



PROMOTING NON-MOTORIZED TRANSPORT IN NAIROBI

A STUDY ON USERS, SAFETY, AND INFRASTRUCTURE TRENDS



Climate & Development
Knowledge Network



REPUBLIC OF KENYA

EXECUTIVE OFFICE OF THE PRESIDENT
NAIROBI METROPOLITAN SERVICES



ABOUT CDKN

The Climate and Development Knowledge Network works to enhance the quality of life for the poorest and most vulnerable to climate change. We support decision-makers in designing and delivering climate compatible development by combining knowledge, research and technical advice in support of locally-owned and managed policy processes. Kenya has been one of CDKN's priority countries since 2011. The most successful and largest investment to date is the first National Climate Change Action Plan (NCCAP 2013-2017), where CDKN provided technical assistance to develop components of the NCCAP. Currently, promoting Non-Motorized Transport as a low carbon means of transport in Nairobi is our main focus under CDKN's 'Cities' thematic area. CDKN is providing support to Nairobi City in the implementation of the NMT Policy and Masterplan through research, knowledge products and peer learning exchanges aimed at improving NMT infrastructure and influencing behavioural change.

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Front cover photos:

Cyclists (top): Critical Mass Nairobi during a pro-cycling campaign. © Critical Mass Nairobi

Pedestrians (bottom): Pedestrians on a Kenyan street. © Billy Miaron, Shutterstock

FOREWORD

In Nairobi, nearly fifty percent (50%) of all daily trips are made by walking and cycling. This makes it necessary to invest in Non-motorized transport (NMT) infrastructure. The Nairobi Metropolitan Services (NMS) will contribute towards the development of an integrated transport system that serves the needs of Nairobi residents, while safeguarding the environment. NMT provides an alternative pathway for the city. NMS supports Kenya's transport sector climate change strategy of investing in mass transit system which is complemented by NMT infrastructure for last mile connectivity and short trips.

NMT plays an important role in increasing access to basic services, decongesting cities, improving air quality and promoting healthier lifestyles. Despite NMT being the most popular means of transport in Nairobi, used by nearly half of the residents, key challenges related to poor infrastructure, safety of users and public awareness on usage of NMT facilities remain.

NMS is keen to continue with the implementation of Nairobi NMT Policy and Masterplan towards an inclusive network of NMT. Since March 2020, we have improved NMT infrastructure in the Central Business District and its close environs. Additional improvements of NMT facilities will continue in the current, and next financial years.

It is important to note that the majority of NMT users are low-income earners, often walking and cycling because they lack affordable alternatives to transport. Taking cognizance of this, my office is undertaking measures to complete the construction of NMT facilities connecting dense informal settlements to employment zones, in order to increase access and promote inclusivity.

The study on **NMT Users, Safety and Infrastructure Trends** provides answers to many questions raised about NMT and meets key data needs outlined in the NMT Policy and Masterplan. This study has examined the demography of NMT users providing a clearer understanding of user needs. It critically examines NMT safety, while synthesizing five-year crash data, and presents thought provoking information on the most unsafe roads, days and hours in Nairobi. The study also makes useful recommendations on infrastructure standards, having examined major NMT corridors in Nairobi.

This study will be helpful to Nairobi Metropolitan Services and all road agencies in prioritization of NMT infrastructure in Nairobi County, and serves as a reference to stakeholders in the sector.

I am glad to unveil the Study for public use.



Major General Mohammed Badi CBS, SS, ndc (K)

A handwritten signature in black ink, consisting of stylized, overlapping loops and a long horizontal stroke extending to the right.

Director General
Nairobi Metropolitan Services



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EXECUTIVE SUMMARY

This study was commissioned to examine Non-Motorized Transport (NMT) in Nairobi and recommend ways of improving the NMT experience. The research shows that in Nairobi **2.27 million trips per day are made by walking, and 55,000 by cycling**. Many people walk and cycle to work, largely due to **low-income levels and a lack of available alternatives**. Pedestrians and cyclists are faced with several challenges in their NMT journey: from traffic accidents, lack of green spaces and pollution, to muggings, congestion, a lack of footpaths and cycle lanes, and encroachment upon their designated lanes. The majority of these **challenges are safety- or infrastructure-related**. **NMT users account for 66.3% of traffic fatalities in Nairobi**. Pedestrians are the most vulnerable road users, accounting for 64.5% of fatalities in Nairobi, and cyclists account for 1.8% of these fatalities. 88.3% of all fatalities are males. Further investigations reveal that **10 roads in Nairobi account for 55.5% of all fatalities**. Private cars, followed by Public Service Vehicles (PSVs), are leading causes of accidents, many of which occur on Friday, Saturday and Sunday. Factors that contribute to these accidents include **speeding, careless driving and careless pedestrian crossing, lack of pedestrian crossings and poor lighting**, among others.

It is recommended that relevant road agencies undertake to:



Increase NMT infrastructure linking NMT users to neighborhoods and major employment zones, as well as providing access to essential services in order to establish **a network of NMT** (Agencies: Nairobi Metropolitan Services (NMS), Kenya Urban Roads Authority (KURA), Kenya National Highways Authority (KenHA)).



Improve the quality of existing and planned footpaths and cycle tracks, paying attention to their accessibility and usability for all, including persons with disabilities (Agencies: NMS, KURA, KenHA).



Provide continuous road safety education through multiple mediums: school curricula, television, billboards, SMS, radio (Agencies: NMS, Kenya Police/ National Transport and Safety Authority (NTSA)).



Include males as vulnerable users in road safety campaigns, in addition to women, persons with disabilities, the elderly and children (Agencies: Kenya Police/NTSA).



Target males between ages 20-44 in road safety campaigns, who account for the most pedestrian fatalities (Agencies: Kenya Police/NTSA).



Enhance enforcement of speed limits on all roads, especially the top 10 deadliest corridors (Agencies: Kenya Police).



Improve **enforcement of drunken driving laws** on roads (Agencies: Kenya Police/NTSA).



Increase **vigilance of private vehicles and Public Service Vehicles**, which cause the most accidents (Agencies: Kenya Police/NTSA)



Improve capacity to trace accident causes and the types of vehicles causing accidents (Agency: Kenya Police).



Strictly **enforce rules on designated pick-up and drop-off points** for passengers (Agencies: Kenya Police and NMS).



Improve street lighting on all major NMT corridors, and the top 10 deadliest corridors (Agency: NMS).



Increase road signs and consider alternative materials to discourage vandals from selling signs as scrap metal (Agencies: NMS, KURA, KenHA).



Provide for adequate pedestrian crossings, noting that pedestrians prefer to cross at street level rather than footbridges (Agencies: NMS, KURA, KenHA).



Cover all drainage and address storm water management along NMT infrastructure (Agencies: NMS, KURA, KenHA).



Continue to **enforce against encroachment** upon NMT spaces, especially by *bodabodas* and vehicles (Agencies: NMS, KURA, KenHA).



Provide street furniture and litter bins, increase greenery, toilets and water taps and make provision for street vending on pedestrian corridors (Agencies: NMS, KURA, KenHA).



BACKGROUND

Non-Motorized Transport (NMT) in Nairobi

Nairobi is one of Africa's fastest growing megacities, with a population of over four million inhabitants. If car-oriented planning continues to dominate, it will lock us into unsustainable carbon-intensive infrastructure and exacerbate the adverse effects of climate change. NMT, also known as active transportation and human-powered transportation, provides an alternative pathway for the city and includes walking and bicycling as well as variants such as small-wheeled transport, cycle rickshaws, roller skates, skateboards, push scooters, hand carts and wheelchair travel.

Did you know that 2.27 million trips per day are made by walking and 55,000 by bicycle in Nairobi? That translates into:

48.2%
OF ALL DAILY TRIPS
IN NAIROBI ARE
MADE BY NMT



In Nairobi, NMT users account for over 330 deaths annually, resulting in 66.3% of total traffic fatalities



**WERE NMT
USERS**

The transport sector contributes 11% of total emissions in Kenya.



This figure is projected to increase to 15% by 2030 due to a rise in the number of passenger and freight vehicles.

NMT plays an important role in decongesting cities and, hence, promotes healthier lifestyles and better air quality. Despite NMT being the most popular means of transport in Nairobi, key challenges related to poor infrastructure and air quality, safety of users, and congestion remain.

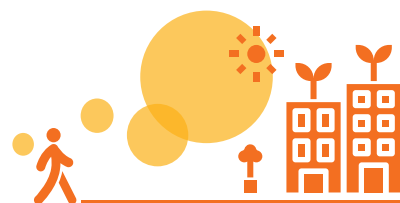
Nairobi Metropolitan Services (NMS) and the Climate and Development Knowledge Network (CDKN) have partnered to meet the following objectives:

1. Enhance the existing knowledge base on NMT in Nairobi through examining current data gaps along Nairobi's major NMT corridors.
2. Support NMS and other road agencies with ongoing public awareness initiatives on NMT facilities, usage and benefits.
3. Publish useful co-produced knowledge products that can be helpful in creating enhanced public awareness and supporting NMS in achieving its NMT objectives.

In the achievement of these objectives, CDKN carried out a study on "Promoting NMT in Nairobi: A Study on Users, Safety and Infrastructure". The purpose was to generate information that may be used to support the prioritization of future NMT projects.

The specific objectives of this report are to:

1. Characterize users on Nairobi's major NMT corridors
2. Undertake safety audits on Nairobi's top 10 deadliest corridors
3. Identify infrastructural and safety challenges faced by NMT users and how to address them
4. Identify trends that can be used in creating public awareness and support for NMT goals
5. Provide recommendations to NMS and road authorities on what to consider in future NMT development in Nairobi



METHODOLOGY

NMT surveys commissioned by the Ministry of Lands, Housing and Urban Development (now, Ministry of Lands and Physical Planning) and Nairobi City County Government were conducted by Sai Consulting International Ltd and CAS Consulting Engineers in 2016. The data was collected on the following key NMT corridors:

- Park Road (near Guru Nanak)
- Park Road (near Muslim Academy)
- Isaac Gathanju Road
- Likoni Road
- Wambui Kenyatta Road
- Lunga Lunga Road (near Likoni Road)
- Lunga Lunga Road (near Donholm)
- Komarock Road
- Muigai Kenyatta Road
- Councillor Opudo Road

The selection of the key corridors was based on a number of factors, which include:



1. Urban centers with high-volume commercial activity



2. Public transport stations (bus terminus and railway stations)



3. Neighborhood markets



4. Low-income settlements and access routes that impact the mobility of the vast population to and from densely populated areas



5. Primary schools, secondary schools, colleges and universities



6. Public service facilities (hospitals, markets, public offices, city hall)



7. Recreational hubs, like parks and green corridors



8. Completing missing links to provide connectivity between different road corridors for continuous flow

The respondents were asked questions to determine:

- The profile of respondents, including age bracket, level of education, household monthly income and bicycle ownership
- Trip purposes
- The most popular modes of transportation and frequency of use of modes
- Preference for walking/cycling
- Journey times
- Ease of walking/cycling, reasons curtailing walking/cycling and preferred changes to enhance walking/cycling

- Perception of strategies to improve walking/cycling
- Influence of fare, weather, journey time and comfort on the choice of transportation modes

These surveys were updated by NMS in partnership with CDKN in December 2020 to shed more light on the questions posed above. With a sample size of 5,374 NMT users randomly distributed across the major NMT corridors, survey respondents were profiled and interviewed about their trip's purpose, the ease of walking and cycling, and any safety concerns, among other issues. Safety audits were also conducted on the deadliest roads in Nairobi, informed by five-year crash data (2015- 2019) from the National Transport and Safety Authority (NTSA). For all surveys, data collection methods included questionnaires, observation and photographs.

CHAPTER ONE: NMT USERS

PEDESTRIANS

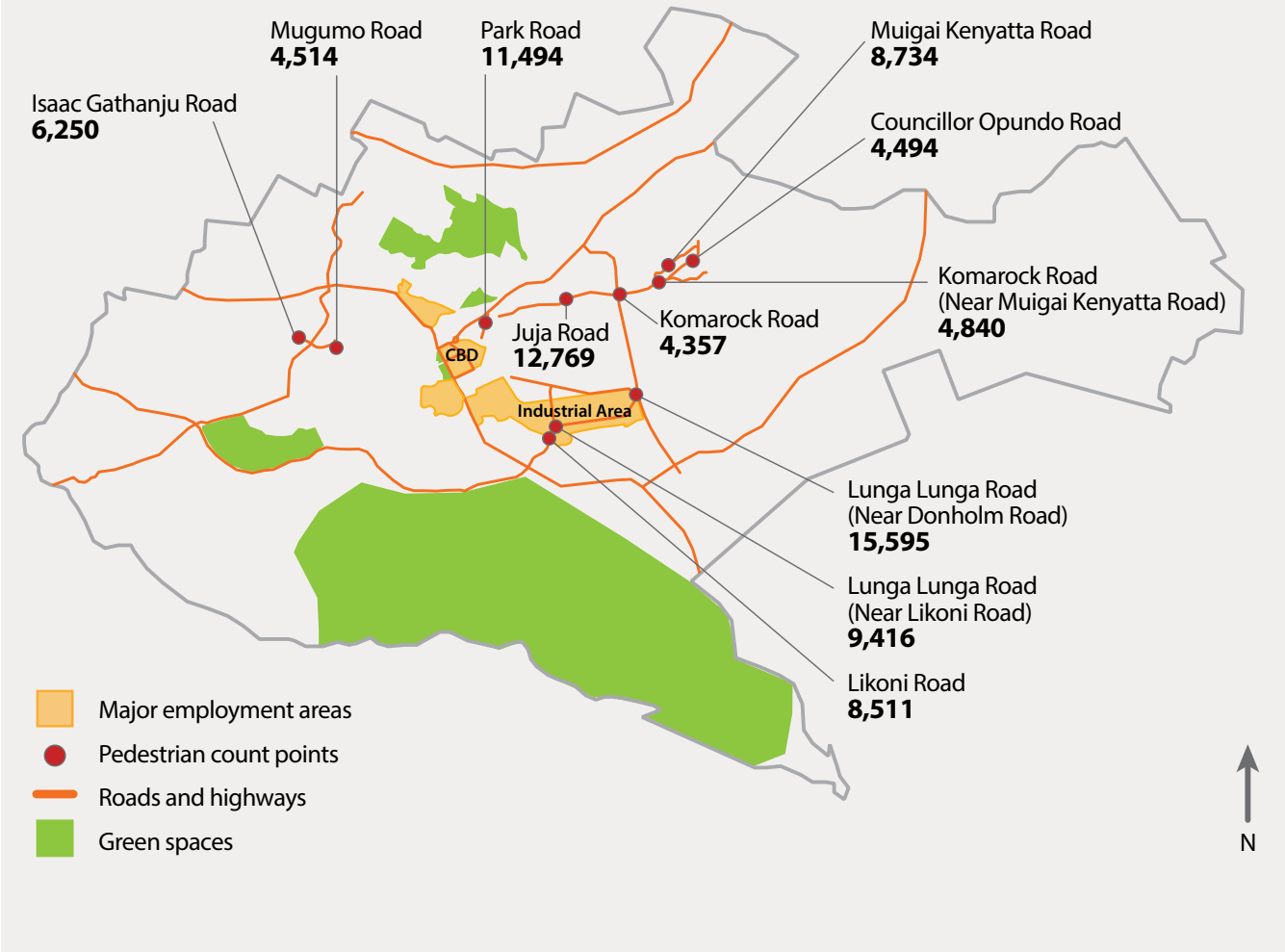
Why give walking so much prominence? Nairobi is already a walking city with almost 47% of all daily trips made on foot.

This results in 2.27 million trips made daily by walking.¹

Pedestrianization is the process of making a street or part of a town into an area that is only for people who are walking, not for vehicles or any other form of motorized transport, such as *bodabodas*. We examine the demography of pedestrians in some of Nairobi's major walking corridors to gain a better perspective of their needs. Naturally, when half of the city walks daily, one would be curious to find out the following information from pedestrians:

- Who are Nairobi's pedestrians?
- Where are they coming from and where are they walking towards?
- What services do they seek to access?
- What is the average duration of their trips?
- Do they enjoy walking?
- What challenges do they face while walking?

Figure 1: Nairobi's major NMT corridors showing number of pedestrians per day





Youth crossing the road in Westlands, Nairobi. © Open Institute, Flickr

AN OVERVIEW OF NAIROBI'S MAJOR PEDESTRIAN CORRIDORS



Eight out of the 10 major pedestrian corridors are located in the east of the city, with close proximity to the Industrial Area: a major employment zone in Nairobi.



The surveys revealed that **dust, vehicular emissions, roadside garbage, open sewage and industrial smoke are major pollutants.** Since 80% of the major corridors are in the east, many pedestrians are exposed to poor air quality – compromising their health and well-being. For this reason, it is important to prioritize the improvement of air quality, particularly in congested areas that serve as socio-economic hubs for thousands of city residents.



Pedestrian corridors have limited access to green spaces. A businessman interviewed along Lungalunga Road emphasized the need for shade and street furniture. He relayed that pedestrians tend to shelter under his business when it gets too sunny, which affects his ability to trade. Unnecessary cutting down of trees to accommodate road expansion has become rampant in Nairobi. A good example of countering this trend is the preservation of the iconic fig tree,² which was earmarked for cutting along Waiyaki Way owing to ongoing construction of the Nairobi Expressway. This demonstrates that many trees can be preserved without interfering with the construction of transport projects.



A recent audit³ of public spaces in Nairobi conducted by UN Habitat highlights the **gaps in the distribution, accessibility and quality of public open spaces** and seeks to restore Nairobi as the “Green City in the Sun.” Such initiatives, if implemented by the respective government entities, will contribute to greening efforts and improve the pedestrian experience, while creating a more sustainable and inclusive city.

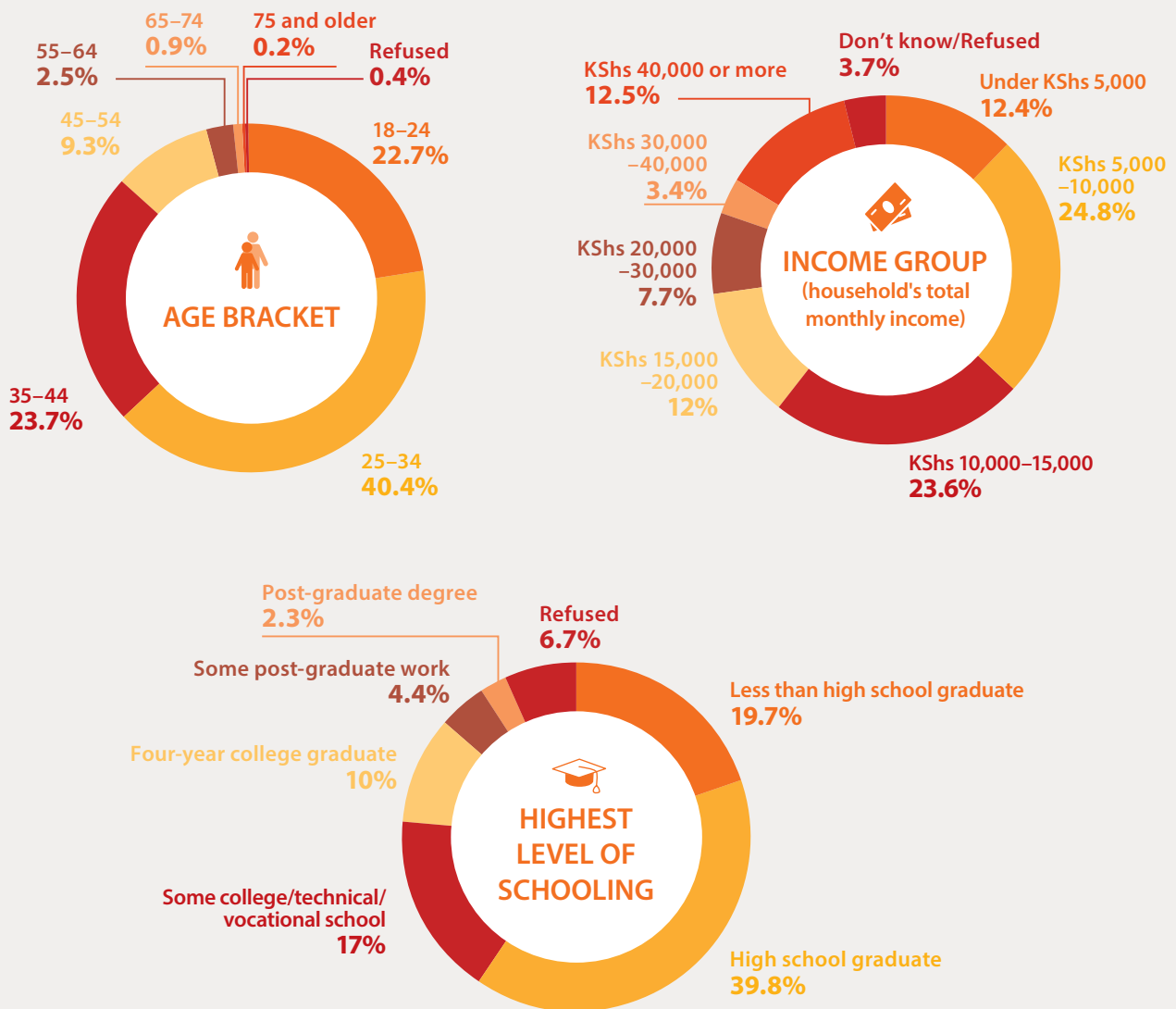
Findings from a journey mapping exercise

Survey respondents were asked to map their walking journeys to shed light on how and where their journeys begin and end. This is also known as first and last mile connectivity, which is important across all modes of transport. The trends revealed that:

- **Most journeys begin on foot,** including for those who have to walk to access public transport and *bodabodas*, and those who make their whole journey using NMT.
- Most NMT journeys in Nairobi **originate at dense residential areas and terminate at major employment areas.** For example, NMT journeys go from Kangemi to Westlands, Kibera to Industrial Area, Pipeline to Kayole and Industrial Area, Kawangware to Kilimani and Kileleshwa. All these journeys tend to cover long distances exceeding five kilometers. This implies that those from poorer, high-density neighborhoods travel very long journeys to access major employment centers. This makes them ‘time poor’ compared to those who have other mobility choices.
- **Short NMT journeys are predominantly within high-density neighborhoods.** For example, all journey mapping done in Dandora showed that origin and destination was within the neighborhood.
- Pedestrians **seek shorter routes wherever possible,** even when a longer route has better NMT infrastructure.

Attention to these trends should assist authorities as they roll out a network of NMT infrastructure that caters for first and last mile connectivity. Additionally, the trends are useful for creating an integrated transport system where users have seamless connectivity and a choice in mode of transport.

Figure 2: Profiling Nairobi pedestrians across age, education, income and gender



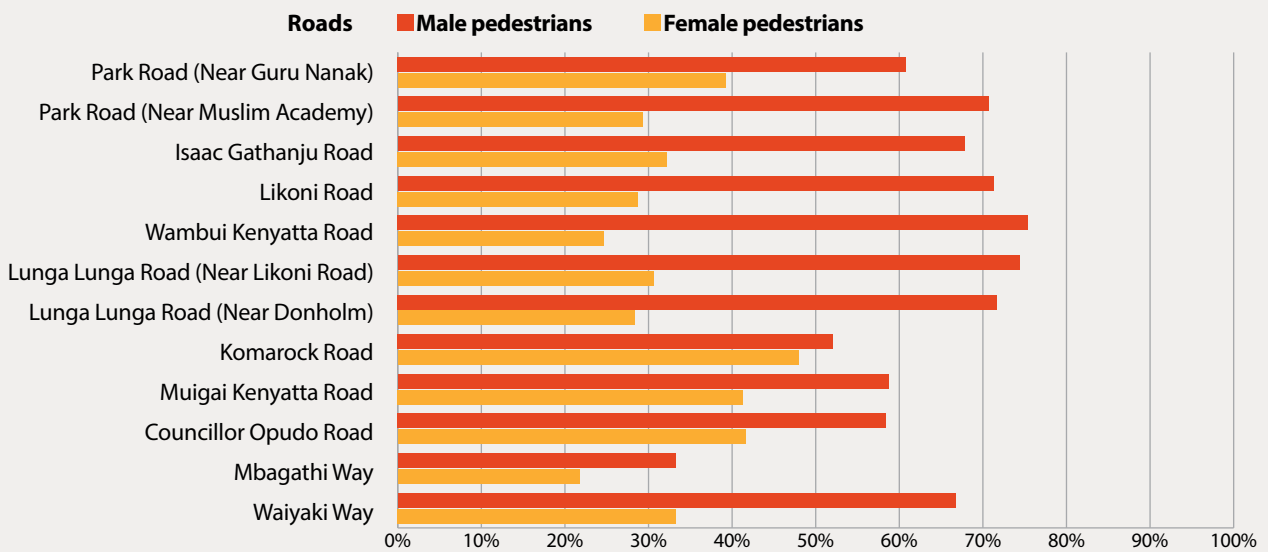
Age: The 25-34 year age bracket is the most common for pedestrians (40.4%). Of these, 86.8% of pedestrians are in the age bracket of 18-44, corresponding to the youthful population in Nairobi city. **As age increases, pedestrian numbers decrease.** In the next chapters on safety and infrastructure, we examine whether the NMT experience caters to diverse user needs, such as those of children, persons with disabilities and the elderly. This is an important facet of an **inclusive transport system.**

Income: The majority of pedestrians earn between KShs 5,000-15,000 (48.4%). This indicates that **most pedestrians are low-income earners often walking out of no choice.** To encourage those in other income brackets, **more effort is needed to shift behavioral attitudes** from viewing walking as being reserved for the poor, to viewing walking as a healthy and environmentally-friendly mode of transport for all.

Education: 73.6% of pedestrians have high literacy levels, ranging from high school graduates to holders of post-graduate degrees. This can be useful in guiding the design of communication strategies and public awareness campaigns about NMT. It is interesting to note that **as levels of education increase, the pedestrian volumes decrease.** Those with post-graduate degrees recorded the lowest number of pedestrians (2%) compared to those with high school certificates (39%). This data point may be indicative of other socio-economic factors at play, such as status or income being connected to owning a car.

Gender: All 10 corridors examined had **more male pedestrians than female pedestrians.** This could be one of the reasons contributing to **high male fatalities** recorded on Nairobi roads, details of which will feature prominently in the next chapter on safety.

Figure 3: Gender profile of pedestrians on Nairobi major NMT corridors

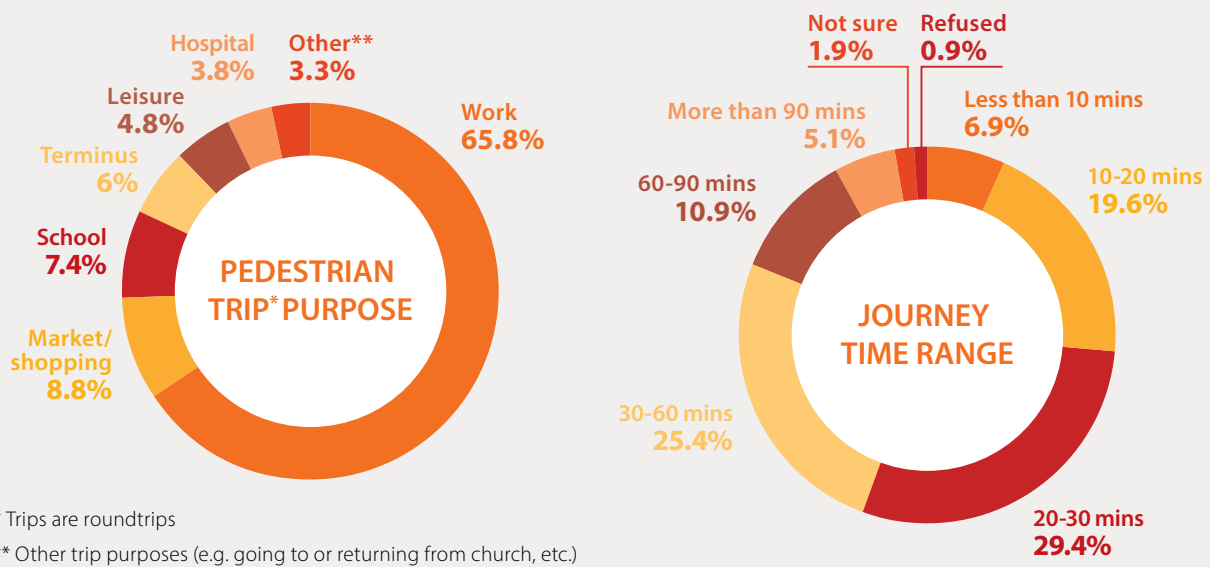


Have you heard of the 20-minute city?

The 20-minute city⁴ is about giving people the ability to meet most of their everyday needs within a 20-minute walk, cycle or local public transport trip from their home. The goal is that this combination of modes would offer a reasonable size catchment area in which people, jobs and services, including recreational opportunities and nature, are accessible. Cities designed in this way bring wide-ranging benefits. These include: less time in traffic, fewer road accidents, lower greenhouse gas emissions, reduction in noise pollution, better health from a more active lifestyle, more choices about how to travel, and more connectivity within your locality which translates into spending more money in local businesses. Originating in Portland, Oregon, the concept is gaining traction as cities across the world, such as Melbourne and Singapore, are implementing it.



Figure 4: Services accessed by pedestrians



- The **majority of walking trips are made to and from work** (65.8%), followed by shopping (8.8%).
- Most walking trips (54.8%) range from **20 to 60 minutes**.
- Morning peak hours range from **6.30am-8:30am**, while evening peak hours range from **5:00pm-6:45pm**, when most pedestrians are commuting for work. Trends regarding peak times can be useful in informing traffic-calming measures to increase pedestrian safety and decrease motorized congestion and pollution. This calls for inter-agency collaboration with NMS, the National Transport and

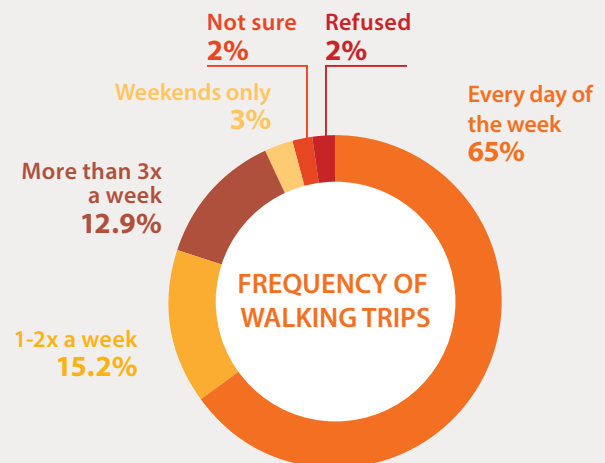
Safety Authority and the Kenya Police. These trends can also support “car-free day” initiatives by providing evidence-based information on which days and areas are most suitable to kick off these initiatives.

- A small random sample of 40 survey respondents showed that 63.2% of **women made more shopping trips** versus 36.8% of men.
- Corridors located in **middle-income neighborhoods observed more leisure walkers and joggers**, compared to those in low-income neighborhoods where very few leisure walkers and no joggers were spotted.

Frequency of walking trips

- **The majority of pedestrians (65%) walk every day** of the week, with the least pedestrian volumes recorded during the weekends. This is expected, considering most walking trips are to commute to and from work.
- Out of a random sample of 295 respondents, **39.2% reported walking because they cannot afford public transport** and 10.3% because public transport does not exist from their homes to their destination. This calls for the need to examine strategies that can **subsidize the cost of public transport**, as well for establishing an integrated transport system that seamlessly incorporates different modes of transport and provides users with a choice on how to travel.

Figure 5: Frequency of walking trips

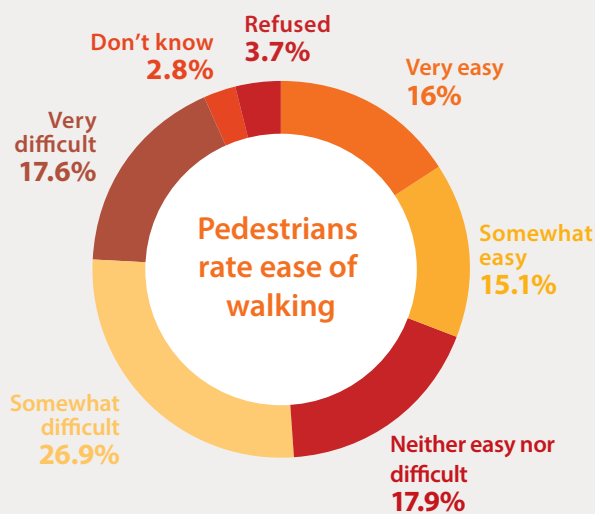


Pedestrians rate ease of walking


- **More pedestrians rated their journey as difficult or very difficult** (44.5%), versus those who said it was easy or somewhat easy (31.1%).
- **Congestion attributed to motorized traffic** is the most pressing challenge for pedestrians (40.9%), followed by lack of sidewalks (26.7%).
- **Many pedestrians struggle with encroachment upon their spaces** by *bodaboda* riders, cars parked on sidewalks and street vendors. Commendably, NMS is addressing the encroachment of NMT spaces. NMS has issued a notice to motorists, riders, florists and Public Service Vehicles operators to desist from encroaching on NMT facilities, and failure to comply will result in hefty penalties.
- **Other concerns such as traffic accidents, muggings, open drainage and lack of streetlights** were mentioned and will be addressed in the safety and infrastructure chapters.

A glimpse into the life of the average pedestrian in Nairobi reveals that many walk to work, generally owing to low-income levels and a lack of available alternatives. Pedestrians are faced with several challenges in their walking journey: from a lack of green spaces, pollution, muggings, and congestion, to a lack of walking paths, encroachment and traffic accidents, among others. The majority of these challenges are either safety- or infrastructure-related. Our next two chapters addressing safety and infrastructure will explore these challenges more deeply and recommend possible actions for respective NMT stakeholders.

Figure 6: Do pedestrians enjoy walking?





What makes it difficult to walk along your journey route?


 **Roads too busy/too much traffic**
40.9%

 **No sidewalks**
26.2%

 **Health issues**
6.5%

 **Don't know**
5.8%

 **No street lights/lighting is poor**
5.4%

 **Refused to answer**
5.4%

 **Unsafe neighborhood**
4.5%

 **Too many hills/big hills on walking route**
4.3%

CYCLISTS

An estimated **55,000 daily trips in Nairobi are made by cycling**, accounting for 1.1% of the share of trips made by different modes of transport. This statistic shows that **there is significant opportunity to raise the profile of cycling as a convenient and healthy means of mobility, for all ages.**

As an active means of transport, cycling is relatively fast for short and medium journeys, does not contribute to pollution, and has the added benefit of physical activity.

We examine findings of data collected from 703 randomly distributed cyclists along Nairobi's major NMT corridors.

Survey respondents were profiled by age, gender, education and income, and interviewed about their trip's purpose, the ease of cycling, and safety concerns they face. Observation and photographs were also used as data collection methods.

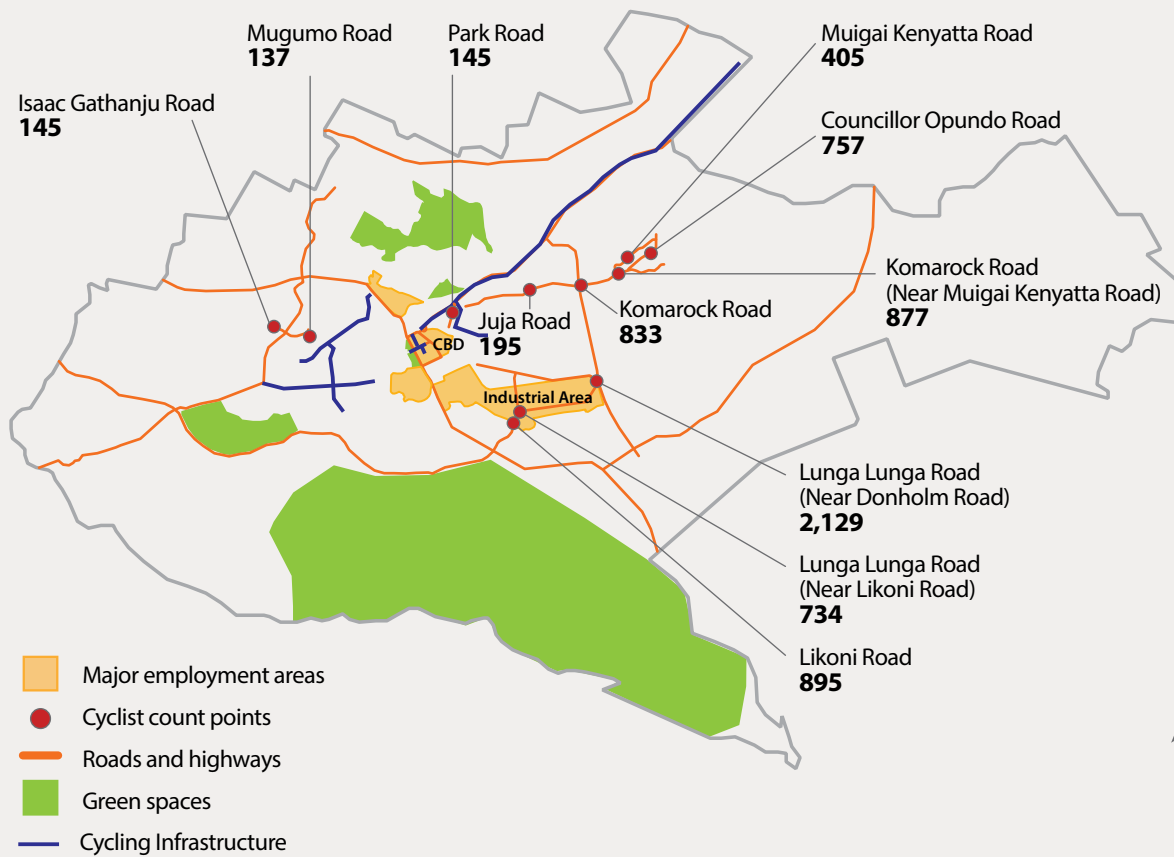
An overview of Nairobi's major cycling corridors

Let's first get an overview of where most of the cycling happens in Nairobi.



Critical Mass Nairobi during a pro-cycling campaign. © Critical Mass Nairobi

Figure 7: Nairobi's major NMT corridors showing number of cyclists per day



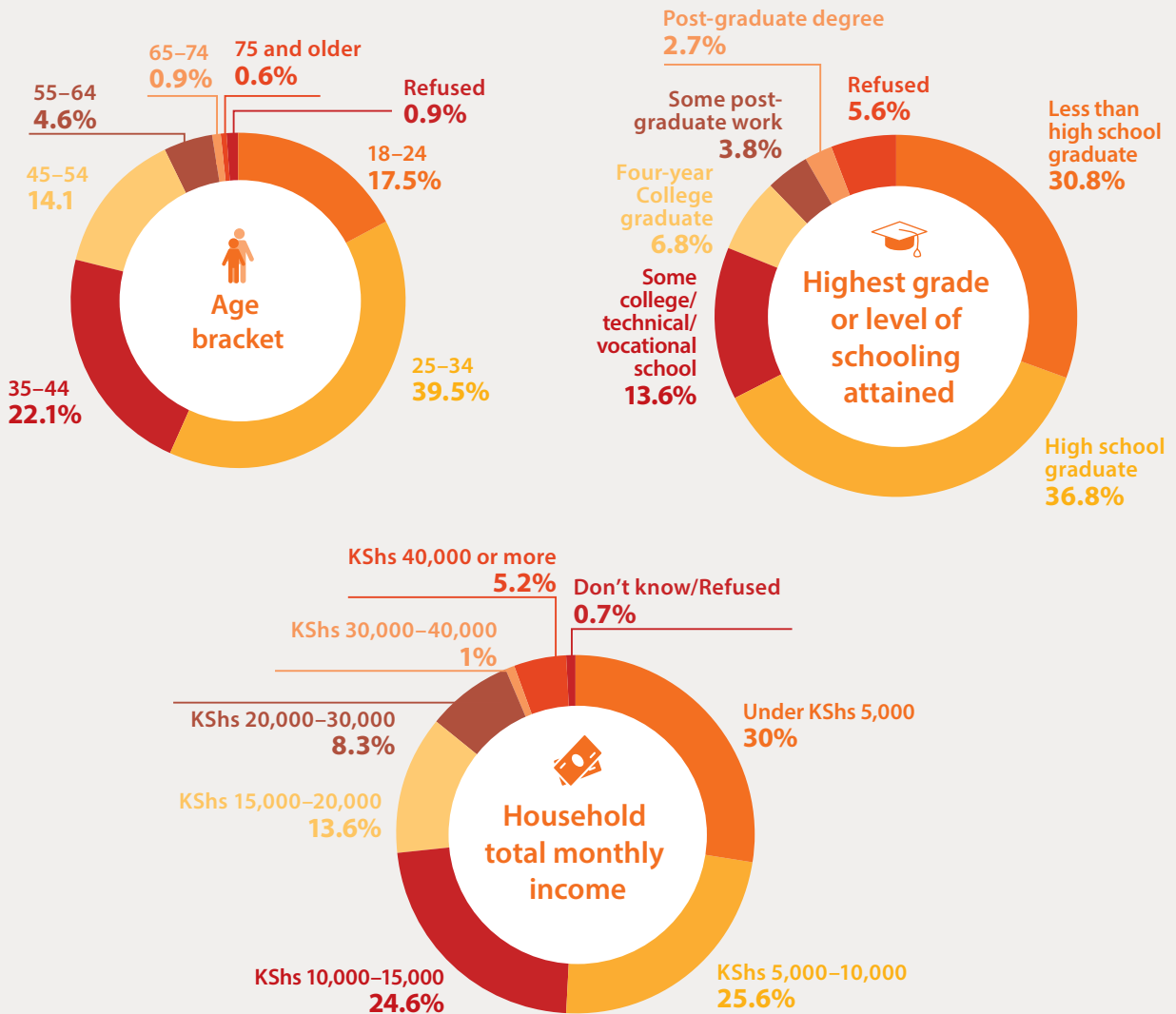
- Careful consideration of the **location of cycling infrastructure is important**. Similar to the pedestrian findings, a majority of cycling corridors are located in the east of the city, with close proximity to the Industrial Area – a major employment zone in Nairobi.⁵ Komarock (near Muigai Kenyatta Road), Lungalunga Road (near Donholm Roundabout), and Likoni Road recorded the most cyclists. Komarock Road and Muigai Kenyatta Road are also in close proximity to dense working-class neighborhoods like Dandora and Kariobangi where NMT is a popular mode of mobility.
- Despite this need, recent projects have seen cycling infrastructure developed within up-market neighborhoods, like Kilimani and Kileleshwa, while **road expansion programs in Eastlands (for example, Outering Road) with the highest volume of cyclists, are lacking safe cycling infrastructure**. It is important to ensure that transport infrastructure is inclusive and serves the needs of the masses. NMS should ensure that well-designed cycling networks linking dense neighborhoods and major employment areas, such as the Industrial Area, are factored into NMT development plans.

Challenges cyclists face

- The **lack of cycling lanes and sufficient cycling networks continue to be a challenge** in the city. An observation from the map shows how cycling infrastructure, which has been developed along some of the new roads, has a lot of gaps with several dead ends, and is not well-linked throughout the city.
- The major pollutants present on cycling corridors are **dust, vehicular emissions, roadside garbage, open sewage and industrial smoke**. It is important to prioritize the improvement of air quality, particularly in congested areas that serve as socio-economic hubs for thousands of city residents.
- **Cycling corridors have limited access to green spaces** as was pointed out in the pedestrianization user section. This emphasizes the need to green NMT infrastructure to provide for a more enjoyable journey with protection from direct sunlight, better air quality and improved aesthetics.

Who are Nairobi's cyclists?

Figure 8: Profiling Nairobi's cyclists across age, education, income and gender



Age: From the 703 cyclists interviewed along the major NMT corridors, the largest frequency of cyclists is 25-34 year olds (39.5%), followed by those between 35-44 years old (22.1%). **79.1% of the of cyclists interviewed were below the age of 44, indicating that most cyclists are youthful.** The number of cyclists decrease as age increases, indicating a similar trend to pedestrians, as noted in the pedestrianization section.

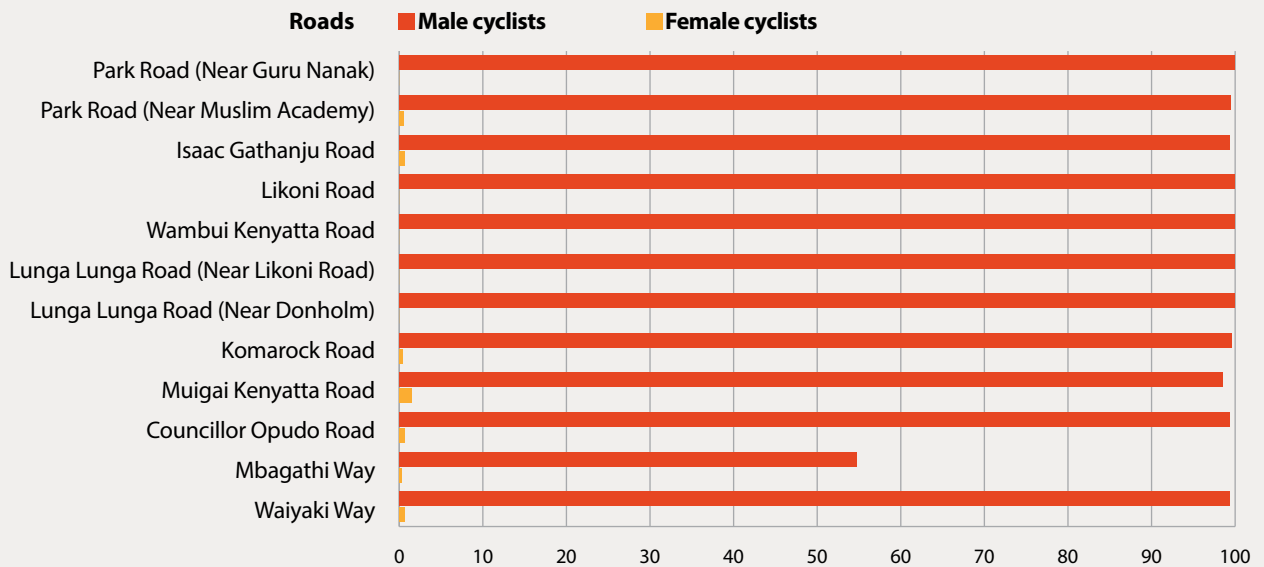
Income: More than half of cyclists earn a monthly income within the range of KShs 5,000 to KShs 10,000 (55.6%). This indicates that most cyclists are low-income earners, with little choice regarding other forms of transport, such as public transport.

Education: 63.7% of interviewed cyclists range from high school graduates to holders of post-graduate degrees, indicating high levels of literacy. This

can be useful in guiding the design of communication strategies and public awareness campaigns on NMT. As education levels increase, the number of cyclists decrease. As highlighted in the pedestrianization section, there is need for more public awareness encouraging people to view NMT as a healthy mode of transport, rather than a preserve for low-income groups.

Gender: All 10 corridors examined had more male cyclists than female cyclists. This may confirm some of the cultural stereotypes that cycling is a preserve of men, and often viewed as "unladylike". However, **Nairobi has seen a number of women take up cycling as a means of transport and physical activity.** A number of cycling groups, such as Dada Rides, Spin Queens and Critical Mass Nairobi, have strong female leadership, and they are challenging the stereotypes related to women and cycling.

Figure 9: Gender profile of cyclists on Nairobi’s major NMT corridors



Services accessed by cyclists

A majority of cyclists cycle every day to work (67.2%), followed by shopping trips (11.1%). These statistics are similar to the pedestrian patterns observed in the pedestrianization section. The recent commuter rail service has integrated the use of cycling by allowing cyclists to go on board with their bikes. This can make it more convenient for those who work close to the Central Business District to use their bicycles for last mile connectivity to their destinations.

Frequency of cycling trips

Figure 11: Frequency of cycling trips

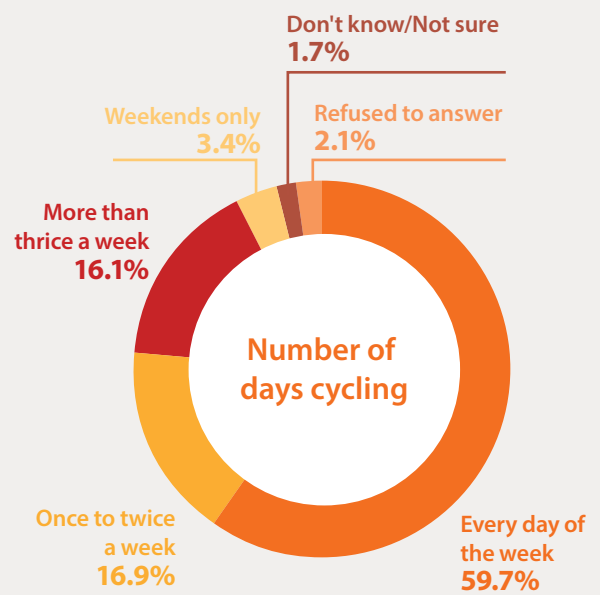
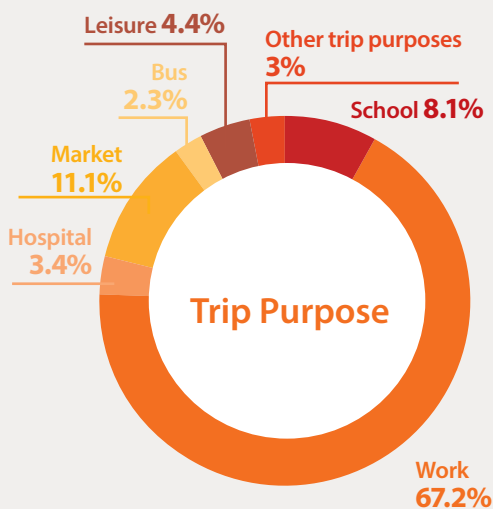
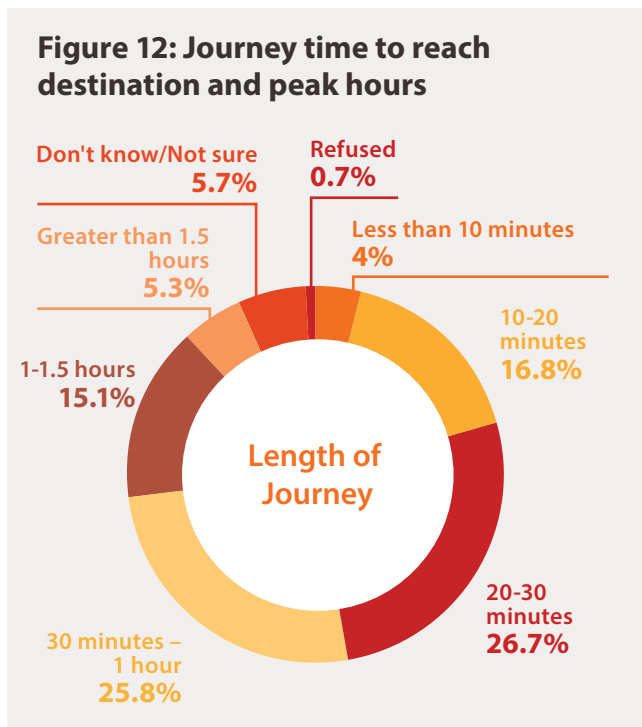


Figure 10: Services accessed by cyclists

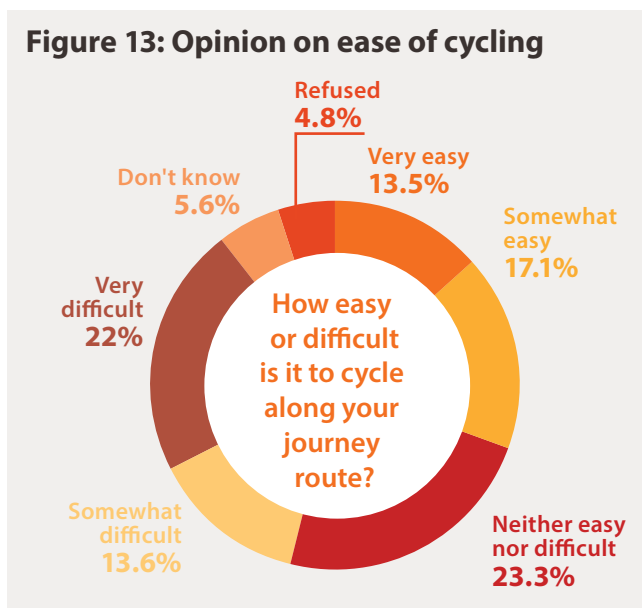


Journey time to reach destination and peak hours

Most cycling journeys range from 20 minutes to an hour (52.5%). Morning peak hours range from 6.30am-8:30am, while evening peak hours range from 5:00pm-6:45pm, when most cyclists are commuting from work. Trends regarding peak times can be useful in informing traffic-calming measures to increase cyclists' safety and decrease motorised congestion and pollution. This calls for inter-agency collaboration with NMS, the National Transport and Safety Authority and the Kenya Police. These trends can also support "car-free day" initiatives by providing evidence-based information on which days and areas are most suitable to kick off these initiatives.



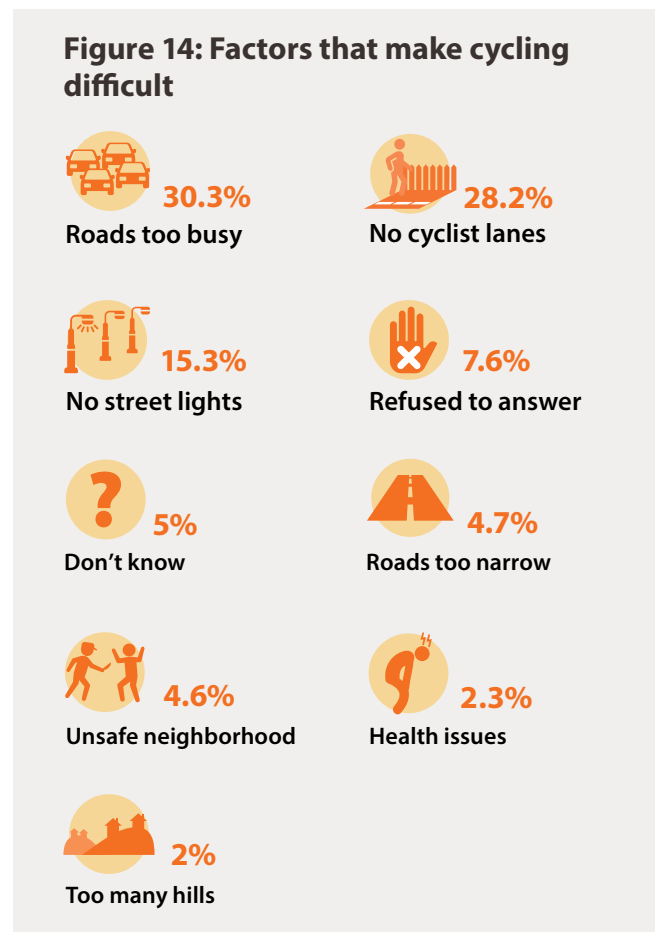
Do cyclists enjoy cycling?



Factors curtailing cycling

35.6% of cyclists find it somewhat difficult to very difficult to cycle along their journey route compared to 30.6%, who find it very easy to somewhat easy. A significant number of cyclists (23.3%) find it neither easy nor difficult. This indicates that the opinions of cyclists regarding the comfort of their journeys are very fragmented.

58.5% of cyclists rate **lack of safe and adequate cycle lanes and motorized congestion** as their top two factors curtailing cycling, while **poor lighting** comes in third at 15.3%. The importance of cycling infrastructure that meets minimum design guidelines cannot be overstated. Details on cycling infrastructure will be addressed in the infrastructure chapter.



Opportunities for more cycling

For this question 4,370 pedestrians and 701 cyclists were asked if they would cycle if an operational bicycle was available to them. While a large majority of cyclists (65%) said they would like to cycle more, almost a quarter of the cyclist respondents would not like to continue cycling perhaps due to the difficulty experienced while cycling. An equal proportion of pedestrians would like to cycle (43%), compared to those who would not cycle (43.1%), even if a bicycle became available. This indicates that efforts are needed to improve not only the cycling experience, but also to shift public behavioral attitudes towards embracing cycling.

Pedestrians and cyclists rate preference for cycling

Figure 15: Pedestrians rate preference for cycling

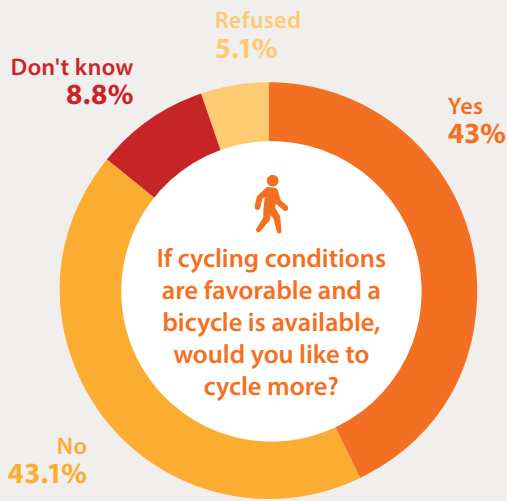
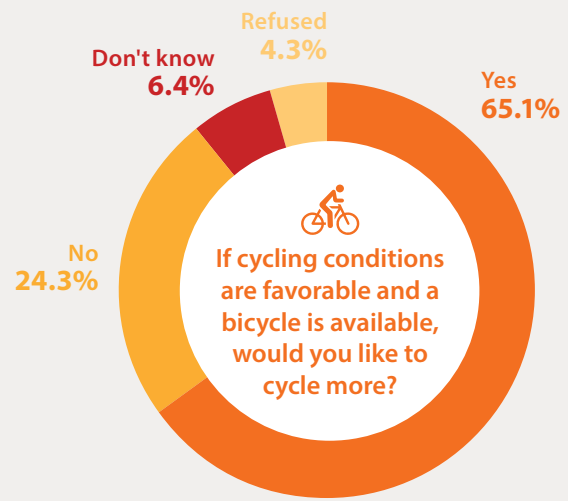


Figure 16: Cyclists rate preference for cycling



Cyclists' recommendations to improve cycling

Table 1: Cyclists' recommendations to improve cycling

Which of these changes would you recommend be made along your journey route to make it easier for you to cycle more?	Percent
Provide more cycling facilities, such as cycling paths, cycle lanes, bike parking racks, better street lighting, safe signals and intersections	41.0%
Making areas for cycling safer	17.8%
Improve existing facilities	15.8%
Don't know	7.4%
Change laws related to cycling and motorists	5.4%
Enforce laws governing cycling	4.8%
Refused	4.7%
Initiating bicycle safety education	2.0%
Something else	1.1%
Total	100%

Most cyclists interviewed singled out **provision of more cycling facilities** (41%) as an important recommendation to improve the cycling experience. These facilities include cycle lanes, bike racks, improved street lighting, safe signals and intersections.



CHAPTER TWO: NMT SAFETY

PEDESTRIAN SAFETY

Over 3,000 Kenyans die on our roads every year, the majority of whom are young people between the ages of 20 and 44.⁶ **In Nairobi, pedestrians account for 64.5% of all traffic fatalities, translating into an estimated 320 pedestrians dying annually.** Road accidents cost our economy in excess of \$50 million annually.⁷

In the previous chapter on 'Users', when we highlighted the safety concerns of pedestrians, we noted road accidents, muggings, open ditches, health risks from air pollutants, and poor street lighting. This chapter is largely informed by five-year crash data (2015- 2019) from the National Transport and Safety Authority (NTSA),⁸ and a safety survey using questionnaires, observation and photographs of the deadliest roads in Nairobi.

The following questions are addressed:

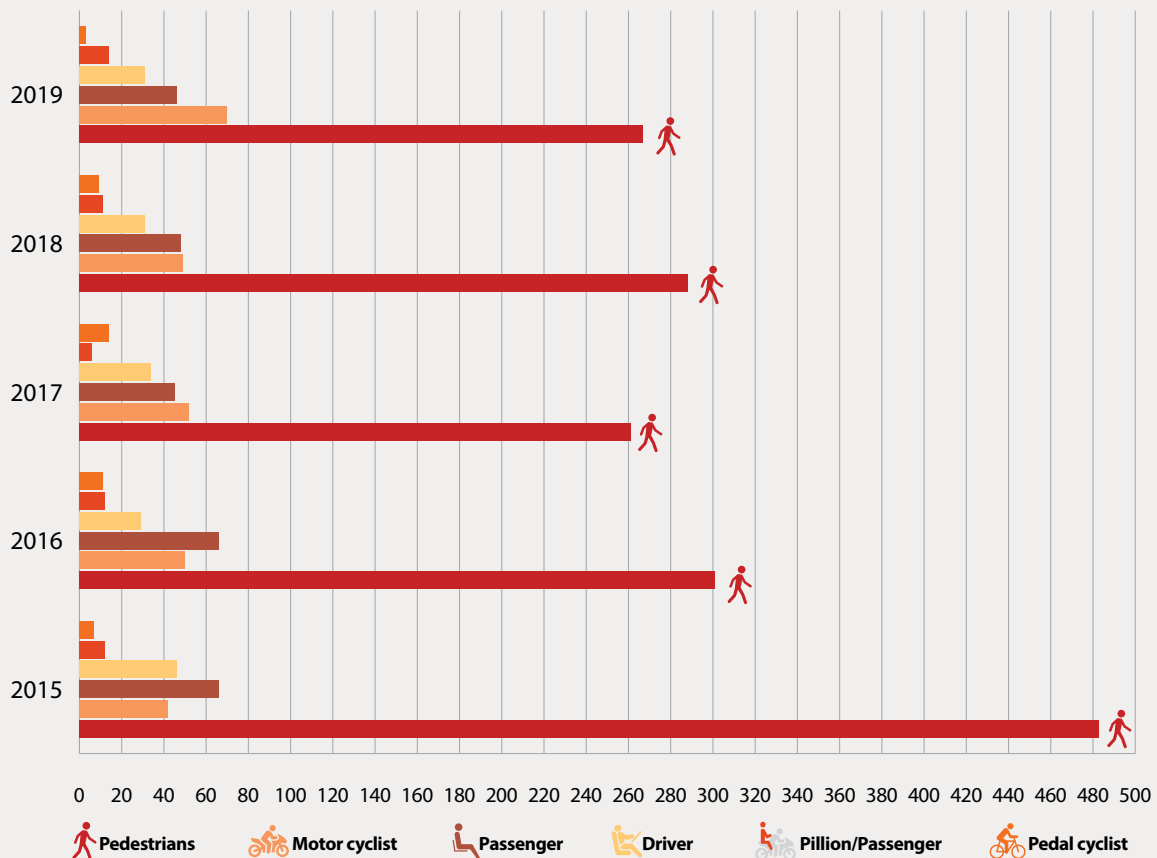
- Who are we losing on the roads?
- What causes these traffic accidents?
- Where do most of these accidents occur?
- When do most of these accidents occur?

These insights can support decision-making by those authorities who have mandates related to road safety. These include: NTSA, the Kenya Police, NMS and, by extension, the Kenya Urban Roads Authority (KURA) and Kenya National Highways Authority (KeNHA).

Who are we losing on the roads?

The NTSA five-year crash data was disaggregated by types of road users, their gender and age.

Figure 17: Traffic fatalities by type of road user (2015-2019)



Nairobi traffic fatalities by type of road user

- The five-year crash data consistently show that, **by far, the most vulnerable road users are pedestrians**, followed by motor cyclists (the majority of whom are *bodaboda* riders), vehicle passengers, vehicle drivers, passengers on *bodabodas* (pillion) and pedal cyclists.
- Pedestrians accounted for an average of 64.5% of traffic fatalities from 2015-2019.** This is in line with several studies⁹ and the broader literature showing that Nairobi city's design is largely not people-oriented, and the **greatest danger to a pedestrian's life is a private car.** With 2.27 million pedestrian trips made daily in the city, and the high risk of pedestrian traffic fatalities, there ought to be a shift towards a more people-oriented approach in land-use planning and mobility infrastructure. In addition, measures to address careless driving that endangers pedestrians need to be taken. These factors will be discussed below under 'What causes these traffic accidents?'

Plans by NMS to roll out well-designed and connected NMT networks across the city are one of the measures that promise to move us towards a city designed for people, and not one built primarily for cars.

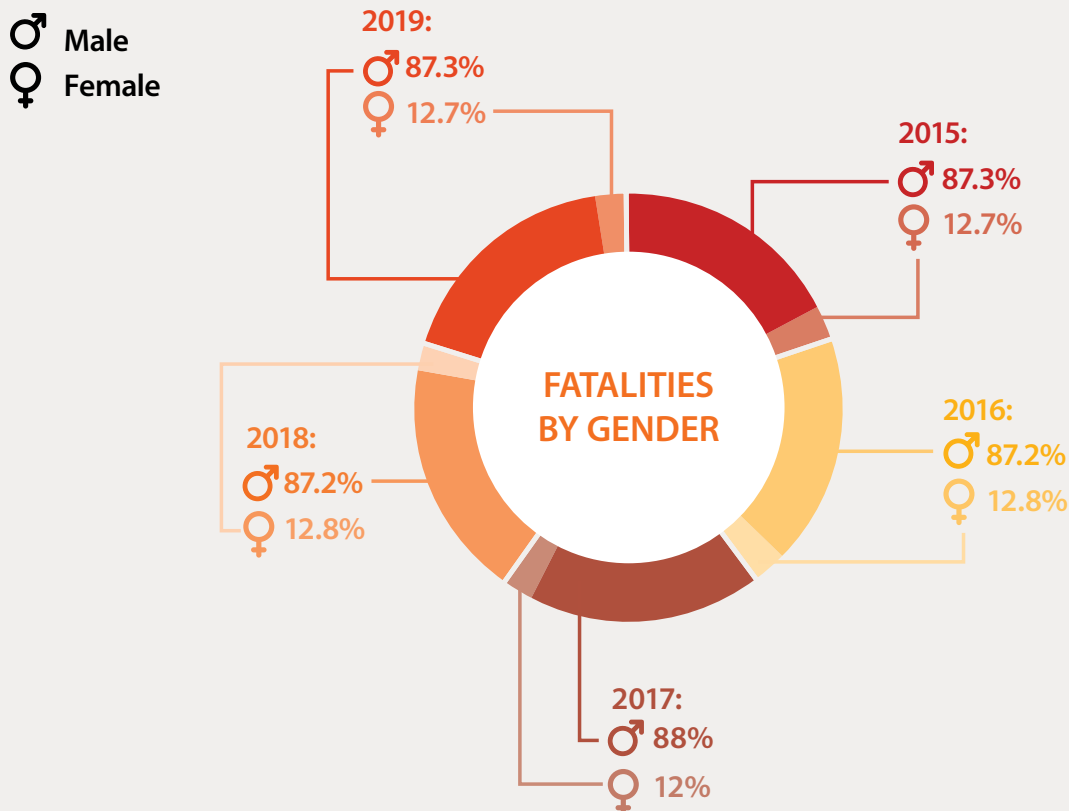
Nairobi traffic fatalities by gender

The NTSA crash data was disaggregated by gender, noting that in some instances the gender of the deceased was unspecified at the time of reporting.

Males account for an average of 88.3% of all traffic fatalities compared to 11.8% for females. This is a stark difference, which calls for further inquiry, as the reasons are not completely clear. In the previous chapter on 'Users', it was highlighted that **significantly more men are pedestrians. In fact, the data collected on the major corridors showed an average of 50% more men compared to women**, at all times, on all 10 corridors surveyed.

Giving more attention to gender considerations has often focused on the plight of women. However, **road crash data challenges us to consider gender concerns equally from a male perspective.** Do road safety campaigns or street design guidelines adequately recognize men's vulnerability? How often are men categorized as vulnerable road users? We repeatedly focus on children, persons with disabilities, women and the elderly, yet we are losing more men, in particular young men, on the roads. It may mean viewing **every road user as potentially vulnerable as we develop street designs and safety campaigns.**

Figure 18: Nairobi traffic fatalities by gender (2015-2019)



Nairobi traffic fatalities by age

Table 2: Age brackets recording the highest number of traffic fatalities (2015-2019)

	0-4 years	5-9 years	10-14 years	15-19 years	20-24 years	25-29 years	30-34 years	35-39 years	40-44 years	45-49 years	50-54 years	55+ years
2015	13	12	13	21	57	93	100	79	58	19	21	31
2016	4	7	5	8	21	54	43	30	23	7	5	18
2017	6	12	4	2	18	31	31	29	17	13	4	15
2018	2	6	7	9	33	38	39	39	19	9	12	21
2019	9	11	10	7	38	59	57	47	35	56	27	75

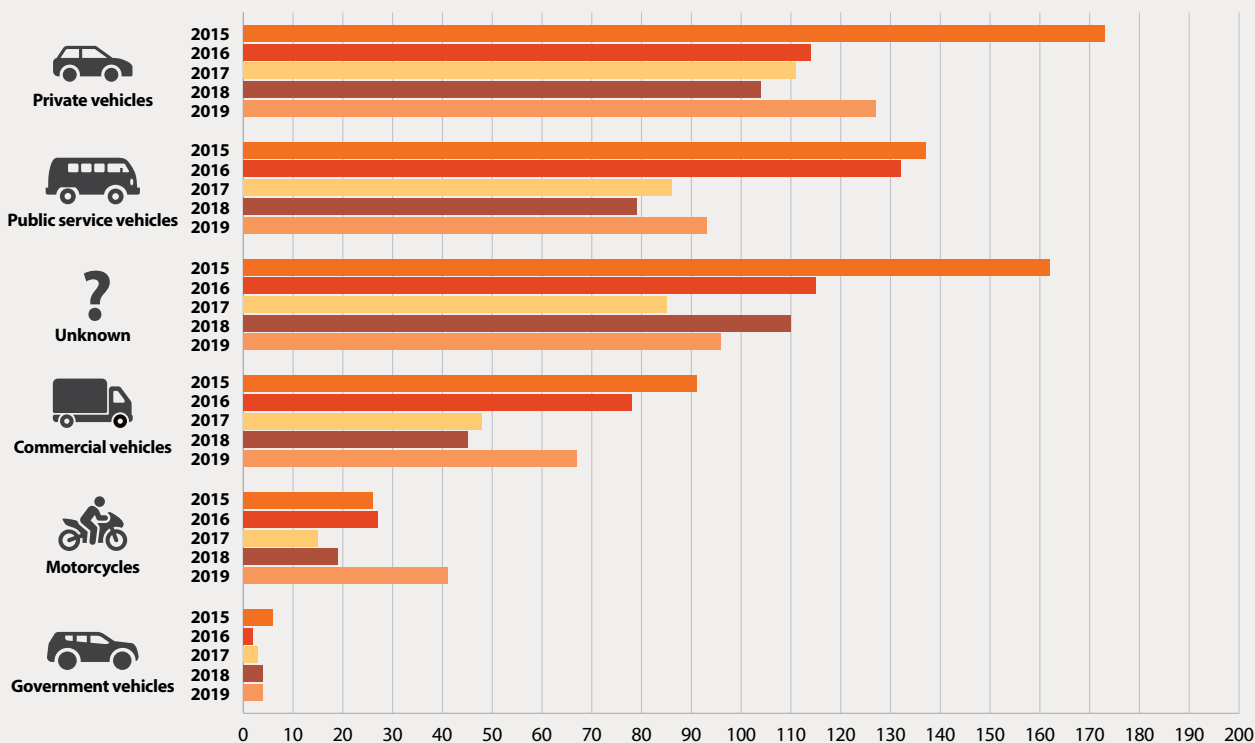
On average, 46.4% of traffic fatalities were people aged between 20-40 years. This confirms that **Nairobi is losing a very youthful population to traffic crashes, in particular young men**. We can assume many of these fatalities are pedestrians, if pedestrians make up 64.5% of fatalities and 86.8% of pedestrians fall under the age of 18-44.

What causes traffic accidents?

Since pedestrians make up 64.5% of traffic deaths, knowing which vehicles cause traffic accidents can help us understand what makes pedestrians vulnerable

- Private vehicles were the leading cause of accidents in 2015, 2017 and 2019.
- Public Service Vehicles appear in the top three types of vehicles causing accidents
- Unfortunately, there is a significant data gap. 'Unknown vehicle' appears in the top three causes of accidents. The Kenya Police provide NTSA with daily crash data, which is then categorized. One of the major reasons for 'unknown vehicle' being recorded is hit-and-runs. In this case, the drivers fled the scene of the crime before the police arrived.

Figure 19: Types of vehicles causing road accidents in Nairobi (2015-2019)





A pedestrian crossing in Nairobi. © Ben Welle, Flickr

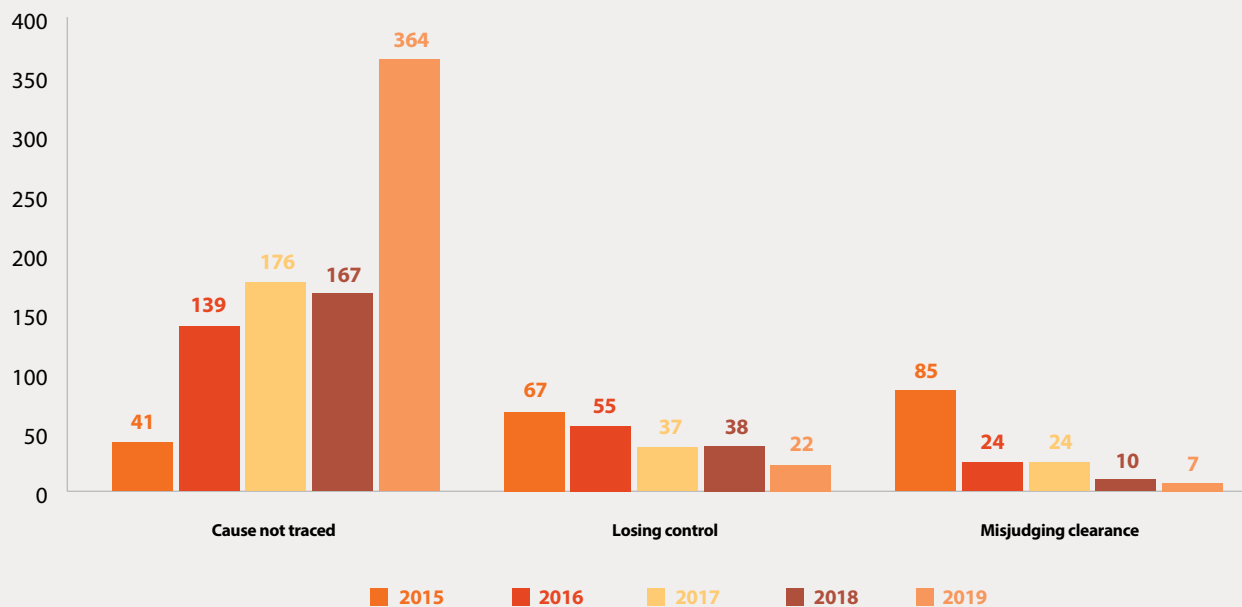
What factors contribute to these road accidents?

- **Unfortunately, the causes of 44.6% of crashes that occurred from 2015-2019 have gone untraced.** This statistic demands we ask the question: what factors contribute to poor tracing of the accident causes and how can they be addressed? This also correlates with the fact that 'unknown vehicle' ranks in the top three of the type of vehicle causing accidents and hit-and-runs are a major factor.
- **Losing control** appears consistently as a **top three crash cause** in all five years, while **misjudging clearance,**

distance or speed of vehicles and objects followed by **recklessness** both **appear twice in the top three** for the five years recorded.

We want to find out more about these untraced causes, as well as the factors contributing towards losing control, misjudging clearance, and recklessness. To effectively address these questions, the subsequent section examines more information about the accidents: where accidents are happening, on which days and at what times.

Figure 20: Top three road accident causes in Nairobi (2015-2019)



Where do most of these accidents occur?

Having knowledge of where the majority of these accidents occur sheds light on which areas deserve priority for intervention. There are 10 roads identified below, which are in need of urgent attention.

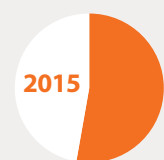
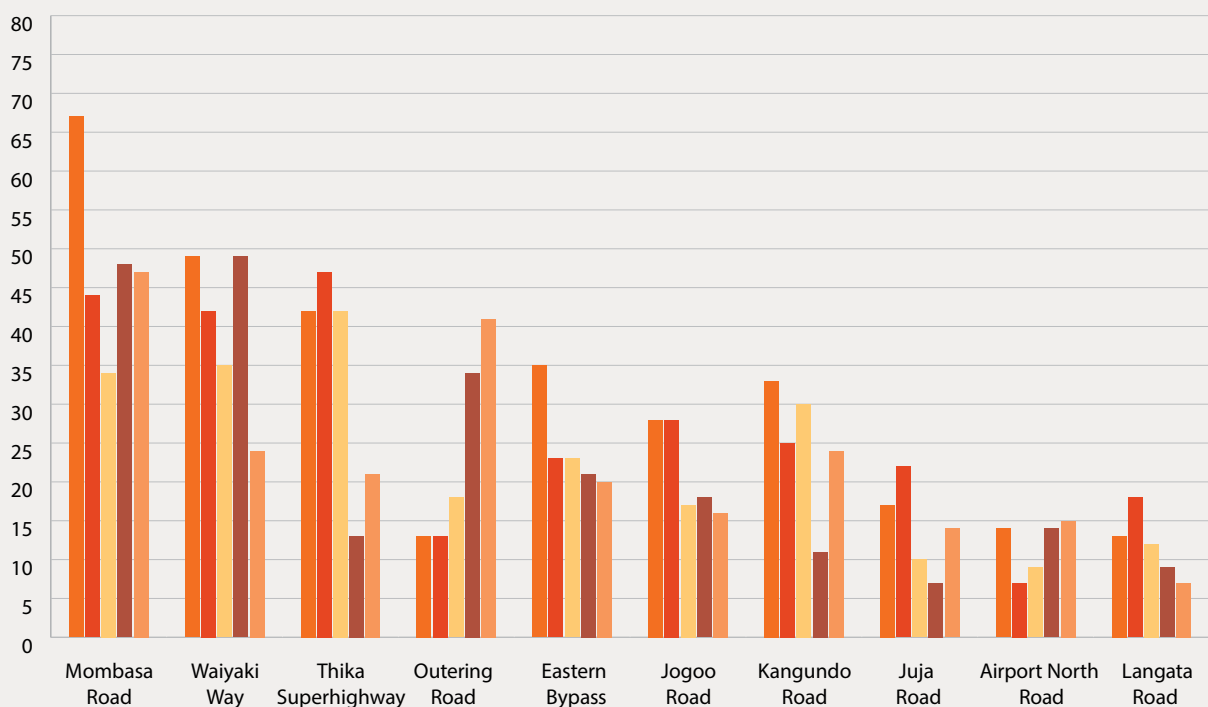
- **Mombasa Road** appears **every time in the top three deadliest roads** during the five-year period. **Waiyaki Way** appears **four times** in the top three, while **Thika Superhighway** appears **three times**, and **Outering Road** appears **twice** in the top three, during the five years.
- **Eastern Bypass, Jogoo Road** and **Kangundo Road** all appear **five times in the top 10 deadliest roads**, while **Juja Road** appears **four times**, **Airport North** appears **three times**, and **Langata Road** appears **twice in the top 10**.

- These **deadliest corridors account for 55.5% of all traffic fatalities** in Nairobi.

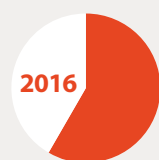
According to the Kenya Police Annual Crime Report (2018),¹⁰ the major causes of road accidents include **speeding, overloading, drunk driving, fatigue, incorrect use of the road by pedestrians, poor road infrastructure and non-observance of traffic laws**. A safety survey sought to find out what makes these roads so dangerous, while considering contributing factors from motorists, pedestrians and infrastructure.

The Safety Survey was conducted along Mombasa Road (City Cabanas), Waiyaki Way (James Gichuru, Kangemi Flyover and Uthiru), Airport North Road, Thika Superhighway (Shell Petrol Station), Eastern Bypass (Kamakias, Kihunguro and Corner), Kangundo Road, Outering Road, Jogoo Road and Landhies Road.

Figure 21: Nairobi's top 10 deadliest corridors (2015-2019)



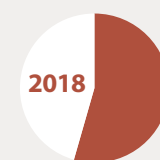
52.8%
of all fatalities
occurred on
these corridors



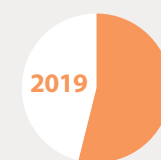
58.6%
of all fatalities
occurred on
these corridors



57.5%
of all fatalities
occurred on
these corridors



54.7%
of all fatalities
occurred on
these corridors



54%
of all fatalities
occurred on
these corridors

Causes of road accidents on the deadliest corridors

Table 3: Causes of road accidents on the deadliest corridors (Safety Survey)

Area	Motorists				Pedestrians		Infrastructure				
	Speeding	Careless driving	Encroaching on NMT spaces	Pick-up and drop-offs at non-designated zones (esp. PSVs)	Careless crossing	Crossing at non-designated zones which are dangerous	Lack of inadequate pedestrian paths	Lack of adequate pedestrian crossings	Footbridges being underutilized by pedestrians	Poor lighting especially at night	Lack of clear road signs
Mombasa Rd (Cabanas)	✓	✓			✓	✓	✓	✓	✓		
Waiyaki Way (Kangemi)	✓	✓	✓	✓	✓		✓	✓		✓	
Waiyaki Way (Uthiru)	✓	✓	✓		✓		✓	✓			
Waiyaki Way (James Gichuru)	✓	✓		✓			✓	✓			✓
Eastern Bypass	✓	✓	✓				✓	✓		✓	✓
Airport North Rd	✓	✓		✓	✓	✓	✓	✓	✓	✓	
Landhies Rd	✓	✓			✓		✓	✓		✓	
Outering Rd	✓	✓			✓		✓			✓	
Jogoo Rd	✓	✓			✓	✓	✓	✓			
Thika Superhighway (Shell station)	✓	✓	✓	✓	✓		✓				
Kangundo Rd	✓	✓		✓	✓		✓	✓			✓

- All surveyed roads recorded **careless driving by motorists**, and **careless pedestrian crossing** was recorded on most roads. This calls for **increased road safety education among all road users**, which should be instilled via school curriculums from primary school up to university level.
- It is commendable to see that **road safety campaigns** by Kenya Police and NTSA are conducted using the media, especially regarding **proper use of the roads by pedestrians** since they are the most affected by these accidents. It is also important to ensure that drivers get harsh penalties, such as license suspension, to deter careless driving.
- In addition, **regulations seeking to curb careless driver behavior** – such as banning drunken driving, random breath testing, enforcing seat belt-wearing and forbidding the use of hand-held mobile phones – are all useful. However, **the World Health Organization (WHO) rates the enforcement of these laws in Kenya as relatively low.**¹¹ For example, drunken driving enforcement levels are at 50% and seat belt-wearing at 40%. This implies that Kenya Police and NTSA have a lot of room for improvement in the enforcement of these regulations.
- **Speeding was noted on most roads. WHO rates Kenya's enforcement of speed limit levels at 40%.**¹² This shows the need for better enforcement of speed limits of maximum 50km/h on urban roads by Kenya Police in collaboration with NTSA. Some of the measures undertaken – such as speed-guns, permanent camera traps, and tamper-proof speed governors for all PSVs – are useful. Digital fines issued for speed trap cameras can also support a more efficient and transparent process of enforcing traffic rules.
- **Lack of adequate pedestrian infrastructure** was recorded on most roads. This naturally results in congestion when all road users struggle for limited space, and this increases the risks of traffic accidents. It is hoped that the NMT infrastructure developed by NMS will follow recommended design guidelines that secure safety and, most importantly, will provide a network that can seamlessly connect people to the services they need. **As development happens in phases, NMS should prioritize corridors with the highest volume of users and those with the highest fatalities.**
- **Lack of pedestrian crossings was recorded on most roads.** Pedestrian crossings are necessary, especially on busy roads, not only to secure pedestrian safety, but also to alert motorists to slow down. **Tabletop crossings (raised pedestrian crossings)** have been installed along Ngong Road, near Coptic and Kenyatta hospitals, and **ought to be considered for most urban roads, as they increase the visibility of pedestrian crossings.**
- **Poor lighting, especially at night**, is a big challenge on Kangemi Kawangware, Eastern Bypass, Airport North Road, Landhies Road and Outering Road. This correlates with the fact that most accidents occur between 7:00pm-9:00pm, as will be illustrated in the next section. Muggings were mentioned by pedestrians as a major concern for both male and female pedestrians, especially at night, since many streets are poorly lit. **NMS launched a street lighting initiative, which should maintain momentum until every street in Nairobi is well-lit, particularly the deadliest corridors.** Commendably, Kangundo, James Gichuru, Uthiru and Thika Superhighway all have good lighting.
- **Picking up and dropping off passengers at non-designated zones** is rampant in Kangemi Kawangware, James Gichuru Road, Airport North Road, Kangundo Road, and Thika Superhighway. **Designated pick-up and drop-offs points should be designed in a manner that does not interfere with the movement of traffic.** Traffic police should be deployed in these areas to enforce traffic rules.
- In the case of City Cabanas on Mombasa Road and Airport North Road, the **footbridges erected to increase pedestrian safety are underutilized.** Most pedestrians interviewed stated that the **footbridges make for longer journeys, and they would rather cross the road at very risky spots to save time.** Globally, there are different views on pedestrian footbridges. Some claim that they make cities less walkable and reinforce that pedestrians do not belong on the street. On the other hand, some claim that they can significantly reduce traffic fatalities and best utilize limited space.
- All the same, pedestrians want safe and convenient options and, in some instances, **safety is sacrificed for convenience.** Agencies with mandates relating to transport planning and infrastructure, such as KURA, KenHA, NMS, Nairobi Metropolitan Transport Authority and Kenya Roads Board, should bear in mind the competing interests and strike a balance.
- In some of the instances **where a lack of road signs was noted, vandalism was mentioned** as a challenge. For example, in the case of James Gichuru, respondents shared that road signs once erected are stolen and sold as scrap metal. NTSA, KURA, NMS could consider using alternative materials for road signs, such as recycled plastics, which are hardy but do not attract vandals.
- **Open ditches** are a safety concern that was observed on almost all 12 of the major pedestrian corridors. Pedestrians can easily have accidents when infrastructure is not properly maintained by authorities. For Nairobi, the road is managed by NMS if it is a county road, KURA if it is an urban road, and KenHA if it is a highway.

When do most accidents occur?

A look at which days of the week record the highest number of accidents, as well as the time of these accidents, also gives us further insights. This information can guide the relevant agencies as to which days and times need increased deployment of resources, such as police check points to discourage careless driving and encourage responsible pedestrian crossing, as well as more random alcohol blow tests to check for drunken driving.

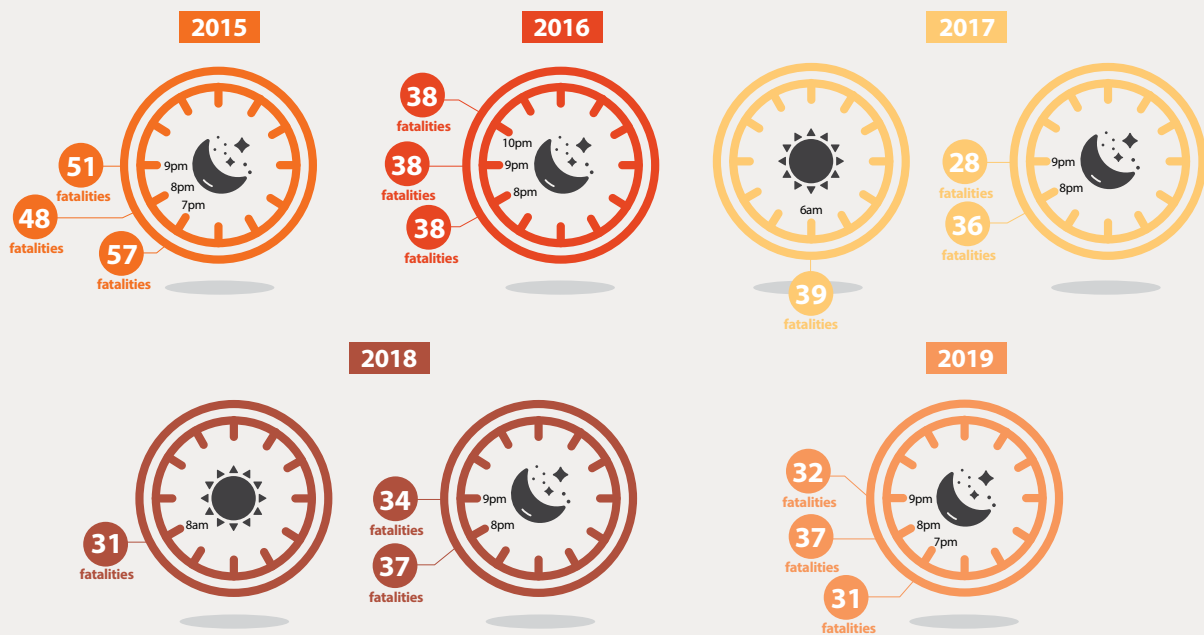
Most fatalities occur on Friday, Saturday and Sunday, making these the most dangerous days of the week to be on the road. Kenya Police Crime Report confirms fatigue and drunk driving are some of the leading causes of accidents. This may explain why the majority of accidents occur after a long week and perhaps at a time when road users have indulged in alcohol.

- On average, **most accidents occur at night compared to daytime, with 7:00pm-9:00pm being the most dangerous time** on Nairobi roads. This suggests that there may be more need for police stops, speed cameras and breathalyzer testing by NTSA at this time, especially from Friday to Sunday.
- The fact that 7:00pm-9:00pm is the most dangerous time also correlates with the survey findings that **poor street lighting, especially at night, is a contributing factor to accidents.** This may further relate to the fact that **miscalculating speeds and distances of vehicles and objects is a top three cause of accidents in Nairobi.**

Table 4: Days of road accident occurrence in Nairobi (2015-2019)

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
2015	83	83	84	68	103	120	115
2016	70	48	51	53	64	96	87
2017	36	40	53	52	76	75	80
2018	51	52	54	46	68	75	92

Figure 22: Top three deadliest times of road accident occurrence in Nairobi (2015-2019)



CYCLING SAFETY

This section is informed by five-year crash data (2015-2019) from the National Transport and Safety Authority (NTSA).¹⁴

Cyclists account for 1.8% of traffic fatalities. Though these numbers may appear low, they need to be considered in direct proportion to the share of cyclists in the city who account

for 1.1% of the share of the trips made by different modes of transport. In 2020, a number of avoidable cyclist fatalities were witnessed in the city, which led a Parliamentarian to table a bill requiring road authorities to prioritize the safety of cyclists and pedestrians in Kenya.¹⁵

Table 5: Nairobi cyclists' fatalities (2015-2019)

YEAR	NUMBER OF CYCLIST FATALITIES	TOTAL NUMBER OF FATALITIES	PERCENTAGE
2015	7	656	1 %
2016	11	469	2.3 %
2017	14	412	3%
2018	9	438	2%
2019	3	431	0.7%



Cyclists during a pro-cycling campaign organized by Critical Mass Nairobi. © Edna Odhiambo

DID YOU KNOW?



Vision Zero is a strategy to eliminate all traffic fatalities and severe injuries, while increasing safe, healthy and equitable mobility for all.¹³ First implemented in Sweden in the 1990s, Vision Zero has proved successful across Europe, and is gaining momentum in major American cities.

Kenya is losing too many lives on the roads. Is it time to implement #KenyaVisionZero? The difference between Vision Zero and the status quo approach is:

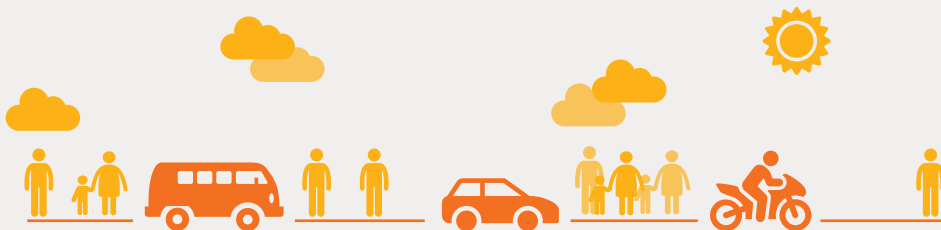
Traditional approach:

- Traffic deaths are **inevitable**
- **Perfect** human behaviour
- Prevent **collisions**
- **Individual** responsibility
- Saving lives is **expensive**

VS

Vision Zero:

- Traffic deaths are **preventable**
- Integrate **human failing** in approach
- Prevent **fatal and severe crashes**
- **Systems** approach
- Saving lives is **not expensive**



We have compiled information on the most vulnerable road users, the causes for these accidents, and where and when the majority of these accidents occur. The recommendations made to authorities concerning increased road safety education, improved pedestrian infrastructure, harsher penalties for speeding and careless driving as well as better street lighting, will go a long way in realizing a #KenyaVisionZero. Together, let's save lives!

CHAPTER THREE: NMT INFRASTRUCTURE

PEDESTRIAN INFRASTRUCTURE

We started out by examining the demography of pedestrians in Chapter 1. This was useful in understanding the profile and needs


of the average pedestrian in Nairobi. The majority of the needs that came to light were either safety or infrastructure related. Having dealt extensively with the safety-related concerns in the previous chapter, this chapter will focus on infrastructure and how it affects the pedestrian experience.

Table 6: Pedestrian infrastructure challenges observed on major NMT corridors in Nairobi

	 Inadequate pedestrian crossings	 Inadequate footpaths (including design shortcomings where footpaths are present)	 Lack of greenery and shade	 Poor street lighting
Park Road (near Guru Nanak)	✓	✓	✓	✓
Park Road (near Muslim Academy)	✓	✓	✓	✓
Likoni Road	✓	✓	✓	✓
Lunga Lunga Road (near Likoni Road)	✓	✓	✓	✓
Lunga Lunga Road (near Donholm)	✓	✓	✓	✓
Komarock Road	✓	✓	✓	✓
Muigai Kenyatta Road	✓	✓	✓	✓
Councillor Opudo Road	✓	✓	✓	✓
Mbagathi Way	✓	✓	✓	✓
Waiyaki Way	✓	✓	✓	✓
Isaac Gathanju Road	✓	✓		✓
Wambui Kenyatta Road	✓	✓		✓

A number of the challenges faced by pedestrians in Nairobi relate to inadequate pedestrian infrastructure. These include lack of footpaths, poorly maintained footpaths, lack of pedestrian crossings, lack of access for persons with disabilities, poorly lit streets, and the encroachment upon footpaths by other road users. These infrastructure gaps compromise pedestrian safety and health, as well as making the pedestrian experience less enjoyable.

In this section, we examine the highlighted infrastructure challenges, and make recommendations based on the standards presented in the Street Design Manual for Urban Areas in Kenya, 2019 (SDMUAK).¹⁶ The NMS-CDKN survey engaged with pedestrians on the challenges they faced on 12 busy NMT corridors using questionnaires, observation and photographs.

 Lack of protected footpaths (separated lane for pedestrians with barriers such as vegetation on each side)	 Lack of street furniture, adequate litter bins and toilets	 Poor drainage facilities (open drains and/or visible sewage)	 Encroachment on footpaths	 Presence of litter on footpaths	 Inappropriate for persons with disabilities
✓	✓	✓	✓	✓	✓
✓	✓	✓	✓	✓	✓
✓	✓		✓	✓	✓
✓	✓	✓	✓	✓	✓
✓	✓	✓	✓	✓	✓
✓	✓		✓	✓	✓
✓	✓		✓	✓	✓
✓	✓	✓	✓	✓	✓
	✓				✓
✓	✓			✓	✓
✓	✓		✓	✓	✓
✓	✓		✓	✓	✓

Pedestrian infrastructure challenges



All corridors exhibited a lack of adequate pedestrian crossings, making pedestrians vulnerable to road accidents while crossing the road. As per Kenya's Street Design Manual mentioned above, **pedestrian crossings should be located where many people need to cross the street, such as at a bus stop, an entrance to a shopping mall, or where a path intersects the street.** In busy commercial areas, crossings should be spaced at more frequent intervals.

Pedestrians often prefer to cross at street level compared to climbing a stairway in order to cross the street. In the previous chapter on safety, we highlighted that on some of the roads, footbridges are underutilized, as pedestrians find that they increase the length of their journeys and prefer to cross the road at street level despite the danger from oncoming traffic.



All corridors lack adequate and protected footpaths. In most cases, footpaths have less than two meters of clear space and are, therefore, not compliant with the Street Design Manual's minimum standard design requirements. **Footpaths are also not continuous,** forcing pedestrians to walk on the road. Additionally, the **footpaths are not protected by barriers, such as greenery on each side,** and most pedestrians feel exposed to the risk of road accidents, especially from motorized traffic.



Eight out of the 12 corridors lack greenery and shade. Eight corridors are located on the eastern side of the city, and the three corridors with some greenery and shade are located on the western side of the city – close to high and middle-income neighborhoods. This correlates with the fact that the air quality in the western side of the city is better than the eastern side.¹⁷

Greenery plays an important role in providing shade, purifying the air by absorbing polluting gases, and has aesthetic value. The Street Design Manual recommends that trees with high branches are preferable, and medium height vegetation should be trimmed next to pedestrian crossings to improve the visibility of pedestrians (for pedestrians to see cars and for motorists to see pedestrians). As pointed out in the 'Users' chapter, unnecessary cutting down of trees to accommodate road expansion is rampant and should be addressed.



Poor street lighting is observed on all corridors. All corridors have some street lighting, but **pedestrians do not consider these streets to be adequately lit, especially at night.** This increases safety concerns, not only in terms of risk of traffic accidents, but also muggings and tripping on unseen objects. The Street Design Manual recommends that the spacing between two streetlight poles should be approximately three times the height of the fixture, and the poles should be no higher than 12 meters. In residential areas, the poles should be significantly lower than 12 meters to reduce

undesirable illumination of private properties. The placement of street lighting should be coordinated with other street elements so that trees or billboards do not affect proper lighting.



There is a lack of street furniture, adequate litter bins and toilets on all corridors observed. **Streets serve many functions in addition to being paths to get from one point to the next. Streets can be places to sit and relax, have a snack, socialize, and enjoy activities such as street art.** Street furniture should be placed in areas that receive shade, to make them comfortable for users. Street furniture can also be used as advertising space by companies, for example through the adoption of benches. Partnerships with private sector and government institutions can also save on costs for infrastructure while making the streets more user-friendly. **Other amenities such as toilets, litter bins, and water taps are equally important to support streets as spaces that can be enjoyed as places to socialize and enjoy activities.** Litter, and in some instances dumped garbage, was present in all corridors due to the lack of adequate litter bins.



Five out of the 12 streets observed had **poor drainage facilities.** According to the Street Design Manual, footpaths should be raised to permit storm water runoff to flow away from/under the footpath. Storm water should be carried through closed drains to free up road space for pedestrians. **NMT facilities, bus stops, and street vending areas should be at a higher level to avoid flooding,** which is a common sight in Nairobi streets during rainy seasons.



All corridors observed had elements that make them **unfriendly to persons with disabilities.** These include a **lack of ramps on footpaths,** which force persons with disabilities to be dependent on others to access the footpath. Lack of continuous footpaths often force people with disabilities to use the road or rough surfaces, which exposes them to physical discomfort, road accidents and generally uncomfortable journeys. Narrow footpaths of less than two meters pose a challenge to those in wheelchairs. Footbridges make it very difficult for people with disabilities to navigate the street, and they are often at the mercy of others to help them across footbridges.



Encroachment is rampant on all corridors observed. **The most common forms of encroachment are due to street vending, cars parked on footpaths and bodabodas using the footpaths.** There are efforts to address encroachment, such as the notice by NMS of harsh penalties for florists, *bodabodas* and vehicles that block footpaths.

Street vending is trickier to manage as a form of encroachment. It often seeks to provide essential goods and services. The Street Design Manual states that **well planned streets should accommodate street vending.** It recommends that vending spaces be placed **where they will not interfere with pedestrian movement.** It also notes that **vendors will**

be attracted to areas with shade and areas with high visibility to pedestrians. Supporting infrastructure, such as cooperatively managed water taps, electricity points, litter bins, and public toilets, should also be provided to encourage hygienic practices.

NMS, KURA and KenHA are responsible for addressing these infrastructure challenges depending on whether it is a county road, urban road, or highway respectively. For street lighting, NMS is responsible for all streetlights in Nairobi. For matters dealing with greenery, NMS has mandate over environmental matters in Nairobi and should collaborate with KURA and KenHA to protect trees during road works. NMS should also collaborate with the National Environment Management Authority on strategies to increase and maintain greenery in the city.

DID YOU KNOW?



Good walking is good business! Retail spending is often higher in walkable areas. A welcoming walking environment attracts strolling visitors and local customers running daily errands. People on foot are more likely to see street vendors or window displays, encouraging them to go into more stores and to stay longer, all of which offers the potential of increased sales.



Open drainage and garbage strewn on footpath, Landhies Road. © CDKN.

CYCLING INFRASTRUCTURE

Lack of adequate and well-designed cycling infrastructure compromises the safety and comfort of cyclists. The Street Design Manual for Urban Areas in Kenya provides the following standard design guidelines for cycle lanes:




- Cycle tracks should be positioned **between the footpath and carriageway**. To increase cyclists' safety, it should be physically separated and elevated from the carriageway with a space that is at least 0.5 meters wide rather than painted cycle lanes, which offer little protection to cyclists.



Well designed cycle track. © Street Design Manual for Urban Areas in Kenya

- The recommended width for cycle tracks is a **minimum width of 2 meters for one-way movement, and 2.5 meters for two-way movement**. A **smooth surface material should be used**, such as asphalt or concrete. Paver blocks are to be avoided.

Selecting the side of the road for cycle tracks

1.  The **side with fewer obstructions** (shops, kiosks, street traders) and the one **not frequently used by pedestrians is more attractive to cyclists**, as there are fewer "obstructions" or "hindrances". Most cyclists are actually transit travellers and are not very interested in roadside shopping. The concept of hindrances is more directly related to the comfort and convenience of cyclists.
2.  The **side with a wider space and fewer side roads**, that links well with other network roads at intersections is the better choice. It is inconvenient for cyclists to keep stopping and crossing the road to different sides each time they meet another road.
3.  If the track is to be used by cyclists as a two-lane-two-way path, **cyclists travelling in the same direction should not be allowed to ride side-by-side. A dividing line should be marked on the track to indicate two-way usage**. This design has one distinct advantage: the cyclist moving in the same direction as the motor vehicle will be further away from the motor vehicle; and the one travelling in the opposite direction will be closest to the motor vehicle. This provides some sort of safety at side roads for those travelling in the same direction with the motor vehicle; it also offer more safety for cyclists travelling in the opposing direction, as one has clear visibility of the motor vehicle at all times.¹⁸



Cyclists during a pro-cycling campaign organized by Critical Mass Nairobi. © Edna Odhiambo



Beneficiaries of the Bicycles for Educational Empowerment Program. © World Bicycle Relief

DID YOU KNOW?

Bicycles are being used as tools for empowerment to enable access to education in Kenya. **Bicycles For Educational Empowerment Program (BEEP) is a World Bicycle Relief flagship programme mainly targeting students in rural areas where distance affects their ability to obtain an education.**¹⁹

Thousands of girls and boys can look to a brighter future having completed their primary and secondary school education thanks to the power of a bicycle!

BICYCLES FOR EDUCATIONAL EMPOWERMENT PROGRAM (BEEP)

Across the globe, to date BEEP has provided over 209,743 life-changing Buffalo Bicycles to students in rural areas.

2019 KENYA BEEP IMPACT

Girl/boy students received bicycles	2,833/1,233
Total schools reached	54
New bicycle supervisory committees trained	9
New mechanics trained	26
Existing mechanics upskilled	20
Schools that attended termly coordination meetings (TCMS)	100%
Average bicycle usage	80%
Average student attendance	90%

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

The multiple benefits of a walkable and bikeable city

The previous chapters have examined the NMT experience in Nairobi and highlighted the need to improve walking and cycling as safer, more enjoyable modes of transport. It is worth recapping some of the many benefits of walking and cycling:



Being engaged in an active mode of transport, those who walk and cycle **realize improved health**, compared to those living sedentary lifestyles.



Walking, in particular, can **increase economic productivity** as those walking are more likely to purchase goods and services from shops along their journey. A study that evaluated the effects of walkability on housing prices concluded that walkability had a statistically significant positive impact on housing values.²⁰



NMT facilities can improve the lives of many citizens through **better access to economic opportunities**. For example, well-lit streets can allow someone to stay later at work and thus earn more money as well as provide easier access to healthcare services or social engagements. It can also reduce the amount of money spent by families on public transport, particularly in the low-income bracket.



Lastly, walking and cycling are forms of clean transport and are **quick wins to address the climate crisis and air pollution in cities**. The more citizens choose walking and cycling over cars, the more we avoid releasing harmful greenhouse gas emissions from vehicles, and the more opportunities we have to abate air pollution.



A beneficiary of the Bicycles for Educational Empowerment Program. © World Bicycle Relief

RECOMMENDATIONS

Having examined the demography of NMT users along Nairobi's major NMT corridors, the infrastructure challenges they face, and the outcome of safety audits on Nairobi's deadliest corridors, the following recommendations are made to the respective road agencies:



Increase NMT infrastructure linking NMT users to neighborhoods and major employment zones, as well as providing access to essential services in order to establish **a network of NMT** (Agencies: NMS, KURA, KenHA).



Improve the quality of existing and planned footpaths and cycle tracks, paying attention to their accessibility and usability for all, including persons with disabilities (Agencies: NMS, KURA, KenHA).



Provide continuous road safety education through multiple mediums: school curricula, television, billboards, SMS, radio (Agencies: NMS, Kenya Police/NTSA).



Include males as vulnerable users in road safety campaigns, in addition to women, persons with disabilities, the elderly and children (Agencies: Kenya Police/NTSA).



Target males between ages 20-44 in road safety campaigns, who account for the most pedestrian fatalities (Agencies: Kenya Police/NTSA).



Enhance enforcement of speed limits on all roads, especially the top 10 deadliest corridors (Agencies: Kenya Police).



Improve **enforcement of drunken driving laws** on roads (Agencies: Kenya Police/NTSA).



Increase **vigilance of private vehicles and Public Service Vehicles**, which cause the most accidents (Agencies: Kenya Police/NTSA)



Improve capacity to trace accident causes and the types of vehicles causing accidents (Agency: Kenya Police).



Strictly **enforce rules on designated pick-up and drop-off points** for passengers (Agencies: Kenya Police and NMS).



Improve street lighting on all major NMT corridors, and the top 10 deadliest corridors (Agency: NMS).



Increase road signs and consider alternative materials to discourage vandals from selling signs as scrap metal (Agencies: NMS, KURA, KenHA).



Provide for adequate pedestrian crossings, noting that pedestrians prefer to cross at street level rather than footbridges (Agencies: NMS, KURA, KenHA).



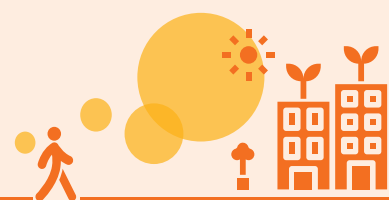
Cover all drainage and address storm water management along NMT infrastructure (Agencies: NMS, KURA, KenHA).



Continue to **enforce against encroachment** upon NMT spaces, especially by *bodabodas* and vehicles (Agencies: NMS, KURA, KenHA).



Provide street furniture and litter bins, increase greenery, toilets and water taps and make provision for street vending on pedestrian corridors (Agencies: NMS, KURA, KenHA).



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Photo overleaf: A beneficiary of the Bicycles for Educational Empowerment Program. © World Bicycle Relief



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