FILLING A GAP IN THE REFERRAL SYSTEM: LINKING COMMUNITIES TO QUALITY MATERNAL HEALTH CARE VIA AN EMERGENCY TRANSPORT SYSTEM IN SIX DISTRICTS OF ZAMBIA

Authors: Mary Surridge, Cathy Green, Dynes Kaluba, and Victor Simfukwe

Abstract
Poor physical access to health facilities is a challenge facing many rural communities in Zambia. Concerns about distance, poor terrain, lack of affordable transport options, and seasonal challenges such as flooding or impassable roads contribute enormously to delays in decision-making when maternal emergencies occur, and act as barriers to utilisation of other essential maternal health services.

In order to bridge this gap, the UK Aid-funded Mobilising Access to Maternal Health Services in Zambia (MAMaZ) programme supported six districts to implement and test a range of locally-appropriate transport solutions. Remote rural communities established emergency transport systems (ETS) comprising bicycle ambulances, boats, oxen or donkey and carts, with the choice of transport largely dependent on the terrain. Some districts also operated a facility-based motorcycle ambulance service, which served communities within a 10 km radius of the health facility and links to the district ambulance service. Results from the programme were striking.

The paper explores the extent to which the emergency transport solutions supported by MAMaZ offered a cost-effective and sustainable solution to the physical access barriers faced by rural communities in Zambia, and the extent to which the transport improved health outcomes. Key policy implications are explored, including the need for government to devise a transport policy which recognises the role of communities in providing transport solutions at the lowest level of the referral chain.

“Ukwali insoke takwafwile abantu: where there were warnings people never died. The work MAMaZ is doing is warning us of the dangers that take our children and loved ones. Finally we have the light and we don’t wish to go back to our past, which is full of darkness. We will continue looking after and using our ETS (Emergency Transport System) wisely” (Translated from a statement by a community leader).

BACKGROUND AND INTRODUCTION
Globally every year over 350,000 women die due to pregnancy and childbirth related conditions, of which 99% of these deaths occur in low-income countries (WHO, 2010). The lifetime risk of maternal death is particularly high in Sub-Saharan Africa (SSA) at 1 in 31 (ibid). This level of risk represents the widest disparity between developed and less developed countries of all human development indicators (Babinard and Roberts, 2006). Pregnancy and childbirth and their consequences are the leading causes of death, disease and disability among women of reproductive age in SSA, most of which is avoidable (Lema, 2009). Likewise, almost all (98%) of the deaths of children under five years of age occur in less-developed countries, with an estimated four million deaths worldwide each year (ibid, 2009).

It is estimated that 75% of maternal deaths could be prevented through timely access to essential health care. Transport and road infrastructure play a key role in accessing that

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care yet, in many cases, women and their families spend considerable time seeking or waiting for transportation. This often results in women with complications having to walk to a health facility or be taken on the back of a bicycle (Babinard and Roberts, 2006).

In Zambia, maternal and newborn indices have greatly improved over the past decade (Zambia Demographic Health Survey, 2007) but there is still a long way to go, especially in remote rural areas where significant access barriers remain. This strong urban-rural divide is illustrated by the skilled birth attendance rate, which nationally has remained at around 47% for over 20 years with the urban-rural differential being 83% to 31% (ibid).

Inadequate or unaffordable transport services often impact negatively on poor people’s ability to access preventive and emergency health services and can result in poorer health and higher mortality rates. Improving transportation access to health facilities has significant potential to improve overall health outcomes (World Bank, 2006).

In the rural areas of Zambia, communities can be more than 30 km from the nearest health facility. Distance combined with poor terrain, lack of affordable transport options, and seasonal challenges such as flooding or deep sand create significant barriers to access and utilization of essential maternal health services. Moreover, people’s knowledge and perception of these barriers contribute greatly to delays in decision-making and care-seeking when maternal emergencies occur.

The role of mobility and transport in public health is often neglected. In Zambia, as in other countries, efforts to strengthen emergency transport systems for health have focused on expanding and upgrading ambulance services at district level. Yet even with significant scaling up of these services, which is unlikely in the short- to medium-term, there will still be a missing link in the referral chain; that between communities and the first level of care (Green, 2012; Krasovec, 2004).

Recognition of the negative health impacts associated with lack of rural transport options has resulted in the implementation of a number of interventions that have set out to test different transport technologies and to examine how effectively these work in specific implementation contexts. A great deal of this experience, however, has been documented in grey literature, and hence is not easy to access. Some exceptions include experiences in northern Nigeria (Shehu, Ikeh Kuna, 1997; Green et al, 2008); and Malawi (Hofman et al, 2008).

In order to bridge the gap between communities and the first level of health care the UK Aid-funded Mobilising Access to Maternal Health Services in Zambia programme (MAMaZ) programme provided support to the Ministry of Community Development and Mother and Child Health’s (MCDMCH) safe motherhood efforts. MAMaZ was implemented in six districts of Zambia to test a range of locally appropriate community systems that enabled communities to respond to their own maternal and newborn health challenges. An Emergency Transport System (ETS) was one of the systems tested by MAMaZ and its district partners. Baseline and endline surveys measured changes in health care access over time in all six intervention and five control districts.

While in many rural parts of Africa there are usually some transport options that have the potential to be organized into an emergency response system, this was not the case in many of the MAMaZ programme areas in Zambia. A few people in some communities owned bicycles, one or two others had an oxcart, but even where these vehicles existed they were in heavy demand and accessing them as emergency transport was either virtually impossible or unaffordable to many. Because of the lack of transport options in many of the programme’s focal communities, MAMaZ provided locally appropriate transport such as bicycle ambulances, boats or oxcarts.
Baseline studies conducted during the programme’s inception phase identified a range of barriers to accessing maternal and newborn health (MNH) services by rural communities. For example, during a rapid qualitative assessment of demand-side constraints in each of the six districts (Green and Nalili, 2010a; Green and Nalili, 2010b; Soyoola and Banda, 2010; Surridge and Mate, 2011; Soyoola and Nyirenda, 2011; Green and Nyirenda, 2011)\(^5\), community members recounted many tragic stories (such as those in Box 1) in which women died because of delays in identifying danger signs and locating transport and because of the long distance to the health centre.

<table>
<thead>
<tr>
<th>Box 1: Accounts of Maternal Deaths Reported by Community Members</th>
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<tbody>
<tr>
<td>• In March 2010 a woman was walking from a distant village on her way to the clinic. She delivered on the way, not far from another village. The woman had a retained placenta. The women in the nearby village were called to help but when they got there it was too late, the woman had died.</td>
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<td>• In July 2010 in a village located about 18 km from the nearest rural health centre, a pregnant woman aged 32 years went into labour. The baby’s head came out first but the baby then became stuck for 10 hours. The family members decided to take the woman to the health centre for help and went to look for oxen. The oxen were hard to find but when eventually located, they started off for the health facility. However, the woman died just before they got there.</td>
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<tr>
<td>• In January 2011, in a rural village, a pregnant woman aged 27 years went into labour at home. She struggled with labour for about 24 hours. When the family realized that she was not going to deliver they set off for the health facility but the health centre was too far (20 km away) and the woman died on the way.</td>
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<tr>
<td>• A young woman in her first pregnancy laboured for a whole day. On the second day community members began searching for an oxcart to take her to the health centre. They searched and searched and could not find one available. In the end they were too late. The young woman died.</td>
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Surridge and Mate (2011)

The most frequently mentioned barriers to accessing MNH services were the physical ones, such as distance from the nearest health facility, poor road access because of flooding and/or deep sand, lack of transport and, where transport existed, the high cost. Box 2 presents some of the statements made by community members during the baseline assessment phase of the programme.

The programme’s quantitative baseline survey also identified a range of demand-side barriers and reinforced the qualitative findings with distance and lack of transport mentioned as key barriers to institutional delivery by 54% of all respondents (Ensor, 2012; Green, Badru and Kaluba, 2012).

\(^5\) The six district-specific rapid qualitative assessment baseline survey reports can be downloaded at: http://www.healthpartners-int.co.uk/our_projects/ProgrammeResources.html.
For a few communities commercial hire vehicles were available but the cost was often prohibitive to many families and, if paid for in an emergency, could result in the selling of assets leaving families extremely vulnerable to any further shocks. In addition, it sometimes took community members hours, even days, to raise the funds, which were often borrowed from neighbours or relatives. Raising such funds was particularly challenging from November to March, when food stocks were running low and savings used up. Box 3 provides an example of some of the cost-related challenges facing communities in the MAMaZ focal districts.

Box 2: Physical Barriers to Accessing Maternal Health Services

- “The health centre from this village is four hours walking or two and a half hours on a bicycle... going to the health centre is very far...it’s very hard.”
- “The health centre is 42 kms away from this place. If we use an ox cart, and start out at 05.00 we reach the health centre at 19.00. If there is no ox cart, some people may die on the way. If people walk they have to sleep on the way to the health centre... This involves a journey of 13 km on a tarred main road and 29 km off-road.”
- “The problem that we have is that the health facility is very far from here. If we start at 6am we may reach the facility by 12pm. If labour is near or starts in the village we would rather have our babies in the village.”
- “I planned to go to the health facility with all my pregnancies, but there was no transport and the health centre is six hours walk away so I had to deliver in the village.”
- “If labour starts at night and there is a long distance to the health centre, they will decide to stay at home... Women don't plan to deliver at home – it's just that the health centre is very far.”
- “The health centre is far from this village ....We use bicycles. We put a chair on the bike and carry the patient. It takes us three hours and 30 minutes to reach the clinic. We try by all means to save women’s lives.... If we walked to the health centre, it would take us a day to get there.”
- “From here to the health facility the terrain is hilly. By the time we put a chair on the bicycle, the woman will deliver on the way or lose the baby because of the bumps and hills and during the rains the muddy areas are difficult so we prefer to give birth in the village.”
- “Distance to the health centre is a problem. The health centre from this village is three to four hours if a pregnant woman is being pushed on a bike, or seven to eight hours if she is walking. The patient would need to rest on the way.”

From Green and Nalili (2010a); Green and Nalili (2010b); Soyoola and Nyirenda (2011), Surridge and Mate (2011)

Box 3: Cost of Emergency Transport to and from Rural Areas

“From this village to the health centre costs 150,000 kwacha for private hire... Normally we wouldn’t have 150,000 kwacha at home in savings. We would try to borrow from neighbours to raise the funds. We would also sell beans, groundnuts and rice. We can sell a 5 kg container of groundnuts for 15,000 kwacha; a 5 kg container of beans would sell for 15,000 kwacha; with maize we would get 3000 kwacha a gallon when the maize has just been harvested, but up to 10,000 kwacha during the hungry months. We would also sell chickens and goats. A chicken can fetch 15-25,000 right now.”

Green and Nalili (2010b)
What became clear during the baseline assessments was that the different factors that constrain access to maternal health services did not operate independently but impacted on each other to create a more complex picture against which decisions were made and health seeking behaviour was determined. Even though women may know the dangers of childbirth, the challenges of getting to the facility combined with other constraints, including socio-cultural influences, gender relations and long-standing practices, may result in a decision to remain in the village. Women weigh not just their perception of the risk but also their perception of the probability of the risk occurring against the challenges of delivering at the facility. Table 1 provides a visual illustration of how, in the minds of many women, the challenges often greatly outweigh their perception of the probability of the risk. The greater the distance the health facility and the greater the difficulty in accessing transport, the more likely they are to remain at home. This is particularly true if women lack personal knowledge of someone who has had a maternal emergency. If on the other hand they have personal knowledge of someone close to them dying in childbirth when they were unable to get to the facility, their perceptions are likely to change.

Table 1: Factors Affecting Decision-making

<table>
<thead>
<tr>
<th>Factors that may encourage women to deliver at the facility</th>
<th>Factors that may discourage women from delivering at the facility</th>
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<tbody>
<tr>
<td>Knowledge that every pregnancy carries a risk</td>
<td>Perception that the probability of risk occurring is low</td>
</tr>
<tr>
<td>Personal knowledge of someone dying because of lack of access to a facility</td>
<td>No personal knowledge of someone dying because of lack of access to a facility</td>
</tr>
<tr>
<td>Knowledge that it’s safer to deliver at the facility</td>
<td>Great distance to facility</td>
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<tr>
<td>Encouraging attitude of some facility staff</td>
<td>Lack of availability, or high cost of transport</td>
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<tr>
<td>Other women in the community delivering at the health facility</td>
<td>Insufficient food to take to wait at mother’s shelters (where pregnant women wait when they are near to term)</td>
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<tr>
<td>Supportive husband and family</td>
<td>Condition of mother’s shelter</td>
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<td></td>
<td>Lack of childcare</td>
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<td></td>
<td>Faith in those who assist delivery in the village</td>
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<td></td>
<td>Residual belief that women should endure hardship in childbirth</td>
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<tr>
<td></td>
<td>Mother or mother-in-law and siblings delivered safely at home</td>
</tr>
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</table>

2. THE MAMAZ EMERGENCY TRANSPORT SYSTEM (ETS)

Overview

In response to these multi-faceted demand-side challenges, the MAMaZ community engagement approach was designed with a number of interdependent components that assisted community members to share experiences, develop new understanding about maternal and newborn health issues, and develop community response systems that empowered them to take action for themselves.

The programme was implemented in selected communities in six districts of Zambia: Serenje and Mkushi (Central Province); Kaoma and Mongu (Western Province); Choma (Southern Province); and Chama (Muchinga Province); a total population coverage of 250,900. The implementation period of MAMaZ was relatively short, with some communities operating for nine months or less.

A central component of the community systems was the ETS, which provided communities with the capability to take action by transporting women or newborn children to the facility.
once danger signs had been recognised. The action was supported by other components such as savings schemes, foodbanks and childcare schemes.

The ETS model was adapted from the successful emergency transport system established in Northern Nigerian as part of the UK Department for International Development (DFID) and Norwegian Aid funded Partnership for Reviving Routine Immunisation in Northern Nigeria and Maternal, Newborn and Child Health Programme (PRRINN-MNCH)\(^6\), which, in turn, was based on successful approaches developed by other previous maternal health programmes in Nigeria (Shehu, Ikeh and Kuna, 1997; Green et al, 2008).

Unlike the PRRINN-MNCH programme, which utilized locally available transport, very limited, if any, local transport was available in the Zambian communities in which MAMaZ operated. In such communities, MAMaZ filled the gap by installing locally appropriate transport. A total of 123 community-based bicycle ambulances, 28 oxcarts, one boat and one donkey cart were introduced across the six districts.

The decision as to which type of vehicle to install was made after a thorough review of the terrain and discussions with community members and leaders as to the most appropriate form of transport for that community.

**How the ETS Functioned**

The programme functioned in the following way:

- The ETS was introduced and its functioning fully explained during volunteer-led discussion groups.
- During community meetings, which included community leaders, the ETS was fully explained and decisions were taken regarding who would be the riders and who would be the custodian of the vehicles. All community members were helped to understand how to access the vehicle; how the vehicle belonged to them; and that they, the community members, would be entirely responsible for its maintenance, safe-keeping and responsible usage.
- Two riders from each community were trained in maintenance and usage of the vehicle; its safe-keeping; what to do in an emergency; how to handle pregnant women; how to relate to facility staff; how to ensure their emergency patient received immediate treatment; and record keeping.
- The riders were encouraged to train other riders and develop a mechanism for ensuring that at least one of them was always readily available.
- Many of the riders were also trained as community engagement volunteers, which increased their level of understanding and created greater synergy.
- Community members were all trained in what to do in an emergency and how to locate a rider. In some communities, children were also trained and knew exactly where to run to for help.
- When an emergency arose, the riders were trained not to delay but leave as quickly as possible for the facility. They were accompanied by at least one additional rider, on a bicycle (this being the only other available form of transport in the locality) if

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accompanying a bicycle ambulance, or walking if accompanying an oxcart, so that they could take over when the main rider became tired, or assist through difficult terrain. The husband and/or a female ‘mother's helper’, who would know what to do if the women delivered on the journey, also accompanied them.

- Once the woman was being treated at the facility the riders ensured that the transfer was recorded in both the facility’s and in their own record book.

- Having delivered the woman to the facility, the rider usually waited to see if the woman needed to return home that same day. If so, they would make the return journey with the woman. If not, they returned to the community and sometimes travelled the distance again a day or so later to collect the woman.

- As the programme evolved, the ETS was also used to transport women to wait at the facility near to the due date. This was especially so in the communities where oxcarts were used, because they moved so slowly.

- In some communities, once they fully understood the potential dangers in pregnancy, many women sought out ETS riders to transport them to the facility as soon as they began labour. Moreover, once they understood that every pregnancy carries a danger, ETS riders often encouraged women to be taken to the facility as soon as labour began – just in case an emergency arose.

Integration of ETS with other components

While an emergency transport system could operate independently, provided people are able to recognise danger signs, it is unlikely to be successful or sustainable if not accompanied by additional supportive measures. The ETS was fully integrated with all other aspects of the MAMaZ community engagement approach. Mother’s helpers were carried on the supporting bicycle on the same journey. Maintenance of the bicycle ambulances was dependent on community emergency saving schemes, and in some communities the riders were supported with food from community food banks during the journey. The majority of ETS riders were also involved in community-wide safe motherhood discussion groups.

During a review of ETS in December 2012, when asked whether ETS could stand alone, responses from community members were as follows:

- “ETS would not have been as effective without the community mobilisation work because the present effectiveness is primarily a result of the awareness-raising of the SMAG volunteers.”
- “Without the education by the volunteers people would not have been sensitised; the way they taught us led us to know the importance of the ETS.”

Male Involvement

The programme targeted men as well as women in all aspects of the community engagement strategy, including the discussion of maternal emergencies and knowledge of danger signs. Consequently, health facility staff reported a greater number of men accompanying their wives to Ante-natal Care (ANC) visits and for institutional deliveries. However, the introduction of ETS and rider training provided an activity that a greater number of men could relate to more easily because of the traditional male roles and thus helped to more fully involve a greater proportion of the male population in the communities.
Because of these traditional roles, the majority of ETS riders were men, but in some districts, such as Serenje, a few of the bicycle ambulance riders were women.

Types of Vehicle

The selection of the mode of emergency transport in each community was based on careful study of each situation; discussion with community members in each recipient community; and the most familiar form of transport in that area. Careful consideration was then given to the most appropriate type of transport in each community.

The Bicycle Ambulances

MAMaZ and its district partners opted for a bicycle ambulance design that enabled the stretcher section to be detached from the carriage, thereby allowing the patient to be carried from their place of residence to the ambulance, or from the bicycle ambulance to the health facility. The design included a full canopy for protection and privacy of the patient and size 26-inch tyres to provide high ground clearance. The regular bicycle design was adapted to include hand brakes instead of the foot breaking system, and a light was fixed to accommodate night riding. The bicycle ambulances were designed by a Lusaka-based NGO, Disacare, which had a long track record of designing low-cost appropriate transport technologies.

The Oxcarts
The oxcarts were made locally to the area in which they were to be used. Their design incorporated a metal base and wooden sides with higher than normal suspension due to the local terrain. They were designed to be sufficiently sturdy for prolonged use and sustainability.

The Boat

This short, wide boat was sourced and procured locally. Its size and stability made it ideal for transporting expectant mothers in labour or with a complication. Long poles, similar to the local dugout canoes, were used to manually power the boat.

The Challenges

There were a few challenges with the ETS but most of these occurred in the initial stages and were resolved as the programme progressed:

- One of the main issues was the sourcing of well-made oxcarts and an appropriate size of oxen in the districts that required them. The initial workmanship on some of the oxcarts was not of an acceptable standard and a few of the oxen were too small to pull the carts. This delayed the installation of the oxcarts and, given that ETS was integral to the community-based programme, it led to initial disillusionment in some of the intervention communities.
As the programme progressed, communities identified a number of additional requirements, such as protective clothing for riders and an additional bicycle for the accompanying rider that would improve the scheme. Some communities were able to pay for these from their savings schemes and from grants awarded through a Social Fund operated by the programme and the District Health Management Teams.

A small number of bicycle ambulance riders dropped out early on, particularly because of the long distances they needed to travel. Sufficient new riders were then trained by existing experienced riders to ensure that more of them would be able to take turns in riding the bicycles on the long journeys.

RESULTS AND ACHIEVEMENTS

Across the six intervention districts, institutional deliveries increased from 51% to 76%, a 25 percentage point increase, which is striking in a programme of relatively short duration. This and other positive maternal health-related results were much higher in the six programme intervention districts than in five control districts, and hence it is possible to attribute a large proportion of the positive changes to MAMaZ. A total of 1,190 women benefitted from the community-based ETS between July 2011 and December 2012 (216 women with complications and 974 women with normal deliveries). The ETS transfers that were made throughout the programme’s timeframe were equivalent to 14% of reported deliveries in the intervention sites. This result shows that ETS provided an important safety net for pregnant women in the rural communities in which MAMaZ worked.

Across all six districts, the 216 women with complications transferred to a health facility by the community-based ETS by December 2012 was equivalent to 47% of reported maternal complications. However, the programme’s community monitoring system only captured the data of women for whom a complication was identified while they were in the community, rather than at the facility. Once women had become aware of the potential dangers, more of them were either walking or travelling by ETS to the facility in advance of their due date and waiting at the mother’s shelters. Thus any complication was more likely to occur at the facility rather than in the community. This was illustrated by the programme’s endline survey, which highlighted a significant shift in where complications took place. When the programme first started, about 67% of women in both intervention and control districts were at a health facility when their complication arose. This had increased to 83% in the endline survey and was 10% higher in the intervention compared to the control sites.

Chart 1: Baseline and Endline Results of the Intervention
In addition, many ETS riders reported taking all women in labour to the health facility as soon as possible because of their new awareness of the potential dangers and, they felt that the women would be better served if they were at the facility in case an emergency should arise.

The 216 emergency ETS transfers from the community to the health facility can be used as a proxy for ‘maternal deaths averted’. Although there is no guarantee that a successful ETS transfer results in a life saved, research and monitoring visits undertaken in the implementation districts showed that communities perceived that maternal deaths had all but ceased since the programme began (Green, 2012). Data from the health centres supported this perception.

The programme collected case studies illustrating the importance of the ETS to communities. Box 4 contains the account of a beneficiary and Box 5 contains two accounts of ETS riders.

Box 4: Story Narrated by a Beneficiary
“I was almost nine months pregnant and lived with my husband and mother in-law. I felt abdominal pains at 1am and informed my mum of my condition at 12 noon. My mother immediately fetched an ETS rider who also lives in our settlement; the rider arrived at 2pm with the bicycle ambulance. He asked me to lie down in the ambulance, and he set off for the health facility. We reached the health facility at 3pm; the nurse welcomed me and led me to a bed. I delivered just one hour later - at 4pm; both my baby and I were fine and we were discharged that same day. The bicycle ambulance rider had waited for us and he took us back to the village.”

It was not an uncommon trend across all programme districts for riders to return women to the village after treatment and discharge from the health facility. It is possible that this trend is one of the contributory factors for the increased uptake of health facility delivery in the MAMaZ sites.
In the MAMaZ programme, the levels of participation of community members in general, and the ETS riders and helpers in particular, have had a major positive impact on the communities in which they work. The following paragraphs outline some of these impacts.

Ownership by Community Members
Possibly because of previous dependence on government to provide all the solutions, it took time and a number of support and monitoring visits for all community members to fully understand that the ETS, along with other community systems, was their own system and that they were totally responsible for it. Once it was fully realized that they had been entrusted with the vehicles to keep, this had a positive impact on communities and they took on the role willingly. Evidence of the strength of community ownership can be seen in the following account of how community members protected their ETS vehicles from misuse in different districts.

**Box 5: Two Accounts of ETS Transfer by Riders**

- “I was called to pick up a neighbour who was pregnant and had also experienced swollen feet earlier in her pregnancy. I was called at 23 hours and I went to pick her up with the bicycle ambulance immediately. We arrived at the health facility at about 24 hours and she was attended to immediately, the health workers even offered her tea because she was cold. While trying to deliver she had another problem. It was a twin pregnancy, the first baby was delivered OK but there was a problem with the second, the foot came out first. But the health worker helped her and mother and both babies were fine. I returned to the village that same night, as soon as I knew the woman was being treated.”

- “It was in the morning around 8am that a community member sent her child to inform me that there was a case to transport. I immediately got on the bicycle ambulance and headed for the woman’s place. When I got to her place and was informed that the condition started at midnight and we started off to the health facility (17.5 km away) with one of the volunteers and a female family member as escorts. Just about 500 metres away, I was asked to stop. The volunteer said to me can you go away from here we want to do something? After 10 minutes they called me back to the scene and told me the woman had delivered. We proceeded to the facility as we were taught; before we reached the facility I was told that the woman needed to rest so I stopped again. They went in to a nearby village, maybe to dispose of the placenta and clean the baby. We started off for the health facility again and reached there at about 14 hours. There was no complication, I waited and brought the woman and her baby back to the village. We reached the village at about 16 hours.”

(Soyoola, Simfukwe and Surridge, 2012)
The records of patient transfers and the construction of shelters for safe keeping of the bicycle ambulances provide additional evidence of ownership. Village headmen also played a key role by taking interest in understanding, promoting and monitoring the operation of the ETS in their communities and ensuring that every woman had equal access.

**Capability to Act**
One of the main benefits of the ETS was that it provided communities with the capability to take action for themselves. Once they understood the danger signs, they felt that they could do something about the situation. As soon as they realized that a pregnant woman was experiencing a complication, they took action immediately, prepared the transport and immediately began transferring her to the facility. Other studies have highlighted the importance of getting right both the sequencing of participatory problem-solving and provision of means to act (Schmidt, 2001).

**Male Involvement**
The programme targeted men as well as women in all aspects of the community engagement strategy, including the discussion of maternal emergencies and knowledge of maternal danger signs. Consequently, health facility staff reported a greater number of men accompanying their wives to ANC visits and to delivery. However, the introduction of ETS and rider training provided an activity to which a greater number of men could relate because of persisting traditional male roles. This helped to more fully involve a greater proportion of the male population in the communities.

**Equity and Equitable Access**
The volunteers discussed mechanisms for reaching isolated and harder-to-reach families and individuals, especially those living in poverty, but also women who lacked the support of their families. Strategies were then agreed and acted upon. In the discussion groups great emphasis was placed on ensuring that everyone knew about, and was able to access ETS. The case study in Box 7 below illustrates that efforts were made to reach socially isolated women and include them in the community response. Community Chiefs also played a significant role in reminding volunteers to target more marginalized individuals; to ensure that they were visited regularly during pregnancy; and that they knew exactly how to summon the ETS, if and when required.

**Box 7: Reaching Marginalised Women**
In a MAMaZ focal community, the community health volunteers identified a pregnant woman with an intellectual disability; the husband had a similar disability. The volunteers encouraged them to deliver their baby at the health facility and organized the ETS to take them when the woman was near to term. Despite their inability to prepare for facility delivery, the couple went to wait at the mother’s shelter. Whilst at the mother’s shelter, some of the volunteers gave them food and baby clothing. The mother had a successful delivery and the couple waited for the six days postnatal visit after which they returned to their village.

The MAMaZ training approach, its use of small group discussions, and its objective of saturating the whole community, ensured that the voices of as many community members

**Box 6: Protecting the Transport**
In Serenje district women confronted one rider who they observed was drunk using the bicycle of the bicycle ambulance. They managed to retrieve the bicycle and the community changed the custodian. Similarly in Chama district women confronted a rider who they thought was misusing the bicycle belonging to the bicycle ambulance. Later they were informed that the rider was on his way to service the bicycle. In the third case from Mongu district community members thought that the riders were misusing oxen, then it transpired that they were training the newly arrived oxen to pull the cart.
as possible were heard. In one or two communities, where an elite member tried to keep and use the emergency transport for themselves, community members complained and the custodianship of the vehicle was reassigned.

**Developing Trust**
Wherever communities and authorities or development partners work together there is a need for mutual trust (Joseph, 1998). For example, for the MAMaZ communities and authorities to work together to create an effective referral transport system, there needed to be trust between the two, as well as trust between the MAMaZ programme staff and community members.

Initial reluctance in some communities to trust in the programme was the result of previous participatory interventions, which had not taken sufficient account of local needs and practices. To address this, the inception phase of MAMaZ was characterized by a number of baseline activities, in which the views, experiences, expectations, concerns, constraints and potentials were carefully listened to, documented and taken full account of in adapting the programme design to the needs of each district.

The arrival of the bicycle ambulances and oxcarts were extremely significant in the communities; not just because of the increased access they afforded but because they were a symbol of the fact that the MAMaZ programme kept its word, and thus built greater trust in the programme. The arrival of the vehicles also signaled to communities that they were genuinely being trusted to own and manage the transport themselves.

**Impact on the Riders**
A number of the MAMaZ ETS riders reported that they had gained greater confidence and self-esteem since they took on the role. They had been accorded greater status in their community, with community members being extremely grateful for the service they had rendered. Others realized that there were many things they had learnt in the MAMaZ training that they could transfer to other aspects of their lives. They had changed in many ways. This transformational potential of volunteering has often been reported (Cooke, 2001; Uphoff, 1996).

Many of the riders were extremely committed to their work as Box 8 shows. In this case study, even though the woman had delivered, the rider saw the need to transport the newborn who had obvious newborn danger signs to the facility to seek help.
Prospects For Sustainability

The results achieved by MAMaZ indicate that a significant number of women’s and newborn infants’ lives can be saved by a programme that addresses demand-side constraints. In the MAMaZ sites, the ETS was crucial to achieving these results. However, in the absence of a committed group of community volunteers who had been successfully mobilised around a maternal and newborn health agenda and who had gone on to facilitate a change process at community level, it is questionable whether the ETS would have worked as effectively.

Capacity development and sustainability were integral to the design of the MAMaZ programme. The high level of ownership of the ETS by communities provided a strong indication that the programme was likely to be sustained as did the low level of attrition of volunteers, including the ETS riders.

The enhanced community capacity in the management of the ETS will also contribute to sustainability and the integration with the other community systems will ensure that the resources are in place for its continuation. The increased community knowledge and commitment to saving lives and the positive results will strengthen communities’ motivation to ensure that the ETS keeps running. As one community member said: “We see the women go the clinic in pain and with complications and we see them and their babies come back alive – this gives us much hope” (Surridge et al, 2012).

Policy Implications

Mobility is essential for many rural communities to access available maternal and child health services. Maximising the potential for communities to manage their own systems which bridge the gap between the community and the health facility could be the most effective and cost-effective way of ensuring poor people’s access to both emergency and non-emergency maternal health services (Green, 2012). This in turn should have a significant impact on progress towards the Millennium Development Goals (MDGs) 4 and 5.

Demand-side barriers to the utilisation of maternal and newborn health services can be deep and complex and need specific strategies and programmes to address them (Ensor and Cooper, 2004), but with constraints on health sector budgets, and the challenges involved with addressing such barriers, for which many health personnel are unprepared and inexperienced, demand-side constraints tend to be neglected. In addition, there is often confusion about where the appropriate institutional home for such initiatives should be.

The Zambian government has moved this debate forward with the introduction of the Safe Motherhood Action Group (SMAG initiative) and the devolution of funds for SMAG and other community-based activities to the health facilities. It is also giving priority to building or upgrading mother’s shelters (maternity waiting homes), which allow pregnant women who

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**Box 8: An ETS Transfer by the Respondent (Rider’s story)**

“This incident happened on 01/10/2012 and it was around 22-23 hours. The pregnant woman lives in the hills; one of the [community health] volunteers called me that the woman needed to get to the health facility, her health condition was severe abdominal pains. The village is far from here, before I could get there, the [community health volunteer] called again to say that the woman had delivered. The baby was born weak and could not cry. We decided to take the mother and her baby to the health facility. We put them in the bicycle ambulance that was around 24 hours when we started off for the clinic. The ride to the clinic was slow because of the hilly terrain; when we got to there, they decided to refer her to the General Hospital. We got to the clinic at 02 hours and she was referred to the General Hospital by ambulance at 03. Once she was on her way, I returned to the village. The woman delivered her baby safely and both mother and baby are now fine.”

Soyoola, Simfukwe and Surridge (2012)
are near to delivery to wait at a location that is closer to the health facility. In the rural Zambian context there is huge potential to use sustainable forms of community transport to ensure that communities are able to utilise this service.

In 2013 the Zambian government relocated the Maternal and Child Health Department from the Ministry of Health to the Ministry of Community Development – now the Ministry of Community Development, Mother and Child Health. It is hoped that relocating responsibility for maternal and child health will provide the appropriate systems and structures to better support community-focused initiatives.

A number of policy implications arise from the implementation of emergency transport schemes and integrated community engagement strategy, such as those that have been implemented with the support of MAMaZ. These include the need for governments to:

- acknowledge in policy and strategy that it is the responsibility of the government to ensure that the referral gap between communities and the facility is closed and that specific, budgeted activities need to be implemented in order to achieve this
- build a secure institutional home within government for community engagement activities in health and emergency transport systems
- devise a policy which recognises the potential of communities in contributing to transport solutions at the lowest level of the referral chain
- when planning referral systems, involve community representatives in the planning processes.
References


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