its Millennium Development Goal target of reducing MMR to 127 per 100,000 live births by 2015.

Graph 2. Maternal Mortality Ratio in Madagascar 1992 to 2013



Sources: Demographic and Health Surveys (DHS) and Millennium Development Goals (MDG) Survey

Chart 2. Causes of Maternal Deaths, 1997–2007
Regional estimates for sub-Saharan Africa



In sub-Saharan Africa, over one-third of maternal death is attributable to hemorrhage and nearly one-fifth is caused by hypertension or pre-eclampsia. Sepsis, a condition where an infection enters the bloodstream and spreads, and unsafe abortion are also major contributors to maternal mortality. Many factors contribute to Madagascar’s high MMR including the high fertility rate: women have an average of five children (MDG Survey, 2013). The

Madagascar Emergency Obstetric and Newborn Care survey (2010) found that 61 percent of

maternal deaths occur following childbirth. The primary cause is postpartum/retained placenta (39 percent) followed by prolonged labor (22 percent), and infection (20 percent).

In Madagascar, more than 65 percent of the population lives more than five kilometers, or more than one hour's walk, from a basic health facility (MGD, 2013). Although 91 percent of pregnant women reported having at least one prenatal consultation, only 44 percent of all births were attended by a skilled health provider, and only 38 percent of babies were born in a health facility (MDG Survey, 2013). A recently published article analyzing risk and socioeconomic factors on maternal mortality at the community level in Madagascar found that improvement to transportation systems and access to hospitals with surgery rooms are needed to deal with obstetric complications and reduce maternal mortality.³

Even when pregnant women manage to visit their nearest health facility, quality care can be an issue (Maternal and Neonatal Health Quality of Facility Care Study, 2010). Moreover, when asked about barriers to health care access 40 percent of women cite concerns about non-availability of drugs at the health facility, and 37 percent report concerns about non-availability of health providers at the facility (MDG, 2013). A 2010 UNFPA study found that less than 10 percent of health facilities offering delivery services had the five required maternity care products.

³ Hernandez J, Moser C. *Community Level Risk Factors for Maternal Mortality in Madagascar*, *Afr J Reprod Health* 2013; 17[4]: 118-129



Integrated Community Case Management (iCCM), Maternal Care, and Community-based Family Planning Services at Scale

USAID/Madagascar's Community-based Primary Health Care program currently supports an expanded network of over 17,000 Community Health Volunteers (CHVs) in 20 of the island nation's 22 regions, reaching 1,080 rural communes of all 1,578 communes in the country. USAID's program increases access to life-saving products and services for integrated Community Case Management (iCCM), Maternal Care, and Community-based Family Planning services to approximately 9.5 million Malagasy people or about 64 percent of the 15 million people living in Madagascar's rural and remote countryside.

Integrated CCM promotes the early recognition, prompt diagnosis, and appropriate treatment of simple pneumonia, diarrhea, and malaria as well as referral for severe cases for children under five years of age. CHVs also promote preventative child health practices including the use of long-lasting insecticide-treated bednets, improved hygiene and sanitation, home point-of-use (POU) water treatment, Growth Monitoring Promotion, appropriate complementary feeding, and dietary quality and diversity.

Maternal care services provided by CHVs include screening, early recognition of pregnancy danger signs, and the promotion and referral of pregnant women for antenatal care. CHVs also expand the delivery of quality antenatal care by distributing iron/folic acid, de-worming medication, and refer for preventive treatment of malaria in pregnancy. CHVs counsel women on birth preparedness including promotion of facility delivery as well as essential newborn care including, clean delivery, immediate drying and covering/wrapping, as well as early immediate and exclusive breastfeeding.

CHVs were also trained on the community-level management of maternal and newborn complications, in particular how to recognize danger signs and trained to assist women and newborns experiencing complications before transfer to a health facility.

Volunteers also provide Community-based Family Planning services, which include counseling, pregnancy screening, method eligibility screening, and provision of short-acting contraceptive methods. CHVs inform and refer clients for long-acting and permanent methods available through mobile outreach, private, and public service providers.

CHVs acquire their commodities through a network of more than 1,080 commune-level supply points. In turn, they provide antibiotics for pneumonia treatment, diarrhea treatment kits (oral rehydration salts and zinc), malaria testing using Rapid Diagnostic Tests (RDTs), artemisinin-combination therapies (ACTs) for malaria treatment, point-of-use water purification solution, cycle beads, condoms, oral and injectable contraceptives. Most products are socially marketed, whereas CHVs sell them at a highly subsidized price in their communities.

Country Facts

Population: 23.2 million
 Youth: 60% under 24 years of age
 Fertility Rate: 5 children per woman
 Poverty Rate: 92%
 Adult Literacy Rate: 64.5%

Sources: CIA World Factbook, MDG Survey, World Bank, UNICEF

Map 1. Geographic Coverage (in blue) of USAID/Madagascar's Community-based Primary Health Care Program

Community-Led Total Sanitation (CLTS)

In Madagascar, diarrhea is among the leading causes of child death: accounting for 10 percent of under-five mortality. Only 15 percent of Malagasy households have access to improved sanitation (WHO/UNICEF, 2012). Open defecation, which propagates the cycle of fecal-oral contamination, is a major issue in Madagascar.

Community-led Total Sanitation (CLTS) is an innovative hygiene behavior change methodology that mobilizes communities to eliminate open defecation. Through a facilitated and participatory process, communities conduct their own appraisal and analysis of open defecation: increasing awareness of how it leads to the ingestion of feces. By raising awareness that any one person's open defecation puts everybody in the community at risk for ingesting feces, CLTS triggers a paradigm shift within the community to stimulate collective action.

This approach is remarkably successful in catalyzing communities to construct unsubsidized latrines and improve handwashing practices. Social pressure, mutual support, and appropriate local solutions lead to greater ownership and sustainability. Once all households have a latrine the community is recognized with an Open Defecation Free (ODF) certification.

The approach also promotes hygiene behavior change through interpersonal communication, community mobilization and mass media channels in order to improve handwashing practices. Households are encouraged to construct simple handwashing stations or Tippy-taps with recycled materials.

CLTS was launched in Madagascar in 2000. Since then, USAID partners have catalyzed the construction of more than 25,000 household latrines. However, many of these newly built latrines do



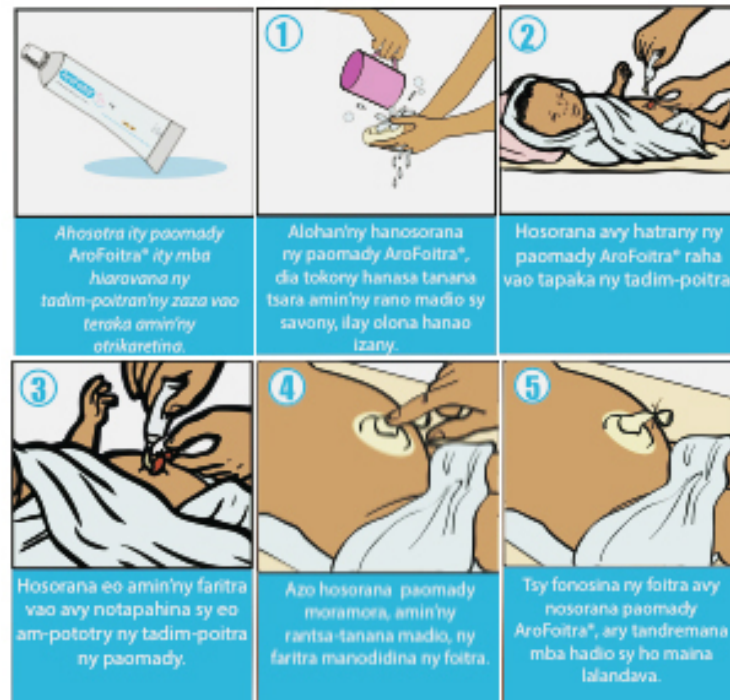
not meet the definition of an improved latrine, thus increasing the risk that it may not be maintained. Now CLTS is linked to the construction and sale of low-cost, washable, hygienic latrine floor slabs. Local masons are trained to produce and market the slabs and Village Savings and Loan associations are established to generate capital for community members to be able to purchase the slabs.

Chlorhexidine for Infection Prevention



Over 16 percent of neonatal death is attributable to sepsis, a condition where an infection enters the bloodstream and spreads (WHO 2012). In Madagascar’s rural areas, two-thirds of deliveries occur in the home (MDG, 2013) where hygiene and infection control can be an issue. Chlorhexidine (CHX) is a low-cost antiseptic effective against neonatal infection of the umbilical cord stump. CHX has been demonstrated to reduce neonatal mortality by 23 percent; the results are some of the largest effect sizes seen in any neonatal intervention (The Lancet, 2012). CHX has a long shelf life, requires no cold chain, and is extremely easy to apply with minimal training and no equipment. These factors make it suitable for both facility and home care. Few other interventions have demonstrated such potential for rapidly reducing newborn mortality across so many settings for such a low cost.⁴

USAID/Madagascar is supporting a demonstration activity for the community-based distribution of 7.1 percent Chlorhexidine. USAID procured 13,000 CHX units at a unit cost of \$0.30 and catalyzed the establishment of a technical working group comprised of key stakeholders including the Ministry of Health, UNICEF, UNFPA and USAID implementing partners. The group developed training, promotion and supervision tools for the pilot activities and completed a joint field assessment to inform initial scale-up planning. UNFPA has committed to support the procurement of CHX nationwide (for both community and health facilities). In FY 2015, USAID partners will support scale-up of community distribution of CHX to eight regions through the expanded network of Community Health Volunteers.



⁴ Segrè J. Case Study: Chlorhexidine for Umbilical Cord Care, 2012

Preterm Birth Prevention

Preterm birth is the birth of a baby of less than 37 weeks gestational age. Preterm birth is the leading direct cause of neonatal death worldwide and the second cause of deaths in children under five. In Madagascar, 13 percent of under-five death or 36 percent of neonatal mortality is attributable to preterm birth (WHO/CHERG, 2012).

USAID partners will conduct a cluster randomized trial in 50 villages to demonstrate that training of Community Health Volunteers and provision of an adapted preterm birth (PTB) risk score permits the early detection of pregnant women at risk of PTB, and can reduce associated maternal and child complications. The primary objective will be to demonstrate that PTB-related maternal and baby complications are significantly lower in communities with CHVs who are able to identify PTB risk factors.



A preterm birth risk scoring system will be developed and incorporated into a simple tool for Community Health Volunteers to identify and assess known risk factors of preterm birth including the mother's height, parity, malaria, blood pressure, diabetes, and signs of pre-eclampsia. Once the tool and scoring system is validated, baseline data will be collected and CHVs in the intervention villages will be trained on the use of the tool and home-based management of high-risk pregnancies including active surveillance for the early identification of pregnancy danger signs (fever, blood loss, swollen hands and face, convulsions, and abnormal breathing) which require immediate referral to a health facility.

The intervention will include CHV training on the scoring system to identify pregnant women at risk of preterm birth; regular home visits during pregnancy and the first month following birth for neonate monitoring, and counseling and/or referral of pregnant women according to the severity of risk.

Pregnancy Test Kits

Family Planning (FP) programs that address the key determinants of unintended pregnancy and unmet need for contraceptive services have the potential to prevent 32 percent of maternal deaths and nearly 10 percent of childhood deaths (Lancet, 2006).

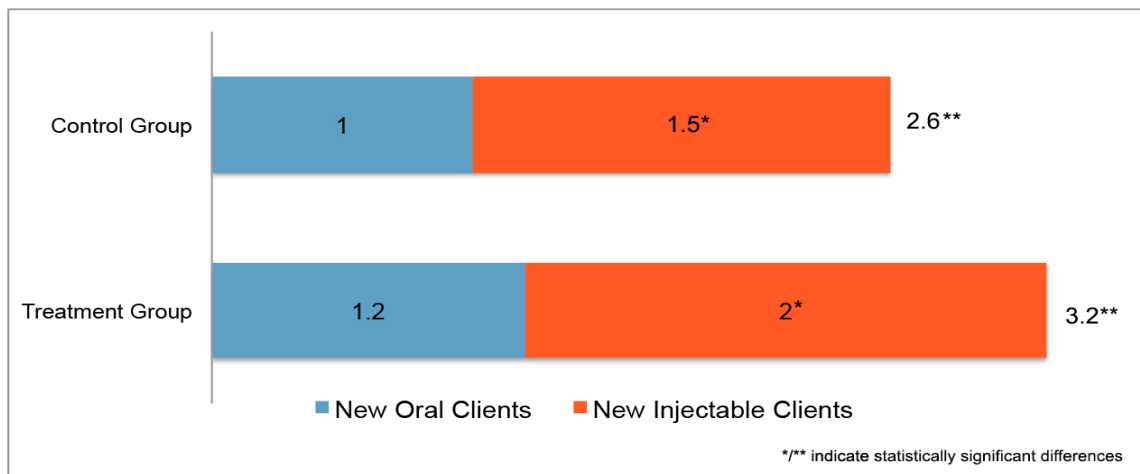


USAID/Madagascar recently completed a randomized-controlled trial to test whether providing pregnancy test kits to Community Health Volunteers (CHVs), who in turn can offer free pregnancy testing services in their community, is an effective approach to increase use of hormonal oral and injectable contraceptives among potential clients. Pregnancy test kits require minimal training, are easy to administer, and at under \$0.10 per unit, are low-cost. CHVs who provide community-based Family Planning services in three regions of Madagascar were randomly assigned to either receive pregnancy test kits and training on their use (treatment group) or not (control group). The effect of the intervention was measured by comparing the number of new clients in the treatment and the control group, using weighted least squares regression analysis.

The study found a statistically significant ($p=0.024$) increase in the number of new hormonal contraceptive clients among CHVs who are offered free pregnancy test kits for distribution to clients: a monthly average of 0.6 more clients per month compared to the CHVs who were not offered the test. This represents a 25 percent increase in the monthly average number of new hormonal contraceptive clients per CHV. This effect is driven by an increase in the number of new clients receiving injectables: the treatment group CHVs had an average of 0.5 ($p=0.028$) more new injectable clients compared to control group CHVs.

The study findings suggest that providing CHVs with free pregnancy test kits and training on their use enables CHVs to increase the number of new hormonal contraceptive clients. This intervention is a promising approach to increase adoption of hormonal contraceptives in Madagascar and other countries. In FY 2015, USAID partners will scale-up this community-based intervention to 12 regions.

Chart 3. Monthly Average of New Hormonal Contraceptive Clients per CHV



Notes: The control group total does not equal new users by method due to rounding; *** statistically significant differences

Misoprostol for the Prevention of Postpartum Hemorrhage

Hemorrhage, both antepartum and post-partum, is the leading cause of maternal death (20 percent according to the MOH 2009 Health Facility Audit). Uterotonics induce contraction of the uterus which can reduce blood loss and decrease the incidence of PPH. Oxytocin, a uterotonic agent, is the gold standard for the prevention of PPH.



However, oxytocin requires both a reliable cold chain (refrigeration) and administration by injection, rendering it impracticable in rural areas where two-thirds of Malagasy babies are born in the home.

Misoprostol is an inexpensive and stable alternative where oxytocin is not available. WHO recommends the use of misoprostol for the prevention of PPH by community health care workers and lay health workers in settings where skilled birth attendants are not present.⁵ The medication is consumed orally immediately following delivery and prior to removal of the placenta.

In March 2012, USAID partners organized a study tour to Nepal to complete an in-depth review of the successful community-based misoprostol program for PPH prevention. Seeing first-hand the benefits of Nepal's approach, participants were convinced of the intervention's effectiveness and feasibility, and mobilized to introduce misoprostol for PPH in Madagascar.

USAID/Madagascar closely coordinated with other maternal health partners to undertake a district-level demonstration project to increase uterotonic coverage for both facility and home births. UNFPA supported training and refresher courses for public providers in active management of the third stage of labor (AMSTL) using oxytocin as well as misoprostol for PPH to demonstrate that misoprostol is a viable alternative for PPH prevention when oxytocin is not available at the health facility. Misoprostol was given to pregnant women attending antenatal visit starting at 32 weeks. USAID supported the community component to test the effectiveness of community distribution of misoprostol for PPH. CHVs provided the drug to women for use during home birth when they were not able to access care at a facility.

Different cadres of health providers successfully demonstrated the feasibility and effectiveness of dispensing and/or administering misoprostol for PPH in the context of home delivery in Madagascar's rural and remote communities. The assessment showed that CHVs were able to reach 47 percent of the target group; 86 percent of target women correctly took misoprostol; and, 92 percent reported that they would use it in the future. Based on lessons learned from the introductory study, USAID is expanding community distribution of misoprostol for PPH prevention to another district. Currently, the technical working group is advocating for the development of a national policy in order to proceed with scale-up.

⁵ WHO recommendations for the prevention and treatment of postpartum hemorrhage. World Health Organization 2012

Pre-eclampsia Community Case Management

In Madagascar, 19 percent of maternal mortality overall (WHO, 2010) and 13 percent at the health facility level (MOH Maternal Mortality Audit, 2009) is attributable to pre-eclampsia/eclampsia. Pre-eclampsia or pregnancy induced hypertension is a serious condition that causes a pregnant women to develop very high blood pressure. If untreated, it may result in eclampsia- convulsions or coma late in pregnancy. Pre-eclampsia is associated with very high burden of maternal, fetal and neonatal death as well as several disabilities and health complications. Known preventive factors of pre-eclampsia related maternal and neonatal deaths include: (1) effective routine antenatal care (with pre-eclampsia detection); (2) awareness from pregnant women (self-referral); (3) screening capacity (blood pressure, glycemia, symptoms); and (4) prompt therapeutic response.

USAID partners will support a cluster randomized trail in 50 villages to demonstrate if training of Community Health Volunteers on pre-eclampsia early warning signs and symptoms, provision of simple diagnosis tools, and affordable drugs enable the early detection and case management of pre-eclampsia with the aim of reducing related complications.

The primary objective of the study is to demonstrate that pre-eclampsia related maternal and child complications are significantly lower in communities with CHVs trained and equipped with an innovative pre-eclampsia kit.

Pre-eclampsia Warning Signs and Symptoms

- Headache
- Visual disturbance
- Abdominal pain
- Vaginal bleeding
- High blood pressure
- Proteinuria

Pre-eclampsia kit:

- Laminated pictograms to raise awareness on mothers at risk
- Blood pressure monitor
- Blood sugar test kit
- Mobile phone for smart messaging service (SMS) reporting
- Methyldopa for prompt therapeutic response with referral criteria

Emergency Transport Systems

When a given situation surpasses a Community Health Volunteer's knowledge and skills (such as severe malaria, pneumonia or diarrhea, pregnancy danger signs, and neonatal emergencies), referral to the nearest health facility is the next step. When there is no emergency transport system available, organizing transport during a health emergency becomes a major issue.

Nearly half (47%) of rural women report that distance to a health facility is a serious obstacle to access (MDG survey, 2013). Furthermore, a 2012 needs assessment study found that emergency transport systems are practically non-existent in many regions. To address this issue, [USAID partners recently launched an innovative demonstration activity to develop emergency transport adapted both to medical emergencies and the local geographic context.](#) Transport solutions include motorized cyclo ambulance, bicycle ambulances, wheeled stretchers, and canoe ambulances.

Management committees and drivers were identified and trained to ensure sound management. This equipment is maintained by local private contractors who are paid by the management committees whom have established emergency transport insurance schemes. Each family pays about \$0.10 per month for the insurance. Newly formed management structures were integrated with existing local health committees and associations to reduce financial barriers to accessing care once the patient arrives at the health facility. [This demonstration activity makes emergency transport services available to over 42,500 people.](#) Utilization of the systems is being monitored before similar systems are expanded to additional geographic areas.



Hovercraft to improve commodity access and availability

Reliable access to commodities is essential for Community Health Volunteers (CHV) to provide their service. Socially marketed products used by CHVs include antibiotics for pneumonia treatment, diarrhea treatment kits (oral rehydration salts and zinc), malaria Rapid Diagnostic Tests (RDTs), artemisinin-combination therapies (ACTs) for malaria treatment, point-of-use water purification solution, cycle beads, condoms, oral and injectable contraceptives.

USAID partners piloted the use of a hovercraft to ensure availability of these products to very remote and difficult to reach communities that are inaccessible by road for most of the year. Hovercrafts are ideal for very specific geographical conditions including rivers prone to significant changes in depth. Seasonal rivers carry large quantities of sediment in the wet season and then deposit the sediment in vast sandbanks in the dry season. As a result, rivers can often be just a few centimeters deep and impassible by boat. Hovercrafts can traverse such conditions easily due to the fact that they hover just above the surface, reaching communities that otherwise have no way to access health services. The pilot also established additional supply points to reduce the travel distance and time spent for CHVs to restock their commodities.



In order to measure the impact of the intervention, a quantitative evaluation was conducted. Prior to the pilot project, only one of the seven pilot communes had received a delivery of health commodities in the previous three months. The baseline also revealed that only 59 percent of CHVs had resupplied in the last three months; at mid-term it was 98 percent and by the final evaluation all CHVs had resupplied in the previous quarter. The average number of visits a CHV made to the supply point increased from one visit every six months to one visit per month. The final evaluation also found that stock outs at the CHV level were dramatically reduced. For example, the availability of malaria RDTs was less than 5 percent at baseline; within 12 months, more than 90 percent of CHVs had RDTs in stock.

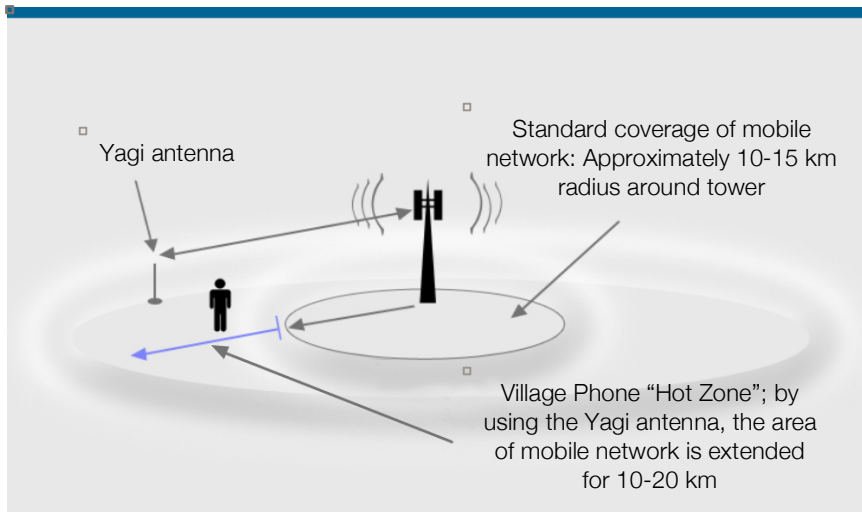
To assess the impact, service statistics from the pilot district were compared to those from another district with a similar demographic and geographic profile. The number of family planning users in the pilot district was more than three times that of the comparison district. Likewise, in the pilot district the number of children with fever treated within 24 hours was double that of the comparison district.

A quarterly hovercraft delivery to the two most difficult to reach communes costs approximately cost of \$3,800 per year (four deliveries at a cost per delivery of \$950) serving approximately 16,800 women of reproductive age and 11,200 children under five years of age who would otherwise have no access to basic health services.

Mobile Health to improve the commodity supply chain

This innovative mobile health (mHealth) activity aims to mitigate product stock-outs by improving communication between USAID partners who deliver health products and community supply points where Community Health Volunteers come to resupply. The Village Phone Project (VPP) enables community supply points to more efficiently report stock levels and place orders for socially marketed products. The phone has also enabled the introduction of short messaging service (SMS) reporting. The phone also provides supply point managers with a sustainable income generating activity as they can sell phone service in their communities.

USAID initiated this innovative pilot activity in collaboration with the private telecommunications company Airtel and supported by the International Finance Corporation. The Village Phone Project (VPP) technology expands mobile network phone coverage to a fixed point up to 20 kilometers beyond the existing mobile coverage around a tower. Village phones are a communication solution for communities where people cannot afford personal phones, the existing cellular signal is too weak to be functional, or where there is no electricity. The activity engages microfinance institutions to



provide microcredit loans to supply point managers, enabling them to purchase a “Village Phone Kit” from Airtel. The kit includes a phone handset, SIM card, Yaggi antenna, solar charger, and publicity and marketing materials. Airtel provides installation and training to the supply point manager. USAID partners coordinate the initiative and provide business and entrepreneurial skills training.

A mapping simulation overlaid the global positioning system (GPS) coordinates of commodity supply points with existing Airtel coverage. This exercise revealed that out of more than 1,080 existing community supply points, 460 sites were suitable or village phone ‘able’. An additional 186 sites are located more than 15 kilometers from the tower and required on-the-ground testing. Thirty-five supply points are now participating in the activity.

Another mobile health innovation is the introduction of the SMS system for CHV results and commodity stock reporting. USAID partners initiated this innovation in two pilot regions covering 22 communes. Three hundred and fifty (350) CHVs are participating. By automatically generating outputs on activities and indicators, this community Health Management Information System (c-HMIS) will help USAID implementing partners to track CHV service statistics and stock levels. The mHealth CHV reporting system is integrated with the VPP commodity supply point system: when CHVs send their monthly stock report via SMS, they receive an automated reply confirming availability of commodities at the nearest supply point.



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