



FOUNDATION



MOTORCYCLE
INITIATIVE

A FARE PRICE:

AN INVESTIGATION INTO THE
HEALTH COSTS OF MOTORCYCLE
TAXI CRASHES IN KENYA



MARCH 2024

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FOREWORD



Road traffic deaths fell slightly to 1.19 million in 2021, representing a 5% reduction in total numbers since 2018, according to the latest **Global Road Safety Status Report (2023)**. However, this is far short of the 50% reduction by 2030 expected through the implementation of the 2nd Decade of Action for Road Safety. Sadly, there has been an increase in road traffic deaths in the African region, which has a death rate of 19 per 100,000 – three times that of Europe (the best performer). This makes African roads some of the deadliest in the world.

The vast majority of those who die on African roads are vulnerable road users – cyclists, motorcyclists, and pedestrians. In particular, the rapidly growing powered two-wheeler industry on the continent is fueling the issue. Motorcycles are relatively cheap to buy and maintain, can be driven by younger riders, and are part of a booming two-wheeler taxi industry – called boda-boda riders in many East African countries. Those who die in motorcycle-related collisions are often male, young, and invariably the breadwinner. This epidemic of two-wheelers is feeding into the poverty cycle and needs to be stopped in its tracks.

Governments need to strengthen their road safety motorcycle initiatives and commit to putting in place and enforcing the best road safety laws, standards and improved trauma care. In particular, there should be a good helmet standard and the capacity to test helmets to reduce the splurge of poor quality (and potentially dangerous) helmets that flood into countries.

The private sector should step up to the plate and offer free helmets (for riders and passengers) with every motorcycle – why should the onus only be on the user? Seatbelts come with a vehicle – you don't have to pay more for them, so why don't helmets come with motorcycles?

And finally, the road user needs to be made aware of all the potential dangers and how they can be part of the solution. They should be provided adequate training and technology to mitigate collisions and provide post-crash care and support.

Research conducted in Kenya is a critical key to understanding the drivers and challenges of the motorcycle problem. More African countries should consider replicating such studies, including the users in focus groups to understand the problem better and identify solutions.



DR MARGIE PEDEN

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EXECUTIVE SUMMARY



In Kenya, rapid growth in the number of motorcycle taxis in the last two decades is continuing, with a reported 2.2 million registered bodabodas currently on the road. Kenyan citizens make over 22 million journeys every day, and collectively riders earn more than US\$100 million daily (C&G, 2022) providing an essential source of income predominantly to men under 35. Motorcycle taxis have transformed mobility in both rural and urban areas, providing more affordable access to essential services, education and employment. This does however come at a high cost with an increasing risk to users, from a personal safety point of view.

Efforts to reduce road traffic deaths and injuries continue to fall short of the targets set by the United Nations' second Decade of Action for Road Safety 2021-2030, particularly in low- and middle-income countries.

An increasing proportion of traffic fatalities and injuries are motorcycle-related and nowhere is this more evident than in Kenya. Motorcycle users made up 35% of all Kenyan road deaths in 2023 (NPS, 2024) with low helmet prevalence considered to be a principal reason for this, despite robust legislation.

This study therefore sets out to understand more about helmet usage, and the impact of motorcycle related deaths and injuries, and to build a case for immediate action to strengthen the enforcement of the Kenyan motorcycle helmet standard.

THE HUMAN COST

In an observational study, as part of this research, carried out on selected high-risk roads in Nairobi, 63% of bodaboda operators were seen to be wearing helmets and only 15% of pillion passengers with areas under greater surveillance from the police showing higher rates of helmet compliance. During discussions, operators confirmed that enforcement crackdowns were the primary influence on whether or not to wear a helmet. This was not the case with pillion passengers, for whom the law states that they should be provided with a helmet by the bodaboda operator. Their dislike of helmets stems mainly from concerns about hygiene and aesthetic reasons. In effect the law exonerates passengers from that responsibility placing the onus on the rider.

Head injuries are the leading cause of hospital admission, representing more than one third of all injuries (35%) according to hospital records. Records from two selected hospitals in Nairobi showed almost 1,000 individuals injured in motorcycle crashes in an 18-month period. Most victims were under the age of 35 years, with bodaboda operators (62%) being more frequently injured than pillion passengers. Six per cent of victims lost their lives while undergoing treatment, however, those that die at the scene are not captured in the records and limited data exists linked to these fatalities.



Four injury types are recorded of which injuries to the head and limbs were the most common (69%), with 24% of patients experiencing more than one type of injury. The mean length of hospital stay was 18.12 days, with almost 28% of patients spending more than three weeks in hospital.

THE ECONOMIC COST

The cost of treatment is generally passed on to patients. For the approximately 14 million members of the National Health Insurance Fund (NHIF), each making monthly payments of just over US\$3, a proportion of their expenses is covered. Those that are not part of the scheme are forced to rely on loans, in some cases thousands of US dollars, from family and friends.

In addition, there is considerable cost to the country. While there is no data specifically related to the national economic burden that motorcycle crashes represent, a World Bank study (2020) revealed the burden of road traffic injuries collectively to be approximately US\$6.5 billion.

The most expensive forms of treatment relate to head and limb injury types which are the most common amongst motorcycle users. Personal testimonies

revealed bodaboda operators with healthcare costs equal to 4.5 years' worth of salary. Many riders were unable to return to work for more than one year after the crash.

HELMETS

In depth qualitative studies with bodaboda riders involved in crashes highlighted conflicting perceptions around helmet safety. Most reported wearing helmets but had a mixed understanding of helmet safety and the role of helmet standards.

Only 14% of riders were confident that they were wearing quality helmets and reported basing this on the fact that the Kenyan Bureau of Standards standardisation mark was attached to the helmet when purchased. Riders in general reported only wearing helmets to 'avoid being stopped by police' and for this reason, they purchased cheaper, poor quality helmets.

This report identifies both a lack of public awareness around helmet safety and its importance, particularly those with safety standard markings, as well as a lack of understanding of the types of helmets sold and their levels of protection.



RECOMMENDATIONS

The finds of the report lead to a series of recommendations identify the following needs:

- Strengthen data collection, which is a significant constraint to determining the scale of the current problem;
- Greater awareness on the part of bodaboda operators around helmet safety;
- More financial and political investment towards prioritising helmet compliance and
- The establishment of a helmet testing laboratory, the first in East Africa, to address substandard helmets which fail to protect riders from serious injury.

One thing is clear, this epidemic needs the commitment of multiple sectors to work together collaboratively to address motorcycle safety and to save the lives of millions of Kenyan citizens who rely on this mode of transport every day.



INTRODUCTION

GLOBAL CONTEXT

According to the World Health Organization's Global Status Report on Road Safety (2023), road traffic deaths have reduced to 1.19 million globally in 2021. Most of the gains, however, have been recorded in Europe with nine out of ten deaths occurring in low- and middle-income countries. People in low-income countries continue to face the highest risk of death per population.

Efforts to reduce fatalities continue to fall short of the target to halve deaths, as part of the United Nations Decade of Action for Road Safety 2021-2030. This underpins the need for urgent action to reinforce road safety efforts to achieve these targets with this global health crisis continuing to present a significant burden on households and health systems in countries which can least afford it.

The most vulnerable road users continue to be pedestrians, cyclists and motorcyclists all of which groups face an acute and rising risk of death in sub-Saharan Africa (WHO, 2023). These groups account for 73% of traffic deaths and of these, 35% are motorcyclists and pillion passengers across the region. The scale is such that some hospitals in Kenya have even been forced to set aside entire wards specifically for motorcycle crash victims.

ROAD SAFETY IN KENYA

In Kenya, the National Transport and Safety Authority (NTSA) reported a slight drop in the total number of road traffic deaths in 2023 (4,324) when compared to 2022 (4,432). However, the WHO estimates Kenya's road traffic crash fatality rate at 28 per 100,000 population translating to an annual road death toll of 14,926 (WHO, 2023) indicating that many incidents are going unreported.

In Kenya and an increasing number of countries in sub-Saharan Africa, the rise in road traffic deaths is exacerbated by the growing use of motorcycle taxis, known locally as bodabodas, as a form of informal public transport.

THE GROWTH OF BODABODAS

Over the past two decades, the bodaboda industry has experienced rapid growth in Kenya, attributed largely to the availability of low-cost motorcycles from China and India for commercial use (Bishop and Courtright, 2022) and high levels of unemployment amongst young men, many of whom have become bodaboda operators as a source of income (Peden et al., 2004).

Demand from passengers sustains this growth with motorcycle taxis providing a fast, efficient



and relatively affordable alternative to walking and cycling (Bezabeh et al., 2022; Nyachio, 2013). In both rural and urban areas, it is no exaggeration to say that powered two-wheelers have transformed mobility, providing better access to essential services such as healthcare and education and employment opportunities.

The evolution of motorcycle taxis in Kenya stems firstly from bicycle taxis transporting people across the Uganda/Kenya border in the mid-1990s. The transition to motorised two-wheelers came soon after, helped in Kenya by zero-rating import duties for motorcycles up to 250cc in 2008, making them far more affordable.

In addition, population growth in urban settings has placed pressure on public transport systems. It has resulted in high levels of congestion, particularly evident in East Africa in cities such as Dar es Salaam, Kampala, and Nairobi as well as the rise of app-based booking systems.

The International Road Federation (IRF) reported approximately 2,258,800 motorcycle taxi operators in Kenya in 2021, a figure which has almost doubled since 2017.

MOTORCYCLE SAFETY

This growth has, as expected, come at a cost. In Kenya, of the 4,324 road traffic fatalities reported in 2023, motorcycle-related deaths made up 35% (1,526), and this number is expected to grow.

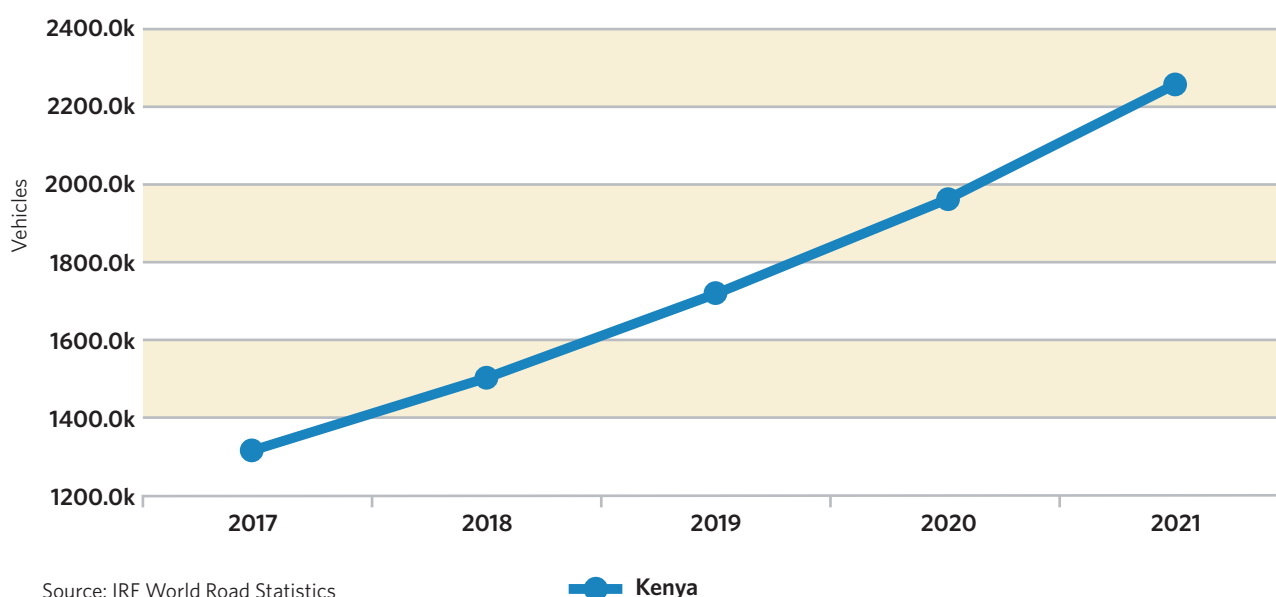
TABLE 1: Road traffic fatalities, Kenya, 2023 (NPS, 2024)

Category	Number of Victims	Percentage
Pedestrians	1,591	36.8%
Drivers	382	8.8%
Passengers	739	17.1%
Pillion Passengers	393	9.1%
Pedal cyclists	86	2.0%
Motorcyclists	1,133	26.2%
TOTAL	4,324	100%

Motorcycle-related road traffic crashes lead to a loss of income at a household and a national level. In many cases, the person(s) involved in motorcycle crashes is often the principal 'breadwinner' in a family and the loss of income can have long-term consequences on families, as can the care requirements, and the costs associated with hospitalisation and rehabilitation (Durodola et al., 2019). Consequently, the notable increase in motorcycle road traffic injuries in Kenya places a heavy burden on low-income families and communities as well as the health system in general (Opondo et al. 2018).

There is no existing data linked specifically to the economic burden that motorcycle injuries place on health services in Kenya. This lack of data is evident throughout limiting an ability to link the severity of injuries to whether or not the rider was wearing a helmet at the time. The GRSF (2020) reports that in 2016 the cost of road traffic crashes collectively was 9.1% of the country's GDP.

FIGURE 1: Growth in registered motorcycles in Kenya 2017-2021 (IRF, 2022)



KENYAN MOTORCYCLE LEGISLATION

In many ways this rapid growth has outpaced the Kenyan government's ability to regulate the industry effectively raising significant concerns about safety, especially considering the increasing proportion of road traffic fatalities in Kenya which are motorcycle-related.

However, much has been done to ensure that the legislation has caught up, and reflects the current situation on Kenya's roads concerning motorcycle taxis. Most consider the current legislation, the Traffic Act (2015) and the National Transport and Safety Authority (Operation of Motorcycles) Regulations (2015), to be robust and stronger than other countries in the region.

The legislation refers to the Kenyan helmet standard (KS_77), which has been in place since 2012. It is a requirement that all helmets in Kenya, including those imported into the country, comply with the national standard which the Kenya Bureau of Standards enforces.

With every motorcycle purchased, the retailer is obliged to supply two helmets, and two reflective jackets to the motorcycle owner. If the bodaboda operator is not the owner of the motorcycle, the owner is required to pass the helmets and reflective jackets to the person operating the motorcycle.

Every motorcyclist must wear a helmet and a reflective jacket while operating a motorcycle. The motorcyclist must also provide a similar helmet and jacket to the passenger, who must also wear them.

Despite having this legislative framework in place, helmet prevalence is low among bodaboda operators and even lower among pillion passengers. This indicates that efforts to support more vigorous enforcement are still required to overcome this barrier to achieving the goals of creating a safe and sustainable motorcycle taxi sub-sector. In addition, the helmet market is dominated by sub standard helmets imported from outside the country. They present a more affordable option for motorcycle users, however, they provide limited protection in the event of a crash.

THIS STUDY

While recognising the limitations with regards to access to data, this study sets out to understand helmet usage, and the scale and impact of motorcycle related deaths and injuries, to highlight the urgent need for immediate action to strengthen the enforcement of the Kenyan motorcycle helmet standard to help reduce the number of deaths and serious injuries linked to low helmet prevalence.



METHODOLOGY

OBJECTIVES

The study had the following objectives:

1. To understand helmet usage levels amongst bodaboda operators and pillion passengers;
2. To analyse hospital records of people involved in motorcycle crashes to determine associated healthcare costs;
3. To learn the implications of being involved in a motorcycle crash from victims.

OBSERVATIONAL STUDY

An observational study was conducted to determine helmet usage rates on five selected high-risk roads¹ in Nairobi including Mombasa Road, Kangundo Road, Outer Ring Road, Jogoo Road and Thika Road. The observations were conducted at different times of the day (10 am-12 Noon, and 1pm-3 pm) and on other days in October 2023. A total of 3,415 motorcycle users (operators and passengers) were observed.

In addition, two focus group discussions were conducted involving bodaboda operators and pillion passengers, to better understanding their reasons for wearing or not wearing protective helmets.

HOSPITAL RECORDS DATA ANALYSIS

The research team were granted access to the hospital records from two hospitals, Kenyatta

National Hospital in central Nairobi, the largest referral hospital in the country and Mama Lucy Kibaki Hospital in Embakasi, with one of the largest catchment areas, both of which had accident and emergency departments. Both are government-run facilities.

Hospital records covering a period of 18 months, from May 2022 to October 2023, were reviewed, and only the records that clearly indicated an explicit link to a motorcycle crash were used for this study the proportion of which of the total records is unknown. Where possible, health outcomes, hospital treatment and costs were collected for further analysis. A total of 992 case files were identified for this period. Care was taken to ensure the data collected excluded personal information.

PERSONAL TESTIMONIES

Personal testimonies from crash victims were gathered via one-to-one interviews at the two hospitals mentioned above and Shalom Community Hospital², a private-run facility in the Athi River area, as well as through links to motorcycle associations. A selection of these interviews contributes to case studies which tell the story of how lives are impacted as a result of motorcycle crashes. All crash victims interviewed were either out-patients or bodaboda operators involved in crashes who were identified through associations. Early on, a decision was made not to engage with in-patients to ensure that participants fully understood and provided their consent to participate in this study.

ETHICAL APPROVAL

Before commencing this study, on selection of the target hospitals, several permissions were obtained.

TABLE 2: Research permits, approvals and permissions acquired for the study

PERMITS /PERMISSIONS	INSTITUTION OFFERING
Research license	National Council for Science and Technology (NACOSTI)
Ethical review permit	Kenyatta National Hospital - University of Nairobi
Study registration certificate	Kenyatta National Hospital
Research authorisation permit	Nairobi City County
Approval to collect data	Kenyatta National Hospital Surgical Department
Approval to collect data	Kenyatta National Hospital Orthopaedic Department
Approval to collect data	Mama Lucy Kibaki Hospital

FINDINGS



MOTORCYCLE CRASHES RESULTING IN INJURY

The Kenyan National Police Service (NPS) records all reported motorcycle deaths and injuries allocating each case to one of three categories; fatal, serious or slight. While the difference between fatal and serious is relatively easy to define, the difference between serious and slight is less clear. One or other category is attributed to each individual where the duty office incurs an injury based on personal opinion.

For the period May 2022 to October 2023, figures 3-5 show a comparison in the severity of injuries incurred as a result of a motorcycle crash for both motorcycle operators and pillion passengers. The NPS data shows that 9,996 people were directly affected by motorcycle crashes during this period, with a total of 2,384 fatalities, 5,581 serious injuries and 2,031 slight injuries. Based on this data, the most likely outcome for motorcycle users hurt in a crash is to incur a serious injury (56%), the second most likely outcome being death (24%). However, it may be the case that slight injuries are less likely to involve the police and not need hospital treatment.

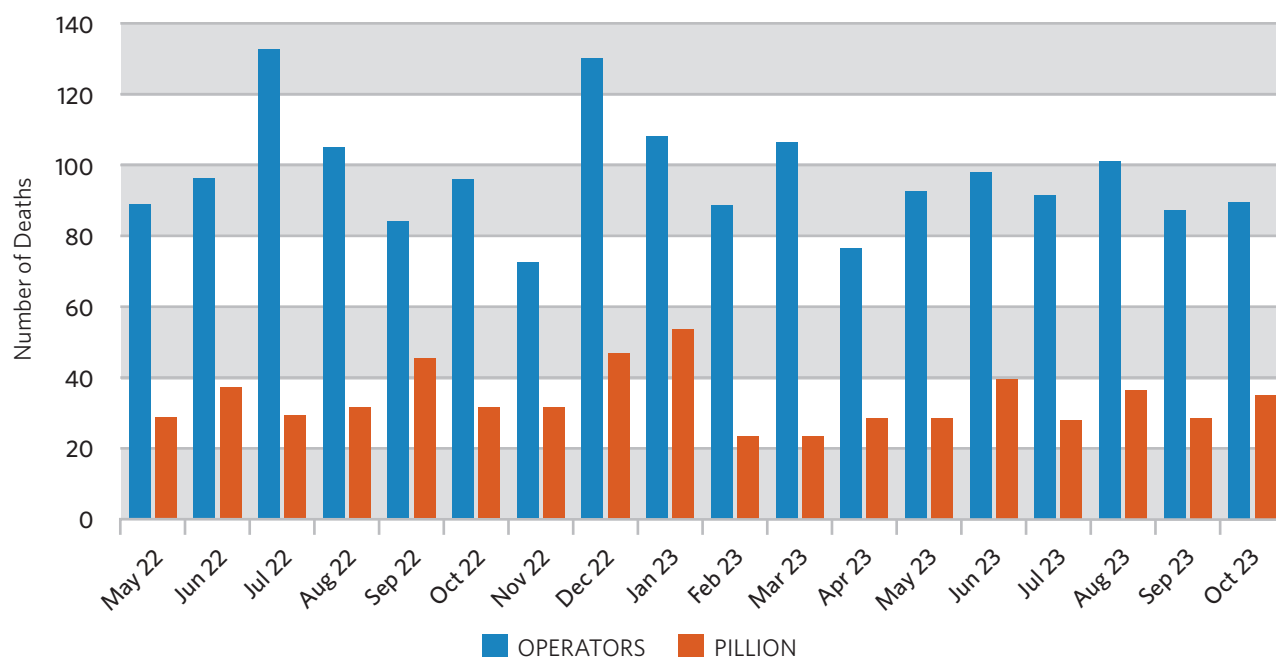
FIGURE 2: NPS Categorisation of motorcycle injuries (NPS, 2024)



It should be noted here that this data does not include other road users that were killed or injured as a result of a motorcycle crash as the detail of how they were hurt is often not recorded.



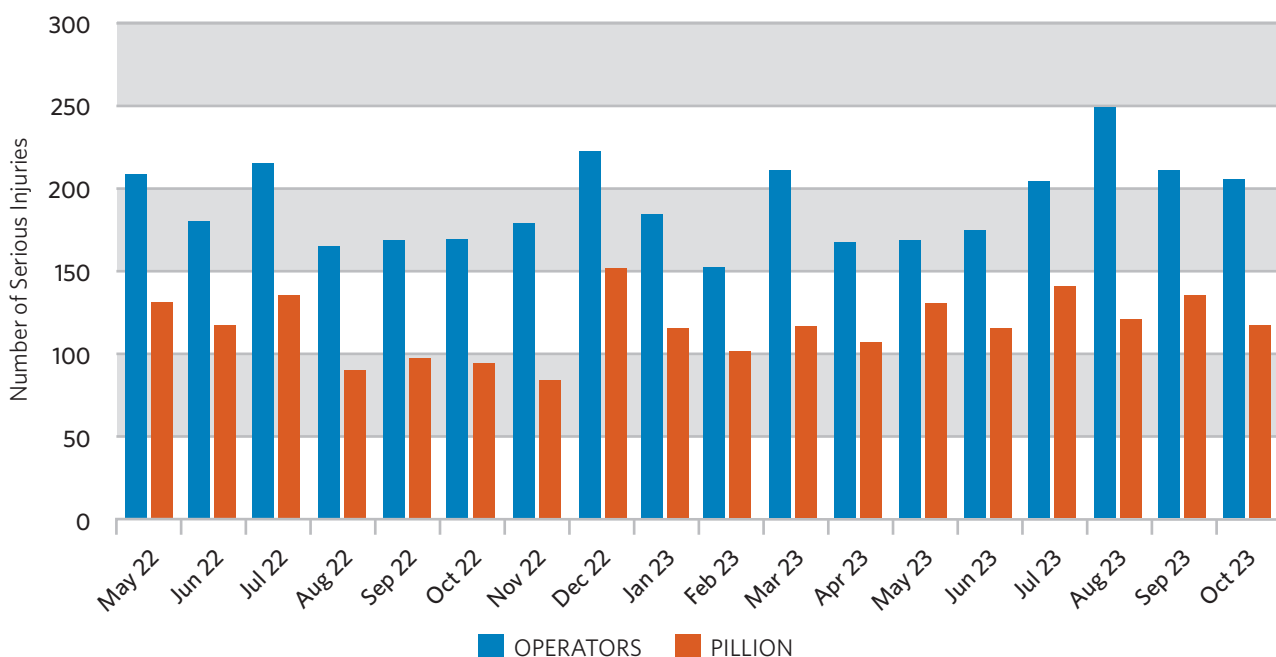
FIGURE 3: Comparison between operators and passengers - Deaths



The data shows that when comparing pillion passengers and bodaboda operators, the latter are more likely to die as a result of a motorcycle crash, constituting 74% of the total number of deaths recorded during the 18 months. There is an

evident peak in fatalities for both operators and passengers during December, which could be linked to the holiday season, or equally to the warmer weather at this time which might result in a reluctance to wear the appropriate protection.

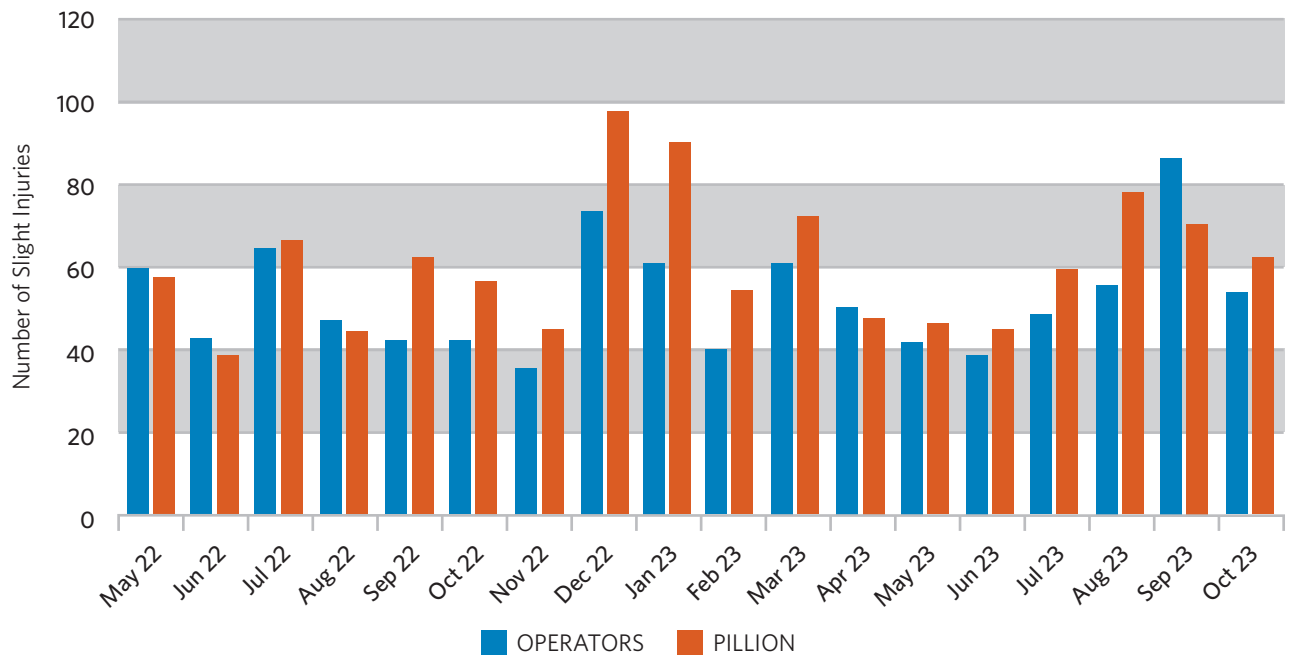
FIGURE 4: Comparison between operators and passengers - Serious Injuries



As with fatalities, operators (62%) are more likely than passengers to incur a serious injury in the event of a crash, with a similar pattern of peaks during the period

in question. It's difficult to ascertain whether these peaks are problematic year on year without more data to establish a trend.

FIGURE 5: Comparison between operators and passengers - Slight Injuries



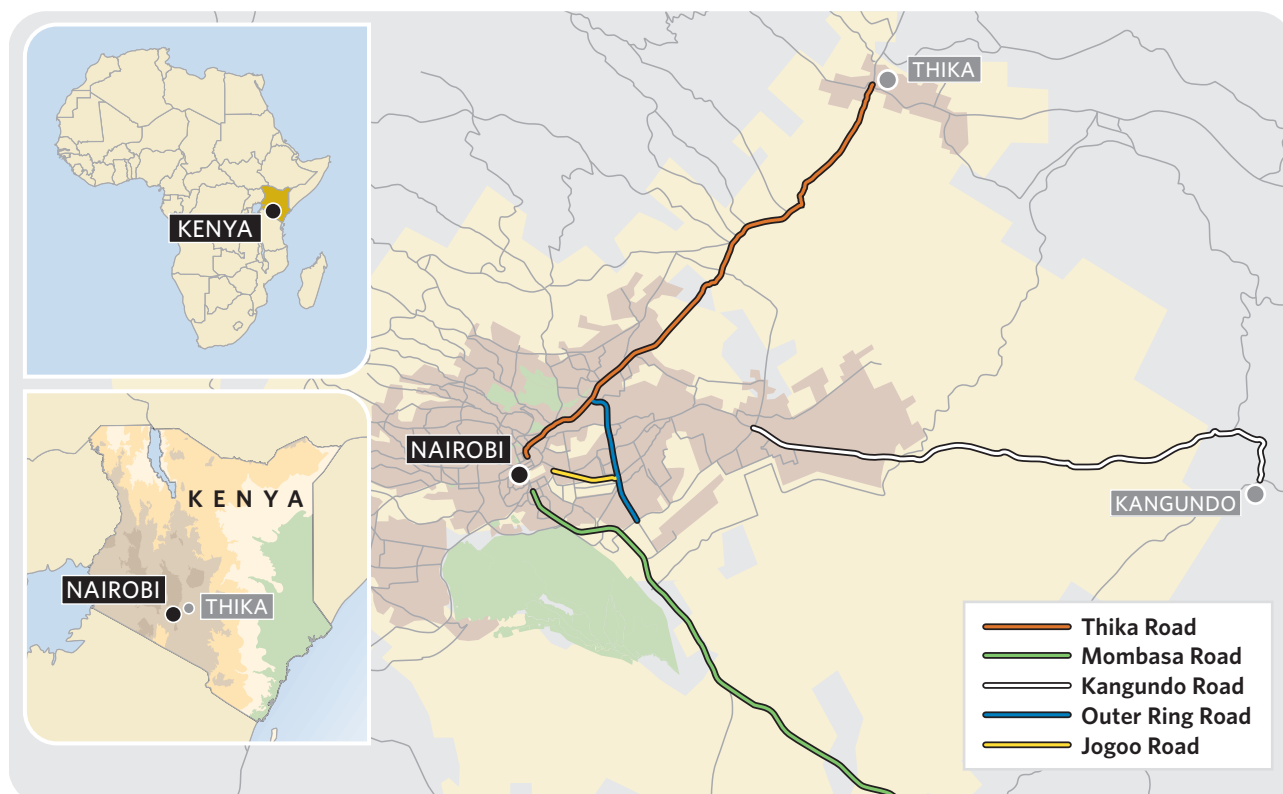
The only category of injury which pillion passengers are more likely to incur in the event of a crash are what the NPS call 'slight' injuries, which are less likely to lead to longer-term consequences such as ongoing treatment and the associated costs of that treatment, as well as loss of income through not being able to work.

TABLE 3: Categories of injury according to severity - May 2022 to October 2023 (NPS, 2024)

DATE	MOTORCYCLISTS			PILLION PASSENGERS		
	FATAL	SERIOUS	SLIGHT	FATAL	SERIOUS	SLIGHT
MAY 2022	89	211	59	30	130	58
JUNE 2022	97	182	43	37	118	39
JULY 2022	133	217	64	30	136	66
AUGUST 2022	106	166	47	32	91	45
SEPTEMBER 2022	85	170	42	46	98	62
OCTOBER 2022	97	171	42	32	96	56
NOVEMBER 2022	74	180	35	32	85	45
DECEMBER 2022	131	223	72	47	154	97
JANUARY 2023	109	187	61	54	115	90
FEBRUARY 2023	90	155	40	25	103	54
MARCH 2023	108	212	61	24	116	72
APRIL 2023	78	170	50	30	107	48
MAY 2023	94	170	42	30	128	46
JUNE 2023	99	176	39	40	116	45
JULY 2023	93	205	48	29	145	59
AUGUST 2023	102	250	55	37	123	79
SEPTEMBER 2023	88	213	85	30	136	70
OCTOBER 2023	91	207	53	35	119	62
TOTAL	1,764	3,465	938	620	2,116	1,093

OBSERVATIONAL STUDY

FIGURE 6: Study site selection for observational study



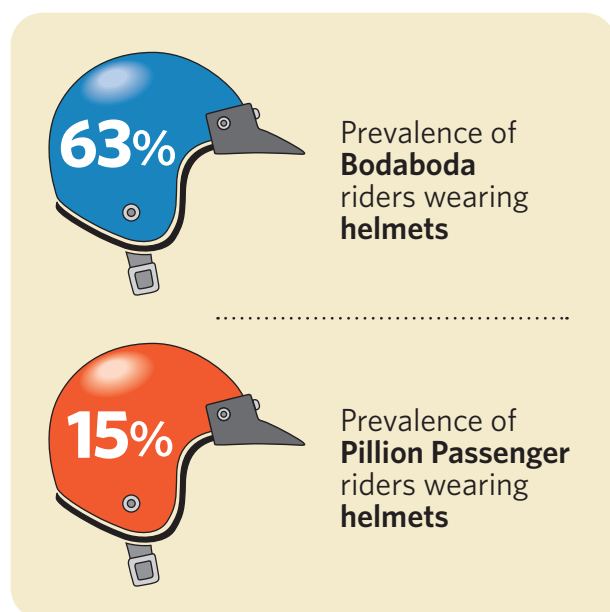
The results of the observational study provide insights into helmet usage that are not captured by hospital records, most notably, whether motorcycle road crash victims are

wearing helmets at the time of a crash. It should be noted that this observational study did not ascertain whether helmets used conformed to the national helmet standard.

TABLE 4: Helmet usage by bodaboda operators and pillion passengers in five locations in Nairobi

LOCATION	BODABODA RIDERS			PILLION PASSENGERS		
	HELMET	NO HELMET	TOTAL	HELMET	NO HELMET	TOTAL
Mombasa Road	403 (65%)	217 (35.0%)	620 (100.0%)	102 (20.9%)	385 (79.1%)	487 (100.0%)
Kangundo Road	293 (57.5%)	217 (42.5%)	510 (100.0%)	40 (12.3%)	286 (87.7%)	326 (100.0%)
Outer Ring Road	130 (56.5%)	100 (43.5%)	230 (100.0%)	16 (9.9%)	146 (90.1%)	162 (100.0%)
Jogoo Road	156 (62.4%)	94 (37.6%)	250 (100.0%)	23 (13.5%)	148 (86.5%)	171 (100.0%)
Thika Road	296 (70.5%)	124 (29.5%)	420 (100.0%)	22 (9.2%)	217 (90.8%)	239 (100.0%)
TOTAL	1278 (63.0%)	752 (37.0%)	2030 (100.0%)	203 (14.7%)	1182 (85.3%)	1385 (100.0%)

Nearly two-thirds of bodaboda operators (63%) were observed wearing helmets while riding. Helmet prevalence varied between locations, with the Outer Ring Road having the lowest rates of helmet usage by operators at 56.5% while Thika Road had the highest helmet usage by motorcycle riders at 70.5%. There are several likely explanations for variations in helmet prevalence according to location, not least the fact that the Traffic Police Head Quarters is located on Thika Road.



Observations revealed that the location of the Traffic Police HQ inevitably led to more frequent episodes of surveillance carried out by police, leading to higher helmet usage levels by operators than in other locations. In addition, Thika Road is a high-speed major trunk route where bodaboda operators say they perceive themselves to be at greater risk of crashing compared to other locations, primarily intra city roads.

Law enforcers from the National Police Service support this finding:

“Helmet use also depends on localities. In urban areas like Nairobi there is a 50-60% use but in the rural areas usage is about 20%.

Helmet use also depends on the distance covered. Most riders do not use helmets when driving for short distances.

NPS

“There is low helmet use on the part of riders (bodaboda operators). Some of them even wear it halfway on the face. Some of their helmets are dirty and so it discourages them from wearing them. Most of them purchase the helmets but do not wear, instead they just carry on the motorbike just to show the law enforcement officers that they have it.”

NPS Officer

Discussions with the NPS revealed them to be under resourced and hopeful that the Bodaboda SACCOs (or cooperatives) represent a solution to stronger enforcement through self-regulating their member riders, as long as they receive the support they need from the NTSA. Bodaboda riders are more often fined for not being able to provide licences or proof of insurance rather than for now wearing a helmet.

Helmet usage among pillion passengers was significantly lower than among operators with only 15% of the 1,385 passengers observed wearing a helmet while on a motorcycle.

Interestingly, Thika Road had the lowest rate of helmet usage at 9.2% while Mombasa Road had the highest helmet usage amongst passengers. It should be remembered here that the law emphasises the responsibility of the operator to provide the passenger with a helmet, therefore absolving the passenger’s responsibility, although operators seem more concerned that they comply with the law than their passengers perhaps the perception being that passenger compliance is lightly policed.

“Most of the pillion passengers do not use helmets as they say the helmets are dirty. Many of the ladies do not wear helmets due to the health reasons they say, and riders do not offer any helmets. Most of the riders have only one helmet on their motorbikes.”

NPS



“Many passengers do not wear helmets due to the distance travelled. The shorter the distance, the lower the rate of use.”

NPS

The NPS state that low helmet use can also be attributed to limited enforcement:

“Mostly during operations, the riders wear their helmets, but after the operation is over, it is back to business as usual.”

NPS

Interviews with the NPS reveal that enforcement drives can be periodic and reactive to particular incidents such as a spike in the number of motorcycle crashes in a given area. This implies a lack of consistency in the way helmet use is enforced, with it being tolerated at times when accident rates are low.

When questioned, the police officers demonstrated a knowledge of the Traffic Act regarding motorcycle use, but limited understanding of the national helmet standard, which raises questions about their ability to identify counterfeit poor-quality helmets which are non-compliant.

OPERATOR AND PASSENGER FOCUS GROUP DISCUSSIONS

Discussions with a group of 13 bodaboda operators and eight pillion passengers, on Mombasa Road and Thika Road revealed broad agreement with previous statements made by the NPS.

Bodaboda operators stated that the primary reasons for wearing a helmet were linked to enforcement crackdowns in certain areas, particularly in Nairobi's city centre. Longer distances and wet weather are perceived as presenting greater risk to the rider, therefore on such occasions, helmets are worn. In a minority of cases passengers insisted that they wear a helmet.

Enforcement is a recurrent influencing factor regarding whether or not a motorcycle user decides to wear a helmet, indicating that more vigorous

enforcement would lead to an increase in helmet prevalence. Otherwise weather conditions are key – heavy rain, dust, cold weather, as is the speed of travel – whereby helmets are used to protect the rider from insects and debris on the road.

Passengers repeatedly stated that they are rarely provided with a helmet by bodaboda operators, with most having only one helmet. Also of concern was hygiene which most claiming that where the operator did have a helmet for the passenger, they were either unclean or didn't want to wear the helmet for fear of 'spoiling their hair'. This claim was repeated by the motorcycle victims that the research team spoke to putting the onus on the operator to provide the helmet, as does Kenyan law.

RETROSPECTIVE HOSPITAL DATA ON MOTORCYCLE INJURIES

The total number of records extracted where patients were involved in the motorcycle crash was 992. The level of detail on patient records varied, which is why, in some of the tables below, the total number of records is fewer than 992.

Age and Gender

Of the 992 patient records, 968 contained information about the patients age and gender.

Ninety-one per cent of patients were male, with an average age of 31 years old. Similarly, the average age of female patients was also 31 years. As expected, the majority of victims were in the lower age brackets for both women and men, 68% of women and 75% of men being 35 years or under; this mode of transport is considered to be more accessible to young people, both operators and passengers.

TABLE 5: Age and gender of motorcycle victims

AGE	FEMALE	MALE	TOTAL
<18 years	10	64	74
19 - 25	24	233	257
26 - 30	19	190	209
31 - 35	7	174	181
36 - 40	8	88	96
41 - 45	10	42	52
46 - 50	2	35	37
51 - 55	3	23	26
56 - 60	3	13	16
61 - 65	1	8	9
>66 years	1	10	11
Total	88	880	968



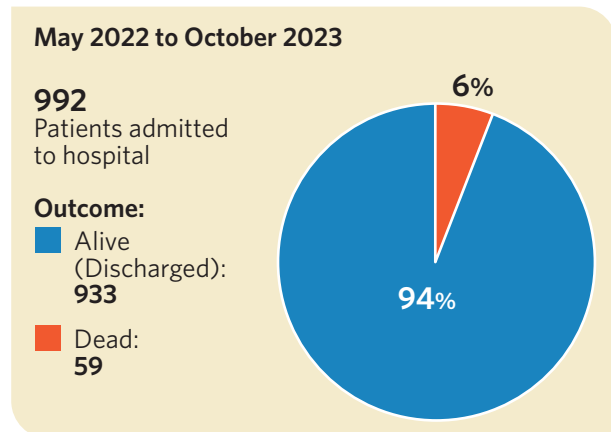
Death and injury can be said to have a more significant impact when it involves young adults particularly in terms of consequences at the household level. Long-term injuries or conditions that require ongoing treatment and the associated medical costs can drive families deeper into poverty.

Health Outcomes

From the hospital records, the only health outcome recorded for patients admitted to hospitals is dead or alive when discharged. Unfortunately, hospital records do not indicate a more detailed health outcome such as whether there are any long-lasting implications resulting from the patient's injury, for example a long-term disability.

From the data available, the records indicate that 94% of the 992 patients during these 18 months were discharged "alive", while 6% died as a result of their injuries. It should be noted that if crash victims are found dead at the scene of the crash, they will not be brought to the hospital and instead are taken directly to the mortuary. Therefore, these motorcycle crash victims are missing from the data, many being registered at mortuaries as 'accident victims' with no specific link to vehicle type.

FIGURE 7: Health outcomes of motorcycle crash victims treated at hospital



Crash Victim Type

The type of injury victim is consistent with the NPS data (2024), with a breakdown of the information provided by the hospital records showing that where an injury is incurred in the event of a crash, by far the largest group affected are the bodaboda operators (63%).





As was mentioned earlier, it is not only bodaboda operators and pillion passengers that can be involved and/or injured as a result of a motorcycle crash.

Unfortunately, national statistics omit details linked to other road users; however, as we can see from Table 6, the data gathered from the hospital records includes other road users affected, usually pedestrians. The records reveal that the majority of these were hit while walking, crossing the road, waiting to cross the road, and standing near the road.

TABLE 6: Type of motorcycle injury victim³

Type of Victim	Number of Patients	Percent
MC Pillion Passenger	144	15%
MC Rider	622	62%
Other users	178	18%
Not specified	48	5%
Total	992	100.0%

Injury Type

The most common types of injury recorded between May 2022 and October 2023 were injuries to the head (35.2%) and then to the leg(s) or arm(s) (34.1%). Both abdominal and thoracic injuries accounted for a smaller proportion of injuries at 3.5% and 2.8% respectively. Almost one-quarter of patients had incurred multiple injuries (polytrauma) (24.2%) because of a motorcycle crash.

TABLE 7: Type of motorcycle injury

Injury Type	Number of Patients	Percent
Head injury ⁴	346	35%
Limb injury ⁵	336	34%
Abdominal injury ⁶	34	3%
Thoracic injury ⁷	28	3%
Polytrauma ⁸	240	24%
Not specified	8	1%
Total	992	100%



The high proportion of head injuries sustained can be attributed to the low helmet prevalence in Kenya which has already been discussed. It could also, in part be attributed to the proliferation of substandard, counterfeit helmets which dominate the helmet market in Kenya and provide a cheaper alternative for bodaboda operators. Unfortunately, these helmets offer limited protection against head injuries, which was a challenge that the Federation Internationale de l'Automobile's Safe and Affordable Helmet Initiative tried to address.

“According to the number of patients that present to the hospital, a huge proportion lies in this category of blunt force injury and fractures.”

Health Personnel

The issue of riders not wearing the appropriate personal protective equipment is a recurrent theme during conversations with health personnel with many going further and advocating for the use of chest and knee guards, as well as helmets to minimise crash impact.

“Three months ago I was a passenger on the motorbike then we were hit by another motorbike and both the rider and I were injured. None of us was wearing a helmet.”

Pillion passenger

The issue of low helmet prevalence particularly amongst passengers extended to health personnel with one interviewee confessing to using bodabodas without wearing a helmet because the operator did not provide one.

Riders are often asked when they get to the hospital (whether or not they were wearing a helmet) but health personnel think that many lie about whether or not they were wearing helmets.

Health personnel estimate that the majority (75%) were not wearing helmets when the crash occurred.

Length of Hospital Stay

Of the 992 records, only 749 contained information regarding length of hospital stay as a result of a motorcycle crash.

Time spent by crash victims at one of the target hospitals varied with 30% of victims spending short stays of up to 24 hours (208); 55%, stays of between one and 30 days (410); and 12% of patients spending between one and two months (89). Surprisingly, according to the data more than 59% of crash victims between May 2022 and October 2023 spent at least one week in the hospital, the implications on income lost being an obvious consequence. Forty-two patients (6%) were recorded as having stayed in the hospital for longer than two months, in some cases more than 90 days.

TABLE 8: Length of hospital stay after a motorcycle-related crash

Hospital Stay (Days)	Number of Patients	Percent
1 day	208	27.8%
2 - 5	98	13.1%
6 - 10	112	15.0%
11 - 15	61	8.1%
16 - 20	63	8.4%
21 - 25	50	6.7%
26 - 30	26	3.5%
31 - 60	89	11.9%
61 - 90	22	2.9%
90+	20	2.7%
Total	749	100.0%

NB. 243 records did not have information on the length of stay.

Table 9 shows that the mean length of hospital stay was 18 days with a minimum of one day and a maximum of 406 days for hospital stays.

TABLE 9: Mean length of hospital stay duration

Number of Patients	Mean (days)	Standard Deviation (days)	Minimum (days)	Maximum (days)
749	18.12	30.1	1	406.0

As one would expect, the length of hospital stay depends on the nature and severity of the injury. Health personnel confirmed that patients not requiring surgical procedures were likely to have a shorter stay. Health personnel reported that hospital stays depend on many factors, with most cases being classed as moderate to severe.

Cost of Treatment

All hospital costs, including treatment and medical procedures, are generally passed on to the patient and their family. Health personnel reported that, on occasion, the hospital will bear the cost on behalf of patients or their families who do not have the means to pay for treatment.



“The reality is that many patients do not have the money to pay for treatment and therefore Mama Lucy Hospital regularly waives the fee. The Social Care department follows up with patients, traces relatives where needed, organizes transport, and tries to get payment from patients.”

Health Personnel

The mean stay at hospitals for motorcycle crash victims is over 18 days during which expenses are incurred in terms of healthcare costs, as well as a loss of income for that period. This is especially the case for self-employed patients such as the bodaboda operators. Therefore, the injury affects the whole family, especially if a family member becomes the caregiver which can incur a further loss in household income.

“If the patient is using NHIF⁹... the insurance foots the bills; for patients who do not have NHIF, they pay cash for their care as and when the bills fall due.”

Health Personnel

In the target hospitals, health personnel reported that the most expensive type of treatment for an injury involves a surgical intervention.

“The most expensive patients to treat are those victims with severe head injuries due to the numerous procedures involved in the treatment process”

Health Personnel

Cost of Treatment by Injury Type

Only 558, of the original 992 hospital records contained information relating to the cost of treatment for each injury category. Table 10 shows the minimum and maximum payments for each injury category by an individual.

TABLE 10: Mean cost of treatment by injury type at target hospitals

Type of Injury	Number of Patients	Mean (USD)	Minimum (USD)	Maximum (USD)
Polytrauma	128	\$1,184.74	\$92.11	\$7,312.50
Limb Injury	149	\$1,019.64	\$12.74	\$11,215.81
Abdomen Injury	25	\$771.42	\$40.35	\$2,212.29
Head Injury	249	\$771.40	\$12.74	\$20,518.06
Thoracic Injury	7	\$372.07	\$12.74	\$755.13

The data indicates that patients suffering from multiple injuries (polytrauma patients) can expect to pay the most, while patients with thoracic injuries pay the least for treatment. The mean payment for each injury type



in Table 10 is calculated by adding the costs paid by all individuals in this category, divided by the total number of individuals. Note that this only considers the cost of treatment during a patient's stay in hospital. It therefore excludes any ongoing expenses related to ongoing treatment or long-term disability.

Specific cost of treatment by the injury type

In the same way as Table 10, the mean cost per person in Table 11 is calculated by adding up all costs for different treatments per individual and then dividing it by the total number of individuals.

TABLE 11: Cost of different types of treatment by the injury type

Type of Injury	Type of Treatment Cost	Mean (USD)	Minimum (USD)	Maximum (USD)
Polytrauma	Laboratory Tests	\$91.74	\$0.00	\$1,066.95
	Radiological Tests	\$90.07	\$0.00	\$350.34
	Medicines	\$118.66	\$1.78	\$1,046.05
	Surgical Procedures	\$777.16	\$0.00	\$11,647.93
	Other	\$188.81	\$2.55	\$2,861.04
Limb injury	Laboratory Tests	\$58.05	\$0.00	\$422.96
	Radiological Tests	\$55.64	\$6.37	\$261.16
	Medicines	\$195.61	\$0.55	\$16,189.35
	Surgical Procedures	\$625.29	\$0.48	\$7,365.74
	Other	\$162.56	\$1.27	\$3,372.16
Abdomen Injury	Laboratory Tests	\$93.25	\$2.55	\$350.34
	Radiological Tests	\$81.12	\$0.00	\$212.75
	Medicines	\$126.95	\$6.40	\$773.06
	Surgical Procedures	\$305.69	\$0.00	\$1,196.21
	Other	\$201.00	\$3.18	\$1,615.13
Head Injury	Laboratory Tests	\$87.11	\$0.00	\$3,235.24
	Radiological Tests	\$75.37	\$0.00	\$450.98
	Medicines	\$123.65	\$0.24	\$1,649.89
	Surgical Procedures	\$415.00	\$1.31	\$12,463.53
	Other	\$192.02	\$0.38	\$6,986.21
Thoracic injury	Laboratory Tests	\$30.68	\$10.83	\$45.86
	Radiological Tests	\$53.00	\$7.64	\$100.64
	Medicines	\$27.59	\$3.40	\$51.66
	Surgical Procedures	\$217.02	\$30.99	\$570.23
	Other	\$100.32	\$3.82	\$277.04

Table 11 shows the costs for testing and treatment linked to each injury type, noting that the maximum costs payable for many tests and treatments are far beyond the means of many households.

The costs are in five categories, namely: laboratory tests, radiological tests, medication, surgical procedures, and other related expenses. For every type of motorcycle injury, the highest cost was for surgical procedures and

the least was radiological costs. Patients with polytrauma injuries were burdened with the highest average costs. These costs are passed directly to patients and it was reported that in some cases, patients weren't discharged until they were able to pay the full costs. For the minority of riders, all or some of the costs are covered by the National Health Insurance Fund and for others, on a case by case basis, facilities sometimes waived the fees according the patient's ability to pay.

CASE STUDIES

These case studies were gathered from 28 bodaboda operators who responded to an invitation to participate in discussions linked to injuries incurred by motorcycle crashes. The results of a brief impromptu survey are shown in Table 12.

TABLE 12. Injury audit of a group of 28 bodaboda operators

	Helmeted	Non-Helmeted
Riders involved in crashes	22	6
Injury type		
Head	8	4
Limb	20	5
Abdomen	0	0
Thoracic	0	0
Polytrauma	14	5
Length of Hospitalisation		
<1 day	0	0
<1 week	5	0
<2 weeks	4	0
<1 month	5	0
<3 months	5	2
>3 months	3	4
NHIF members	11	1

While the sample size is small, some interesting patterns emerge from the findings shown in Table 12 above. A more significant proportion of riders which were not wearing helmets suffered head injuries. Likewise, 100% of riders without helmets were hospitalised for more than one month perhaps indicating that the injuries incurred were more severe. In addition, only one of the six riders without helmets subscribed to the NHIF either indicated less concern about personal safety or a failure to make the necessary payments.

Most of the riders were wearing helmets at the time of the crash however when questioned further, only four riders were confident that they were wearing quality helmets as opposed to poor quality helmets. They concluded this due to the Kenyan Bureau of Standards standardisation mark attached to their helmets when purchased. Incidentally, all these helmets were Kenyan-

manufactured. Riders in general reported only wearing helmets to 'avoid being stopped by the police' and for this reason, they purchased cheaper, poor-quality helmets.

The vast majority of injuries were to the limbs, with comparatively minor head injuries reported. This could be linked to the fact that the chances of surviving a severe head injury are reduced which when riders were questioned, was the response that they gave. On reflection, more detailed and accurate data collected linked to victims who do not survive motorcycle crashes would add greater certainty to this conclusion. Of the 22 individuals wearing helmets at the time of the crash, nine helmets were completely destroyed indicating poor quality and limited protection. Only 6 of the 28 riders had protective clothing to wear when riding.

The following personal testimonies represent real-life stories from bodaboda operators whose lives have been impacted by motorcycle crashes both from the point of view of injuries incurred and also of the effect on their livelihoods which inevitably affects the entire family.

Here, the reader is struck by the cost of healthcare compared to the daily income that bodaboda riders receive, the serious long-term nature of many of the injuries, and the resilience of the riders and their families in dealing with the impact of injuries incurred by crashes. While change often begins with the policymaker, the riders were quick to admit that their role is equally important in making sure that Kenya's roads are safer for all road users.





CASE STUDY 1:

CALEB OLIMA

(BODABODA OPERATOR)

Caleb Olima is a 45-year-old bodaboda rider with one wife and two children who was able to purchase a motorcycle in 2013 at US\$611.50, which by his own admission was considered 'cheap' at the time. Caleb did not start working as a commercial motorcycle taxi rider until 2018. He didn't attend school as a child and was taught to ride by his brothers. His daily income as a bodaboda rider was US\$15.90 on a good day.

Caleb was riding his bike with no passengers in April 2022 in the Two Rivers area of Nairobi County. While joining a slip road on the road from Runda, Caleb was involved in a head-on collision with an approaching car that was overtaking. The impact of his head hitting the ground smashed the helmet into pieces, one of which cut into his head leaving a large scar which is still visible today.

Thankfully the head injury was superficial, however, when Caleb was taken to hospital, doctors focusing on his head injury failed to notice that he had also dislocated his knee and discharged him three days later. Three weeks later, Caleb's knee had become infected, and as a result, doctors had to replace his kneecap, which led to a three-month stay in hospital and a more extended period of recovery.

The total cost of hospital treatment came to US\$2,452.40, US\$2,420.50 of which was paid for by the National Health Insurance Fund (NHIF) which for a monthly contribution of 500 KES aims to cover health costs to prevent financial hardship.

Caleb was unable to earn an income as a bodaboda rider for 20 months after the injury. Still, thankfully, prior to the crash, he had invested in a grocery shop that supported his family while he was unable to work. Caleb has yet to regain full mobility and continues to walk with a crutch despite now returning to work as a rider.



CASE STUDY 2:

ANDREW BENSON**(BODABODA OPERATOR)**

Andrew Benson is 30 years old with a wife and two children, and until 2014, he had been working as a full-time bodaboda rider for three years. His family owns the motorcycle, and Andrew has received no formal training; therefore, he is self-taught. His average daily salary was US\$9.50 gross, before fuel and maintenance costs were taken into account.

In 2014, Andrew was travelling alone on a steep road in Kibera when a Matatu, driving in the other direction overtook a truck and collided with him head-on pulling him from his motorcycle and dragging him along the road for some distance severing his right leg below the knee. Fortunately, he was wearing a helmet, which he says probably saved his life, protecting his head from the road surface.

Andrew was taken to Kenyatta National Hospital where he received treatment, spending a total of 18 months in care. The cost of his surgery and ongoing therapy during his stay in the hospital came to US\$15,924.60, equal to more than four and a half years salary. US\$9,554.80 was paid by the driver of the Matatu with his family taking a loan out for the remaining balance.

Andrew lost his right leg and now has a rudimentary prosthetic limb. He was unable to ride a motorcycle for three years after the crash and was forced to change his career – he became a men's barber. Ten years on, he can now ride occasionally although this is limited by ongoing pain to his leg. Unable to provide money to his family for about two years after the crash, his wife and children were forced to leave home and return to their extended family outside Nairobi.

This devastating injury left Andrew with limited means to generate income and a family to care for him when he was discharged from the hospital.



CASE STUDY 3: **MOSES SIMIYU** (BODABODA OPERATOR)

Moses Simiyu was taught to ride a motorcycle by a friend before becoming a bodaboda rider nine years ago. He has since attended training at a driving school before getting his licence. He is married and has one child who is 11 years old. Moses purchased his motorcycle via a hire purchase scheme and pays daily interest payments of US\$7.50. Taking into account interest payments, as well as the cost of fuel, his daily take-home pay is about US\$1.90.

In 2018 while riding alone in Kawagware, Moses swerved to avoid a pothole in the road and was hit by an oncoming car. He was wearing a helmet at the time which minimised injuries to the head, but he experienced a significant fracture to his femur.

He was admitted to Kenyatta National Hospital in Nairobi, where he spent a total of seven months, doctors having inserted a metal rod into his thigh during surgery. The total cost of his treatment was US\$828.00, which Moses was able to raise US\$191.10 with the help of family and friends. Once the rod had been inserted, the hospital would not let him leave until the balance on his bill was paid. Social workers intervened and were able to negotiate his release, with the hospital knowing that he would have to return to remove the metal rod.

Soon after, and in excruciating pain, Moses returned to the hospital, by which time Moses had subscribed to NHIF. Doctors reopened the wound to find that the metal rod had been incorrectly placed. This mistake resulted in doctors having to shorten the injured femur bone by five inches, leaving his right leg, significantly shorter than his left. Due to concerns about escalating costs, Moses completed his treatment by going to traditional doctors.

Moses was unable to work as a bodaboda rider for one and a half years after the crash, during which time his wife was not working, and his family experienced significant financial hardship. They managed with the support of his friends. Moses still has an outstanding bill with the hospital of US\$637.00 from his first visit to the hospital immediately after the crash, which NHIF was unwilling to cover.



CASE STUDY 4:

MOSES JUMBA**(BODABODA OPERATOR)**

Moses Jumba is 32 years old, is married and has one child. He has had no formal motorcycle rider training and was taught to ride by a friend before becoming a bodaboda rider 11 years ago. He doesn't own his motorcycle, so pays the owner US\$0.30 every day and splits the daily profits with the owner. In an average day, Moses would expect to make US\$8.30 gross.

Moses also uses his motorcycle to deliver other items where required, as well as providing passenger services. On one day he was delivering khat to a customer which is highly perishable and reduces in value quickly. By his admission, this encouraged him to exceed the speed limit and as a result he was involved in a crash while in Ngara.

He sustained multiple breaks on his lower leg when hit by a car, which failed to stop at the scene of the crash. At the time, for one reason or another, Moses wasn't aware of the seriousness of his injury and continued to ride, which exacerbated the damage to his leg.

Soon after, Moses was admitted to Kenyatta National Hospital, where he stayed for 11 months of treatment and rehabilitation. Hospital costs amounted to US\$11,465.70. Unfortunately, despite being a member of NHIF, the fund only covered US\$3,185.00 of the total bill, and Moses was forced to rely on friends and take out loans to cover the remaining US\$8,280.80.

He was unable to ride his motorcycle for five years, during which time his partner left him, although he has since married. During these five years Moses was able to develop an alternative source of income by opening a hair salon.



CASE STUDY 5: **JOSPHAT BUNDI** (BODABODA OPERATOR)

Josphat Bundi is 43 years old and has been a bodaboda rider since 2013. He is a self-taught motorcycle rider, although he eventually received formal training before getting his motorcycle licence. He owns his motorcycle and earns between US\$9.60 and US\$12.70 on average every day. He has two wives and six children between six and 18 years old.

In 2018, Josphat was approaching a road junction while riding his motorcycle. A car entering the intersection failed to indicate, which led to a crash, which he now thinks would have been avoidable if he had been more careful and waited. The crash resulted in him having a clean break to his right leg.

Josphat spent one month and three days in two different hospitals. During treatment, the bone was misaligned and had to be broken a second time for it to be reset. The total cost of his treatment was US\$1783.60, of which US\$828.10 was covered by NHIF. Josphat was forced to borrow money from friends to cover the remaining balance.

He was unable to work as a bodaboda rider for one and a half years after the crash, however, fortunately, he had invested his earnings in helping his wives set up their own businesses, which limited the impact of not being able to work during this time.



CASE STUDY 6: **JONES MERABA** (BODABODA OPERATOR)

Jones Meraba is 28 years old and is married with one child who is six months old. He has been riding a motorcycle and working as a bodaboda rider since he was 13 years old. He was first taught to ride by friends, but once he reached the legal age, he underwent formal training to gain his licence. He owns his motorcycle and earns an average of US\$9.60 a day.

Jones was involved in a crash three months ago, in December 2023, although he wasn't riding his motorcycle in this incident. He was relaxing at his bodaboda stage when the driver of a passing car lost control of their vehicle and drove into the stage, hitting Jones.

Jones sustained a fractured lower left leg, a dislocated heel and some damage to his hip. He was admitted to the hospital for two days, whereby a rod was inserted into his leg. The total cost of treatment to date is US\$146.50, however, treatment is ongoing and is expected to incur additional costs. Jones' mobility is still significantly impaired, and he is forced to walk on crutches.

Jones has been forced to use all of his savings to cover the cost of the treatment so far, and recently, his wife has had to find employment. With a 6-month-old baby at home this presents several challenges and so Jones is now the primary caregiver at home. No timeline has been provided for when Jones expects to fully recover.

RECOMMENDATIONS

This study gives an overview of the current context in Kenya as far as motorcycle crashes are concerned. It highlights the potential cost to motorcycle victims when an injury is incurred in the event of a crash. The recommendations do not admonish our responsibility to invest in our safety. Still, they do also recognise the fact that more investment to strengthen enforcement is a key factor in saving lives on Kenya's roads.

RECORDKEEPING IN HOSPITALS

The process of gathering retrospective data from hospital records highlighted a critical need to digitalise these data, and to standardise how the data are recorded across all hospitals to improve access and enable more in-depth and accurate research on this important subject. In addition, there are little or no data related to the health outcome of crash victims especially in a context where many victims are terminating treatment earlier than they should due to escalating healthcare costs.

DATA COLLECTION AT CRASH SCENES

Previous studies of this kind have been limited to the United States and Europe primarily due to the availability of comprehensive, accurate data. At present, only rudimentary data are being collected at

crash scenes in Kenya. As mentioned in the findings section, there are little data related to those who die at crash scenes such as the probable cause of death. For this reason, it is anticipated that the number of motorcycle crash fatalities that occur due to serious head injuries is hugely underreported.

THE NEED FOR MORE RESEARCH

A lack of research capacity has been communicated verbally from representatives of the National Transport and Safety Authority (NTSA), emphasising the need for more good quality research as an important starting point to influencing positive change at a policy level within government.

AFFORDABLE ACCESS TO EQUIPMENT AND TRAINING

This research has highlighted how little a bodaboda operator earns in a day. Therefore, if we want riders to be safer on our roads, it is critical to consider their ability to invest in a good quality helmet, or a rider training course. For everyone working in this field, we are responsible for thinking creatively about how to keep the cost of a good quality helmet low, and how to widen the benefits of formal training to the majority of riders rather than the minority.



ENHANCING HEALTH INSURANCE CAMPAIGNS

Insurance coverage (third party public service vehicle) is required by law and puts operators in a far better position when it comes to covering the cost of healthcare in the event of a crash as this study shows through personal testimony. Sensitising riders and the public around the benefits of health insurance, and addressing the sometimes difficult relationship between insurers and bodaboda operators is an important step towards reducing the impact that healthcare costs can have in the event of a crash.

GOOD VS POOR QUALITY HELMETS

The observational study pointed to over 60% of bodaboda operators wearing helmets in Nairobi. However, one element not determined by this study is what proportion of the helmets worn comply with the national helmet standard. Operators admit to purchasing the cheapest helmets purely to be seen wearing a helmet. Still, ultimately, for the sake of their safety, they need to be given better access to affordable, good- quality, helmets which are compliant with Kenyan

law. This can be achieved by policymakers introducing legislation that supports the local manufacture of helmets and other protective gear.

HELMET TESTING CAPACITY

The helmet market in Kenya is dominated by poor quality substandard helmets imported from outside the country. Kenya is rare amongst countries in the region because it has a national helmet standard (KS_77) in place since 2012. However, without a helmet testing laboratory in Kenya, the Kenyan Bureau of Standards's ability to enforce this regulation is compromised. Establishing a helmet testing laboratory should be a priority to stem the supply of counterfeit helmets entering the country to ensure that every motorcycle user has a good quality helmet.

STREET LEVEL ENFORCEMENT

This report refers to the fact that Kenya already has the legislative framework needed to support improved motorcycle safety. However, it lacks the capacity to enforce it effectively. Less reactive and



more preventative policing, along with consistent prioritisation of helmet safety is needed as a deterrent to non-compliance.

SACCOs AS ENFORCERS

The regulations introduced in 2022 by the NTSA requiring all bodaboda operators to be members of a SACCO constituted an attempt to bring order to this industry. However, SACCOs vary in the support they offer their riders. The NTSA should work closely with SACCOs to ensure that they can play an important role in supporting their riders to comply with safety legislation, therefore supplementing current enforcement capacity.

SENSITISATION ON HELMET SAFETY

With such low take up of helmets amongst riders (particularly in rural areas) and pillion passengers, greater efforts are needed to educate motorcycle users on the importance of helmet safety and the repercussions of not investing in high quality personal protective equipment, including helmets and clothing.

NPS ROAD SAFETY SENSITISATION

The National Police Service plays an important role in providing road safety sensitisation to motorcycle users however, discussions with the NPS point to these activities often bring unbudgeted and of low priority. In addition, detailed knowledge around road safety issues within the NPS is concentrated in Nairobi, requiring a relatively small team to travel to other parts of the country to conduct sensitisation. The capacity of regional police teams should be increased, using standardised materials which prioritise helmet safety.

GREATER PRIVATE SECTOR ACCOUNTABILITY

Whether its helmet manufacturers, motorcycle assemblers, training schools or ride hailing platforms, private sector bodies with a stake in this industry have a responsibility to ensure that motorcycle users are safe on Kenya's roads. More investment in innovative ways to improve motorcycle safety should be forthcoming, as should advocacy efforts on the private sector's part to demand policies that improve safety.



CONCLUSIONS

This study, investigating the health costs of motorcycle taxi crashes, is one of the first studies of its kind specific to Kenya. Its origins respond to a communicated lack of research capacity within the National Transport and Safety Authority, and represent the efforts of key stakeholders committed to supporting the Kenyan government by providing the research needed to influence change. Given the rapid growth in motorcycle-related fatalities, a collaborative approach is critical to improving motorcycle safety nationwide.

The NTSA reported there to be 2.3 million registered motorcycle taxis in 2023, up from 1.9 million in 2021, an increase of almost 15,000 bodabodas every month supporting the employment of predominantly young Kenyan males and providing an essential means of transport to citizens in rural and urban areas. Therefore, measures to ensure the safety of motorcyclists and other road users should be implemented without delay.

It should be noted that in other studies, helmeted patients have been shown to have lower healthcare costs than non-helmeted riders (Kelly, 1991) and yet low helmet prevalence amongst bodaboda operators (63%) and pillion passengers (15%), figures which are likely to be far lower in rural areas, persists. This is the result of a lack of awareness around helmet safety on the part of the user, and a limited capacity to enforce on the part of the authorities, the consequences of which increase the severity of injuries and in parallel, drive individuals and families into financial hardship and poverty as a result of healthcare and other indirect costs.

Injuries to the head and the limbs of motorcycle crash victims are most common. They are the costliest, leading to long hospital stays and extended periods where individuals are unable to work and, therefore, generate income. Unfortunately, due to a lack of data, this study is not able to analyse ongoing costs linked to long-term care once discharged, as well as other indirect costs linked to factors such as loss of productivity, permanent disability and victim compensation. Healthcare costs alone represent a mountain to climb for many with one bodaboda rider reporting to have had treatment costs equal to four and a half years' worth of his salary.

This is to say nothing of the financial burden to the Kenyan government, its health system and the Kenyan taxpayer. While there have been no studies which specifically examine the economic burden

of motorcycle injuries, collectively, the burden of road traffic injuries is approximately US\$6.5 billion according to a study carried out by the World Bank (2020).

A strong starting point would be to work with the Kenyan government to strengthen its ability to enforce the current legislation and the existing national helmet standard. Foreign exporters are currently exploiting that lack of enforcement capacity by literally dumping substandard, counterfeit helmets on Kenya, and in every other East African country for that matter. There is a simple solution but it must be led by an informed government which genuinely prioritises the safety of its citizens.

The forthcoming Kenyan National Road Safety Action Plan (2023-2027) recognises this need for action and above all else, the need to improve enforcement. It plans to establish a helmet testing laboratory in Kenya before 2027. This is supported by a strong cadre of civil society organisations that understand the value in collaborating to address motorcycle safety through the creation of the National Helmet Wearing Coalition.

But these organisations need help. With a few notable exceptions, donors are failing to support initiatives to reduce the lives lost on Africa's roads. It is difficult to find a single person in Kenya whose life has not been directly or indirectly affected by a road traffic crash. It reduces the nation's productivity, and places additional stress on an already overstretched health system. Therefore, the value of investing in projects that make roads safer brings far wider benefits to a country's development.

We are now almost half way through the second half of the UN's second Decade of Action on Road Safety and yet road traffic fatalities are increasing in Africa. With motorcycle crashes accounting for a growing proportion of road traffic fatalities, genuine change that saves lives on Kenya's roads is needed - policies which are relevant to context and have the user's best interest at heart; robust and just enforcement which promotes compliance on Kenya's roads; better access to support, whether it be information, or affordable quality training and protective gear. This requires collective action from organisations and agencies from multiple sectors working together to ensure that motorcycle users are equipped with the skills, knowledge and capacity to come home safely to their families at the end of every day.

REFERENCES



- Adera O (2018) Patterns of Injury in Fatal Motorcycle Road Traffic Incidents and Determinants of Fatalities at Kenyatta National Hospital and Nairobi City Mortuaries abdominal and thoracic injuries and fatalities within 24 hours URI <http://hdl.handle.net/11295/105933>. University of Nairobi.
- Bezabeh GB et al (2022) Motorcycle Safety in Africa. Abidjan, Côte d'Ivoire: African Development Bank.
- Bishop T, Barber C, Adu J, Afukaar F, Muhia G, Mwaipopo H, Kiracho E, Rettie N, Krasnolucka-Hickman A, Divall D, Porter G 2018 Enhancing understanding on safe motorcycle and threewheeler use for rural transport, Final Report, RAF2114A. London: ReCAP for DFID.
- Bishop T and Courtright T (2022) The Wheels of Change: Safe and Sustainable Motorcycles in Sub-Saharan Africa. FIA Foundation.
- Chang-Yeon K (2015) The Economic Impact of Helmet Use on Motorcycle Accidents: A Systematic Review and Meta-analysis of the Literature from the Past 20 Years. *Traffic Injury Prevention*. 2015;16(7):732-8.
- Cholo W, Odero W & Ogendi J (2023) The burden of motorcycle crash injuries on the public health system in Kisumu city, Kenya. *Global Health: Science and Practice*, 11(1), e2200197. <https://doi.org/10.9745/ghsp-d-22-00197>.
- Durodola AO et al. (2019) Family and social demographics of victims of motorcycle accidents. *International Journal of Current Research* 7(12):23650-23654.
- Global Road Safety Facility (2020) Kenya road safety country profile. World Bank Group.
- Kelly P et al. (1991) A prospective study of the impact of helmet usage on motorcycle trauma. *Annals of Emergency Medicine*. 1991 Aug;20(8):852-6.
- Kroupa J (1990) K Definici polytraumatu a polytraumatismu [Definition of "polytrauma" and "polytraumatism"]. *Acta chirurgiae orthopaedicae et traumatologiae Cechoslovaca*, 57(4), 347-360.
- Kunda H (2019) The Prevalence, Severity and Pattern of Head Injury Among Motorcycle Crash Victims At Kenyatta National Hospital URI <http://erepository.uonbi.ac.ke/handle/11295/109422>. University of Nairobi.
- Mensah J et al. (2020) Combating noncommunicable diseases in Kenya: An investment case. World Bank.
- Nyachieo G and Kayi C (2022) Gendered perspectives in mobility and safety in public transport. The case of motorcycle taxis (boda boda) in Kisumu City, Kenya. Maria Alice Nogueira (ed). In *Alternative (Im) Mobilities* (Pp). Routledge.
- Nyachieo G (2013) Creating employment through transport; the Youth and Motorcycle (Boda Boda) in Kitengela, Kajiado County. *Research Journal in Organizational Psychology & Educational*.
- Opondo V et al. (2018) Boda boda motorcycle transport and security challenges in Kenya. National Crime Research Centre Research Report No. 14.
- Peden M (2004) World Report on Road Traffic Injury Prevention. WHO/UNICEF.
- World Bank (2019) Guide for Road Safety Opportunities and Challenges: Low- and Middle-Income Countries Country Profiles. Washington, DC., USA: World Bank.
- World Health Organization (2023) Global Status Report on Road Safety, 2023.
- World Health Organization (2018) Global Status Report on Road Safety, 2018.
- Xu X, Lazar CM & Ruger JP (2021) Micro-costing in health and medicine: a critical appraisal. *Health Econ Rev* 11, 1. <https://doi.org/10.1186/s13561-020-00298-5>.

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Dr Peden holds degrees in nursing and epidemiology and is an internationally recognized injury epidemiologist. She headed the unintentional injury prevention team at WHO for 17 years leading both world reports on Road traffic injury prevention (2004) and Child injury prevention (2008). She is currently the head of The George Institute's global injury programme based at Imperial College London. She co-directs a WHO Collaborating Centre on Injury Prevention and Trauma Care.



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Sam Clark is a transport and development specialist with more than 20 years' experience in programme management linked to transport and logistics and community development. With significant experience of having lived and worked throughout sub-Saharan Africa, Sam has a proven track record as Head of Programmes with Transaid where he provides technical support to programmes, team leadership, programmatic design and implementation and monitoring, evaluation and learning activities.

ENDNOTES



- ¹ High risk according to the NTSA's National Road Safety Action Plan 2023-2027.
- ² The project team was unable to get permission to access retrospective hospital records from Shalom Community Hospital. Its selection was based on it receiving many of the crash victims from the Northern Corridor and its status as a private hospital in comparison to government hospitals.
- ³ Unfortunately, here and in many cases there was no disaggregated data by gender, likewise there was a lack of disaggregated data between operators and pillion passengers.
- ⁴ A head injury affects the brain, scalp, skull or tissue and blood vessels in the head.
- ⁵ A limb injury is defined as an injury to the arm or leg, toes or fingers, and can include broken bones, dislocations, sprains and strains and bruising.
- ⁶ An abdominal injury is an injury to the abdomen (or belly) which may also affect the small/large intestines, liver, kidneys and/or spleen.
- ⁷ A thoracic injury is an injury to the chest area which may affect the thorax, chest wall and thoracic organs such as the heart and lungs.
- ⁸ Polytrauma is a term used for severely injured patients usually with associated injuries in at least two areas of the body.
- ⁹ National Health Insurance Fund, a government run scheme to reduce financial hardship as a result of healthcare costs.



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