



Community based rural transport solutions for improving access to essential health services in Zambia

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Abstract

The MORE Mobilising Access to Maternal Health Services in Zambia (MORE MAMaZ) programme was an integrated programme that empowered rural communities and aimed to improve health outcomes for women living in rural Zambia. Running between March 2014 and September 2016 the programme was implemented by a consortium comprised of Development Data, Disacare, Health Partners International and Transaid and was funded by Comic Relief/DfID.

The MORE MAMaZ approach strengthens existing structures, namely the community-based Safe Motherhood Action Groups (SMAGs) and an integral part of the programme is the Emergency Transport Scheme (ETS). The ETS uses non-motorised Intermediate Modes of Transport (IMTs) to reduce the barrier in accessing health care services in rural communities, particularly for pregnant women.

After a comprehensive assessment, bicycle ambulances were selected for use in four of the districts and ox carts were chosen in Mongu district. ETS Riders were identified and trained and robust community management systems put in place. MORE MAMaZ has placed 120 IMTs in communities across the five programme districts. Communities now have access to transport when previously it was either unavailable or unaffordable. Riders trained by the programme have cascaded their training down to other community members, thereby expanding the pool of riders that pregnant women can draw on.

The utilisation of the scheme is also high. Between September 2014 and July 2016, 4,105 pregnant women benefitted from the ETS. The programmes’ community monitoring system showed that 92% of all deliveries were ‘normal deliveries’ and in 8% of cases, a maternal complication occurred. The programme’s end-line survey shows that the programme has made a significant contribution to increasing utilisation of essential Maternal and Newborn Health (MNH) services. Data from the five programme districts show that the percentage of women delivering at a health facility has increased from 64% at baseline to 89% at the end-line.

Key words: Transport, Emergency Transport, ETS, Maternal Health, Zambia, Access

Introduction

In 2013, the World Health Organisation (WHO) estimated that maternal deaths were more than 14 times higher in economically developing countries than in developed countries (WHO, 2014). In fact, 99% of global maternal deaths occur in developing countries (WHO, 2014). The vast majority of maternal deaths are preventable. With haemorrhage and hypertension being the primary cause in the majority of maternal deaths, access to skilled care during pregnancy and at birth is critical. The delay in achieving access to the appropriate care is a key determinant in maternal mortality. Thaddeus and Maine introduced the three delays model which has been hugely influential in defining approaches to addressing the number of maternal deaths and in analysis of the barriers to accessing maternal health services (Thaddeus, S & Maine, D, 1994). They stated that delays in accessing maternal health services can occur at three levels:

1. Delay in the decision to seek care: This is influenced by late recognition of symptoms, a reluctance to travel to health facilities possibly due to cultural norms, or the absence of a decision maker highlighting gender inequity at the household level.
2. Delay in reaching the appropriate health facility: Usually due to the lack of an appropriate means of transport or an inadequate network of health facilities resulting in low coverage.
3. Delay in receiving adequate care once at the health facility: Often caused by a lack of equipment or essential supplies such as blood for transfusions and medicines, or a shortage of staff.

The second delay recognises that transport plays an integral role in influencing the level of access a woman has to maternal health services. In many isolated rural areas where there is low demand and inadequate infrastructure, the lack of available and affordable transport services is a major contributing factor to reducing the uptake of essential services, in turn exacerbating rural poverty. Therefore failure to integrate transport into programmes designed to address the constraints to accessing essential services, in this case maternal healthcare, will reduce the effectiveness of community-based efforts that aim to improve maternal health through increasing uptake of institutional deliveries.

In rural Zambia the availability of transport services is low and where they do exist, cost often presents a major barrier. The terrain, combined with the distance from health facilities in Zambia are both challenges. Seasonal barriers and flooding mean there is a lack of year-round accessible roads. Many pregnant women end up walking to health facilities, are pushed on a bicycle or are discouraged from travelling citing lack of appropriate transport as a major constraint. The implementation of community managed Emergency Transport Schemes (ETS) has the potential to present communities with an effective means of overcoming transport related barriers to accessing health services.

Background

In 2013-14, Zambia's estimated maternal mortality rate (MMR) was 398 maternal deaths for every 100,000 live births which equates to four women dying for every 1000 live births (ZDHS¹ 2013-14). 64 percent of births took place in the presence of a skilled birth attendant in 2013-14 (ZDHS). Clearly there remains a number of challenges regarding access to maternal healthcare. The relatively low level of facility-based births is influenced by the fact that approximately 50 percent of the population in Zambia live more than five kilometres away from a health facility, and are without access to formal rural transport services (WHO, 2005).

The MORE Mobilising Access to Maternal Health Services in Zambia (MORE MAMaZ) programme is an integrated initiative that empowers rural communities and aims to improve health outcomes for women living in rural Zambia. Running between March 2014 and September 2016 the programme was implemented by a consortium comprising Zambia-based development organisations Development Data and Disacare, with Health Partners International and Transaid and was funded by Comic Relief/DfID.

The MORE MAMAZ programme is based on the successful MAMaZ programme which was implemented from 2010-2013 and funded by DfID. MORE MAMaZ was fully supported by Ministry of Health from the central all the way to district/facility level. The Neighbourhood Health Committee's (NHC's) which are part of the health structure at the community level, were also fully engaged to ensure a sustainable approach.

Methodology

The MORE MAMaZ approach aimed to strengthen existing structures, namely the community-based Safe Motherhood Action Groups (SMAGs) in managing Emergency Transport Schemes. The design of the ETS in MORE MAMaZ was innovative in its approach. It works through a community empowerment approach that draws on community resources to address the so called 'first mile' which is very often not covered by motorised vehicles.

The Emergency Transport Scheme (ETS) in Zambia uses non-motorised, Intermediate Modes of Transport (IMTs) to reduce access barriers in rural areas between communities and health facilities. Due to the context of many rural communities, a lack of funding for on-going fuel and maintenance, and the need for sustainability, IMTs were opted for as the most appropriate transport solution. MORE MAMaZ drew on the lessons from the original MAMaZ programme and also benefitted from learnings from other IMT programmes such as bicycle ambulance initiatives undertaken by the Bicycle Empowerment Network Namibia and programmes implemented by Transaid in Malawi. Lessons were also shared from Madagascar where Transaid has been working as part of the Community Based Integrated Health Programme 2011-2016; a five year USAID-funded programme led by JSI Research & Training Institute, Inc.

Based on the initial assessment phase of the programme, bicycle ambulances were selected for four of the five districts, while ox carts were selected as a more suitable IMT for Mongu district. The bicycle ambulances were chosen in the districts where the

¹ Zambia Demographic and Health Survey

terrain was suitable for bicycle use, and where there was availability of spare parts. In Mongu district, the deep sand and seasonal factors such as frequent flooding meant that ox carts were a more appropriate form of IMT.

The MORE MAMaZ programme constructed 102 bicycle ambulances drawing on the long standing expertise of consortium partners Disacare, which has extensive experience in the construction of mobility aids in Zambia. 18 ox-carts were also locally constructed and 36 oxen purchased.

The bicycle ambulance consists of a detachable stretcher which sits on a trailer with two wheels, which is then attached to the bicycle. The stretcher provides good ground clearance using 26" bicycle wheels and is therefore appropriate for uneven terrain. It weighs approximately 36 kilograms and can therefore be lifted manually to negotiate obstacles.



Photograph One: ETS Riders and SMAGS in Mkushi district during a monitoring visit in 2016

It also provides a full canopy to protect its passengers from the elements as well as providing privacy for the patient.

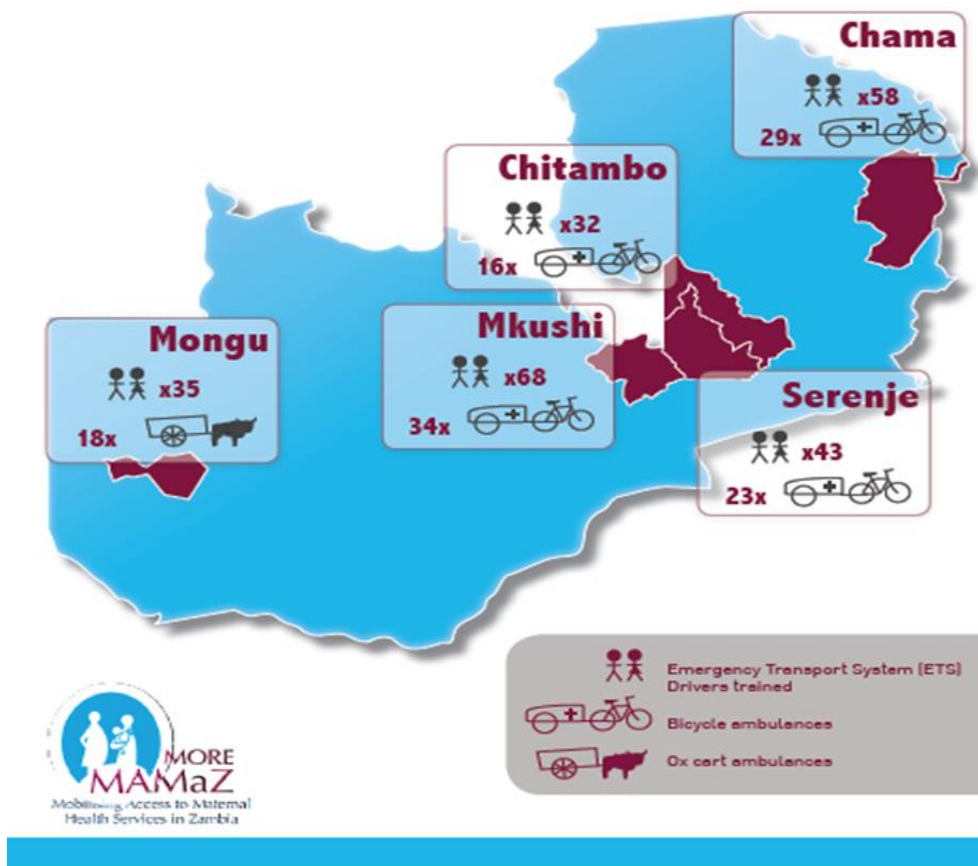
The ox cart is more appropriate in areas where there is deep sand and where seasonal factors such as, water logged tracks affect mobility. The ox carts were specifically designed to offer high ground clearance to facilitate safe transfer of the passenger through waterlogged areas. Another factor in determining the appropriateness of the ox-cart for a particular area, is whether or not there is a culture of cattle rearing.

Photograph Two: ETS Riders in Mongu district transporting a pregnant woman in labour to the health facility using an ox-cart Mongu, Zambia-2016



Fig 1: Infographic showing distribution of IMTs in the MORE MAMaZ programme

Emergency Transport Systems Implemented in Zambia



A standardised approach to recruiting volunteer ETS riders/operators was employed in all five districts whereby each of the riders/operators, two riders per IMT, were nominated by the community according to their own criteria. Custodians of the IMTs were also nominated by community members on the basis of trustworthiness and reliability. Throughout this participative approach, it was made clear that the communities were to be the ‘stewards’ of the ETS and that their role was to ensure the safekeeping and responsible utilisation of the IMT as well as maintenance. This approach aimed to maximise sustainability by incorporating saving schemes mechanisms from the wider community to cover the cost of repairs and maintenance. The programme supported the riders throughout the life of the programme by offering advice, helping find solutions to issues as well as offering encouragement to the volunteers to promote continuity of service and minimise attrition rates.

Community-based training of the ETS riders/operators then took place between September and November 2014 in all districts. The selection and orientation of additional riders was then tasked to the newly trained ETS riders and it was agreed that this should be conducted within four weeks after distribution of the ETS equipment. Orientation was conducted by the riders with support from SMAGs in some communities.

Photograph three: ETS Riders demonstrating how to safely lift patients when carrying them on a bicycle ambulance in Chama district, Zambia-2014

The principal topics covered in the training were:

- The role and responsibility of an ETS volunteer
- The importance of using logbooks to record trips
- Safe lifting and handling of mothers during transportation
- The basic principles of ETS maintenance
- The practical dismantling and assembly of the bicycle ambulance
- The importance of maintaining confidentiality of the patient during transfers



Ox cart operators were also trained in the provision of care to the oxen to ensure they are healthy and fit, and able to pull the cart whenever needed. This involved periodic screening of oxen and prompt reporting of any illnesses identified. The training was supported by the local veterinary experts.

Chama district presented an additional challenge due to it being located in a Game Management Area. The human wildlife conflict is a strong physical barrier preventing access to health facilities and schools as the wild animals consider some of these community surroundings as grazing areas. Additional training was required for ETS riders in cases where they might encounter wild animals.

Wild animal obstruction during night transfer in Mapamba

Riders Name: Lovewell Banda, NHC: Musunga

“It was 01:00 when I was called that a woman was in labour and we have to take her to the health facility. We did not delay because she had a history of complications in her past pregnancies. We started off and there was about six of us; SMAGs, family members and another rider. We found a hippopotamus with a baby (a calf) and it didn't want to move. We stayed until the woman gave birth right there. After shouting and clapping the animal eventually left and we took the woman and the baby to the facility. We stayed there until morning. If the light on the bicycle ambulance was strong the hippopotamus may have moved more quickly.”

A comprehensive sensitisation strategy was devised as a means of building awareness about the project in communities and to potential users. Neighbourhood Health Committees (NHCs) played an important role in conducting demonstration rides to introduce the BAs to the community during this activity. Construction of the ETS shelter and arranging a community general meeting with Traditional leaders to form maintenance committees were other tasks given to the trained riders.

Results

The overall MORE MAMaZ programme results have been encouraging:

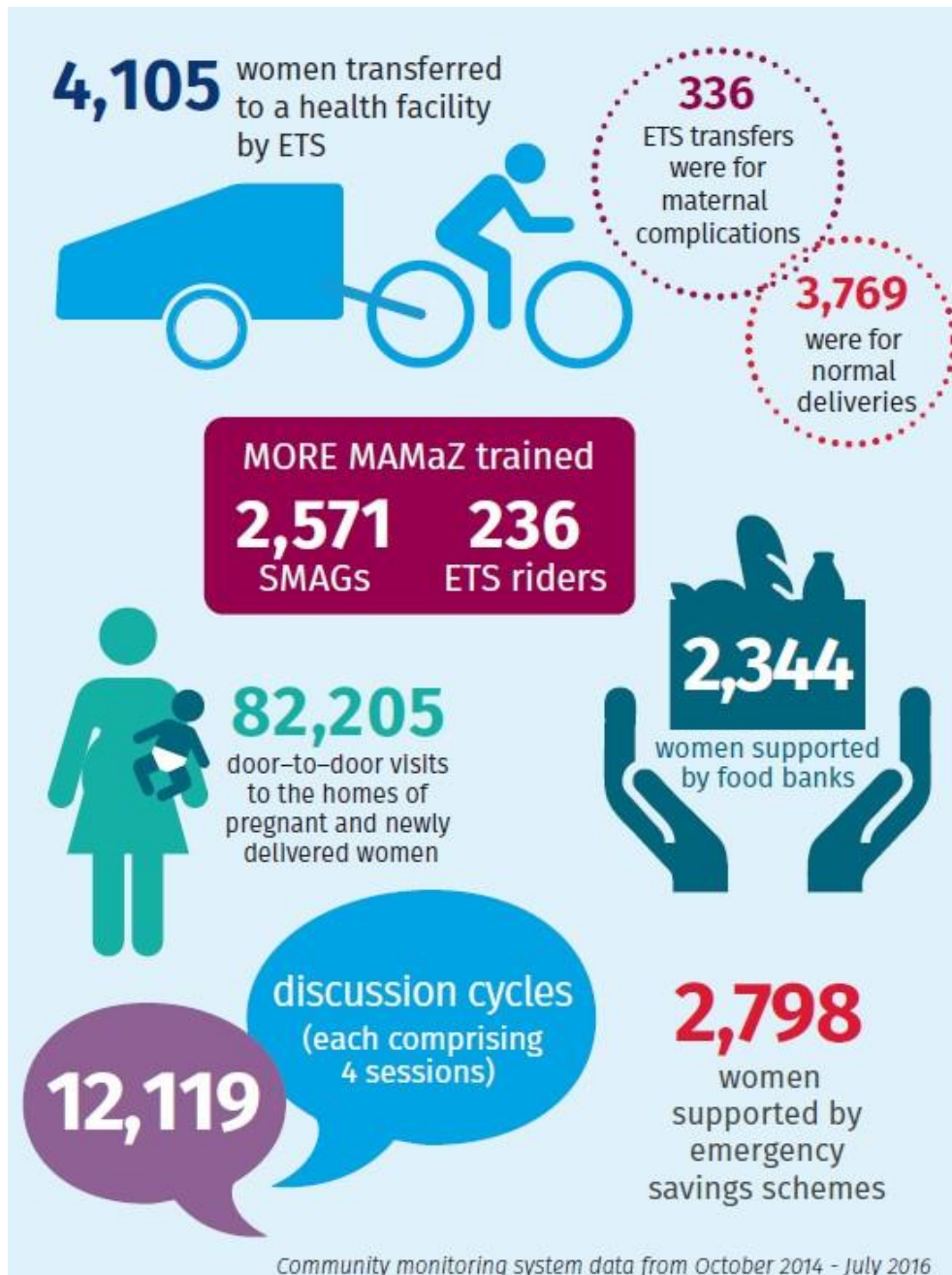


Fig 2: Infographic showing MORE MAMaZ results

120 Neighbourhood Health Committee areas in five districts that received IMTs communities now have access to transport when previously it was often unavailable, prohibitively expensive or took a very long time to arrive. Feedback from communities, District Health Management Teams and Traditional Leaders suggests that the ETS is valued by the communities and that people know how to access it. The utilisation of the scheme is also high. **Between September 2014 and July 2016, 4,105 pregnant women benefitted from the ETS.** 92 percent of all deliveries were ‘normal deliveries’ and in 8% of cases, a maternal complication occurred.

This highlights the considerable importance of and reliance on the ETS in rural parts of Zambia. 37 percent of ETS transfers occurred at night, indicating that women are able to rely on this system at any time of the day or night.

Results from the programme's end line survey suggest that the programme has made a significant contribution to increasing utilisation of essential maternal health services. **The percentage of women delivering at a health facility has increased from 64 percent as identified by the baseline survey, to 89 percent.**

Programme results also show that the ETS was widely used by women in intervention districts. According to the end line survey, 30 percent of women experiencing pregnancy during the programme cycle claimed to have used the ETS. There remain a proportion of women who still travel by other means. 27 percent continue to walk to health facilities, 16 percent use public transport and 16 percent use their own bicycle or cart.

In the MORE MAMaZ intervention districts, reliance on ETS ranged from 47 percent of women in Chama to 22 percent in Serenje and Mkushi. In all intervention districts, however, the end line survey shows a high level of reliance on ETS.

15 percent of women surveyed had a complication which is in line with global averages. In each of intervention and control sites, 80 percent of women reported that they tried to get to the facility when the complication occurred. Results suggest that ETS has met some of the need for emergency transport. Furthermore the data collected shows that for sampled women and men, all mothers survived the complication, while 96 percent of the babies were also reported to have survived.

Community Perspectives from Mukushi District:

“Because it's free it helps so much. People don't have money...was a lot of miscarriages before. Bicycle ambulance changed things for the better”

“A long time ago you would deliver on the way to the health facility. Now there is a big difference as you get to the health facility and then deliver”

What motivates ETS riders and operators to volunteer varies from rider to rider and community to community. Many riders have first-hand experience where family members have died without access to skilled attendants during childbirth.

ETS Rider: Josephine Mupeta, Serenje District

What do you like about being an ETS Rider?

“[It] brings me joy as I save not only mothers but babies lives. Once I had a sad experience in my family. A family member died due to lack of transport and I have never forgotten. Now we have transport and there are almost no home deliveries.”

In other communities, riders were highly motivated by the status that their role gave them in terms of their standing in the community. The provision of gumboots, rain suits and additional protective clothing also made carrying out their challenging role easier. In the majority of communities, there were a number of volunteers aspiring to join the scheme and therefore are in a position to replace riders should they drop out of the scheme. The capacity to train future riders remains within the community.

Motivation for riders transporting women to the health facility

NHC: Kawelele

“I am very happy that we have the BA in our community, as the head rider, I am committed to transport women any time, any hour, any day. I am a rider for life and nothing will stop me from doing this work”.

Many riders thrive on the respect and admiration they receive from the community and the satisfaction in being able to save lives by bringing women to health facilities during labour.

Implications for policy makers

Available and affordable transport is essential for many rural communities' access to maternal and child health services. Developing community managed transport systems to bridge the gap between the community and the health facility can be a highly effective way to ensure people in rural communities have access to both emergency and non-emergency maternal health services. MORE MAMaZ has recognised a need to:

- Acknowledge in policy and strategy the responsibility of the government to ensure that the referral gap between communities and the facility is reduced and that specific, budgeted activities need to be implemented in order to achieve this.
- Policy makers need to recognise the potential of communities in contributing to transport solutions at the first level of the referral chain.
- Build an institutional home within government for emergency transport systems operating in a rural context
- When planning referral systems, to involve community representatives and traditional leaders in the planning process and continue this engagement to ensure sustainability.

Conclusions

The lack of reliable and affordable rural transport services in many economically developing countries continues to be a constraint to communities accessing essential services such as healthcare. This situation often leads to a disproportionate amount of women undergoing home births. However, the reduction in out of pocket expenses through the provision of affordable transport has the potential to improve access to maternal health services.

Evidence points to the fact that the introduction of an Emergency Transport Scheme using IMTs in five districts in Zambia is achieving its objective in providing an affordable and available means of transport and in turn is promoting health facility-based deliveries. Emergency Transport Schemes such as the one presented in this case study are effective in filling gaps left in the referral system and are making a positive difference to pregnant women in rural Zambia.

The programme's exit strategy for all communities and a formal handover of the ETS is an important part of the sustainability of this approach. District Programme Officers (DPOs) employed by the programme have worked closely with District Health Management Teams and health facilities to conduct exit meetings with all community members involved in the programme to explain the reason for the exit and how the communities and the DHMT can best continue what the programme has established. Advocacy at the national level is also required by MORE MAMaZ and DHMTs to include the programme's components in the national budgeting process. For the future success of this programme, policy makers and communities must continue to work together to ensure the positive impacts continue to benefit rural communities.

Key recommendations for future programmes of this nature include:

- A comprehensive needs assessment is required to ensure that the IMTs are suitable for the terrain, and are culturally appropriate
- Where possible, production should take place locally so that repairs and spare parts can be easily accessed
- The importance of community engagement and awareness of the ETS is paramount
- The motivation and ability of volunteers like the ETS riders should not be underestimated when establishing emergency transport schemes. For sustainability purposes, it is the authors perception that volunteerism can be as strong a motivation as payment schemes and arguably more sustainable if the right incentives and structures are put in place from the outset.
- Working with oxen as part of an ETS can be a challenge. Sourcing oxen locally to target communities, vaccinations and screening and ongoing care all need to be considered
- There is a need to supply protective equipment along with the ETS vehicles. Basic tools for repairs, high visibility jackets, gum boots for the rainy season and protection from snakes and quality lights/torches so riders can find their way in the dark are essential and should be considered as a package when procuring the BAs and ox-carts
- All costs for the ETS (unit cost, logistics etc.) should be shared with the DHMT so they are able to plan to support ETS replacement or scale up in the future and have solid data to enable them to budget correctly. Whilst it can be challenging for the government to pick up such costs it is important to advocate for this
- Robust data about the performance of an ETS needs to be gathered to understand its role in improving access to health care and this data should be shared with the MoH and other stakeholders

References

Central Statistical Office (CSO) [Zambia], Ministry of Health (MOH) [Zambia], and ICF International (2014) *Zambia Demographic and Health Survey 2013-14*: Rockville, Maryland, USA: Central Statistical Office, Ministry of Health, and ICF International

Murray, SF and Pearson, SC (2006) *Maternity Referral Systems in Developing Countries: Current Knowledge and Future Research Needs*: Social Science & Medicine, Vol. 62 pp. 2205-2215

Thaddeus, S & Maine, D (1994) *Too Far To Walk: Maternal Mortality in Context*: Social Science and Medicine, Vol. 38(8), 1090-1110

World Health Organisation. (2014). *Trends in Maternal Mortality: 1990 to 2013 Estimates by WHO, UNICEF, UNFPA, The World Bank and the United Nations Population Division*. Available: http://apps.who.int/iris/bitstream/10665/112682/2/9789241507226_eng.pdf?ua=. Last accessed 07 October 2016.