MAKERERE UNIVERSITY SCHOOL OF PUBLIC HEALTH

REPORT ON

HEALTH SYSTEM COST SAVINGS ATTRIBUTABLE TO "OPERATION FIKA SALAMA" IN UGANDA: CASE STUDY OF HEALTH FACILITIES ALONG KAMPALA - MASAKA ROAD

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EXECUTIVE SUMMARY.

INTRODUCTION: In Uganda, Road Traffic Accidents (RTAs) account for almost 3.16% of total deaths particularly among the 15 to 29 year olds and have an immense cost to the economy and the health system. Though RTA occurrence has been consistently high for the past 5 years (Uganda Police 2014 – 2017), the number of associated injuries has often varied with levels of traffic enforcement (Bishai et al 2008). Hence, to reduce the high incidence of RTAs on one of the high burden highways in 2016, key stakeholders including the Uganda Police Force (UPF), the Uganda National Roads Authority (UNRA) and others synergized their efforts through a multi sectoral traffic intervention code-named "Operation Fika-Salama (OFS)" along Kampala -Masaka road. But despite the observed change in RTA injuries since then, the impact and lessons learnt from this initiative remain undocumented and the cost savings of this multi-sectoral investment to the health sector also remains unknown to-date.

OBJECTIVE: *To assess the medical and non-medical costs of Operation Fika Salama and estimate its Budget Impact to health facilities and implementing institutions.*

METHODS: Data for this cost analysis was collected using a mixed method approach that involved key informant interviews, reviewing records and quantitative interviews from both police officers and health workers. Costs were retrospectively collected through ingredient costing in 6 health facilities, Ministry of Works and Transport and 10 Uganda Police Force stations. In Police, data sources included casualty files, KI interviews, Traffic Accident Registers while injury data on RTAs in health facilities was sourced from HMIS 105 monthly forms, out-patient registers, Orthopaedic registers, emergency records and casualty files as well as key informant interviews (with Ward In-Charges , Head Nurses and former Fika Salama field officers). Costs in UGX were computed from a health provider and a traffic regulators' perspective in a time horizon of two calendar years from January 2016 to December 2017. Cost savings were estimated using the Cost Differences between each of the OFS implementation phase and the Normal phase.

RESULTS: Comparing the periodical outcomes of Fika Salama, in the short run the Intensive phase posted the biggest fatality and severe injury reduction of 83% compared to the normal phase while deaths in the 'Reloaded' phase were reduced by 66%. Though the number of minor injuries initially reduced by 10 % in the Intensive phase, it increased later in the Reloaded phase.

Considering the medical costs of each Fika Salama phase, with a 6 - month cost of about UGX 2, 472,736,858/= (USD 688,018) , the biggest medical cost savings of UGX 5,424,489/= (USD 1,509) per RTA injury were accrued from the Reloaded phase.

Similarly, of all the 3 phases, Uganda Police incurred UGX 581,610,534/= (USD 161,828) as the most optimal non-medical costs of deploying 8 squads of traffic police and 3 patrols at 8 check points in the Reloaded phase. As such the Reloaded phase posted the largest OFS non-medical cost savings of up to UGX 115,239,811 (USD 32, 064) per check point and the lowest sunk costs compared to other phases

CONCLUSION: Leveraging RTA injury prevention on multi sectoral initiatives like Fika Salama is not only an effective way of curtailing RTA related fatalities and injuries but is also a more cost effective way of optimizing prevention benefits and cost savings particularly in the long run (as evidenced in the Reloaded phase of OFS).

RECOMMENDATIONS:

Financing of OFS should greatly be increased and sustained to reduce both the sunk costs of enhanced enforcement and the injuries or deaths related to MV RTAs. But Fika Salama effectiveness would be higher if it is complimented by similar operations on feeder roads of the intervention highway.

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1.0 Introduction

In Uganda, Road Traffic Accidents (RTAs) account for almost 3.16% of total deaths annually particularly among the 15 to 29 year olds and have an immense cost to the economy, health system, and households. Although annual RTA occurrence staggered over 3500 fatalities for several years, monthly incidence of RTA often spirals to unimaginable proportions as previously witnessed on Kampala-Masaka road in 2016 (Uganda Police 2016). To address this challenge, a number of stakeholders including the Uganda Police Force (UPF), the National Roads Authority (UNRA) and others, launched an operation code-named "Operation Fika-Salama (OFS)" on one of the highest burden highways in Uganda. But while it is believed that Fika Salama yielded a reduction in the spiral incidence of RTAs on this road in 2016 /2017, the cost benefits to the health sector accrued from this multi-sectoral investment remains unknown.

2.0 Study Context of Fika Salaama.

The World Health Organization estimates that every year, up to 1.3 million people die due to road traffic accidents and crashes world-wide. The most affected group are the young and productive group aged between 15- 44 years[1]. To this, it is estimated that an additional 20 to 50 million people are injured due to accidents. With the current burden and trend in RTAs, it I s projected that RTAs will generally be the major cause of deaths worldwide. Up to 90% of the most fatal RTAs, occur in low and middle income countries[2]. In 2004, the global economic impact of RTA was estimated to exceed US $ 3.7 billion (1 % of the GDP) of which hospital costs constitute a sizeable portion. For instance, in Nigeria the average cost per road crash victim was US$ 35.64 (Juillard C, etal 2010) while in South Africa the average inpatient costs alone per day was US $ 2.81 (Parkinson 2014) and the total cost to the South African was estimated at R 306 Billion per year (Chikunga S, 2015). RTA prevention guarantees huge resource savings, but combined RTA strategies can save more resources.

The Burden of Road Traffic Accidents in Uganda.

In Uganda, Road Traffic Accidents have consistently remained high over the years. Uganda is among the top countries in SSA with the highest RTA burden, and this has partly been attributed to steadfast increase in vehicle population, a relatively less developed road infrastructure, let alone the fewer and architecture of the roads. In the year 2009, the World Health Organization estimated that Uganda has lost over 317,000 DALYs to RTIs. The Uganda Bureau of Statistics (UBOS) together with reports from the Uganda Police Force (UPF REPORT 2017), estimated that the annual road mortality rate had averaged 3500 deaths per year using data for 2015 to 2017.

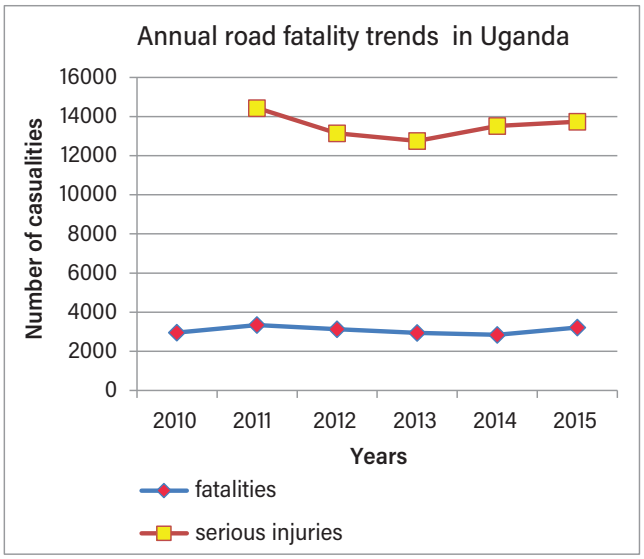


Figure 1. Road fatality trends in Uganda (Source: UPF and UBOS reports)

More recently in Uganda, motorcycles commonly known as boda-bodas have become one of the main causes of injury and deaths. Boda-bodas are currently the major form of transportation and therefore are used by a larger number of people – on account of their convenience to navigate traffic jam but also relatively cheap for the low income earners. Boda-Bodas are also an alternative form of employment for the largest number of Uganda's youth. The 2018 Road Safety Performance Review report, noted that road fatalities involving boda-boda drivers doubled between 2011 and 2016. The major causes of rising boda-boda accidents were reported to include: speeding, unsafe overtaking, driving under the influence of drugs,

1 World Health Organization [WHO]. Ten facts on global road safety. Fact File. Available: http:// www.who.int/features/factfiles/roadsafety/facts/ en/index.html. Accessed 10 June 2016.

2 Koehlmoos T (2011) Farewell to the Colonel. BMJ Blog. Available: http://blogs.bmj.com/bmj/2011/09/02/tracy-koehlmoos-road-trafficaccidents- in-developing countries-farewell-to-thecolonel/. Accessed. June 2016.

failure to wear protective gear driving towards oncoming traffic and distracted driving due to mobile phone use (Andrew et al., 2018; Bachani et al., 2012, 2017).

Interventions to address the burden of RTAs.

Different countries implement different approaches and strategies and others have combined these strategies. Sweden, Netherlands and United Kingdom (SUN countries) have turned into model countries in the world in reducing road traffic accidents (WHO 2004; WHO 2009). Consequently, roads in these countries are regarded to as the "safest" in the world (WHO 2004; WHO 2009). This has not only been due to various packages of accident prevention strategies, but also due to the effectiveness of other unique strategies in each country (WHO 2004). For instance, although all the SUN countries adopted a systems approach in preventing road accidents, Netherlands was outstanding in target setting, U.K aggressively concentrated on enforcing blood alcohol concentration (BAC) limits while Sweden focused more on changing drivers' behavior, enhancing vehicle safety and improving road infrastructure (Wegman 2014).

Table 1. Evidence of the effectiveness of various road traffic enforcement strategies across countries

Country	Intervention(s)	Outcome effect	Source
COMBINED INTERVENTIONS			
Netherlands	Seat belt enforcement + Mass media	10 – 15% acceptability rise	WHO, 2004
New Zealand	Sobriety laws + publicity	285 – 516 lives saved, 15 – 17 % reduction in alcohol related crashes / deaths	Guria , 2002
Sweden, USA	Intelligent car devices e.g Alcohol interlocking cars + infrastructure improvements	40 – 95% reduction in repeat offences of drunkards	Marques(In WHO 2004 report)
Kenya	Education + traffic calming measures + sobriety checks	*25% reduction in pedestrian injuries	Ndung'u C et al, 2015
Tanzania	Carriage checks + Speed monitoring + cameras + speed guard machines	44% Annual Reduction in road deaths (from 9151 to 5135) in January – November 2017.	Zacharia A, 2017
SINGLE INTERVENTIONS			
U.K	Seat belt enforcement	35% reduction in hospital admissions	Rutherford, 1985
Australia	Radar based speed camera on rural road sections	38% reduction in fatal crashes & hospital admissions	Lagett,1988
Malaysia	Low cost helmet enforcement	50% reduction in child deaths	WHO, 2004
USA	Motor vehicle safety checks	25% reduction in collisions	CDC MvPICCS, 2004
	Vehicle Impounding	35% reduction in recidivism	
	Sobriety check points	20% reduction in alcohol attributed crashes	

From Table 2, there is increased effectiveness from enforcing multiple strategies particularly if they are innovative and include mass media / publicity compared to independent strategies.

Addressing RTAs in Uganda

The Traffic and Road Safety Act, 1998 of Uganda, specifies a series of traffic offences and the corresponding penalties on commission of those crimes. The Uganda Police Traffic Department has been enforcing this Act to ensure road safety and reduction in RTAs. In addition, other strategies have been implemented but majorly focused on: traffic police checks for road worthiness (for both vehicles and drivers), validity checks of drivers' licenses, traffic education, mobile check points, surveillance cameras, deployment of

traffic police on major highways, among others. The intensity of implementation of these strategies has varied depending on period and the intensity of the challenge. It is important however, that data be available to demonstrate not only the efficacy of specific interventions or a combination of them, but also the costs of implementing the various interventions. More importantly, it is critical that a collaborative approach needs to be adopted where various stakeholders and players come together to address the RTA challenge.

2.0 Study Context

In 2015 – 2016, the problem of RTs rose almost to a national crisis with the upsurge in number of accidents and consequent deaths that were reported. The RTA challenge was more pronounced on the Kampala-Masaka road, whose construction had just been completed. The public attributed this challenge to various things: slippery construction material, over speeding and a general failure to adhere to traffic rules, among others. The hospitals and health facilities along this road, including Nkozi hospital and the general health system, were overwhelmed by the emergency health services that were required to handle the victims. Hospitals reportedly spent almost 60% of their budgets treating accident victims alone and the national emergency cost burden was estimated to have risen beyond 1.862 trillion UGX (New Vision, 2015).

2.1. The Operation Fika Salama" (OFS): a multisectoral intervention

To address this RTA escalation and improve road safety particularly on Kampala - Masaka highway, different sectors led by the Uganda Police Force (UPF) with support from Uganda National Roads Authority (UNRA), Ministry of Works, Uganda Red Cross, and others, launched an operation codenamed "Operation Fika-Salama (OFS)". Fika-Salama, is a Swahili word meaning *"reach safely"*, and hence the operation was intended to ensure that road users reached safely by avoiding actions that increased the risk of RTAs. OFS involved permanently stationing ad hoc checkpoints along the Kampala-Masaka road traffic police officers, vehicle and driver checks, and a series of other road safety activities. The OFS intervention involved three (3) major phases:

i) **Phase 1: 'Pre-intervention Phase'.** This was a phase that represents routine activities that preceded the Fika Salaama operation over a period of 5 months. For purposes of this study, it will help to provide a baseline or comparable period. It was a period of high incidence of road accident fatalities, and a precursor to the launch of the intervention.

ii) **Fika Salaama (Intensive implementation) Phase.** This was a six (6) months period (July 2016 – December 2016). This was a phase when the OFS was being implemented. The implementation package during this phase included: stationing traffic checkpoints along the road, intensified deployment of police officers together with Red Cross personnel, and other first responders. Activities in this phase included; intensive vehicle / driver's road worthiness checks, validity checks of drivers' licenses, enhanced community sensitization, traffic education, use of mobile check points,24 hour surveillance and deployment of mobile traffic policemen to monitor over speeding / drunken driving; vehicle impounding and instant penalties , instant court trial and 24 hour imprisonment of traffic offenders.

iii) **Relaxed (Disinvestment) Phase.** This was a 6 months period (January 2016 – June 2017). This phase was marked by a reduction in the intensity of enforcement activities. There was a gradual withdrawal and reduction in deployment and enforcement activities. The Uganda Police explain that there was a challenge of resources to sustain the initiative. It was therefore a period of review to reflect on a feasible and long-term approach. Data shows a rebound in accident incidences.

iv) **OFS 'Reloaded' Phase.** This was a 6 month period. This was a period of renewed intensive enforcement. Most activities in this phase are similar to those in phase 2 but with additional activities like mass traffic sensitization, increased frequency of sobriety check points to assess drunken driving, roving patrols, and withdrawal of 24 hour jail confinement and replacement of instant fines with express penalty tickets and reduced support of the army and UNRA.

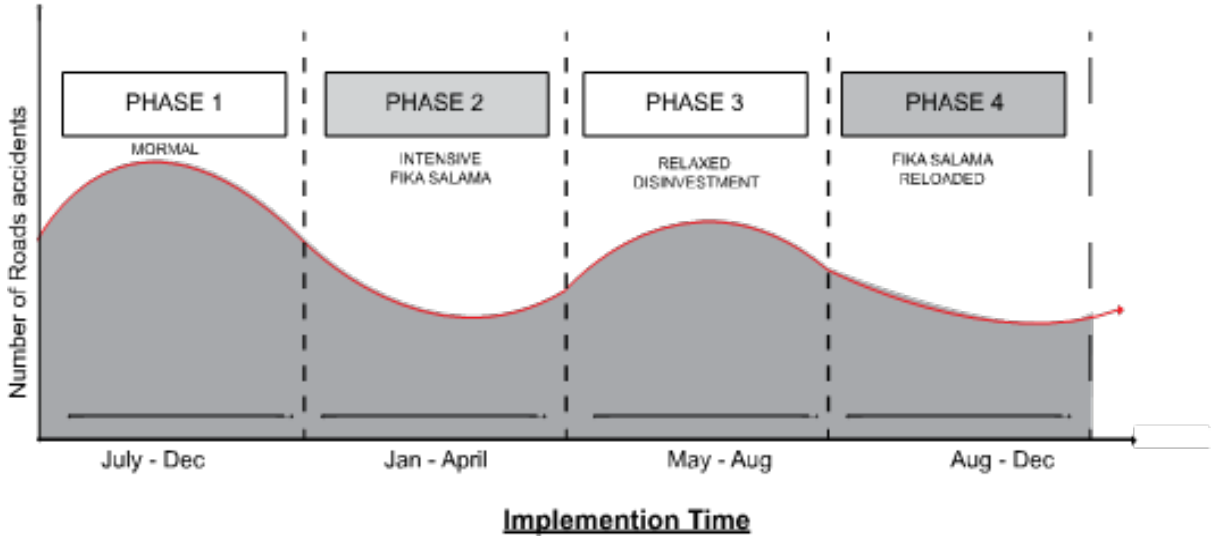


Fig 2. Hypothetical illustration of RTA incidence across the OFS phases before the study

Figure 2, illustrates scenarios based on the packages and RTA incidence rates as reported during the different OFS phases. Data was to be extracted from the Uganda Police records. In the first phase, RTAs were assumed to peak in this period, no intervention had been implemented yet but discussions of proposals were ensuing. In the second phase, OFS was launched and implemented intensively, and it resulted in a significant reduction in RTA incidences. In phase 3, there was a review and limited investments in the operation were observed. A resurgence in the incidence was observed in this period. In phase 4 – the reloaded phase, a significant reduction in RTA is again witnessed.

2.2. Estimating health system cost savings from implementing OFS intervention.

The global economic impact of RTA continues to rise as the RTA burden also rises. Hospital costs are estimated to constitute a sizeable proportion of the RTA economic burden. For instance, in Nigeria the average cost per road crash victim was US$ 35.64 (Juillard C, etal 2010) while in South Africa the average inpatient costs alone per day was US $ 2.81 (Parkinson 2014) and the total cost to the South African was estimated at R 306 Billion per year (Chikunga S, 2015). RTA prevention guarantees huge resource savings to the health system and free resources for other health service areas. The effectiveness of the OFS initiative in averting deaths from RTAs, is a typical example of how investments in other sectors can contribute to achievements of better population health – a goal that is ordinarily perceived to be the mandate of the health sector. As a result, there is an information gap regarding the medical and non-medical savings of Fika-Salaama. This not only impedes informed advocacy but also hinders guided support for increased investment and replicability of road accident prevention activities like Fika-Salaama. As such, the real costs and medical benefits of the intensive implementation, disinvestment or re-loaded Fika-Salaama phases remain a mystery.

The RTA statistics during the OFS implementation show a drastic reduction in fatalities reported at health facilities within the implementation region. It is assumed that this led to a reduction in health facility resources devoted for emergency care at facilities that provided services to the victims. However, this information is needs to be documented, as an important input in discourse on strategic interventions to reduce the escalating costs of providing health care in Uganda.

Objective of the costing study

The main objective of conducting a costing study was to assess the medical and non-medical costs of Operation Fika Salama and estimate its Budget Impact to health facilities and implementing institutions. Specifically,

1) To estimate the number and trends of road traffic accident injuries in various phases of Fika-Salama implementation
2) To estimate and compare the medical costs of health facilities in managing road crash injuries during the different phases of Fika - Salama.
3) To estimate non-medical costs associated with

various phases of 'Fika – Salama'.

4) To do a budget impact analysis of road traffic accident on continued implementation of the most efficient phase of Fika-Salama.

3.0 Methodology

This study began with a stake holders meeting in which various inputs were made to the prosed study design. Stakeholders were drawn from: Uganda Police Force, Ministry of Works and Transport, Uganda National Roads Authority (UNRA), academia and from selected referral hospitals.

Different stakeholders who participated in the first consultative meeting at Metropole hotel- kampala

Summary of Stakeholder recommendations in the study's formative stage.

- Consider designs that allow for modeling of individual productivity loss, costs of accident damages and impact to the economy
- Determine how indirect and direct costs were going to be operationalized.
- Examine and decide how to account for the victim's direct and indirect costs while in hospital & away from work , the trauma related costs and the costs to society e.g at the vigil in case of deaths
- Establish ambulatory costs to enhance advocacy for increased emergency support
- Triangulate information in case of gaps and inconsistency in records.
- Account for patients treated from multiple facilities.
- Determine basis for estimating cost savings in the absence of an earlier survey
- Determine selection of participating hospitals and health centers
- Determine level of health facilities & specify the level of treatment.
- Define a typical accident case / reference case
- Compare costs and outcomes arising out of similar months.
- Proposed a Pre or Post Fika Salaama study design
- Solution to ever changing budgets that vary with amount of RTAs
- Determine how to compute costs in government facilities
- Consider validation of preliminary results

3.1 Costing approach

To determine the costs of RTAs, we used ingredient costing and in instances where no cost records were available, we used average quantity and cost estimates from service experts. Efforts were also made to ensure that the costs reflected the severity levels of various RTA casualties. All costs were estimated from a regulator and health providers' perspective. As such though some studies have used a human capital and value added approaches, these were not possible given the prior stated analytical perspective. Besides that, all costs were prevalence based in order to measure health savings yielded by the intervention over an extended duration.

3.2 Reference case for this study was any individual initially in perfect health before an RTA crash but sustained an RTA injury or became a fatality case after a collision between a motor vehicle with a pedestrian, cyclist or another vehicle along Kampala-Masaka road and was recorded in any of the selected study sites.

3.3 Health Outcomes: In this costing study, we first considered the number of deaths and RTA injuries that resulted from motor vehicle related crashes between 2016 and 2017. They were the primary outcomes for determining the cost of RTA management. But for purposes of comparing costs of different health facilities across different times, all injuries were converted into **Standard Units of Output (**SUO)s.

Intrinsically, an SUO is an aggregate outcome measure that takes into account the number and weights of different severity categories of RTA injuries. While SUOs are used by most, to gauge performance of health entities with multiple outcomes (MOH, 2018), in this study SUOs were adapted as an outcome measure to reflect the heterogeneity of injuries in this analysis. To calculate the number of SUOs, all RTA injuries of various extremity categories were expressed in terms of their outpatient equivalents whose calculation necessitated use of; the number of **In patients per injury category, inpatient duration and cost of services** for the pre-specified category as indicated below.

- For minor injuries: Outpatient equivalents = No. of Outpatients›› x ALOS ……(Op*1)
- For moderate injuries: Outpatient equivalents = No. moderate inpatients x ALOS……..(Ip*2)15
- For serious injuries: Outpatient equivalents = No. of serious Inpatients x ALOS….(Ip*3)15
- For Severe injuries: Outpatient equivalents = No. of severe Inpatients x ALOS ……..(Ip*6)15
- For Critical injuries: Outpatient equivalents = No. of ICU Inpatients x ALOS ……..(Ip*20)

If only variables pertinent to RTA management are considered, and those considered irrelevant (e.g deliveries, immunization, ANC/MCH/FP) are omitted because they add no value,

Then 1 SUO (op-h) = [(Op*1) + 15 (Ip*2+ Ip*3+ Ip*6 + Ip*20)]

and the ***Cost SUO (op-h) = Cost(Op*1) + 15[Cost(Ip*2) + Cost(Ip*3) + Cost(Ip*6) + Cost(Ip*20)]***

3.4 Study sample: In this study, all the 7 health facilities and 9 police sites along the route were chosen for this case study and were selected for data collection. They were purposively chosen, so as to facilitate a comprehensive understanding of the budget and cost implications of the accident prevention initiative.

3.5 Sites visited: Initial data collection for this study was done in 21 days in 13 sites including; Masaka Regional Referral Hospital, Buwama Health Center III, Nkozi, Gombe, Mpigi and Nsambya hospitals. Also several police stations were visited including; Masaka Police, Lukaya (Kalungu) Police, Kayabwe, Buwama, Kammengo, Mpigi, Nsangi and Kyengera Police stations. However, due to information gaps seen in the data provided by the officers available at the time of our visits in some places, additional interviews with more knowledgeable officers were conducted in Masaka hospital, Nkozi hospital, Mulago hospital and police stations like Masaka, Nsangi, Kyengera and Lwengo.

3.6 Data collection: While there are numerous methods of costing interventions with a bearing on health outcomes, data collection for this study was done using of a mixed method approach. This approach not only included use of Ingredient costing in the identification of medical inputs and the number of injuries recorded between 2016 -2017, but also involved estimation of the quantities of the items used in managing RTAs both in hospitals and in police stations. The average cost of each item was ascertained basing on market

prices of JMS, National medical stores and other private suppliers. This was attained through a review of hospital and police records plus interviews of key hospital or police personnel. It was complimented with inputs from OFS stakeholders at two consultative meetings.

During the costing of the injuries, we first categorized the injuries by level of severity to determine resource consumption by various RTA patients. Consequently, we identified the number of RTA injuries that made single visits (e.g OPD patients) and those that were admitted for several days. Identification of costs by day of admission was intended to minimize variations in the costs of the procedures and quantities of medicines used on the first day compared to the subsequent days of admission after the occurrence of an RTA, Injuries for single visits were mainly in the minor injury category.

Mr. Ssebagereka Anthony and another member of the data collection team examining injury records in Nsambya hospital – Kampala.

4.0 STUDY FINDINGS

4.1 OBJECTIVE 1. To estimate the number and trends of road traffic accident injuries in various phases of Fika-Salama implementation

4.1.1 Estimated number of RTA injuries

We examined both out and in patient registers to establish the RTA injuries recorded in each month from 2016 - 2017 in the 6 health facilities that received most RTA victims along Kampala – Masaka road. The facilities sampled included; Masaka RRH, Nkozi hospital, Buwama HC III, Mpigi, Gombe and Nsambya hospitals. To ascertain more realistic injury estimates, our team identified the number of RTA injuries in 5 major severity categories basing on data available in OPD registers or Form 031, and the 'In-patient' registers. Categorization of RTA injuries was based on the extent of severity and was done using the key guidelines of International Severity Score. And based on the average length of stay for each injury category, all injuries were converted into SUO and summarized in Table 1 below.

Table 1. Summary of MV - RTAs identified by injury severity

Duration		NUMBER OF INJURIES BY CATEGORY				
	Minor	Moderate	Serious	Severe	Injury Totals	Deaths
2016	588	205	165	190	**1148**	**35**
# SUOs	588	6,150	7,425	17,100	**31,263**	**-**
2017	749	142	247	129	**1315**	**13**
#SUOs	749	4,260	11,115	11,610	**27,734**	**-**

Data source: *Hospital records and patient cards*

Given the results in Table 1, the number of severe injuries and fatalities reduced by about 3-fold in the period (2016- 17). While on the contrary, minor RTA injuries increased in and accounted for more than half the total number of RTAs recorded in all health facilities in 2017.

4.1.2 The trend of RTAs during various phases of Fika Salama (OFS)

To identify the trend of RTAs over the time of OFS, we conducted an interrupted time series analysis (itsa) for a single group intervention without any comparison as guided by Linden A (Linden et al, 2015). As part of this analysis we first compared the outcomes in the Normal (pre – intervention) phase with those in the Intensive (post intervention) phase of OFS. With only time and intervention status (yes /no) as our main independent variables, the trend in SUOs is depicted in the graph below.

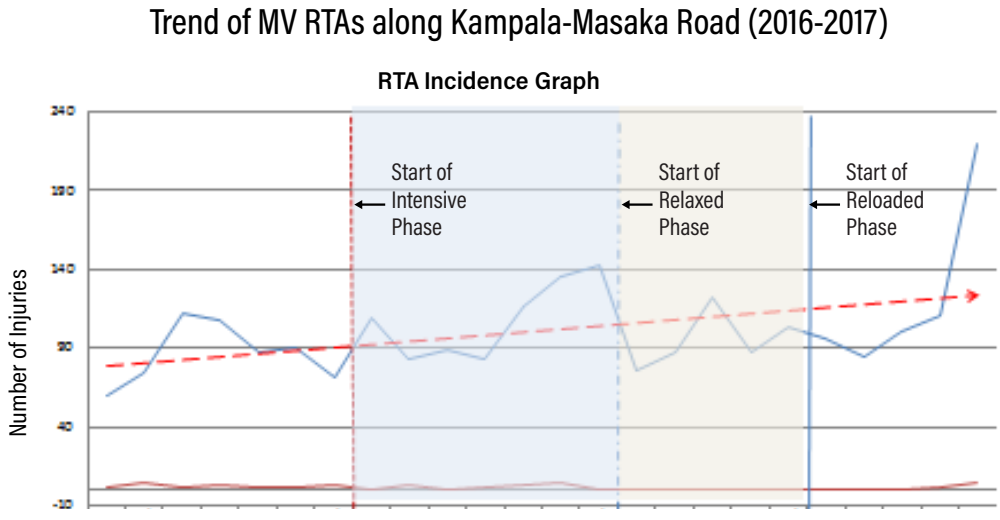


Figure 5: Trend of Motor Vehicle RTA injuries and Fatalities during Operation Fika Salama

During Fika Salama, RTAs markedly declined from April 2016 to the end of November 2016. This decline was proceeded by 3 months of accident upheaval up to February 2017 but in the 6 months that ensued, there was a mild increase in the monthly number of RTAs between March and July 2017 that later escalated rapidly in the last 2 months of 2017.

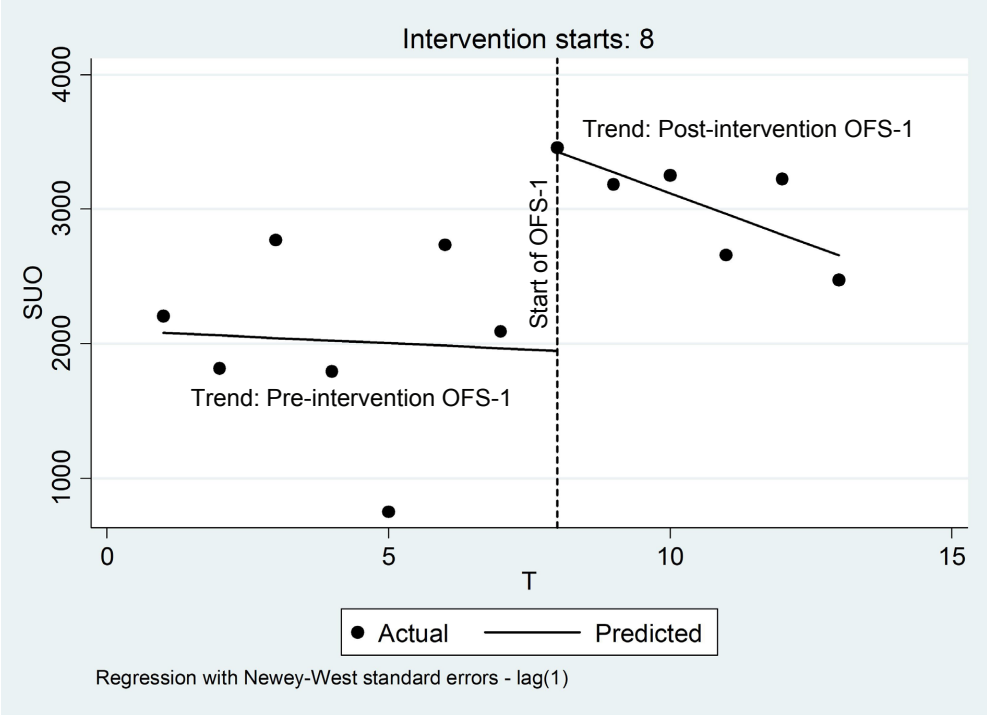


Figure 6: Trend of injuries in the Normal and Intensive Phase of OFS

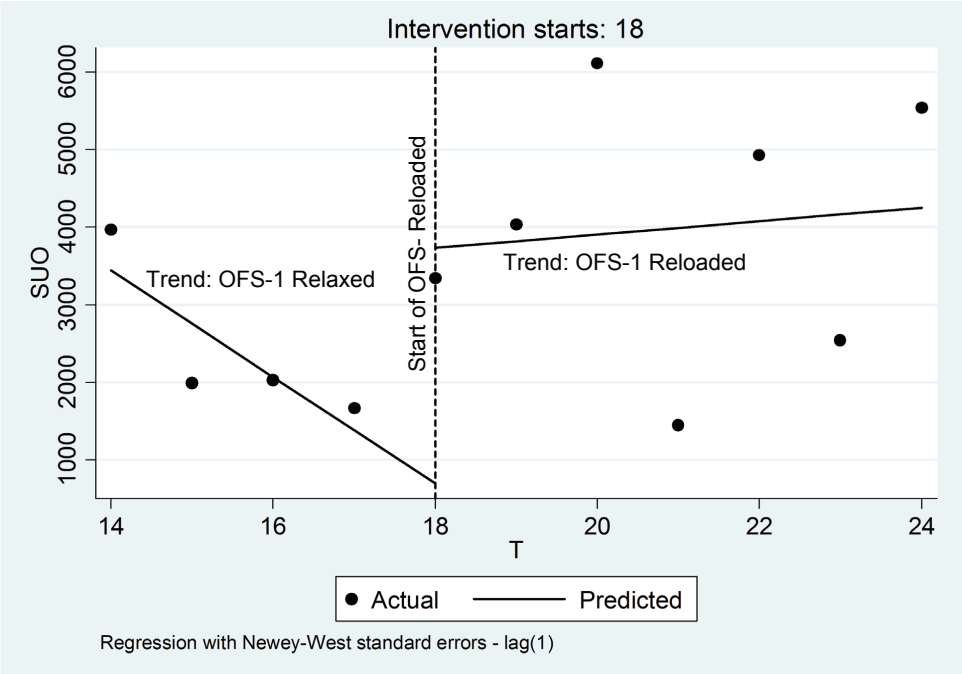
In the graph above, RTAs were relatively high before any intervention and markedly increased in the 2 months before July 2016, when Fika Salama was introduced. But immediately after starting OFS, there was a steady decline in SUOs up to the end of 2016.

Details of the results show that with 2079.5 SUOs at the start, the SUOs slightly decreased every month (although not significantly) by 18.9 SUOs (P= 0.805, CI = [*−187.35, 149.49*]). Though the first month of the post intervention (intensive) phase followed a statistically significant increase in SUOs of 1479.38 (P = 0.013, CI = [*394.00, 2564.76*]) from the Normal phase, it also marked the start of decrease in the monthly trend of SUOs by -134.96 SUO per month (P = 0.137, CI = [*−322.22, 52.31*]). The results further show that after the introduction of FIKA SALAMA in August, the SUOs decreased by 153.89 (P = 0.0017, CI = [−232.89, -74.88]) compared to the Normal phase.

Table 2. Linear regression of Outcomes predictors of the Normal and Intensive phase

Regression with Newey-West standard errors **Max lag:1**			**Number of Obs = 13** **Prob > F = 0.0003**	
SUOs	**Co eff**	**P > | t |**	**95% Confidence Interval**	
Time (month) - t	-18.93	0.805	- 187.35	149. 49
Intervt.n status - (X)	1479.38	0.013	394.00	2564.76
Time x interv.n status (Xt)	-134.95	0.137	-322.22	52.30
_Constant	2079.5	0.000	1618.97	2540.03
Post Intervention Linear Trend – Lincom estimate				
Treated	-153.89	0.0017	-232.89	-74.88

Post Intervention trend between Relaxed and Reloaded Phases



During the Relaxed phase there average number of SUOs per month continued to drop at a rate similar to that of the Intensive phase but experienced upward trend in August that was slowed down in the last quarter of 2017.

In the 'Relaxed' period, the average number of SUOs from RTAs continued to drop by 687 every month given p = 0.010 (CI; -1154.27, -219.53). However due to a resurging mid-year rise in the number SUOs, Fika Salama Reloaded was reintroduced in month 18 (July 2017).

During the last intervention period that stretched from July – December 2017, there was a significant increase of 3037.96 SUOs [p=0.000 (2016.42, 4059.50)] when the intervention was reintroduced compared to when Fika Salama had been relaxed. That apart, it also clear that the Reloaded phase had a non-significant increase of 86.75 SUOs [p=0.45 (-175.43, 348.9)].compared to the relaxed phase as shown in Table 3 below.

Table 3. Linear regression of Outcomes predictors of the Relaxed and Reloaded phases

Regression with Newey-West standard errors **Time variable T: 14 – 24**			**Number of Obs = 11** **Prob > F = 0.0006**	
SUOs	**Co eff**	**P > | t |**	**95% Confidence Interval**	
Time (month) - t	-686.9	0.001	- 995.93	-377.87
Intervt.n status - (X)	3037.96	0.000	2016.43	4059.50
Time x interv.n status (Xt)	-773.65	0.006	306.53	1240.76
_Constant	3442.1	0.000	2848.79	4035.41
Post Intervention Linear Trend – Lincom estimate				
Treated	86.75	0.4596	-175.43	348.93

4.1.3 Efficacy of Fika Salama

In this study, the efficacy of the operation was noted by the difference in injuries recorded between each phase and the 'Normal' phase. From the results, efficacy not only varied between the injuries (SUOs) of the different phases of Fika Salama but also varied largely by the number of fatalities recorded in various operation phases as shown in **Table 2**.

Table 4. Efficacy of Fika Salama based on effectiveness differences between OFS phases

		IMPLEMENTATION TIME						
	NORMAL PHASE (Ref)	Ref	INTENSIVE PHASE (1)	No. of SUOs	RELAXED PHASE (2)	N0.of SUOs	RELOADED PHASE (3)	No. of SUOs
Minor	316	316	283	283	220	220	380	380
Moderate	110	3,300	113	3,390	96	2,880	93	2,790
Serious	68	2,835	76	3,420	65	2,925	112	5,040
Severe	38	3,420	47	2,115	60	5,400	74	6,660
Critical	9	2,700	7	2,100	1	300	20	6,000
TOTAL	541	12,571	526	11,308	442	11,725	679	20,870
Deaths	29	0	5	-	26	-	10	-
Fatality Difference		0	-24	-	-3	-	-19	-

Data Source: Primary and secondary hospital data

Considering the incremental effectiveness of the intervention phases of Fika Salama i.e the Intensive and Reloaded phases registered a sizeable reduction in the number of Critical injuries and fatalities. With a reduction of 83% (24 deaths) in the intensive phase and 66% (19 deaths) in the reloaded phase, the operation far exceeded the annual target of a 50% reduction in fatalities, recommended by WHO (WHO 2018).

Conclusion

All the results above show that, Fika Salama was more effective in the 'Intensive' phase compared to other phases. Nonetheless the effectiveness of both (the Intensive and Reloaded) phases was undermined by accident upheavals particularly in the last 2 months of 2017..

4.2 OBJECTIVE 2: To estimate and compare the medical costs of health facilities in managing road crash injuries during the different phases of Fika - Salama.

To facilitate estimation of the medical costs in the different phases of OFS, the number of RTA injuries seen was ascertained first through interviews with various health facility personnel on various wards of the facilities to contribute responses to various cost items required in the main questionnaire of each of the 6 health facilities.

Though the items identified in the management of injuries were relatively the same across all months, the quantities of these items varied from one facility to another depending on the level of the facility as well as its capacity to provide various injury management services depending on severity of the injuries.

4.2.1 Study assumptions

Nonetheless, the cost estimates were guided by the assumption that;-

1) Injuries of the same severity category consumed relatively the same medical resource quantities, provided the treatment was in the same facility. Hence difference in costs of extreme injuries was catered for by the costs borne in health facilities of higher levels or at the different levels of health service provision.
2) Sources of revenue and number of stakeholders remained stable during all study periods.
3) All public and private health facilities followed the same injury treatment guidelines and there was minimal variation in the costs of items across all health facilities of the same level and category (i.e whether government or PNFPs) during the study time horizon. PNFPs like Nsambya and Nkozi hospitals were assumed to be sourcing items from the same suppliers like JMS, while government health facilities sourced from NMS.
4) The trend in RTA injuries was relatively similar in sites (health facilities and police stations) situated along the same stretch of the study route.
5) Cost differences in expenditures on RTA patients was captured by different injury extremities.
6) Below is a summary of the number of facilities visited and different types of medical services that were quantified and monetized.

Table 5. Variation of medical cost estimates during various phases of Fika Salama

	FIKA SALAMA			
TIME	**Jan – Jun 2016**	**Jul – Dec 2016**	**Jan –Jun 2017**	**Jul – Dec 2017**
IMPLEMENTATION PHASES	**PRIOR NORMAL**	**INTENSIVE OFS**	**RELAXED PHASE**	**FIKA SALAMA RELOADED**
KEY COST ITEMS	**IMPLEMENTATION COSTS (UGX)**			
Personnel	136,473,563	89,825,239	339,033,451	332,526,087
Imaging	3,753,022,537	3,121,798,463	786,817,644	870,716,356
Surgical	413,525,213	524,021,702	79,557,867	70,322,543
Nursing aides	922,623,272	59,218,046	107,410,370	118,791,618
Drugs	502,083,165	686,741,647	844,542,068	776,244,196
Autopsy inputs	2,621,379	2,976,127	1,646,299	3,951,200
Other Treatment aides	5,721,448	3,279,185	298,796,459	251,668,162
Physiotherapy	3,823,716	1,464,247	5,022,975	4,425,967
Food	2,195,000	4,650,000	9,997,000	11,435,000
Accommodation	4,103,000	6,005,000	9,997,000	11,110,000
Oxygen & oxygen concentrators	35,482,700	40,557,470	12,541,017	21,545,727
TOTAL (UGX) USD	5,781,674,993 1,724,843	5,073,499,546 1,513,574	2, 495, 362, 149 744,440	2,472,736,858 688,018
COST DIFFERENCE (PhaseX–Normal Phase)	Ref	-708,175,447 211,270	- 3, 286, 312, 844 914,389	- 3,308,938,135 920,684
Av.Cost per RTA (UGX) USD	10,867,810 3,242	4,088,235 1,220	3, 839, 018 1068	3, 463, 216 964
Av Cost per SUO USD	459,921 137	448,664 134	212,824 59	118,482 33

Data Sources: Primary & Secondary Hospital data

Exchange Rate: *2016 (1 USD = UGX 3352) ; 2017 (1USD = UGX 3594)*

From the results above, the largest amount of medical costs to health facilities in the study period, were mainly incurred on minor and serious RTA injuries. In the "Intensive phase", the total medical costs were estimated at UGX 5,073,499,546 (USD1,513,574). They were particularly spent on imaging (3,121,798,463), nursing sundries (UGX 524,021,702) and drugs (UGX 686,741,647). However as OFS progressed, total expenses reduced later by 43% in both, the 'Relaxed and Reloaded phases".

Average cost per RTA. The average expense per RTA was lowest in the Reloaded phase at UGX 3463217 (**USD 964**) compared to UGX 10, 867, 810 (**USD 3242**) per RTA in the Normal phase. This could possibly be linked to the reduction in the number of critical and fatal cases in this phase .

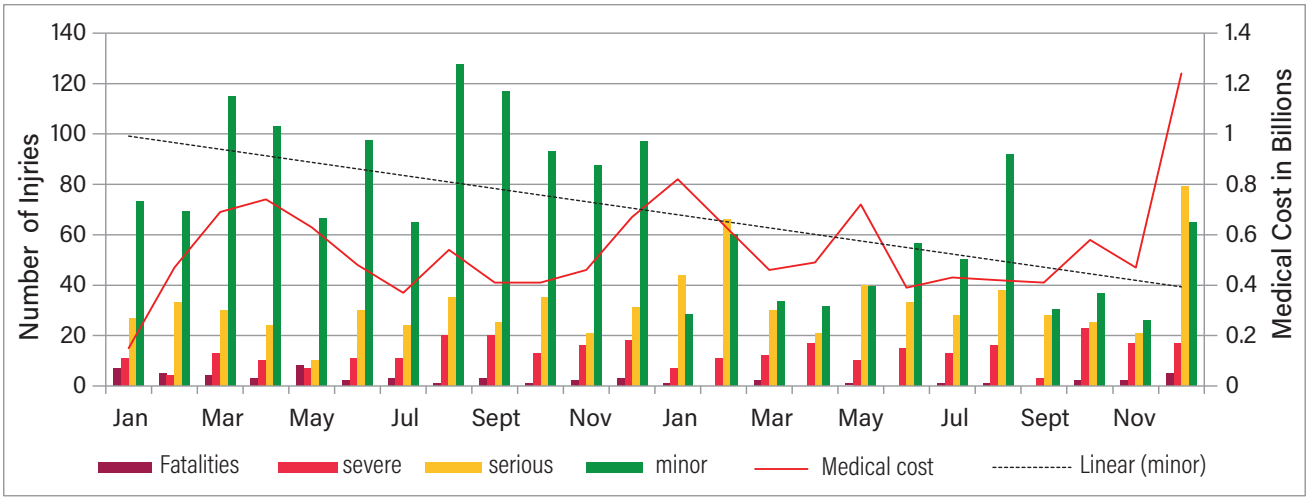


Figure 7: Comparison of monthly medical costs Incurred during OFS by severity of RTAs

4.2.2 Medical Cost savings

Considering the cost difference that arises from change in medical expenditure across the different phases of this study, the largest cost savings were recorded in the Reloaded phase with UGX 3,308,938,135 (USD 920,684) compared to the original "Intensive / Normal" phase of Fika Salama that had a cost deficit of UGX 91, 824,553 (USD 27,394) in 2016.

Comparatively, the costs of the subsequent phases and costs of the major cost items were almost reduced by a half by the end of the intensive OFS phase, the variation in costs was higher more stable in the subsequent phases.

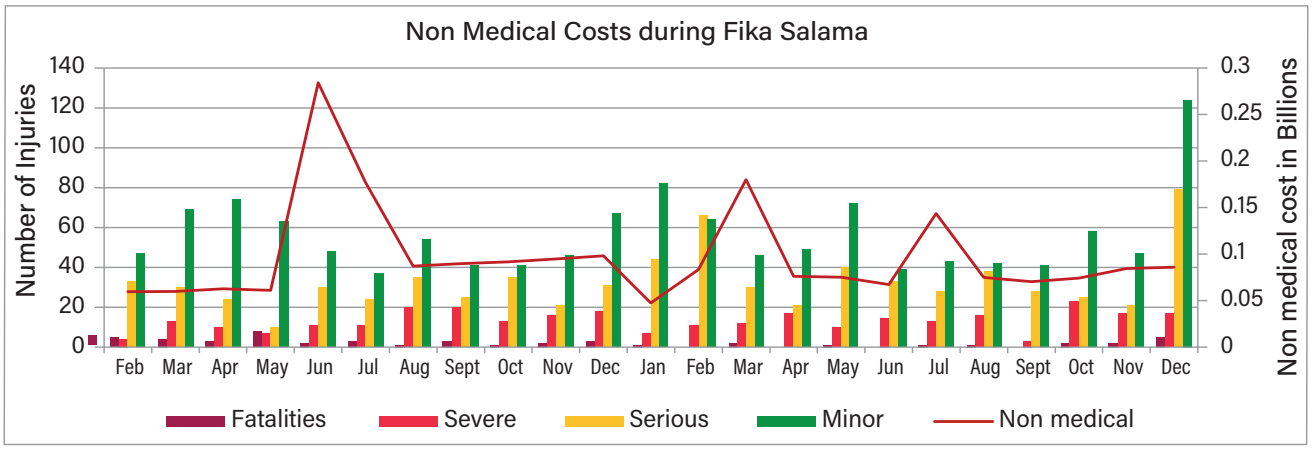
4.2.3 Incremental Cost per Injury during Fika Salama

Further still, considering the cost savings of all the intervention phases, the largest cost savings were made in the Reloaded phase with an incremental cost saving of UGX 5,424,489 per RTA injury compared to an expenditure loss of UGX 7,652,046 in the Normal phase.

5.0 OBJECTIVE 3: To estimate non-medical costs associated with various phases of 'Fika – Salama'.

To estimate non- medical costs of we largely considered the Uganda Police Force expenses as it was the main operation implementer and to a limited extent, also included some OFS activity costs that UPF executed together with Uganda National Roads Authority.

Considering the monthly resource availability more non-medical costs were incurred between June – July 2016, as well as March and July 2017. Apart from these months being the highest investment times of the "Intensive" and 'Reloaded' phases, they also coincided with the periods with the lowest number of number of deaths and minor injuries.



Furtherstill, considering the composition of non-medical costs, they largely comprised of personnel costs, recurrent barricaded site expenses, monitoring and individual facilitation costs as indicated in the Table 6 below.

Table 6. Comparison of non-medical costs of "Fika-Salama" in various phases.

	Do Nothing (Normal) Phase	Intensive Phase	Relaxed Phase	Reloaded Phase
Personnel Costs*	**323,920,000**	**403,370,000**	**229,249,690**	**299,940,000**
Supervision Costs*	323,920,000	433,364,034	238,053,723	308,628,034
Office Logistics*	43,508,600	7,165,000	12,635,500	59,944,000
Equipment (SUNK) Costs*	220,325,002	420,756,000	160,072,500	19,440,500
Recurrent Costs*	170,301,000	80,678,800	52,001,000	128,716,500
TOTAL NON MED **USD**	**734,124,002** **219,011**	**955,871,934** **285,165**	**466,370,723** **129,764**	**581,610,534** **161,828**
AVG COST/CheckPt **USD**	**91,765,500** **27,376**	**119,483,992** **35,646**	**58,296,340** **16,220**	**72,701,317** **20,229**

Data Sources: Primary & Secondary Uganda Police Force data

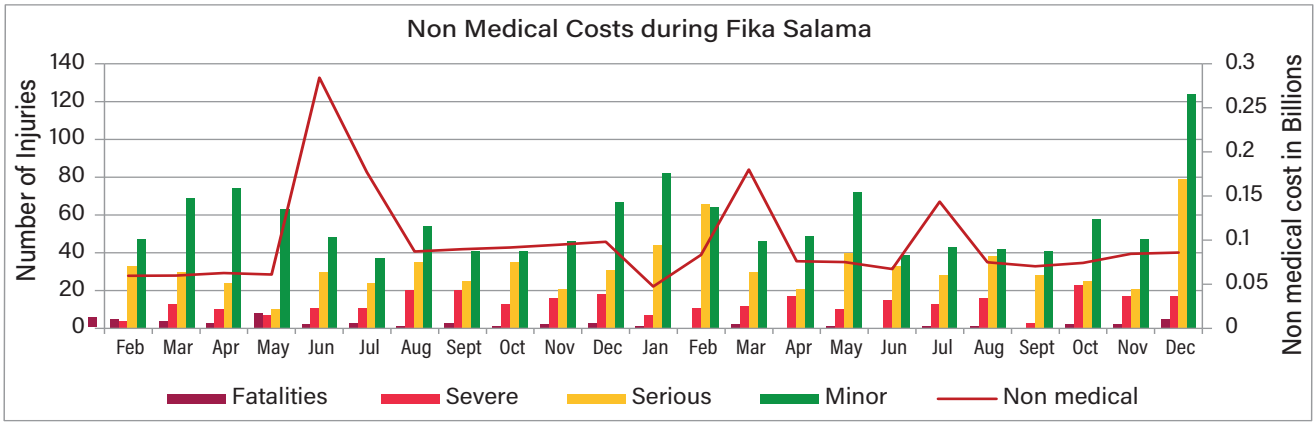
Exchange Rate: 2016 (1 USD = UGX 3352) ; 2017 (1USD = UGX 3594)

*Note: *Cost break down for this item is available in Annex 2*

Total Non-Medical costs: By the end of the "**Normal**" and "**Intensive**" phases in 2016, total **annual** non-medical costs accounted for UGX 1,689,995,936 (USD 504,175). However the annual total of both

the "Relaxed" and "Reloaded" phases combined decreased to about UGX 1,047,991,257 (USD 291,595). As such, by the end of the second year of Fika Salama implementation (in 2017), the "Reloaded phase" registered the lowest implementation costs of UGX 581,610,534 (USD 161,828). In effect, **the ultimate change between the non-medical costs of the Normal and Reloaded phases was a cost reduction of close to a half the initial implementation costs**.

Besides that, considering the monthly resource availability more non-medical costs were incurred between June – July 2016, as well as March and July 2017. Apart from these months being the highest investment times of the "Investment and Reloaded phases, they also coincided with the periods with the lowest number of number of deaths and minor injuries in May – June 2016 and March 2017 respectively.



5.1 **Cost per Check point**: Based on the 8 original checkpoints of Fika Salama, there was an extreme cost reduction in the average expenses per check-point that reduced from UGX 119, 483,992 (USD 35,646) in the Intensive phase of Fika Salama to UGX 72,701,317(USD 20,229) in the 'Reloaded' phase.

5.2 Impact of inconsistent flow of non-medical resources on study outcomes:

During OFS, the highest amount of money was mobilized in the early stages of the Intensive and Reloaded implementation phases particularly in July 2016 and mid-year season of 2017. Comparatively, these periods (not only had vast resources but) were also characterized by the lowest number fatalities and critical RTA injuries.

5.3 Cost drivers of non-medical costs: Of all the costs incurred, personnel costs accounted for about 45 % in the normal and intensive phase of the first year (2016) of implementation. This was followed by recurrent expenses on traffic check point set ups and maintenance of police equipment and barricades. Given the costly nature of police equipment and accessories, recurrent expenses constituted an average of 42% of the total police expenses in the initial two Fika Salama implementation phases

6.0 AGGREGATE COST OF FIKA SALAMA

MEDICAL COST	5,781,674,993	5,073,499,546	2,495,362,149	2,472,736,858
NON MED COST	734,124,002	955,871,934	466,370,723	581,610,534
TOTAL OFS COST	6,515,798,995	6,029,371,480	2,961,732,872	3,054,347,392
USD	1,943,854	1,798,739	824,077	849,846

From a multi-sectoral perspective, the estimated combined cost of implementing Fika Salama during the first 'Intensive phase' was about UGX 6,029,371,480 (USD 1,798,739). Comparatively, the initial cost was more than two (2) fold the implementation cost of scaled down traffic operations (like in the 'Fika Salama' Reloaded Phase) whose cost has been estimated at UGX 3,054,347,392 (USD 849,846).

7.0 Budget Impact of Non-medical costs.

In lieu of the cost effectiveness of Fika Salama and the endless pursuit to halve the number deaths and injuries due to RTAs, it is hoped that if similar operations are executed with similar resolve on 5 of the highest burden highways, possibly this objective could be achieved in the shortest possible time of 2 years. And, with an average cost of UGX **72,701,317** per check point and coverage of 20 checkpoints on the 5 major RTA burden highways in Uganda, the minimum budget implication of scaling up Fika Salama is estimated to be: **72,701,317 x 20 = UGX 1,454,026, 340 (USD 404,570)**

This is based on the pre-supposition that if the activities of the most efficient phase are scaled up along the 5 roads with the highest accident burden, these costs will not only suffice to cover 20 check points at intervals of 30 *kilometers* but could greatly reduce the number of RTAs.

7.1 Budget Impact of medical costs

Similarly, with an average cost of UGX 3,463, 217 per RTA and an annual vehicle count of 6436 vehicles on Masaka Road , the estimated annual population at risk is 11, 584,800. Hence, the estimated **Total Medical expenses** on RTAs along Masaka road in 2017 was **UGX 3,054,347,392 (USD 849, 846)**

8.0 Study Limitations

- This being a retrospective study, the estimates provided in this study heavily relied on available secondary data as well as opinions of ward in charges and other service experts. Poorly recorded and incomplete variables in hospital data were excluded.
- Due to absence of submissions from UNRA as well as receipts for food, water and several donations like reflective gear, boots and sign boards from other stakeholders, we relied on information provided by the Fika Salama Operation commander to estimate delivery frequencies of undocumented donations. The cost of the donated items was deduced from the market prices then. Expenses borne by individual policemen on the some items like food, water and other replenishments were not included while computing providers'costs.
- Though some injuries could have actually cost a lot much more than others, in this study we assumed that all injuries in the same severity category had similar treatment and resource requirements. Capturing real time costs was impossible due to loss to follow up and the retrospective nature of the study.
- Estimates used in this study were based on actual expenditures and have not factored in price differences between different locations if materials are assumed to originate from the same source i.e NMS or JMS.
- For cases where some medications and equipment were sources from private suppliers and hospitals could not readily identify them, such costs were excluded from the cost computations of this study and we relied on National Medical Stores (NMS) and Joint Medical Stores (JMS) prices only.

9.0 Recommendations for Health facilities

At the end of the data collection, preliminary cost results were presented to stakeholders to review and validate the study findings. Stakeholders made several contributions and amendments to the cost inputs and made numerous recommendations for future accident prevention efforts. The suggested recommendations included;

I) MEDICAL RECOMMENDATIONS

Among the priority action areas cited in these recommendations, stakeholders noted that;

- The budget for fuel of ambulance services be increased by 30% in HC IIIs and more ambulances be purchased to permit more timely evacuations and allow the few existing emergency vans to concurrently attend to non RTA emergencies i.e Mpigi HC - 1 ambulance, Masaka RRH – 3 ambulances, Nkozi Hospital – 1 ambulance, Uganda Police Traffic Department – 2 ambulances.
- Some facilitation or funds be set aside for real time archiving of RTA specific data and records in all hospitals.
- The provision or funds for refrigeration in Mortuaries be increased to facilitate new fridge purchases and their maintenance
- Subsidize or double the quarterly provisions for medicines and nursing sundries apportioned to emergency departments like cotton, gauze and syringes etc. Hopefully, this will minimize frequent stock outs as stocks only last 2-3 weeks out of the 4 months that are budgeted.
- Some accident funds be set aside to specifically help hospitals to purchase unique appliances like resuscitation equipment like syringe pumps, ventilators, imaging equipment,
- Make provisions for purchases of rare immobilizing materials like spine boards , Thomas splints , Klamer wires
- Post orthopaedic surgeons and equip existing orthopaedic units like in Masaka Hospital so as to minimize referral and prioritize setting up other orthopaedic units in highway hospitals like Nkozi hospital or Mpigi HC IV without such facilities.
- Identify financial contributions or partnerships to fund construction of emergency and trauma centers like in Nkozi Hospitals
- Recruit more physiotherapists and Increase allocations for physiotherapy inputs to increase availability of rehabilitation services in rural hospitals like Gombe hospital.

II) NON MEDICAL RECOMMENDATIONS

- To boost morale of implantation staff, special facilitation of Traffic Police and other field personnel for food or water, etc be provided more regularly e. g on a weekly basis rather than once a year as in 2016 or nothing in 2017.
- Garrisons or check points be erected after every 30 kms and that each check point be given a service vehicle. Police also recommended 2 more ambulances with trained Police nurses for the entire Kampala – Masaka stretch.
- Develop comprehensive RTA outcome survey protocols capable of capturing robust accident outcomes including health economic data
- Update road crash data base and ensure that and RTA injuries feature in the country health sector monitoring systems.
- Enhance capacity building of driver examiners' in Uganda Police Force.
- Rather than wait for a police recovery truck from Masaka Police whenever need arises mid-way, each of the administrative 3 Police regions (i.e Greater Masaka, Katonga and Mpigi) be given an additional recovery truck . This will shorten the turn-around time of recovery trucks and fasten casualty transfer and route clearance time.
- Consider and include more solar panels, police boot supplies, mobile tents and toilets in annual police budgets.
- Include purchases of speed radars for all patrol vehicles to augment speed guns.
- Procure a motor cycle to support patrol activities at least each check point located after every 30 kms.

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Annex 1. Summary of medical costs extracted from health facilities

Cost Item	Mpigi HCIV	Masaka RRH	Nkozi Hospital	Buwama HC III	Gombe Hospital	Nsambya Hospital	Mulago (Referrals only)
	2016						
PERSONNEL	6,169,264	67,071,398	30,000,000	490625	5,874,502	15,956,974	25,813, 680
IMAGING	0	0	45,000,000	0	18,822,000	326,199,000	79,205, 000
SURGICAL EXPENSES	956,000	24,139,803	1,755,000	2,000,000	6,750,000	51,700,000	146,832,437
NURSING & SURGICAL SUNDRIES	10,731,711	228,249,205	105,000,000	600,000	11,410,456	9,700,700	230,687, 924
MEDICINES -Antibiotics	423,000	88,675,852	28,854,346	200,000	1, 071,200	4,780,700	75,687, 000
- Analgesics	1,639,910	11,650,880	12,000,000	17640	66,645,306	9,779,800	124,760,980
- Anesthetics	7,835,090	40,001,280	7,000,000	0	1,020,250	3,780,600	76,031, 116
Other drugs / IV Fluids		138,254,740	103,927,331	0	2,955,916	17,676,500	41,837, 637
AMBULANCE TRANSFERS	3,440,000	3,900,000	35,000, 000	0	2,160,000	14,494,000	NA
AUTOPSY INPUTS	31,275	6,670,413	2,000,000	0	1,609,597	402,000	NA
NON MEDICAL SUPPLIES	18,357,000	41, 354,100	28,744,000	0	3,398,324	27,347,620	162,134,500
Physiotherapy aides	484,033	81,063	242,600	0	1,073,996	3,100,705	NA
WARD COSTS							
WARD COSTS - Food	0	3,738,000	8,389,000	0	0	16,175,000	0
Accomodation	0	6,675,000	0	0	0	38,820,000	0
ORTHOPAEDIC COSTS	0	14,373, 250	0	0	0	0	3,504,000,000
OXYGEN	0	18,750,000	35,245,800	0	0	28,787,670	731,300,000
ANNUAL TOTAL (UGX)	50,067,283	1,439,057,634	443,158,077	3,308,265	121,827,467	568,701,269	5, 198, 289,350
	2017						
PERSONNEL	13,840,771	106,374,682	27,000,000	288312.5	11,954,657	17893009	494,208,106
IMAGING	0	0	75,525,000	0	75,260,000	269,233,000	1,237,516,000
SURGICAL EXPENSES (ON MV- RTAs)	26,299,239	35, 417, 047	845,000	2,000,000	14,500, 000	49,870,000	69,496,170
NURSING AIDES	10	49,211, 062	64,966,905	600,000	74,495,831	10,473,800	6, 949,617
DRUG SUPPLIES Antibiotics	16,699	400, 780, 848	11,000,000	200,000	946,507	25,760,700	56, 072,340
- Analgesics	3,194,586	27, 321, 876	5,000,000	151200	109,605,655	11,283,400	18, 344,050
Anesthetics	9,522,726	163,798, 544	2,826,942	50,000	1,917,300	7,150,400	87, 887,277
Other drugs		23, 099, 846	85,551,836	100,000	49,957,439	12,377,200	55,836,200
AMBULANCE TRANSFER	7,180,000	4, 200, 000	28,000,000	0	3,700,000	25,160,000	0
AUTOPSY INPUTS	260,325	2,115,000	92,286	0	864,894	2,265,000	NA
NON MEDICAL TREATMENT AIDES	3,164,750	11,113, 000	24,161,000	50,000	4,905,834	48,377,300	111,148,400
PHYSIOTHERAPY AIDES	1,256,352	111,963	203,270	0	1,563,692	6,313,665	NA
Patients food	0	8,008,000	0	0	0	14,800,000	0
Accommodation	0	14,300,000	0	0	0	35520000	0
ORTHOPAEDIC COSTS	0	20, 377, 350	306,187,095	0	0	0	3,144,000, 000
OXYGEN	2,800,000	34,920,000	28,169,800	0	0	41,377,870	541,780 , 000
ANNUAL TOTAL (UGX)	67,635,448	902,237, 255	659,529,134	3,303,433	335,171,809	577,855,344	5, 823, 238,160

Annex 2. Non-medical costs of "Fika-Salama" in various phases.

	Do Nothing (Normal) Phase	Intensive Phase	Relaxed Phase	Reloaded Phase
PERSONNEL COSTS				
Traffic officers	213,460,000	26,9760,000	160,995,500	211,460,000
Registered Nurse	13,140,000	9570000	11940000	15,300,000
Police officer	32,300,000	39,740,000	15838790	33,920,000
Armed officer	22,600,000	39,200,000	16800000	16,000,000
Traffic aides	26,460,000	23,460,000	13675400	12,900,000
support staff	1,5960,000	21,640,000	10000000	10,360,000
SUPERVISION COSTS				
Night allowance	0	13,230,034	2,490,033	3,900,034
station supervisor	0	2,810,000	770,000	1,980,000
safari day allowance	0	12,122,000	5544000	2,094,000
prep. Meetings	0	1,832,000	0	714,000
S/TOTAL	323,920,000	433,364,034	238053723	308,628,034
LOGISTICS	4,068,000	4,501,000	12415500	54,454,000
EQUIPMENT (SUNK COSTS)				
Highway barriers	2,420,000	2,100,000	2620000	3,830,500
Road block tents	1,000,000	10,200,000	1850000	1,200,000
Reflective Gear	3,075,002	50,948,000	2,782,500	6,590,000
Speed guns	202,200,000	352,600,000	152,020,000	6,600,000
Generator	3,1300,00	1,716,000	600,000	1,020,000
Permit readers	8,500,000	3,192,000	200,000	200,000
S/TOTAL	220,325,002	420,756,000	160,072,500	19,440,500
RECURRENT COSTS				
Communication	54560000	7,040,000	1,950,000	2,820,000
Fuel	41087400	43,114,800	23,940,000	31,183,500
Gumboots	1809000	2,499,000	6,160,000	4,005,000
Drinking water	4284000	2,840,000	7920000	3,602,000
Food-field personnel	12,920,000	6,580,000	685000	14,580,000
Ambulance servicing	1,800,000	2,300,000	1000000	5,170,000
Vehicle hire	8,060,000	2,435,000	650000	5,700,000
Court escort costs	2,510,000	640,000	2080000	1,900,000
Towing	1,930,000	3,400,000	750000	1,300,000
Parking	200,000	13,96,000	4540000	51,300,000
Emergence training	1,580,000	486,000	700000	976,000
Admin cost	120,000	5,284,000	1406000	690,000
Sign posts	3,600,000	2,400,000	210,000	4,533,000
Patrol car service	3,560,000	5,200,000	500,000	1,520,000
Motor cycle	2,700,000	2,729,000	500,000	64,291,500
Stationery	39,440,600	2,664,000	220,000	5,490,000
Victim Transfers	4,050,000	3,330,000	2,400,000	472,000
Mobile / Outreach	1,600,000	0	218,000	0
S/TOTAL	185,811.000	94,337,800	55,829,000	199,533,000
GRAND TOTAL	734,124,002	955,871,934	466,370,723	581,610,534
Average Cost/Check Pt	91,765,500	119,483,992	58,296,340	72,701,317

SPEED Brief

The Supporting Policy Engagement for Evidence-based Decisions (SPEED) for Universal Health Coverage in Uganda is a 5 year partnership supported by European Union that started in 2015. The partnership comprises Makerere University School of Public Health (Lead Agency), Uganda National Health Users Consumers' Organization (UNHCO), Economic Policy Research Centre (EPRC), National Planning Authority (NPA), Institute of Tropical Medicine (ITM) Antwerp Belgium and Human Science Research Council (HSRC), South Africa.

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