



Title: MAMaZ Against Malaria Mid-Term Report

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ABBREVIATIONS AND ACRONYMS

CCO	Clinical Care Officer
CHV	Community Health Volunteer
CHW	Community Health Worker
CME	Continuing Medical Education
DHD	District Health Director
DHIS	District Health Information System
DHMT	District Health Management Team
DPC	District Project Co-coordinator
ETS	Emergency Transport System
HMIS	Health Management Information System
i-CCM	Integrated Community Case Management
IMCI	Integrated Management of Childhood Illnesses
M&E	Monitoring and Evaluation
MAMaZ	Mobilizing Access to Maternal Health Services in Zambia
MNCH	Mother, Newborn and Child Health
MNH	Maternal and Newborn Health
MOH	Ministry of Health
MORE MAMaZ	More Mobilizing Access to Maternal Health Services in Zambia
NHC	Neighbourhood Health Committee
PHD	Provincial Health Director
RAS	Rectal Artesunate
RDT	Rapid Diagnostic Test
RHC	Rural Health Centre
RHP	Rural Health Post
SM	Severe Malaria
SMAG	Safe Motherhood Action Group
T-QAG	Technical Quality Assurance Group
TOT	Trainer of Trainers
UNICEF	United Nations Children's Fund
WBR	World Bicycle Relief
WHO	World Health Organisation
ZISSP	Zambia Integrated Systems Strengthening Programme

1. EXECUTIVE SUMMARY

MAMaZ against Malaria is a one year pilot project, funded by the Geneva-based foundation, Medicines for Malaria Venture (MMV). The project aims to devise an evidence-based and sustainable strategy to improve the access of hard-to-reach communities to effective treatment for severe malaria (SM) in a high malaria burden setting. The project is being implemented by a consortium led by Transaid in partnership with Health Partners Zambia, Development Data and Disacare. The consortium is working in partnership with the Ministry of Health in Zambia, specifically the National Malaria Elimination Centre, and the District Health Management Team for Serenje District.

This mid-term report presents progress from the start of the project in July 2017 until January 2018. Substantial progress has been made, and in less than seven months the following headline results based on data generated by health facilities (October to December 2017) and by communities (November to December 2017¹) have been recorded:

- No deaths from Severe Malaria (SM) were recorded, compared to a baseline mortality rate of 8%.
- 224 children with suspected SM were administered RAS - one third of the overall project target number of beneficiaries in just two months.
- 99.6% of all suspected SM cases identified by CHVs (via recognition of danger signs and use of RDT) were administered RAS.
- Just under 50% of all RAS beneficiaries were supported by bicycle ambulances, demonstrating the importance of community-managed emergency transport systems in remote rural settings in Zambia.
- 84% of SM cases were followed up by CHVs for adverse events, exceeding the project target.

At mid-term, the pilot project is well on track to achieve its intended targets. Key activities have taken place, including the following:

- Excellent engagement achieved with district, provincial and national stakeholders, with national level engagement deepening over the last few months
- Secured a waiver for rectal artesunate (RAS) and procured 3,000
- Worked with the District Health Management Team to place an emergency order for Injectable Artesunate (Inj As) for use in Serenje at eight intervention HFs
- Trained 225 Community Health Volunteers (CHVs), including Lead SMAGs, in identification of suspected severe malaria diagnosis and pre-treatment with RAS
- Trained an additional 252 CHVs in community mobilisation and awareness-raising around SM and other common childhood illnesses
- Trained 27 master trainers and health facility staff in use of injectable artesunate, creating a pool of local capacity that can be utilised post-intervention
- Responded flexibly and promptly to a request by the National Malaria Elimination Centre (NMEC) to add training in rapid diagnostic tests (RDTs) to the CHV training

¹ RAS was distributed at community level in October 2017 hence community data is only available from November 2017.

- Revitalised emergency transport systems (ETS) in the intervention sites, including provision of 14 new bicycle ambulances, maintenance support where needed and a refresher training for 66 ETS riders
- Revitalised emergency savings schemes and food banks at community level to support the referral of sick children to the health facility
- Trained CHVs to collect data on RAS administration and other project activities
- Promoted use of referral and counter-referral forms by communities and health staff.

The training approach, adapted from that developed by MAMaZ and MORE MAMaZ, allowed the project to reach over 500 community volunteers (CHVs and ETS riders) in a highly cost-effective way.

2. INTRODUCTION AND BACKGROUND

2.1 Introduction

This report presents the progress of the MAMaZ Against Malaria (MAM) project. MAMaZ Against Malaria is a one year pilot project, funded by the Geneva-based foundation, Medicines for Malaria Venture. The project aims to increase access to community-based pre-referral treatment for severe malaria (pre-referral rectal artesunate - RAS) for children from six months to under six years old, and to reduce referral delays from the community to health facilities that are equipped to treat severe malaria, ideally with injectable artesunate.

The project goal is:

To devise an evidence-based and sustainable strategy to improve the access of hard-to-reach communities to effective treatment for severe malaria in a high malaria burden setting.

MAMaZ Against Malaria began on 10 July 2017. It will run for a 12 month period, ending on 9 July 2018. The project is being implemented by a consortium comprising the UK international development organisation Transaid, the contract holder, and three locally-based organisations, Health Partners Zambia, Development Data and Disacare. All four organisations were involved in the design and implementation of the Mobilising Access to Maternal Health Services in Zambia Programme (MAMaZ), led by Health Partners International and funded by the UK Department for International Development (2010-2013), and the follow-on programme MORE MAMaZ (2014-2016), led by Transaid and funded by the UK charity Comic Relief.

The project's intervention district is Serenje in Central Province. Serenje was an intervention district in both the earlier programmes.

2.2 Background

P. falciparum, the species of plasmodium parasite that causes the most lethal form of malaria, accounts for an estimated 98 percent of malaria cases in Zambia. All 10 Zambian provinces are endemic for malaria and 90 percent of the population is at risk. Epidemiologically, children under five years old are the age group most susceptible to severe malaria due to lack of immunity, and are the key target group for the proposed intervention.² Malaria is endemic

² Noting, however, that the target group for RAS is > 6 months and < 6 years

year-round, although the number of cases increases during the rainy season between November and April.

Zambia recorded a decline in the incidence of malaria from 407 cases per 1,000 population in 2014, to 336 cases per 1,000 population in 2015 (MOH website, 27/12/2016), an estimated 7,100 deaths from malaria occurred in 2015.

Along with Copperbelt, North Western, Western and Southern Provinces, Central Province, where Serenje is located, is categorised as a Zone II malaria transmission zone with low to moderate stable transmission. Central Province has a malaria parasite prevalence rate of 21.8% (Zambia Malaria Incidence Survey, 2015).³ Serenje reported a significant increase in severe malaria cases (children and adults) between 2014-2016; from 70,000 to 80,000 (pers. comm., District Health Director, June 2017), a trend that is of considerable concern to the DHMT. In 2017, 53,872 cases of malaria had been recorded in the district at the mid-point of the year (pers. comm., District Health Director, July 2017).

A recent article (Inambao *et al*, 2017)⁴ analyses 2013-15 data from the national health management information system (DHIS2). The article calculates a national malaria incidence rate (i.e. new malaria cases) for children under five years of age of 756/1000, and a rate of

275/1000 for persons aged five years and above. These figures highlight the large differential in incidence between older and younger age cohorts. **In Central Province, the incidence rate for children under five years old is estimated as 490/1000.** There are therefore strong epidemiological arguments for working in this province.

Severe malaria is a medical emergency: many young children die as a result of delays in starting treatment within the first 24 hours of onset of symptoms, especially in rural areas where physical access and other barriers to timely health care are poor and long delays may occur between a decision to seek care and the receipt of care. MAM was set up to generate proof of concept of an intervention that aims to provide an end-to-end solution (from remote rural communities to their nearest health facility and upwards to higher level referral facilities if necessary) for children at risk of high mortality and morbidity from severe malaria.

³ Available at: http://www.path.org/publications/files/ASTMH_mis_2015_pstr.pdf.

⁴ Inambao AB, Kumar R, Hamainza B, Makasa M, Nielsen CF, 2017, 'Malaria Incidence in Zambia, 2013 to 2015: Observations from the Health Management Information System', **Health Press Zambia Bull.** 2017;1(3).

3. STAKEHOLDER ENGAGEMENT

3.1 Overview

In line with good governance principles, MAM has given high priority to effective engagement with core partners at different levels of government. Key principles that underpin the project's approach are:

- Ensuring full alignment with government priorities
- Responding flexibly and opportunistically to opportunities for deeper engagement
- Placing the emphasis on mutual capacity building in an equal partnership
- Facilitating local ownership and leadership of project activities, helping to embed these in the day-to-day activities of government

3.2 District Level

At district level, stakeholder engagement activities have focused on the following:

- A Partnership Agreement was signed with DHMT in July 2017. This sets out the contributions to be made by the project and the contributions to be made by the DHMT. The document provides a useful means to check that respective contributions are being made as agreed.
- The DHMT kindly allocated MAM's District Project Co-ordinator (DPC) an office in the District Health Office. This helps to promote good interaction between project staff and DHMT members and enables joint working.
- The DPC attends Monday management meetings and other technical meetings at the District Health Office, as appropriate. These meetings provide opportunities for joint planning and updating the entire DHMT on project activities, progress and challenges.
- DHMT focal persons for the project were appointed by the District Director of Health Services in July 2017. The focal persons are integrally involved in all key project activities, including training, coaching and mentoring support visits to communities, monitoring and evaluation activities.
- A District Performance Assessment (DPA) methodology developed by MAM measures the extent to which the activities of the project are being institutionalised (i.e. incorporated into the day-to-day activities of the DHMT). The participatory DPA tool provides an opportunity for reflection and discussion on progress so far by the DHMT, who score themselves on their progress. The first DPA was carried out in early December and shows very good progress on institutionalisation. (This document can be provided separately on request).

3.3 Provincial and National Level

At provincial level, MAM's strategy has been to ensure that the Provincial Director of Health Services and her team are up-to-date with project activities and progress. A large part of the updating is happening via the routine reporting from district to provincial level (via the District Director of Health Services). However, opportunities have also been sought to brief the Provincial Health Team in face-to-face meetings, usually with district staff in attendance.

At national level, the following activities have taken place:

- In October 2017, MAM facilitated two conference calls between NMEC, the DHMT and MAM project staff to discuss the feasibility of adding RDT training onto the training of the CHVs. These discussions were extremely helpful and MAM and DHMT were able to respond positively and quickly and deliver the training without delay.
- MAM was invited to make a presentation at the quarterly Malaria Technical Working Group (TWG) meeting hosted by NMEC in the first week of December 2017. The presentation and subsequent discussion helped to raise the project's profile. The DPC, Operations Manager and other core team members plan to attend future meetings.
- NMEC's focal person for MAM visited the field twice during the reporting period and participated in some core training activities. In December 2017 the Chair of the national Malaria TWG also visited some of the project intervention sites with a team for monitoring purposes. These visits have helped to increase understanding of the work of the project at national level, but have also provided opportunities for national stakeholders to provide strategic and other practical advice. There are plans in place to facilitate regular field visits by NMEC to the MAM intervention sites.

4. KEY ACTIVITIES

4.1 Design Verification

In July 2017 a design activity took place to further engage with partners, validate the approach laid out in the project proposal and flesh out some of detail, to confirm the intervention sites, develop a detailed training plan, update the project plan and detailed budget. Key outputs of the design assignment were:

- a detailed project design document
- a draft RAS and community mobilisation training manual
- design for community monitoring system

- updated ETS training approach and manual⁵

The exercise confirmed the project will operate initially in eight health facilities and in 45 neighbourhood health committee areas (NHCs) covering one third of health facilities in the district and approximately 40 percent of the district population. Two further Rural Health Posts will participate in the project as and when they become operational (staff have yet to be appointed). The ten intervention health facilities include six of the eight MAMaZ and MORE MAMaZ intervention health facilities plus four new Rural Health Posts that have already opened or which are about to open in the catchment area of these older facilities.

Table 1 below lists the eight operational intervention health facilities and the NHCs they serve. The table shows that intervention sites are between 5-40kms from the health facility, with the average distance being 17.5 kms⁶. The NHCs that are closer to their nearest health facility (i.e. those between 5-8kms away) were selected because they face physical access barriers such as lack of transport options or challenging terrain.

⁵ Add this in for completeness. This output was produced as part of the extended design.

Table 1: Intervention Health Facilities, Communities and Distances⁷

Facility	Distance to Dist Hosp (km)	NHCs	Distance of NHC to HF (km)	Distance of NHC to District Hosp
Malcolm Moffat RHC	3	Kankoso	7	10
		Munte	17	20
Muzamani RHC	94	Chief Serenje	15	105
		Chipala	20	110
		Makolongo	24	114
		Musamani (static)	5	95
Kabamba RHC	25	Nakasala	15	35
		Kafunda	15	30
		Chanikila	13	18
		Mfwenta	10	35
		Kalilanama	35	57
		Mupula	30	52
		Teta	35	60
		Chintankwa	40	65
Mulilima RHC	45	Misenga	21	61
		Chisenbwa	25	65
		Chibwe	35	75
		Fitebo	13	53
		Makolongo	12	52
		Ndabala	18	58
		Kebumba	8	48
		Mulembo	15	45

Serenje Urban RHC	0.5	Mbaswa	8	9
		Kashitu	20	21
		Makabi	8	15
		Kabwe-Kupela	8	24
		Mwansa-Chibale	10	18
		Chimupati	8	16
		Munjili	6	22
Kabundi RHC	54	Lupiya	32	86
		Kansomba	32	86
		Luombwa	10	64
		Kabeta	19	73
		Ntenge	39	93
		Nyamanda	18	72
		Chishi	28	82
		Chimfunde	40	95
		Kampumbu	15	69
		Kabundi Static	0	54
Kashishi RHP		Poosa	15	33
		Nkulumashiba	10	35
		Kashishi Static	6	31
		Chinini	14	23
Kalela RHP		Kanjanji	5	80
		Milulu	9	73

4.2 Procurement of RAS and Securing Inj As Stock in Serenje

4.2.1 RAS

3,000 packs of two RAS suppositories (a total of 6,000 units), were procured from CIPLA through a Lusaka-based company called Prime Pharmaceuticals. A procurement waiver was required and was obtained from the Zambia Medicines Regulatory Authority (ZMRA) in August 2017. Future projects will need to secure a waiver until the product is registered in Zambia. NMEC are looking into the latter and will advise on the registration timeframe.

RAS is administered based on age and weight, with one suppository given to children aged from six months to less than three years (expected to be in the weight range 5 kg to less than 14 kg), and two suppositories given to children aged from three years to less than six years (expected to be in the weight range 14 kg to 19 kg).

Trained CHVs collect the RAS from their local health facility, and report on their RAS use to the health facility. Each CHV was initially given 10 blister packs of RAS (total of 20 units per CHV), and CHVs were advised to contact their local health facility when supplies get low.

The initial distribution was equivalent to 4,500 units (75% of stocks). The remaining RAS will be distributed as and when needed. CHVs have been advised to stay in contact with their nearest health facility and to collect additional supplies as drug stocks start to diminish. The project is also using the opportunity of community-based CHV meetings to check RAS supplies and top-up as necessary. The project aims to administer RAS to at least 750 children, further high level project targets can be found in the infographic in Annex 1.

3.2.2 Injectable Artesunate

One aspect of the District Partnership Agreement was that Serenje district would provide injectable artesunate (Inj As) to health facilities in the project intervention sites (at the start of the project, Inj As was only available at District Hospital level). The District Health Director placed a special (emergency) order for Inj As with Medical Stores Limited in July 2017. This was based on a quantification of 8,040 vials for the coming year. The quantification, agreed during the design assignment, was based on previous usage of SM drugs at each health facility plus an increase based on an expectation of more cases presenting. The Inj As was distributed to participating health facilities following a training in severe malaria case management in August 2017.

3.3 Monitoring and Evaluation

MAM's monitoring and evaluation system is based on data generated via the following:

- Baseline and endline statistical surveys
- Rapid qualitative assessment of malaria knowledge, attitudes and practices
- Community monitoring system (CMS)
- Health facility records (part of the District Health Information System - DHIS2)
- On-going qualitative data generation (case studies etc.)
- Routine monitoring activities
- District performance assessment (see Section 3.2)

3.3.1 Rapid Qualitative Community Assessment

As part of the baseline data gathering process, a rapid qualitative community assessment was carried out during the design assignment in July 2017. Individual semi-structured interviews and natural group discussions were undertaken with community health volunteers, ETS riders, community members and facility staff. These explored a range of topics, including knowledge, attitudes and practices relating to malaria/ other childhood illnesses. Headline findings included:

- In communities that had undergone considerable maternal health-related behaviour change, there were significant gaps in knowledge about malaria, severe malaria, and acute respiratory infection, and some knowledge gaps in relation to diarrhoea (e.g. how to mix oral rehydration salts - ORS - at home).
- Many community respondents could cite sad memories of children who had died from or been adversely affected by suspected severe malaria.
- Community respondents had incomplete knowledge of severe malaria danger signs, and general signs of malaria were muddled with those of severe malaria. The same was true of ARI.
- Many community respondents could describe traditional treatments for malaria. Some families were said to delay taking their child to the health facility because they preferred to use local remedies as the preferred first-line treatment.
- Some community members continue to associate fitting in children with bewitchment and, as a result, treat the symptoms with local herbal remedies. This results in the delayed transfer of children with suspected severe malaria to the health facility.

These findings confirmed and reinforced some of the main findings of the baseline statistical survey (see Section 4.3.2 below).

4.3.2 Baseline Statistical Survey and Facility Audit

In July 2017 baseline data were collected through a rapid malaria health facility audit to establish capacity on personnel, malaria case management and drug stock levels.

A baseline statistical survey was carried out between August and September 2017. The primary objective of the baseline was to establish baseline values and conditions that will help towards tracking results of the project. It was also intended to generate further contextual understanding of the situation in the target district to help inform elements of the project approach.

A quantitative survey targeted 300 CHVs (including ETS riders) and investigated knowledge, attitudes and practices relating to severe malaria, malaria and other common childhood illnesses.

Malaria cases data were also collected from the intervention health facilities.

Selected headline findings from the survey can be found in Box 1 below.

Box 1: Selected Headline Findings from the MAM Baseline Statistical Survey and Facility Audit

Human Resources and Training

- Two of the 8 intervention facilities had a Clinical Officer. Elsewhere nurses, midwives or EHTs were in-charge.
- All 8 facilities, and especially the smaller ones, relied on volunteer CHWs to help with patient registration and other tasks around the facility.
- Only 20% of staff had training in IMCI.
- None of the staff had received training in injectable artesunate or RAS.
- Some staff lacked formal training in severe malaria case management.

Drugs and Commodities

- All 8 facilities used intra-muscular (IM) quinine to treat severe malaria.
- Three out of 8 HF's had experienced stock-outs of malaria drugs over the last 6 months.
- Six out of 8 HF's had experienced RDT stock-outs over last 6 months.
- All but 1 HF reported a regular supply of referral forms.
- Counter-referral forms were not used in any of the facilities, although they had been developed as part of the referral forms by the DHMT.

Community Health Volunteer Knowledge

- CHVs' knowledge of uncomplicated malaria danger signs was incomplete: 88% knew fever, but only 56% knew headaches; and 20% knew loss of appetite.
- In relation to malaria in children, 13.7% of CHVs said that they didn't know the danger signs.
- Only 22% of CHVs mentioned that fever and chills were a danger sign of malaria in children; only 13.1% mentioned that headaches were a danger sign.
- 29.7% of CHVs said that they didn't know the danger signs of severe malaria in children.
- In relation to the key danger signs of severe malaria in children: only 27% CHVs knew vomiting everything; 27% of CHVs knew fitting; 25% of CHVs knew unconscious or lethargic.

4.3.3 Community Monitoring System

All CHVs trained by MAM and its district partners have been trained to operate a community monitoring system (CMS). This generates data on CHV activities, on case management and referral of sick children, and on the operation of community safety nets that have been established to support timely access and referral. The CMS data:

- empower communities by providing information on the steps they are taking to address part of the health burden and the impact the CHVs are having
- provide vital information for the health facilities and district on the extent of the severe malaria burden (including cases seen at community level that are not always captured in facility records) and the number of successful pre-treatments and referrals
- provide information vital for project decision-making, allowing adaptation of activities and priorities in response to real-time data on project performance

CMS data collection began in November 2017 and is being generated monthly.

4.3.4 Facility Data Collection

Facility records are reviewed on a monthly basis. Intervention health facilities are generating data on uncomplicated and severe malaria cases in children under five years old; RAS and injectable artesunate beneficiaries; and the proportion of staff trained in injectable artesunate who have administered it. These data are used to triangulate with other available data, including the CMS.

Some of the indicators mentioned above, are not yet part of the official DHIS2. However, intervention health facilities have been requested to keep these records by the DHMT. The data are being used effectively for management decision-making, for example closer monitoring of HFs where more cases are found.

4.3.5 On-going Qualitative Data Collection

During the reporting period, considerable emphasis was placed on the baseline surveys and assessments, establishing the CMS, and supporting facility record keeping. Steps were also taken to put in place a system for on-going qualitative data collection. Working with facility staff and other members of the DHMT, the project team are gathering data on the following:

- Case studies of malaria near-misses and sad memories
- Case studies that capture changes in malaria-related knowledge, attitudes and practices
- and in other common childhood illnesses
- Case studies of successful pre-referral treatment, emergency referral and facility-based treatment

A first batch of case studies will be available to share in February 2018.

4.4 Training

The project conducted a series of trainings between August and October 2018. These included the following:

- Training of RAS and community mobilisation master trainers
- Training of Lead CHVs in RAS administration and community mobilisation
- Training of other CHVs in community mobilisation for common childhood illnesses
- Training of CHVs in RDTs
- Training of ETS riders
- Training of health facility staff in severe malaria case management and Inj As

Table 2: Trainings Conducted

Training	Numbers Trained / Reached
Master trainers	8
Training in administration of RAS (lead CHVs)	225
Training in community mobilisation (ordinary CHVs)	252
ETS training	66
Total community volunteers trained	543

4.4.1 Training Methodology and Resources

The CHVs were trained using the evidence-based training approach and techniques developed by MAMaZ and MORE MAMaZ. This included:

- Use of the rapid facilitation imitation method which allows trainees to practice and quickly assimilate their learning
- Use of communication body tools to learn and remember key facts such as the severe malaria danger signs
- Building communication, facilitation and listening skills and capacity to train others

A training manual was developed and copies provided to master trainers. The manual drew on and where possible aligned with existing manuals and guidelines, such as WHO and

UNICEF's 2011 'Caring for the Sick Child in the Community'⁸, which is considered the 'gold standard' i-CCM training manual; the bespoke i-CCM training materials already utilised in Serenje, the WHO's 'Pre-referral Rectal Artesunate Treatment of Childhood Malaria in the Community' training manual (2012)⁹, and the Zambian National SMAG Training Manual (2016).

A copy of the training manual can be made available on request on can be downloaded here: <http://www.transaid.org/knowledge-centre/training-manual-community-based-pre-referral-treatment-severe-malaria/>

The CHVs trained to administer RAS were given a two-page job aid (a document developed by MMV) which summarises the severe malaria danger signs and the steps in dealing with severe malaria patients (prepare, administer, refer, and follow-up) at the end of their training. The document was photocopied double-sided and laminated to maximise its durability.

4.4.2 Training of Master Trainers (RAS and Community Mobilisation)

In September 2017, ten district master trainers received four day training in RAS administration and community mobilisation. Training participants were selected from the MAM intervention facilities. The training was delivered in partnership with the DHMT, with two of the projects district focal persons - the Clinical Care Officer and the Mother and Child Health Co-ordinator playing core roles in the delivery of the training.

⁸ Available at: http://www.who.int/maternal_child_adolescent/documents/caring-for-the-sick-child/en/.

⁹ Available at: http://www.who.int/tdr/publications/rectal_artesunate/en/.

Image 1: Master trainers (TOTs) demonstrating severe malaria danger signs



4.4.3 Training of Lead CHVs in RAS Administration

In October 2017, this training was given to 225 i-CCM volunteers, other CHVs trained to treat malaria and Lead SMAGs. The training was delivered over a 4.5 day timeframe.

Serenje district has few i-CCM volunteers, but a large number of well trained and highly motivated SMAGs. Lead SMAGs are safe motherhood volunteers who have played a coordinating role in community safe motherhood activities. Many of the Lead SMAGs are also involved in leadership positions in other community health structures and volunteer initiatives such as Neighbourhood Health Committees, community based distribution of contraceptives (CBDs), CHWs, HIV/TB and sanitation programmes. Training Lead SMAGs to give RAS pre-treatment adds a new focus to their repertoire, and early feedback suggests that it is a welcome addition. The large number of volunteers in this group helps to guarantee wide coverage of communities with RAS, ensuring that every household and individual can be reached.

4.4.4 Training of Other CHVs in Community Mobilisation

Once trained, Lead CHVs cascaded the awareness-raising and broader community mobilisation aspects of the RAS training down to other CHVs in the intervention sites. This was a three day training of ordinary volunteers in severe malaria danger signs and other common childhood illnesses. Ordinary volunteers were trained to raise awareness in their communities on issues of severe malaria, ARI, diarrhoea and community systems. A total of 252 ordinary CHVs were trained over the period 16-19 October 2017. Light support and supervision was provided by the DHMT working in tandem with the project team.

Twenty-six traditional leaders attended the trainings and lent their support to the work of the project.

A comprehensive report of the cascade training was produced and is available on demand from the project team.

Image 2: CHVs demonstrating 'excessive vomiting' danger sign in severe malaria



4.4.5 Training of ETS Riders

14 new bicycle ambulances were constructed by Disacare in Lusaka and distributed to Serenje district in September 2017. Disacare has a strong track record of producing appropriate community-based transport in Zambia.

The ETS training was conducted from 20th to 30th October 2017. This training was conducted in five health facilities including Kabundi, Kashishi, Kabamba, Muzamani and Mulilima Rural Health Centres. Two community members from the 33 NHCs with ETS were selected to participate in the training.

The purpose of the ETS training was to develop the knowledge and skills of the community volunteer ETS riders and to enable them to professionally, safely, actively and effectively contribute to reducing delays affecting children with suspected severe malaria associated with lack of affordable and accessible transport.

The training covered the following topics:

- Recognition of maternal and severe malaria danger signs
- Safe handling of patients
- Planned preventative maintenance of ETS vehicles
-

Image 3: ETS riders participating in BA repairs, Kabamba RHC



4.4.6 Training of Facility Staff in Injectable Artesunate

It is critical that patients pre-treated with RAS can go on to access injectable artesunate once they have been transferred to their local health facility. Prior to the MAM project injectable artesunate was not available at rural health facilities and staff were not trained on its use.

Two members of the district health team staff trained as TOTs in injectable artesunate in the provincial capital, Kabwe in May 2016. One of the TOTs has since moved out of the district. The remaining TOT, Stanley Luka, a qualified Enrolled Nurse, is based at Serenje Urban Clinic.

During the design assignment, the value of having a larger group of master trainers who can train rural health staff to use injectable artesunate was emphasised by the design team. In detailed discussions with the DHMT's Clinical Care Officer and the District Health Director, it was agreed that the district would do the following:

- Arrange an orientation session for approximately 20 persons (primarily from the District Hospital but also including DHMT members) on injectable artesunate, and to frame this as a Continuing Medical Education (CME) session.
- Conduct a pre and post-orientation test, and based on the results of these tests, to select a small group of 4-5 TOTs.
- Carry out training in injectable artesunate for staff of the eight health facilities who will be participating in the new project (and roll out further at a later date).
- The TOTs to prepare severe malaria complication charts, dosage charts and weight estimate formulae for use and display at the RHCs and RHPs.

All the above activities were delivered as planned in partnership with the DHMT. The CME session took place in the first week of August, and the training of health staff was added as an extra day into the week-long annual district planning workshop. MAM was asked to assist with provision of lunches and per diems for attendees who were required to stay in the district for an extra night. Trained health staff cascaded their training down to other members of the health facility, in line with current practice in the district. A total of 57 facility staff had received the training by December 2017.

The injectable artesunate TOTs, led by Stanley Luka, are providing on-going coaching and mentoring support to the trainees and are on-hand to assist with queries. Facility records highlight that injectable artesunate is being used, with 233 children given the drug over the period November to December 2017.

4.7 Revitalisation of ETS and Referral Systems

The RAS training given to CHVs and communities emphasised the importance of following four steps:

- Recognise the severe malaria danger signs
- Pre-treatment with RAS
- Refer to the health facility
- Follow up the patient

Prompt referral to the health facility is being supported by the Emergency Transport Systems that were already operational in the project intervention sites. Referral is being monitored via the use of referral and counter-referral forms and through the existing community monitoring system.

4.7.1 Emergency Transport System

The majority of the proposed project intervention sites operate an emergency transport system using bicycle ambulances. The bicycle ambulances comprise a robust Buffalo bicycle supplied by World Bicycle Relief and a bespoke trailer with canopy designed by project consortium partner Disacare. These vehicles are designed to suit the terrain in Serenje district and have been adapted for use in MAM with a trailer that has a heightened canopy to allow carriage of a child and guardian. Each ETS vehicle has two or more trained riders to operate it, and the vehicle is kept in a designated safe place and managed by a custodian, nominated by the community. When the ETS was first established, communities were encouraged to generate their own funds to replace broken or worn out components / parts of the vehicles (e.g. tyres, tubes etc.). However, in practice, communities in Serenje have struggled to do the latter.

MAM has provided for replacement and new bicycle ambulances where needed. Bicycle ambulances that had reached the end of their economic life were replaced. These include ambulances that were provided to an old MAMaZ site in 2012 and which have been operational for more than five years. New ETS vehicles were also provided to replace other broken or otherwise damaged vehicles in a few sites. Several intervention communities supported by MORE MAMaZ which did not have ETS (those around the new Kashishi RHP) were given vehicles.

The project also considered provision of spare and replacement parts and provided maintenance support. An ETS maintenance session was held around every participating health facility during the ETS training in October 2017. A total of 21 existing ETS vehicles were repaired and 14 new vehicles procured.

Existing and new ETS riders were trained to transfer sick children suffering from severe malaria. This was an extension of ETS riders' current focus on maternal health. For riders who had already been trained in previous programmes, 1.5 day training was provided. For riders who were new to ETS, two day training was provided. A total of 66 riders received this training.

4.7.2 Monitoring of Referral

CHVs trained to administer RAS have been trained to fill out a referral form, and families taking their child to a health facility are advised to obtain a counter-referral form. This process helps generate evidence that RAS is being administered, patients are being referred, and that they are receiving further treatment at the health facility.

Based on practical experience in MAMaZ and MORE MAMaZ, CHVs were trained to copy the information from the referral form into their notebooks and to produce their own version of the form. This helps to ensure that the forms are replicated locally and used. Evidence generated by the CMS and through on-going monitoring suggests that the large majority of CHVs are issuing referral forms, and within these, are recording the dosage of RAS administered (see image 4 below).

Image 4: Community Referral Form (showing dosage)

Referral for Severe Malaria

NAME - KESUMBA HEALTH POST

PATIENT NAME - HOSBORN MURITA

PATIENT AGE - 1 1/2

PATIENT ADDRESS - KALUA

DANGER SIGNS - FEVER, CONVULSIONS

T/MENT - RAS (1)

NAME OF CHV - SANDALA MWARE IDISS

SIGN OF CHV - IDISS

DATE AND TIME - 25-01-18, 06:30 HRS

RDT +ve

R.D.T. +ve

The existing community monitoring system in intervention communities have been adapted to allow data collection on ETS transfers for severe malaria and follow-up visits to the home of the children given RAS, which includes a check on whether a counter-referral form was issued / treatment was provided and the outcome of treatment i.e. whether the patient survived or died.

5. RESULTS TO DATE

5.1 Headline Results

Headline results based on data generated by health facilities (October to December 2017) and by communities (November to December 2017¹⁰) are:

- No deaths from severe malaria were recorded, compared to a baseline mortality rate of 8%.
- 224 children with suspected SM were administered RAS - one third of the overall project target number of beneficiaries in just two months
- 99.6% of all suspected SM cases identified by CHVs were administered RAS
- Just under 50% of all RAS beneficiaries were supported by bicycle ambulances, demonstrating the importance of community-managed emergency transport systems in remote rural settings in Zambia.
- 84% of SM cases were followed up by CHVs for adverse events, exceeding the project target.

At mid-term, the pilot project is well on track to achieve its headline targets.

5.2 Summary of Health Facility Data

The data presented below are based on records kept by the eight MAMaZ Against Malaria intervention health facilities in Serenje.

The health facilities are: Kalela RHP, Kashishi RHP, Serenje Urban RHC, Muzamani RHP, Malcolm Moffat RHC, Kabundi RHC, Mulilima RHC, Kabamba RHC.

¹⁰ RAS was distributed at community level in October 2017 hence community data is only available from November 2017.

Table 3: Health Facility Data (October to December 2017)

Indicator	Result (Oct-Dec 2017)
No. uncomplicated malaria cases (children under five)	2,413 ¹¹
No. severe malaria cases (children under five)	251
No. children with severe malaria given injectable artesunate	233
No. children with suspected SM treated with RAS in community	241
No. staff trained in injectable artesunate	57
No. staff trained in injectable artesunate who have administered Inj Art	31 (54%)

Comments / Analysis

- Approximately 10% of all malaria cases presenting at the intervention HFs are severe malaria cases. This is higher than the national average of 5-7%. This is likely partly due to cases at the community level that are not counted at the HFs.
- HFs are seeing children who have been given RAS at community and who have been successfully referred.
 - Injectable artesunate is being used at the health facilities; so far 54% of staff trained to use Injectable artesunate have administered it.
 - The number of severe malaria cases given RAS in the community is quite similar to number of children treated with injectable artesunate at the health facility. The small difference could imply that a small number of children given RAS are later found to not have severe malaria. Alternatively, it could imply that children given RAS who needed injectable artesunate did not receive it.

¹¹ Many cases of uncomplicated malaria are treated at community level - the cases reported above are those presenting at the HF.

- The RAS results are likely to increase over January to March as the number of severe malaria cases increases during the wet season.

5.3. Summary of Community Monitoring System Data

The community monitoring system data in Table 4 below are from the project's 45 intervention NHCs and relate to the two-month period November - December 2017

Table 4: CMS Data, November-December 2017

Indicator	Results
No. children with suspected severe malaria who died	0
No. children with severe malaria danger signs seen by CHVs	225
No. children with suspected severe malaria given RAS	224
No. children with suspected severe malaria tested with an RDT	251
No. children with suspected severe malaria given referral form to take to HF	242
No. children with suspected severe malaria given counter-referral form by HF	99
No. cases of childhood pneumonia seen and referred by CHVs	77
No. cases of childhood severe diarrhoea seen and referred by CHVs	261
No. childhood illness discussion group sessions held	528
No. door-to-door visits for general awareness-raising on severe malaria and other childhood illnesses	832
No. door-to-door visits to follow up children with severe malaria	188
No. sick children (suspected severe malaria cases) transported to HF by ETS	102
Total no. sick children (all illnesses) transported to HF by ETS	111
No. emergency savings schemes beneficiaries (cases of childhood illness)	90
No. food bank beneficiaries (cases of childhood illness)	19

Comments / Analysis

- No deaths from severe malaria have been recorded so far at community level. This can be linked to the increased urgency in sending identified cases to health facilities. The endline survey will be able to check if health facilities registered any deaths in non-interventions communities and compare.
- Communities are using RDTs, giving RAS, and issuing referral forms.
- Almost all children (99.6%) recognised as having the danger signs of severe malaria were given RAS.
- CHVs have so far held 528 discussion group sessions in the project's 45 intervention sites. This equates to almost 12 sessions per NHC, and demonstrates an attempt to reach and involve the entire community in awareness-raising around severe malaria and other common childhood illnesses.
- In addition to the discussion group sessions, CHVs trained by MAM have undertaken 832 door-to-door visits for the purposes of general awareness-raising on severe malaria and other common childhood illnesses. This equates to 1.7 visits per trained CHV in two months.
- Health facilities are not yet consistently issuing counter-referral forms for SM patients. Only 44% of children given RAS were issued a counter-referral form by the health facility. In contrast, 100% of children given RAS were issued a referral form from the community.
- Intervention communities reported 17 fewer children given RAS than health facilities. The fact that records are kept in the community and by the health facility provides an opportunity to triangulate data. The project will investigate the reason for the discrepancy. It is possible that communities are under-reporting.
- CHVs are also referring children to the health facility with ARI and severe diarrhoea (77 and 261 cases respectively).
- 188 door-to-door visits by CHVs were undertaken for the purposes of following up children identified with severe malaria. This is equivalent to 84% of the children administered RAS - and hence exceeds the project target. However, there is room for improvement - it's important that 100% of children given RAS are followed up in their homes once they've returned from the health facility.
- Community safety nets are operational:

- 102 children with suspected severe malaria benefited from community-managed emergency transport by being transferred to the HF by bicycle ambulance. This is equivalent to 46% of the children administered RAS.
- 90 families of children diagnosed with a common childhood illness were supported by community emergency savings schemes and
- 11 families were supported by community food banks (allowing them to eat on the way to and from and while at the health facility).

5.4 Progress against Log frame Targets

Good progress is being made against logframe targets. Progress so far is captured in Table 5 below. Results so far indicate that the project is on track to achieve, or in some cases, exceed, its targets. The priority for MAM going forward is to closely monitor performance against key logframe indicators, ensuring that the early positive performance is maintained. The project will also carry out spot-checks of community and facility records and triangulate between different sources of data as part of a data quality assurance process.

Table 5: Progress against Log frame Targets

Indicator	Baseline	Endline Target	Progress as of 31 Dec 2017	Red/Amber/ Green Rating	Comments
Proportion of children with severe febrile illness (6 months to < 6 yrs) seen by CHVs in intervention communities that resulted in death	8% (18/224)	3.3% (50/1,500)	0%		No deaths due to severe malaria in U5s have been recorded at community level so far
Proportion of children (6 months to < 6 yrs) with severe febrile illness who received RAS from CHVs in project areas	0	50% 750/1,500	99.6% 224/225 (based on community records)		Project has achieved 30% of its target in 2 months and is on track to reach the overall target by end of project
Number / percentage of children who received RAS from CHVs in project areas <u>and</u> were referred to a designated referral HF providing severe malaria treatment	0	40% 600/1,500	100% 224/224		Target exceeded. All children given RAS have been successfully referred to the HF
Number and percentage of children who received QA RAS by CHVs in the project areas, completed referral to a designated referral health facility providing severe malaria treatment, and received a counter referral form with evidence of diagnosis/treatment	0	40% 600/1,500	44% 99/224		On target, but room for further improvement. Will be priority going forward.
Quantity of QA RAS (in units) procured for project areas and available in	0	3,000	3,000		RAS successfully procured and

project communities					distributed.
Development of severe malaria/RAS training manual, CMS forms adapted to accommodate new SM focus and job aids/posters developed	0	1	All training resources and M&E tools produced and in use		
Number of referral health facilities in project areas able to provide Inj AS or alternative recommended severe malaria treatment as per WHO guidelines	8	10	9		8 intervention HFs are providing Inj AS; additional staff were trained at the district hospital

Indicator	Baseline	Endline Target	Progress as of 31 Dec 2017	Rating	Comments
Percentage of children treated with QA RAS by CHV who have been followed and investigated for adverse events in the 30 days post-exposure in the project areas	0	50% 750/1,500	84% 188/224		Good progress has been made, with % cases followed up exceeding project target.
Number and percentage of CHV (who manage sick children) trained in project areas	0	49% 233/477	100% 477 CHVs trained by the project		Target exceeded.
Number and percentage of trained and functional CHV in project areas who provided QA RAS	0	100% 233	Between 4% and 45% of trained CHVs have administered RAS so far, depending on the intervention		As the number of SM cases increases over next few months, the % is expected to increase. All trained CHVs are reported to be active in

			site		community awareness-raising and mobilisation.
Number of HWs from referral facilities in project areas trained on the appropriate management of referred severe malaria cases, including Inj AS	11	27	57 (30 additional HF staff have been trained by cascade)		Target met (and exceeded - additional staff have been trained by those directly trained by MAM).
Number and percentage of trained HWs at referral facilities in project areas who managed referred cases	0	81% 23/27	60% 34/57		Not all HF staff with training in Inj AS have managed a case so far. Likely to change as no. of cases increases over next few months.
Number of ETS drivers recruited and trained	0	62	66		Target exceeded.
Number and percentage of children with suspected severe malaria cases transported to health facility using ETS	0	31% 470/1,500	46% 102/224		Target exceeded. Performance likely to improve further as ETS riders settle into their role.

Green = Indicator all on track

Amber = Indicator on track but the team will place emphasis on this area and monitor closely

6. PROGRESS AGAINST DELIVERABLES

Progress against key project deliverables is captured in Table 6 below.

Table 6: Progress against Project Deliverables

No.	Milestone and estimated date of completion	Percentage of Project Budget	Estimated date for invoice submission
1	Signature of the Agreement	30%	3 rd July 2017
2	Design work completed and design report submitted to the MMV Representative (end of month 2)	10% upon completion of milestones 2, 3 and 4	End of month 2
3	Ethical approval secured, baseline survey conducted and baseline survey draft report submitted to the MMV Representative at the end of month 2		
4	Bicycle ambulances constructed (by the end of month 2)		
5	Waiver for RAS import secured (end of week 6) and RAS procured and received by DHMT in the Project District (end of month 2)	10% upon completion of milestone 5	End of month 2
6	Community training module on severe malaria developed (end of month 2)	25% upon completion of milestones 6, 7 and 8	End of month 7
7	Training completed for RAS for communities – community training module and training report submitted to submitted to the MMV		

	Representative (end of month 5)		
8	Receipt and acceptance of mid-term Report by MMV (end of month 7)		
9	Receipt and acceptance of final Report and technical brief by MMV (end of month 13)	25% upon completion of milestone 9	End of month 13

The table above shows in grey the activities which have been completed as at the end of month 7 (January 2018).¹²

7. CHALLENGES AND LESSONS LEARNED

Progress during the first seven months of the project has been extremely positive. However, there have been a number of challenges encountered and lessons learned.

7.1 Challenges

- There was incomplete information available on severe malaria cases at district level. This made quantification for RAS and Inj As quite challenging as well as the setting of some project targets. However, these challenges have been overcome as far as possible, by working in close partnership with DHMT and NMEC.
- The project team was asked to use RDTs in line with Zambia's malaria policy although it is understood this is not part of the WHO guidelines for RAS use. A solution was found working with NMEC and DHMT to use RDTs (thus respecting the national policy) but equally not to delay with the use of RAS if a child is showing SM danger signs. This interaction actually helped to deepen the partnership with NMEC.
- The late addition of RDTs caused confusion among some CHVs in a context where they had been trained not to delay in administering RAS upon recognition of the severe malaria danger signs. Meetings with CHVs to clarify this and other matters arising are taking place in late January / early February 2018. The team is confident this issue is being resolved.
- There was rather slow uptake of the ETS in the first month of intervention and some communities preferred to use just the bicycle and not the complete bicycle and trailer.

¹² Acceptance of the mid-term Report by MMV is of course still pending.

However, with troubleshooting and work with the CHVs, understanding around ETS and its use for SM was increased and utilisation has been picking up since December 2017.

- There are still some challenges around the regular use of counter-referral forms. The team is working closely with DHMT to understand the challenge and find solutions.
- NMEC has been fully supportive of the pilot and RAS is part of the roadmap for SM in Zambia. However, there are funding gaps for RAS in 2018. This presents a risk in terms of continuity of the project's efforts.

7.2 Lessons learned

- The project was able to mobilise quickly as it had a team already familiar with the project areas, with prior experience and with a strong relationship with the MOH and DHMT. This is an important consideration for future projects, especially from a timescale perspective.
- Implementation of the CHV training has confirmed that the cascade training methodology is not only effective, but also highly cost-effective, allowing many more CHVs to be trained than would otherwise be possible. Early signs are that the quality of the training delivered through the cascade process is good enough to achieve key project outcomes.
- The stakeholder engagement approach utilised by the project, with its emphasis on equal partnership and facilitation of a district-led initiative, is proving to be effective, with excellent partnership working between the project team and DHMT. DHMT and NMEC have invested time and resources into the pilot ensuring a more impactful and sustainable project.

8. POTENTIAL SCALE-UP OPPORTUNITIES

The project team is making concerted efforts to ensure the uptake and embedment of the results and learning from this pilot. Learning is being captured and shared with a range of stakeholders. Training materials produced have been shared with stakeholders and made available through Transaid's Knowledge Centre and MMV's Severe Malaria Observatory. Abstracts to share the project approach and results at two conferences¹³ have been submitted and more opportunities will be investigated.

NMEC has advised that they would like to see a scale-up of the MAM project and to see the impact it can have in even more rural areas. RAS is part of the national policy, and NMEC is keen to learn from this pilot. In light of the promising results to date, and NMEC and DHMT's support, the MAM team and MMV have been seeking scale up funding. There is recognition

¹³ Zambia MNCH Symposium and MIM

of the importance of maintaining momentum and access to RAS and Inj As in the district of Serenje and ideally beyond.

A concept note for Grand Challenges Canada has been drafted with MMV and NMEC that would see wider coverage in Serenje as well as expanding the project to two new districts and further support provided for NMEC through a national scale-up component.

Other work is underway to secure future funding for MAM, although there is currently nothing definite in the pipeline at this stage.

9. CONCLUSION

The first seven months of the project have seen promising results. There has been a genuine collaboration with partners at district, provincial and national level and considerable shared learning. NMEC is actively supporting the pilot. NMEC representatives have been to Serenje to see what is happening on the ground, and the MAM team have been given the opportunity to share updates in the national Malaria Technical Working Group.

In Serenje, the DHMT, under the leadership and direction of the District Health Director, has readily embraced the project in the knowledge that Serenje district will be at the forefront of the national roll-out of cutting-edge severe malaria treatments. NMEC was keen to support Serenje as a pilot district based on recent increases in malaria.

A waiver was secured within two months and RAS was procured and transported to Serenje. A large number of trainings took place between August and October 2018. The large number of volunteers trained by MAM (over 500) has allowed coverage of RAS to a level that extends well beyond the coverage the existing i-CCM volunteers could achieve. Government partners recognise the value of a wider range of trained CHVs in order to deliver Zambia's commitment to universal health coverage.

Priorities going forward include:

- Ensuring that there are reliable systems in place for replenishment of RAS and RDTs at community level and Inj As at health facility level;

- Carrying out quality assurance of data generated by intervention communities and health facilities in conjunction with the DHMT;
- Monitoring performance against project targets, and flexibly adjusting activities in line with experience on the ground, as required;
- Generating case study material on RAS, injectable artesunate and ETS beneficiaries, using this for project learning and PR purposes;
- Continuing to deepen the partnership with different levels of government, monitoring the extent institutionalisation of project activities and promoting local leadership and ownership of the project for sustainability.

Annex 1

