MUMBAI

ROAD SAFETY ANNUAL REPORT

2021

Bloomberg Philanthropies | Initiative for Global Road Safety

REPORT BY

TRAFFIC CONTROL BRANCH
MUMBAI POLICE

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PREFACE

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Commissioner of Police, Greater Mumbai
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For a city with an ever-increasing population and number of vehicles, the Mumbai Police continues to embrace its growing responsibility to work towards the welfare and safety of the city. Mumbai has shown the way by making the roads of the city safer with a systematic approach and cohesive work in the city government and the Mumbai Police. Since 2015, our city has achieved a 43% reduction in road crash deaths. This significant reduction in deaths is a result of implementing life-saving road safety measures in Mumbai.

As we enter the second Decade of Action for Road Safety 2021-2030, I encourage all government stakeholders to use this report as a tool to plan data-led and evidence-based road safety interventions to make streets safer for all road users, especially those most vulnerable on our streets. With accessible and inclusive infrastructure, stringent enforcement, awareness campaigns, and publicly available data like this report, we are on track to achieve our targets to reduce road crash deaths and injuries.

The Mumbai Police is committed to enforcing road laws, smooth movement of traffic, and reducing the number of road crashes leading to deaths and injuries.

I hope this report will play an instrumental role in providing valuable insights into the road safety status in Mumbai and help government stakeholders take immediate steps. I congratulate the Joint Commissioner of Police, Traffic, for releasing the annual report for the sixth consecutive year and wish them to continue in the future. The Mumbai Police are committed to supporting the continuation of this effort in Mumbai.

Shri. Vivek Phansalkar, IPS

Joint Commissioner of Police, Traffic, Greater Mumbai
Maharashtra, India

Road crashes are the leading cause of death in the under-30-year-old population worldwide. Losing the lives of the productive population disrupts the world's economy. Globally 1.3 million people continue to die on the world's roads. India has reported 131,714 deaths and Maharashtra reported 11,569 deaths in the year 2020.

As we overcame COVID 19 leading to lesser mobility restrictions this year, the number of road crash deaths has increased slightly since the pandemic year. However, the declining trend in road crash-related fatalities has continued since 2015 with the city recording a 39% decrease between 2015 and 2021.

Between 2010 and 2021, we have seen a 38% reduction in these deaths. These road crash deaths are preventable and we aim to follow the UN decade of action for road safety to reduce road crash deaths to 50% by 2030.

I hope this report will guide all the stakeholders to collaborate with each other to implement interventions in areas of enforcement, engineering, and media.

We acknowledge and appreciate the efforts made by the different government stakeholders in the city to implement evidence-based interventions in their areas of expertise that have led to a significant reduction of deaths and injuries in Mumbai over the years. We are committed to providing our support to ensure these efforts are sustained so we may continue to bring down these preventable crashes, as well as the preventable deaths and injuries resulting from them.

② ACKNOWLEDGEMENTS

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③ ABBREVIATIONS

BEST	Brihanmumbai Electric Supply and Transport Company
DRIVER	Data for Road Incident Visualisation, Evaluation and Reporting
IRAD	Integrated Road Accident Database
MCGM	Municipal Corporation of Greater Mumbai
MTCB	Mumbai Traffic Control Branch
MORTH	Ministry of Road Transport and Highways
RTO	Regional Transport Office
WHO	World Health Organisation

5 **EXECUTIVE SUMMARY**

Globally 1.3 million people continue to die and 50 million get injured in road crashes each year. They are the leading cause of death in people aged five to 29 years.[1] India in 2020 has reported 366,138 road crashes, resulting in 131,714 deaths.[3] Maharashtra has reported 24,971 crashes causing 11,569 deaths in 2020.[4]

Mumbai has reported 387 road crash deaths in 377 crashes in 2021, marking a 39% reduction since 2015. The death rate shows that 3 people per 100,000 population died on Mumbai roads. Two and three-wheeled passenger fatalities continued to lead for the second consecutive year, with pedestrians as the second largest group. Two and three-wheelers accounted for 46% of deaths, followed by pedestrians at 45%. A total of 93% of fatalities were among vulnerable road users.

Men continued to account for 87% of total deaths for the second year, with the 20-54 year-old age group making up most of the total deaths in men. Motorcyclist deaths were concentrated among the 20-34 year-old age groups.

Hit-and-run events accounted for 27% of all fatal crashes in 2021, and among these 58%, 58% of victims were pedestrians. Many of these pedestrian deaths occurred at Amar Mahal Junction and IIT main gate junction.

During periods of mobility restrictions, such as April, both fatal and non-fatal crashes decreased. The peak hours for fatal crash deaths were between 23:00 to 24:00 hours on Saturdays for the past three years.

Among the top 20 identified high-risk corridors, Dr Babasaheb Ambedkar Marg and NS road had the highest deaths and injuries per kilometer. The Amar Mahal junction continues to be the highest risk.

These findings emphasize the high level of risk among vulnerable road users like motorcyclists and pedestrians, the dangers for these road users of higher speed arterial roads, and the continuing high rate of hit-and-run events.

INTRODUCTION

Globally 1.3 million people continue to die and 50 million get injured in road crashes each year. They are the leading cause of death in people aged five to 29 years.[1] More than 90% of these global road crash deaths occur in low-and middle-income countries. In addition to the human tragedy of each of these deaths, this impacts the development of low-and middle-income countries as economically productive lives are lost.[2]

India in 2020 has reported 366,138 road crashes, resulting in 131,714 deaths.[3] Maharashtra has reported 24,971 crashes causing 11,569 deaths in 2020.[4]

Road crash deaths in Mumbai have been declining since 2015. After the exceptional pandemic year of 2020 with its periods of tight mobility restrictions, 2021 showed a slight increase in the number of deaths and injuries. However, the broader downward trend continued with a decrease in deaths and injuries compared to 2019.

This report aims to increase understanding of the type, times, and locations of fatal crashes, and the profiles of those involved so that more targeted interventions can be undertaken to prevent fatal crashes. Social marketing campaigns can be aimed at specific evidence-based audiences; police can be trained and deployed to target the most relevant risk factors, times, and places; and intersections and corridors can be made safer in zones identified as black spots. Additionally, in order for stakeholders to manage the effort to reduce serious and fatal crashes, they need to be able to measure and monitor them. The new national road crash data system, iRAD (Integrated Road Accident Database) will be a critical tool to support this process moving forward.

This report documents the situation of road crash deaths and injuries in Mumbai during the year 2021. Mumbai has reported a 39% reduction in road crash deaths since 2015. One element of this work is to enhance road safety surveillance systems for outcomes data including crashes, injuries, and deaths. In Mumbai, that surveillance system is composed of a web of actors working together to leverage the available data to understand how and why crashes happen, respond to them, and prevent them. Agencies involved in this system include the MTCB, the RTO, the MCGM Department of Health, the MCGM Roads and Traffic Department, and others.

The following report presents an analysis of the Mumbai Traffic Control Branch's 2021 road crash injury data. It represents a process of digitizing existing data and mapping, analyzing, and compiling it.

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[1] "Decade of Action for Road Safety 2021-2030", n.d. Accessed April 12, 2022.
https://www.who.int/teams/social-determinants-of-health/safety-and-mobility/decade-of-action-for-road-safety-2021-2030.
[2] World Bank (2019). *Guide for road safety opportunities and challenges: Low - and middle - income country profiles*. Washington DC, USA: World Bank.
[3] Annual Report 2021-2022. 2022. Delhi, Delhi: Ministry of Road Transport and Highways.
https://morth.nic.in/sites/default/files/Annual%20Report_21-22-1.pdf.
[4] Highway police of Maharashtra, 2020. *Road Accidents in Maharashtra.* Report, Mumbai: Accident research cell, Maharashtra.

6 METHODS

DATA SOURCES

Road crash and injury data in Mumbai are sourced from police crash reports, compiled and maintained by the Mumbai Traffic Control Branch. Crashes are first documented using a narrative First Information Report (FIR), the same process used for crime reporting. The FIR can be filed by any witness or traffic police official, or even by a crash victim. The FIR is filed at the police station nearest to the crash location with relevant jurisdiction. It is the responsibility of this police station to examine the crash further and investigate it appropriately. Police gather data on the crash circumstances, victims involved, manner and behavior of the accused at the time of the crash, feedback from any witnesses, autopsy report of any fatal victim, and technical reports of the vehicle, along with internal investigation. Selected details are summarized monthly in a table format commonly referred to as the "data sheet" and sent by the investigating police station to the Mumbai Traffic Control Branch (MTCB) Headquarters (HQ). Since 2018, a standardized crash report form issued by the Ministry of Roads, Transportation, and Highways is supposed to be completed for each crash and forwarded in place of the data sheet, but most police stations have not made this transition. Early in 2021 the Ministry of Roads, Transportation and Highways introduced an application called "Integrated Road Accident Data" (iRAD) for crash data collection, management, and visualization and has rolled out a pilot across six states of India including Maharashtra. The iRAD system is not yet used by police in Mumbai.

At the MTCB HQ, the summarized information is cross-checked to avoid duplicate reporting, and then manually tallied. These tallies are compiled to prepare monthly and annual reports for the state and national levels. In 2016 the MTCB team developed a provisional system for digitizing fatal crash data, to improve data management and streamline reporting and to ensure geolocation data is accessible for crash mapping. Starting with 2018 cases, both fatal and non-fatal injury crashes are digitized using World Bank-developed open-source software called Data for Road Incident Visualisation, Evaluation and Reporting (DRIVER).

ANALYSIS

Records from these databases were analyzed and condensed into summary statistics in the form of the tables and figures below. Locations of fatal crashes were mapped by manually entering crash location descriptions into Google Maps and identifying the coordinates based on the best available information.

Road user types were grouped for most tables and graphs into the following four categories: Pedestrians, motorized two and three-wheeler users, vehicle occupants, and cyclists. While previous versions of this report grouped three-wheelers with four or more-wheelers, in 2020 this report shifted to standard global practice for comparability.[5] This also reflects the vulnerability of three-wheeler auto rickshaw occupants who, like motorcyclists, are not protected by a vehicle shell.

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[5] Global status report on road safety 2018. Geneva: World Health Organization; 2018. License: CC BYNC-SA 3.0 IGO.

LIMITATIONS

The current "data sheet" summary formats can be inadequate, and some variables are inconsistently or rarely captured. Crash location information is not precise, and crash locations are manually pinned based on the available description. Information on helmet use, seatbelt use, and alcohol use is unavailable. The crash-recording form introduced by the Ministry of Roads Transport and Highways in late 2017, and reflected in the iRAD national crash data platform, is not followed by most police stations. Training and monitoring of crash documentation are required. The national Integrated Road Accident Database (iRAD) system has been piloted in Maharashtra but is not yet used in Mumbai.

7 **TREND IN ROAD CRASH DEATHS AND INJURIES**

Fatal Crashes and Deaths
2010 - 2021

■ **Fatal crashes** ■ **Fatalities**
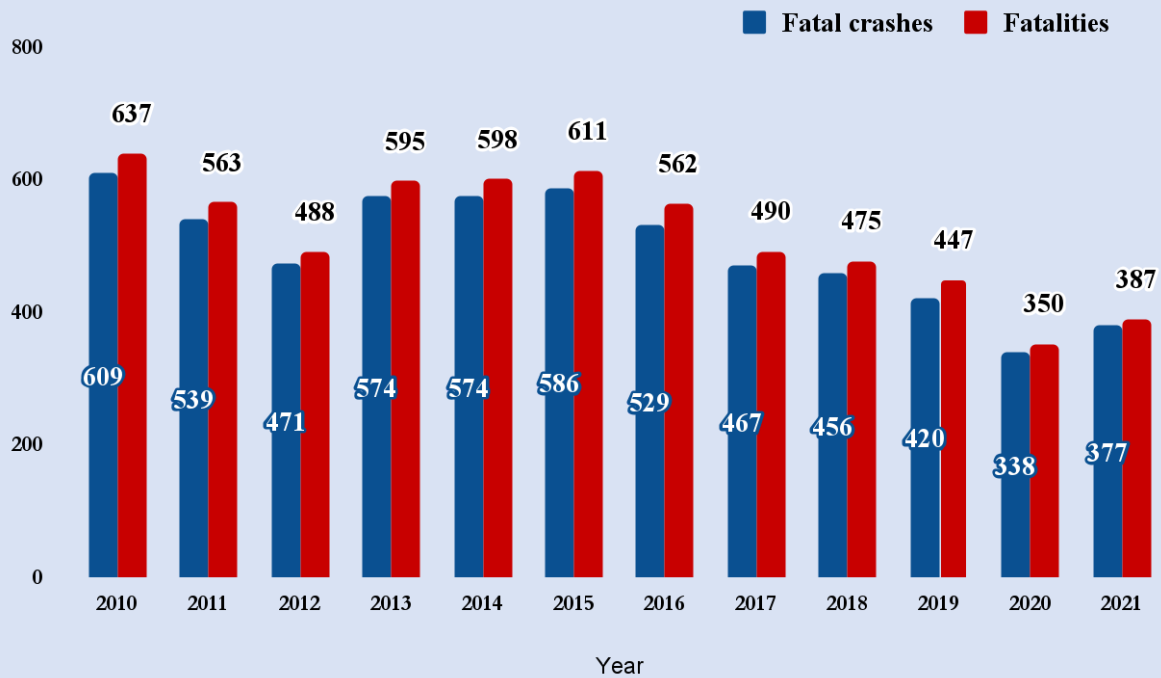
Figure 1

Mumbai has reported 387 deaths in 377 fatal road crashes in 2021. This represents a slight increase compared to 2020 when road crash fatalities decreased sharply during pandemic-associated mobility restrictions. Compared to 2019, there is a reduction of 13% in deaths and 10% in fatal crashes.

Road Crash Fatality Rates
2011 – 2021
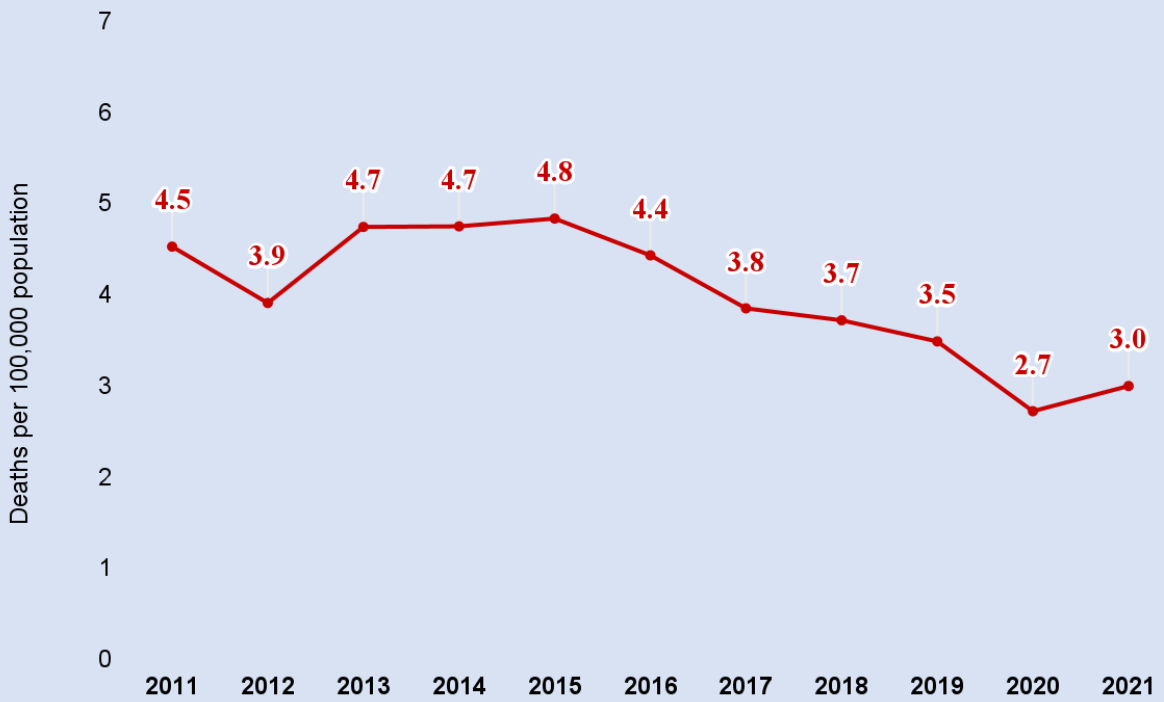
Figure 2

Figure 2 shows that 3 persons per 100,000 population were killed in road crashes in Mumbai in 2021. Death rates show a slight increase compared to the year 2020, but a reduction since 2019, consistent with the overall decreasing pattern since 2015.

Injury Crashes and Non-Fatal Injuries
2010 – 2021
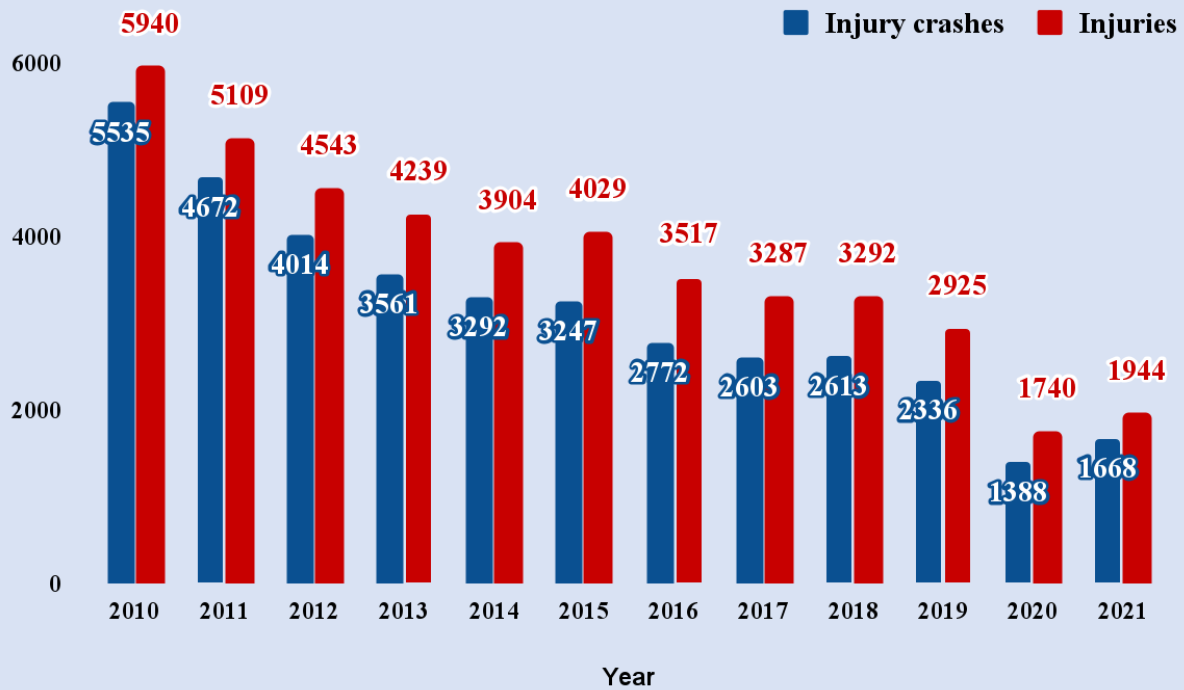
Figure 3

Similar to road crash deaths, reported road crash injuries increased somewhat from 2020, again likely related to the sharp reduction during pandemic mobility restrictions. Mumbai reported 1944 non-fatal injuries in 1668 injury crashes, a reduction of 34% since 2019.

**Trend in Road Crash Deaths by Road User Type
2015 - 2021**
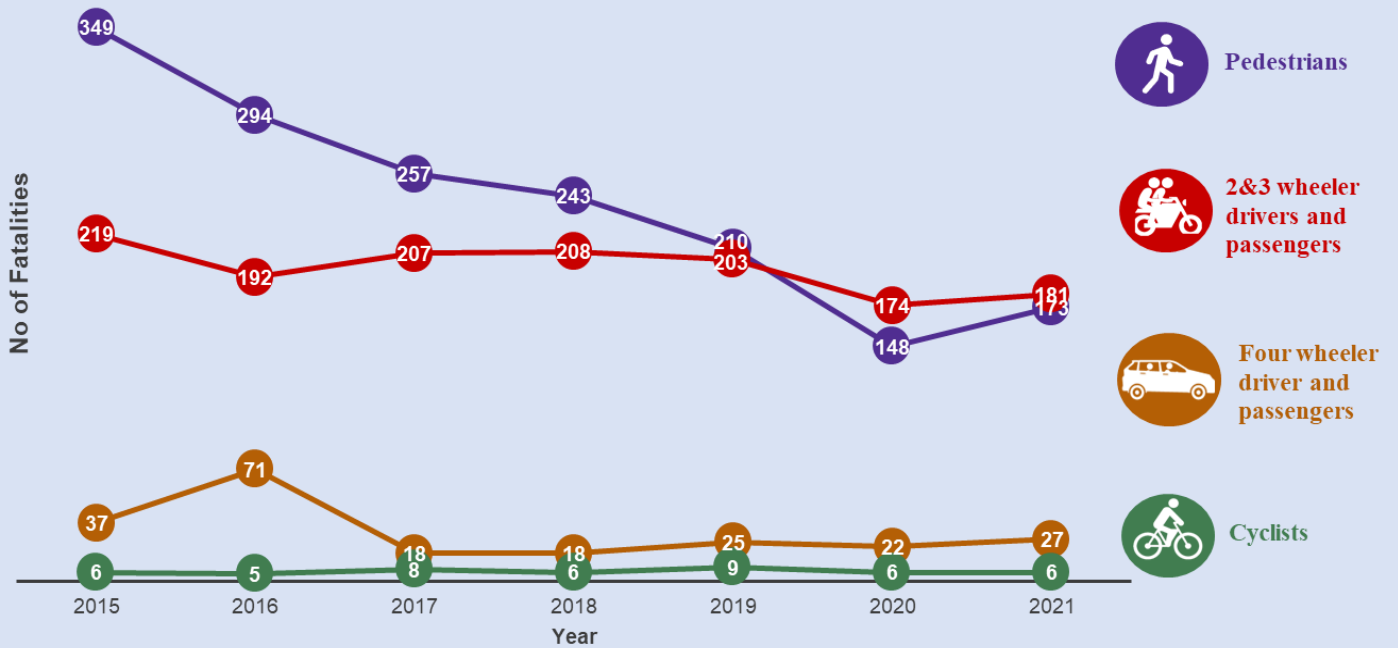
Figure 4

Road crash deaths were highest among two and three-wheeler riders in 2021, and for the second year, this group was larger than pedestrians. These 181 deaths include 162 two-wheeler riders and 19 three-wheeler (auto rickshaw) occupants.

Compared to 2020, deaths increased across all road user types, with the largest increase among pedestrians. In comparison to 2019, however, there were still fewer deaths among all road user types except a small increase in four-wheeled vehicle occupants.

Road Crash Deaths by Road User Type 2021

Four wheeler passengers
2%

Cyclists
2%

Four wheeler drivers
5%

Two & three wheeler passengers
11%

Two & three wheeler drivers
35%
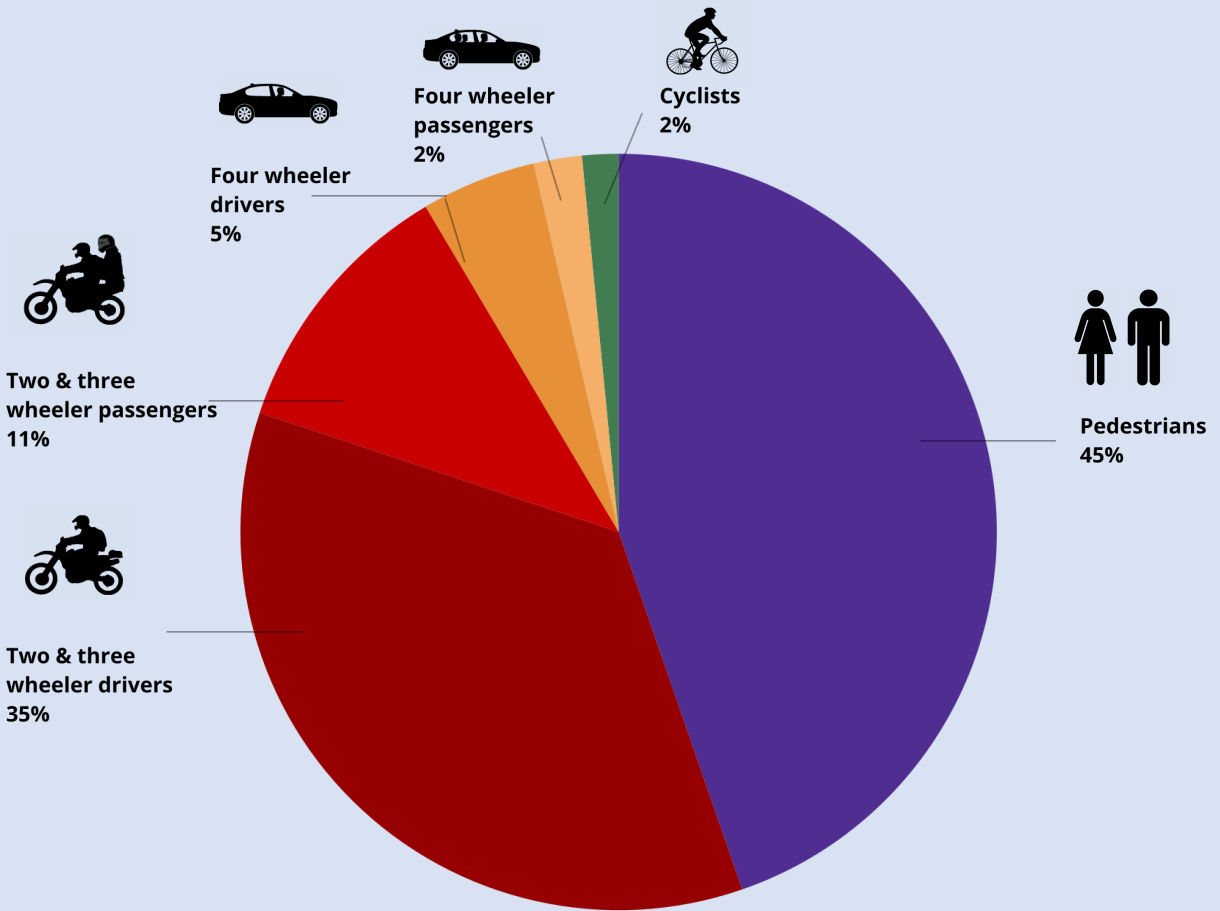
Pedestrians
45%

Figure 5

Two and three-wheeler occupants (both drivers and passengers) accounted for 46% and pedestrians accounted for 45% of all deaths in 2021. A total of 93% of deaths were among vulnerable road users: pedestrians, motorcyclists, three-wheeler occupants, and cyclists.

Non–Fatal Injuries by Road User Type
2021

Cyclists
1%

Four wheeler
passengers
3%

Four wheeler
drivers
6%

Two & three
wheeler passengers
10%

Two & three
wheeler drivers
33%
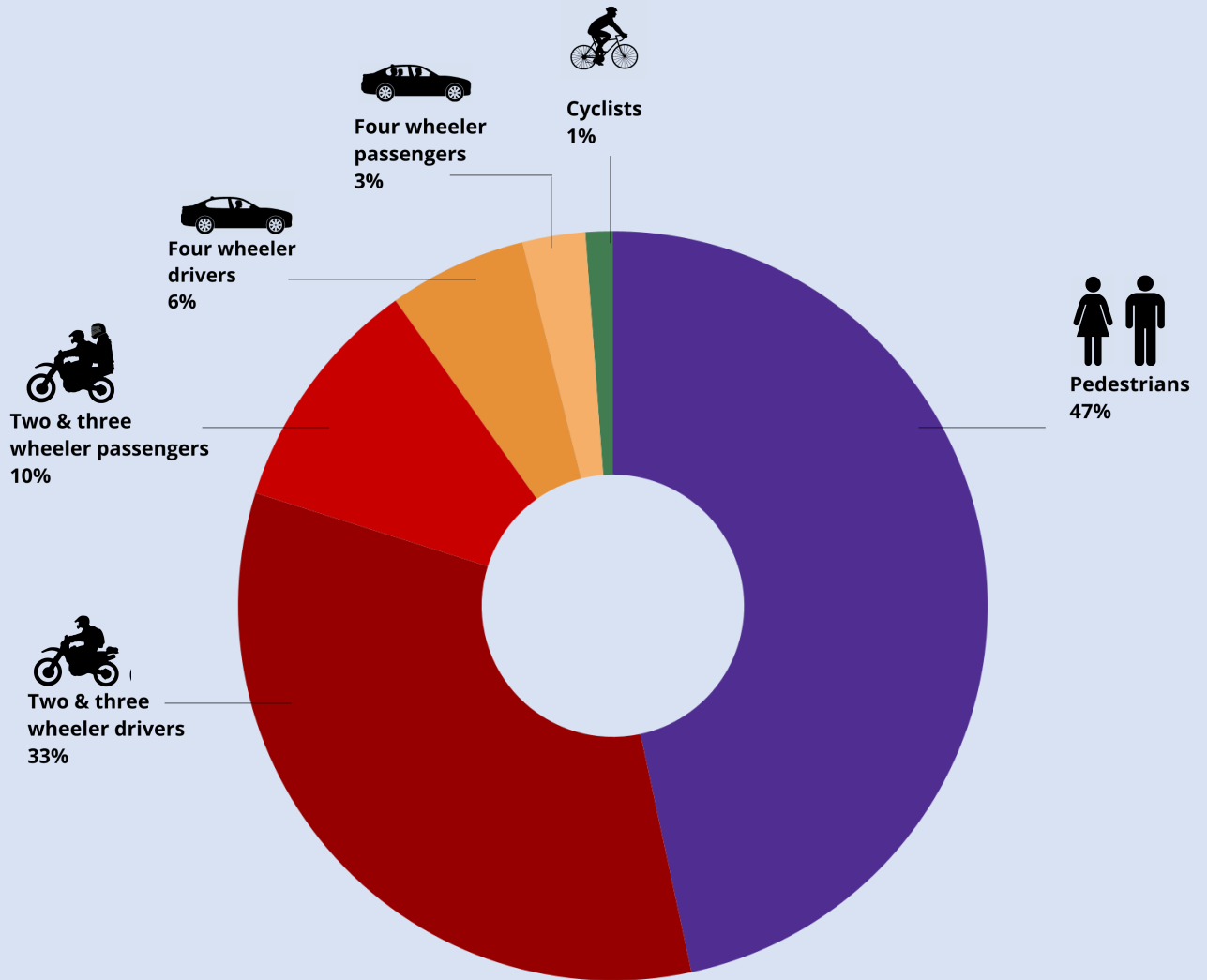
Pedestrians
47%

Figure 6

47% of non-fatal road injuries in 2021 were among pedestrians. Two- and three-wheeler occupants accounted for 43% of road crash injuries. A total of 91% of non-fatal injuries were among vulnerable road users.

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Fatalities by Gender
2021

Figure 7

Men accounted for 87% of road crash deaths in 2021. Females accounted for 13% of road crash deaths.

Non–Fatal Injuries by Gender
2021

Figure 8

Similar to fatalities, men accounted for 80% of non-fatal road crash injuries. Females accounted for 20% of non-fatal road crash injuries.

Road Crash Deaths by Age Group and Gender
2021
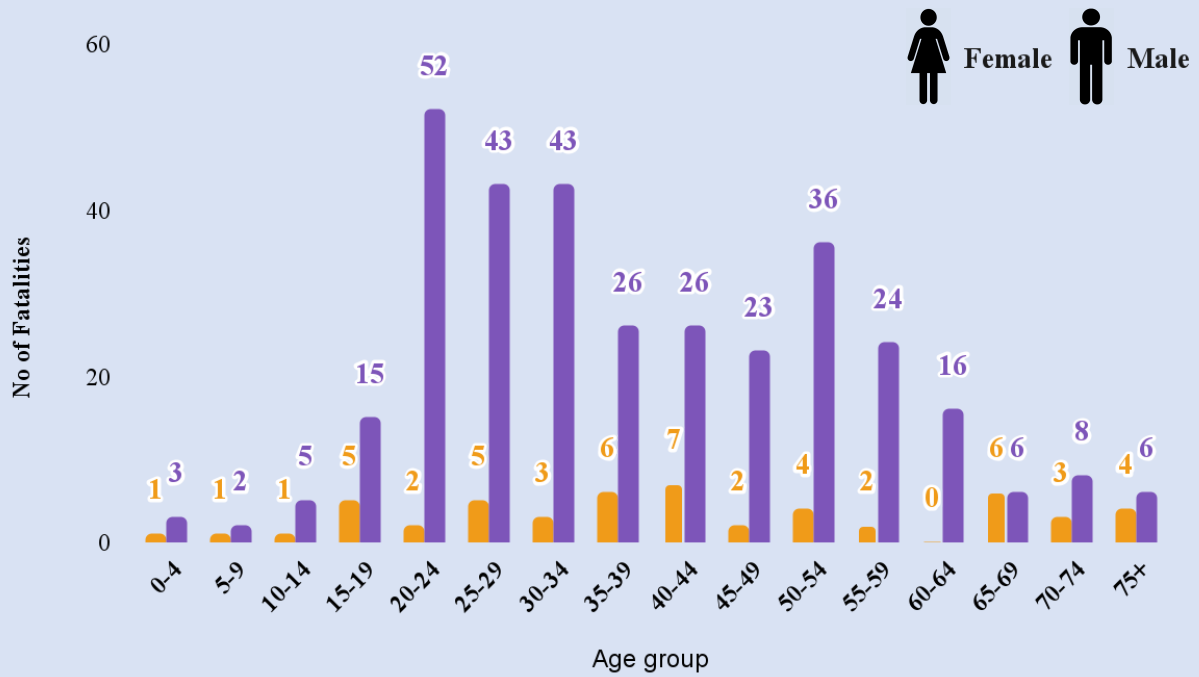
Cases missing age and gender information excluded.
Figure 9

Men between 20 - 54 years of age had the most deaths. Deaths among females were similar across all age groups..
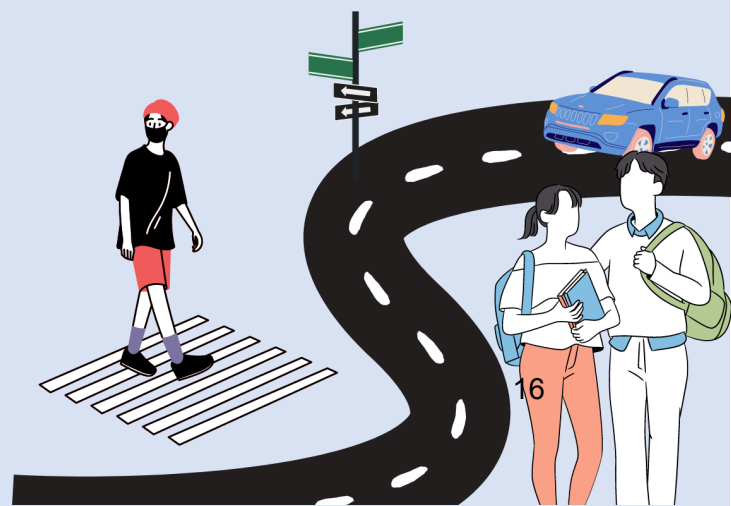
Road Crash Death Rates by Age Group and Gender 2021
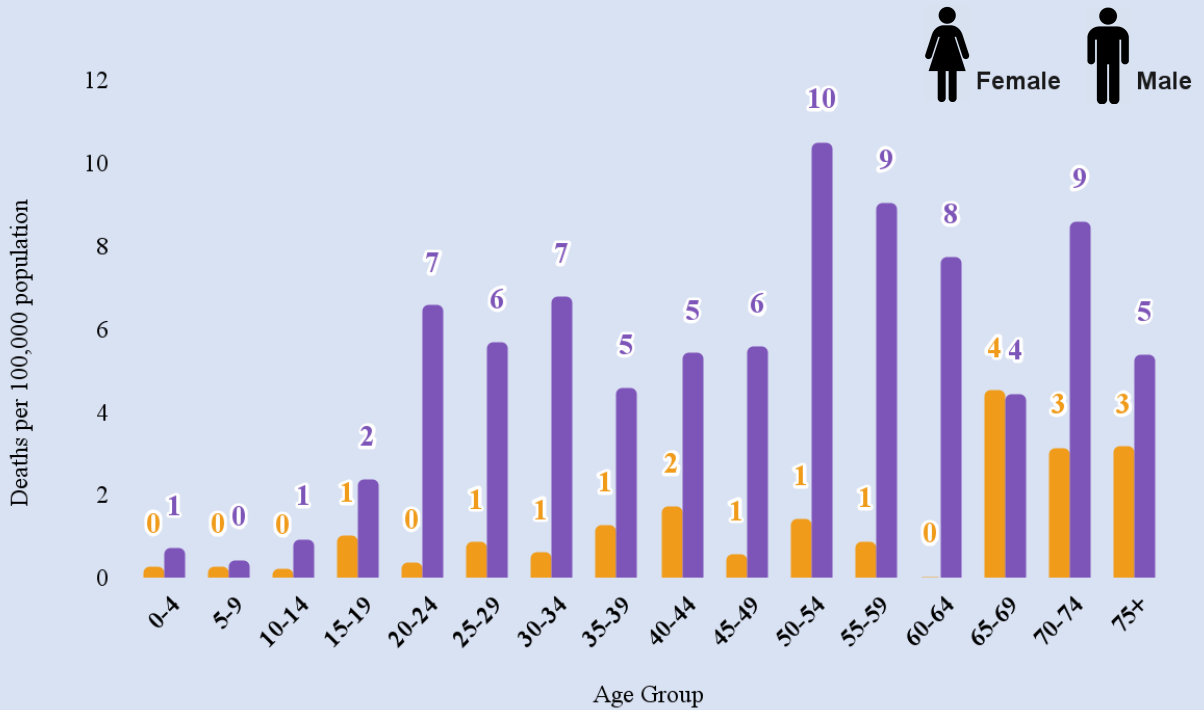
Figure 10 shows fatality rates per 100,000 population by age. In contrast to the raw numbers of deaths, these rates are highest among older ages for both men and women.

Non–Fatal Injuries by age Group and Gender
2021
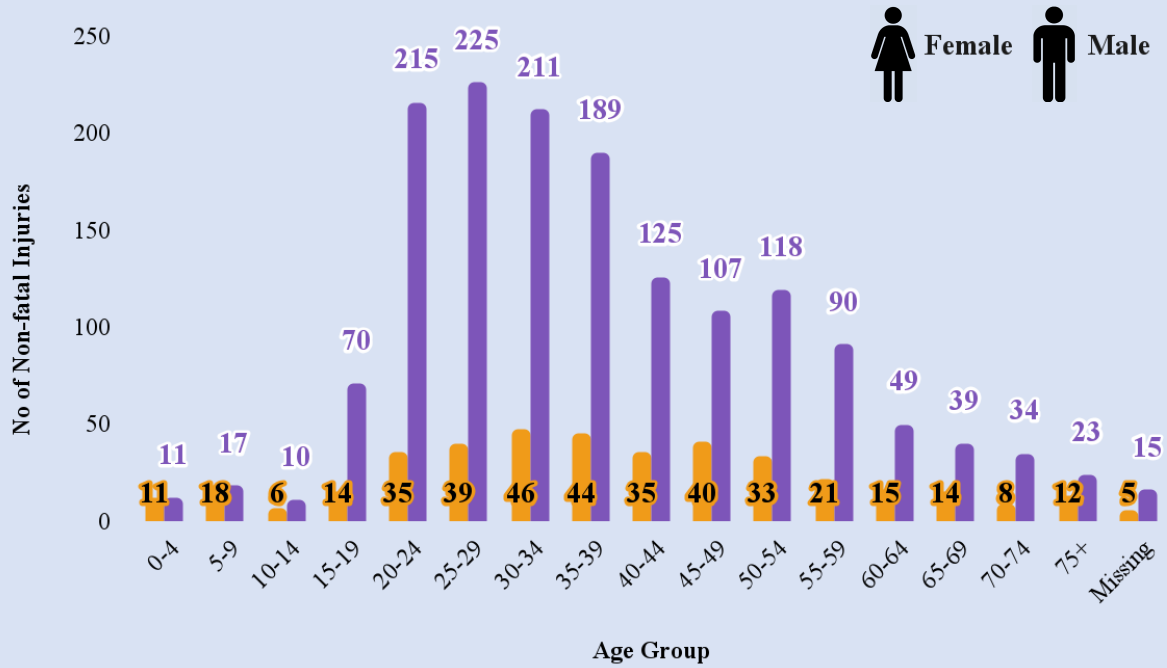
Figure 11

Non-fatal road crash injuries were concentrated in men aged 20 to 39.

Motorcyclist Deaths by Age and Gender 2021

No of Fatalities

Age group	Female	Male
0-4	0	1
5-9	0	0
10-14	1	3
15-19	2	9
20-24	1	37
25-29	3	31
30-34	1	16
35-39	1	8
40-44	2	9
45-49	2	9
50-54	2	12
55-59	1	4
60-64	0	5
65-69	0	1
70-74	0	0
75+	0	0

Female   Male

Age group
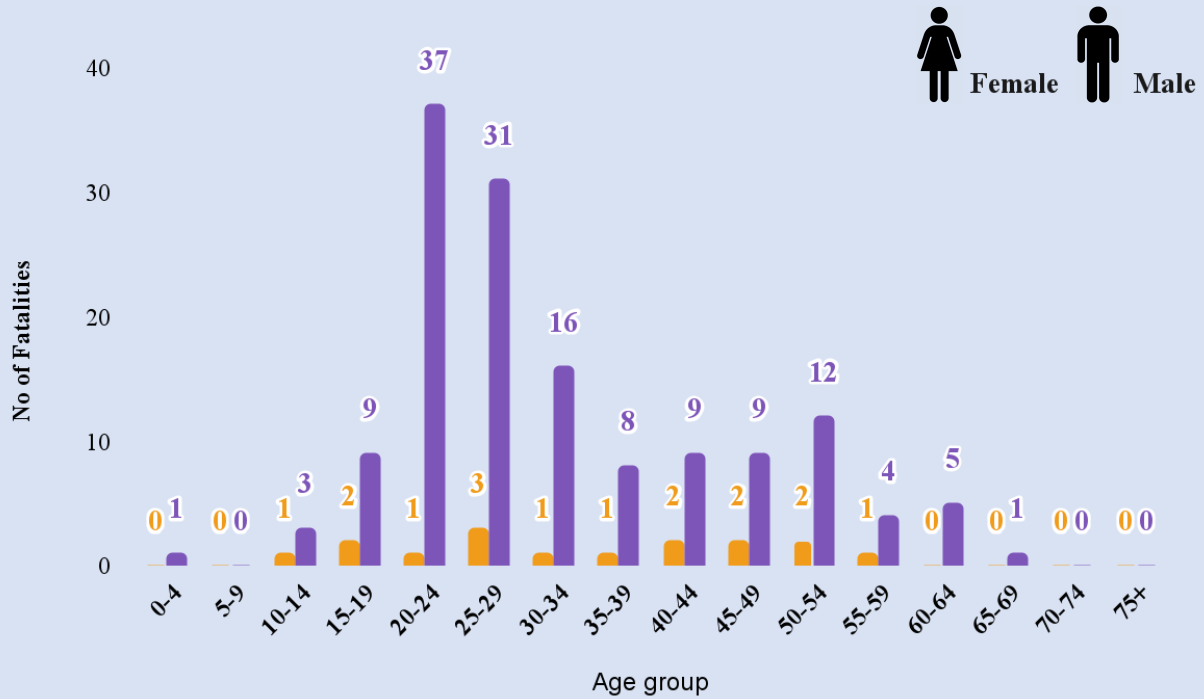
Figure 12

Deaths among motorcyclists were much more concentrated among younger men compared to other road crash deaths. Men aged 20 – 34 years made up most of the motorcycle deaths. Enforcement and awareness should continue to focus on this high-risk group.
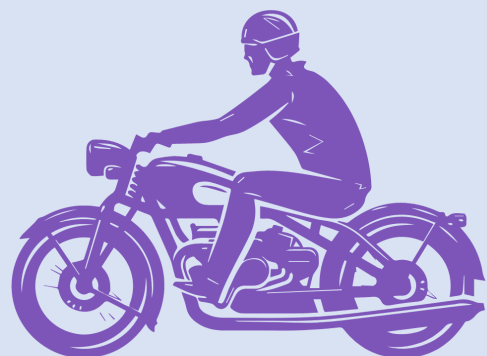
Motorcyclist Death Rates by Age and Gender
2021
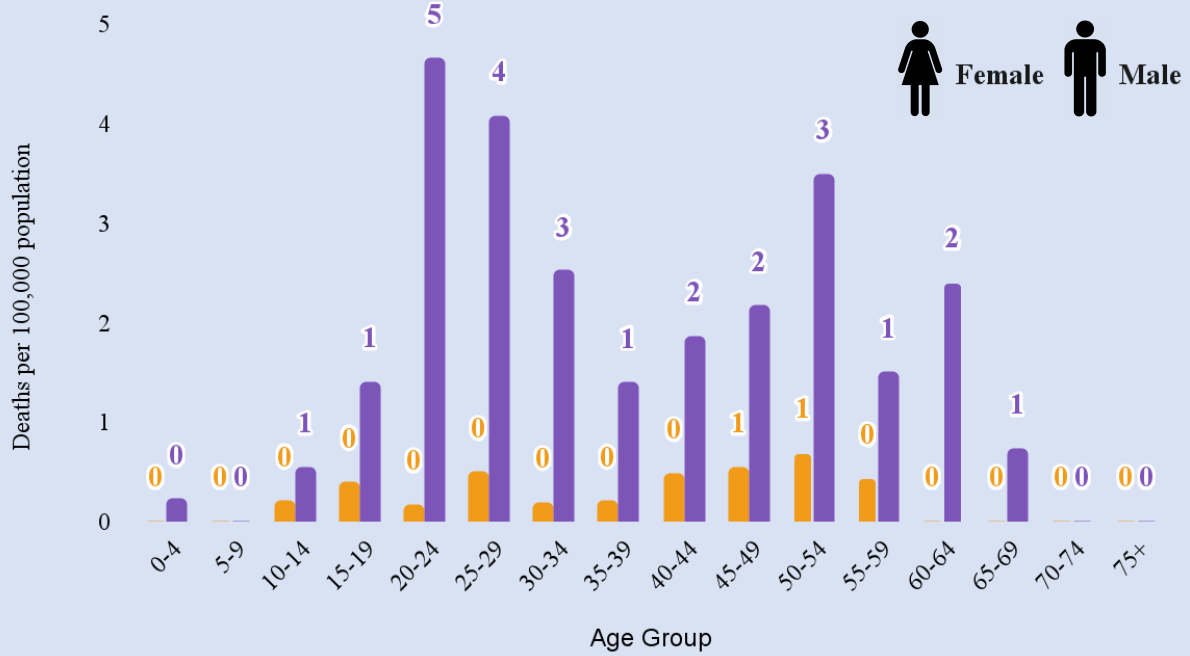
Figure 13

Motorcycle death rates per 100,000 population reflected the high risk among men aged 20 to 34 followed by men aged 45 to 54.
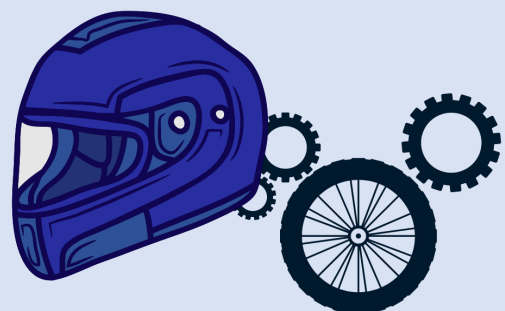
Pedestrian Fatalities by Age and Gender 2021
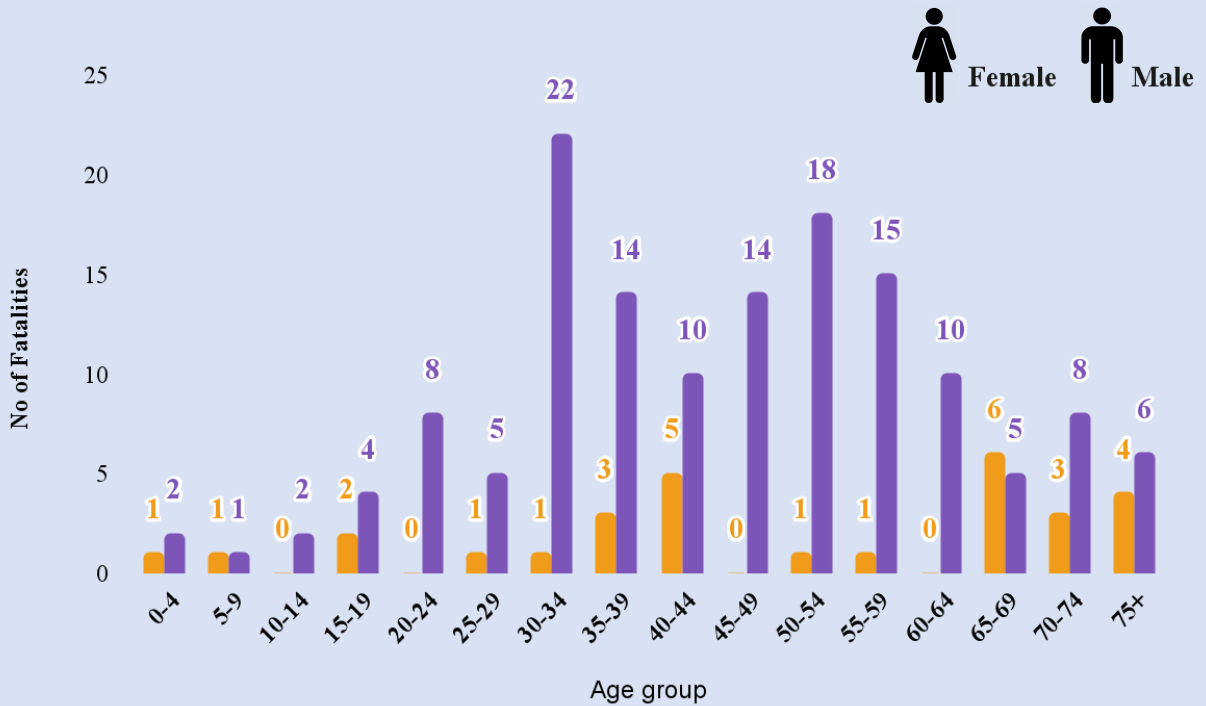
Cases missing age and gender information excluded.

Figure 14

Figure 14 shows the highest number of pedestrian deaths was among 30 - 64 year-old men. Among women, the figures were highest among those over 65.

Pedestrian Fatality Rate by Age and Gender
2021
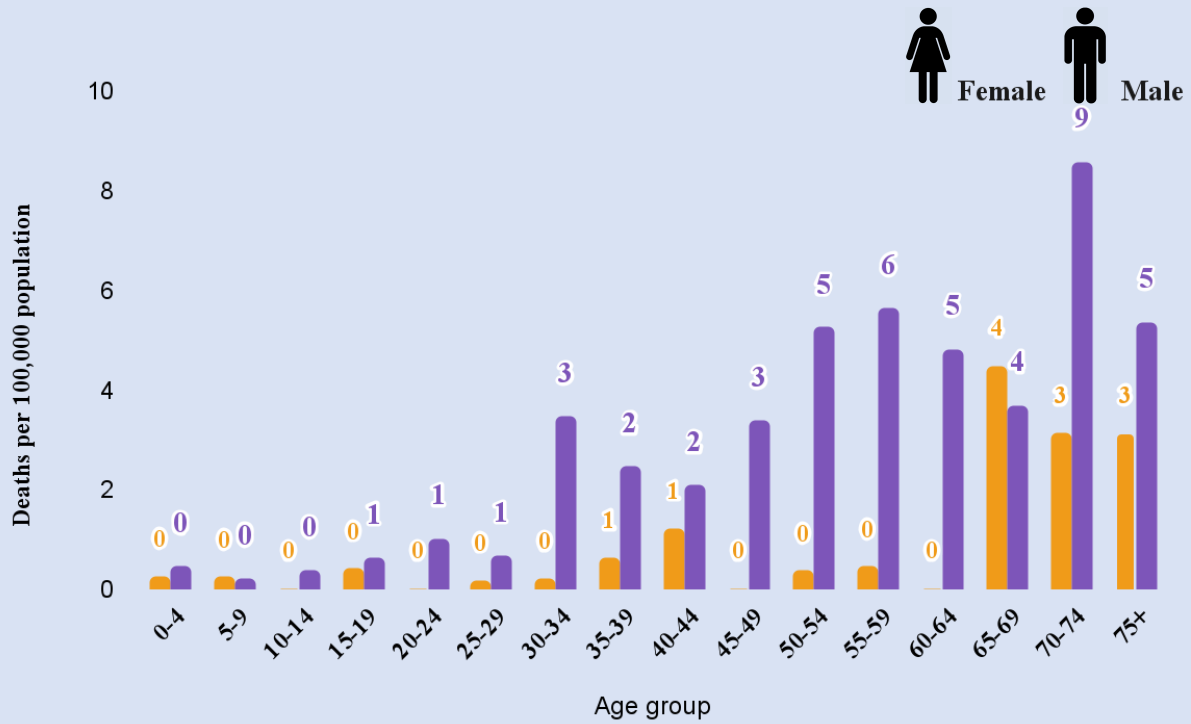
Figure 15

Age- and gender-specific pedestrian death rates showed increasing risk by age among both men and women. The rates were significantly higher among men aged more than 50 years old and among women aged 65 years and above. Speed management and pedestrian infrastructure improvements are key to reducing deaths among vulnerable pedestrians.

At-Fault Drivers in Fatal Crashes by Gender 2021

97% Male

3% Female
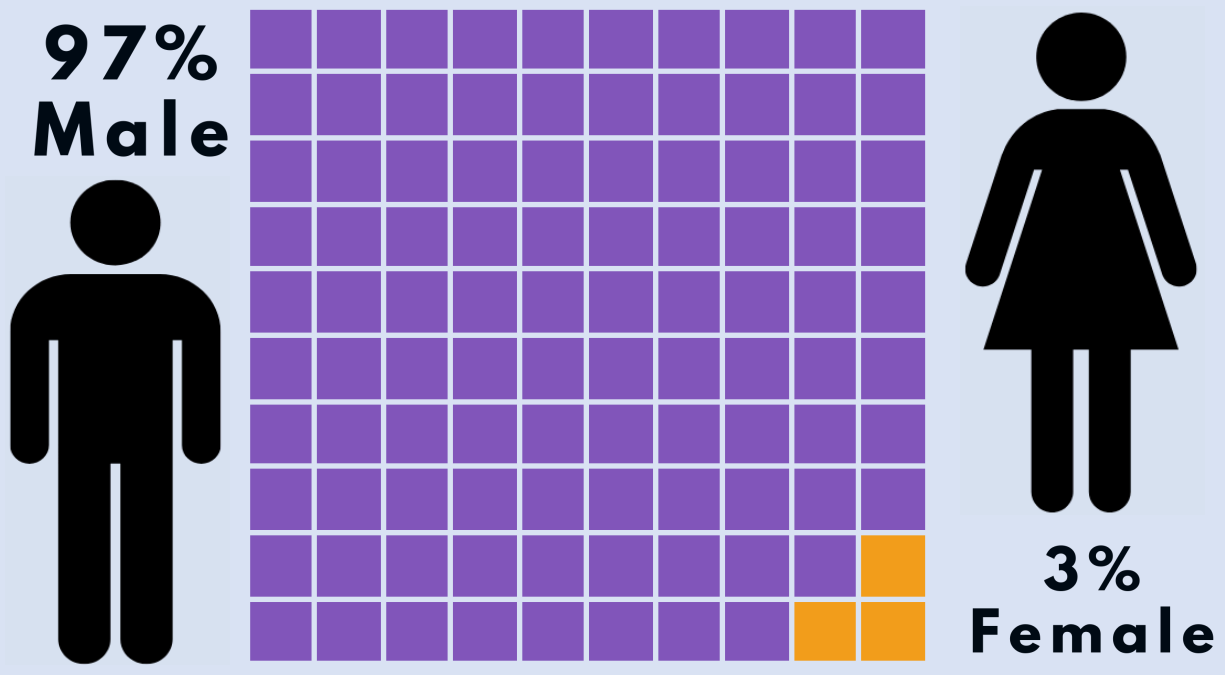
Cases with unknown driver gender excluded
Figure 16

Male drivers were found at fault in most fatal crashes over the past six years. In each crash record, police designate one driver and vehicle as at fault in causing the crash. Cases with unknown gender of the at-fault driver reflect hit-and-run crashes and those where driver gender was not recorded.

At-Fault Drivers in Fatal Crashes by Age
2021
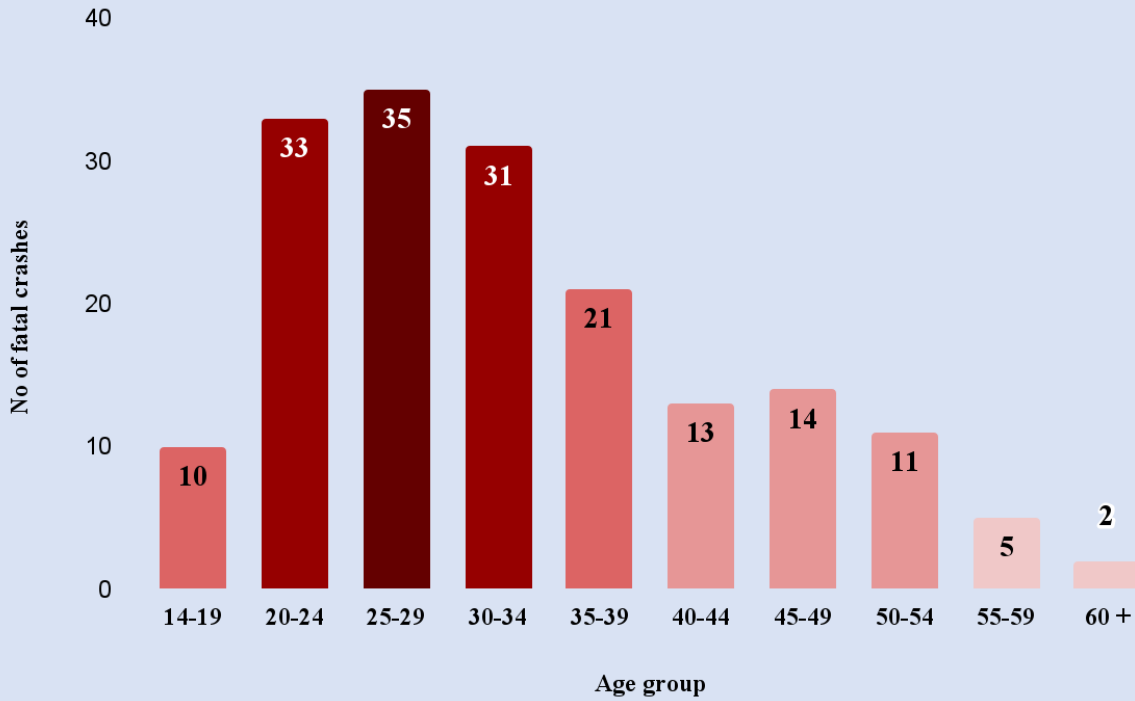
Drivers with unknown age excluded
Figure 17

Among drivers whose age was documented, 20- 39-year-olds were the largest group of those found at fault. The age of at-fault drivers was frequently not recorded, or not available in the case of hit-and-run fatal crashes.

Hit-and-Run Drivers in Fatal Crashes
2021

Hit-and-run offenders
27%

Non hit-and-run offenders
73%
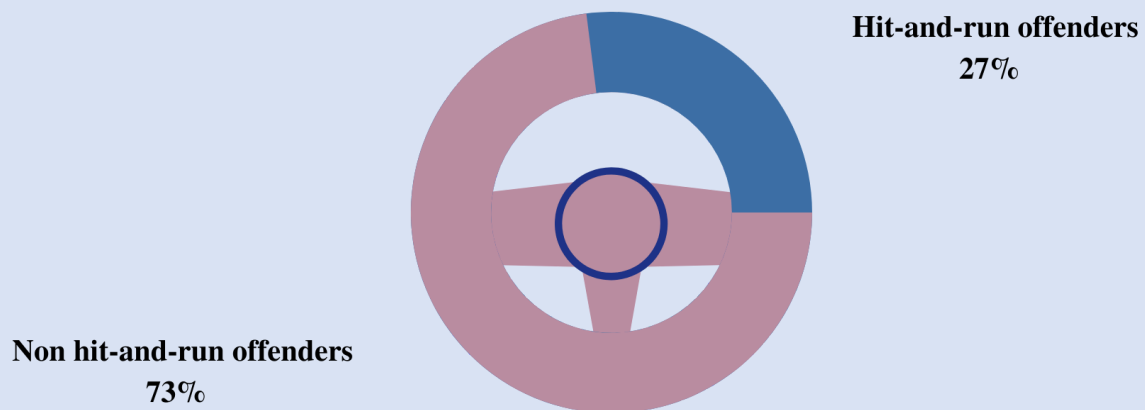
Figure 18

Figure 18 shows that 27% of all fatal crashes were caused by hit-and-run drivers.

Hit-and-Run Fatal Crash
Victim by Road User Type, 2021

Auto rickshaw passengers
2%

Four wheeler passengers
5%

Bicyclists
1%

Motorcycle pillion rider
7%

Motorcycle rider
26%
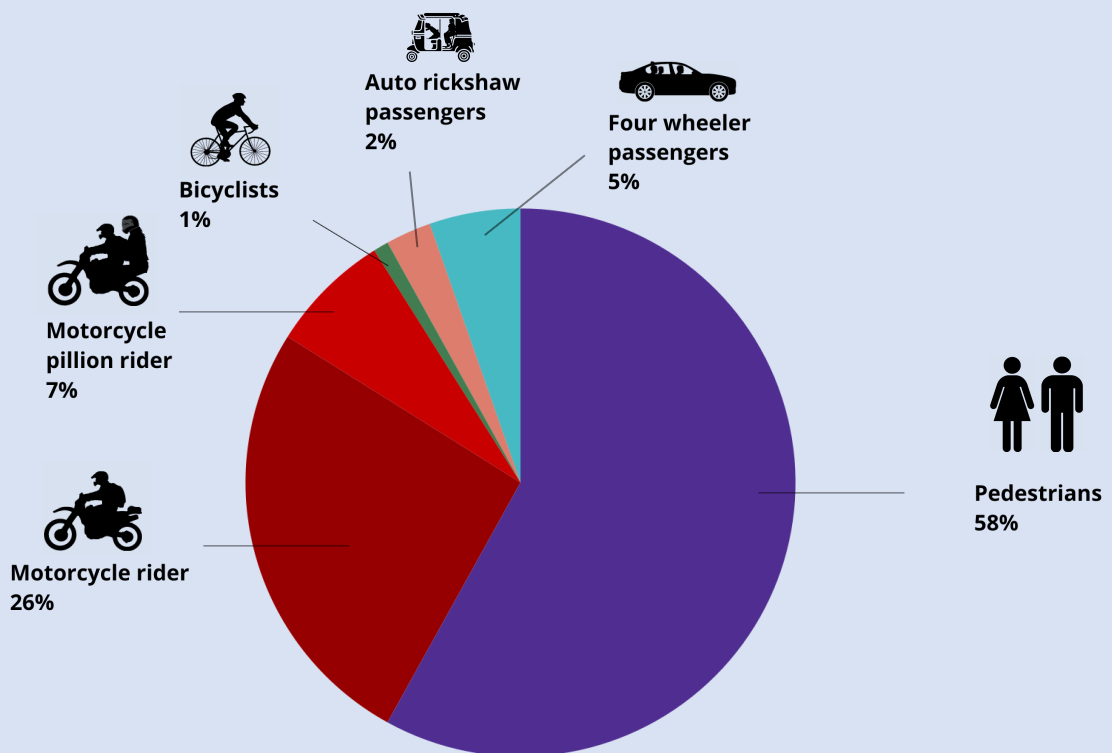
Pedestrians
58%

Figure 19

A total of 27% of all road crash deaths were in hit-and-run cases where the at-fault driver and vehicle could not be identified. Almost all those killed by hit-and-run drivers were vulnerable road users, primarily pedestrians (58%) and motorcyclists (33%).

High-Risk Junctions for Pedestrian Hit-and-Run Fatalities
2019 – 2021

Rank	Junction Name	Pedestrian hit and run fatalities 2019-2021 within 250 mt radius
1	IIT Main Gate Junction	4
2	Amar Mahal Junction Tilak Nagar Ghatkopar	4
3	Intersection of Eastern Free Way Sant Savata Marg	4
4	Intersection of Sant Rohidas Marg and Dharavi Depot	3
5	Intersection of Eastern Express Highway and Goregaon Mulund Link Road	3
6	Priyadarshini Junction	3
7	Intersection of JVLR and Eastern Express Highway	3
8	Intersection of LBS road & Santacruz Chembur Link Road	3
9	Intersection of Dr. Anandrao Nair Marg and Jehangir Boman Behram Marg	2
10	Intersection of Western Express Highway and Akurli Road	2
11	Dr. Kashinath Ghanekar Chowk Prabhadevi	2
12	Intersection Kamlakar Pant Walawalkar Marg and P Tandon Marg	2
13	Intersection of Western Express Highway and Mathuradas Vasanji Road	2
14	Intersection of Sion Panvel Highway and Eastern Freeway (Shivaji Chowk)	2
15	Intersection of Sion Panvel Highway and Ghatkopar Mankhurd Link Road	2

Table 1

Table 1 shows the high-risk junctions for pedestrian fatalities caused by hit-and-run crashes for the past three years. These junctions can be studied further to identify the causes of the hit-and-run crashes and also redesigned in a manner to minimize pedestrian and vehicular conflicts.
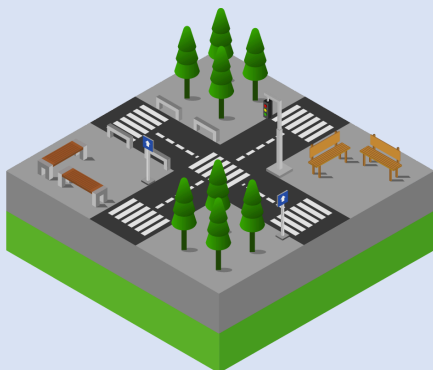
At-Fault Vehicles and Fatal Crash Victim Road User Types, 2021

Victim/Vehicle	Auto rickshaw	Bus	LV	HV	MHV	Two wheeler	Single vehicle crash	Missing	Total
Pedestrian	14	24	34	14	21	34	0	32	173
Motorcyclist	1	14	27	25	26	17	45	7	162
Three wheeler occupants	0	3	3	1	2	0	10	0	19
Four wheeler occupants	0	0	3	5	1	3	13	0	25
Cyclist	1	1	2	0	1	1	0	0	6
Missing	0	0	0	0	1	0	0	1	2
Total	16	42	69	45	52	55	68	40	387

Figure 20

Figure 20 shows which types of vehicles were responsible for deaths among each type of road user. Most of the pedestrian deaths were caused by cars, motorcyclists, and unknown vehicles. The highest number of motorcyclist deaths occurred in single-vehicle crashes, followed by light, medium-heavy, and heavy vehicles in approximately equal proportions.

_____

LV: Light Vehicle
HV: Heavy Vehicle
MHV: Medium Heavy Vehicle

At-Fault Vehicles and Non–Fatal Crash Victim Road User Types, 2021

Victim/Vehicle	Auto rickshaw	Bus	LV	HV	MHV	Two wheeler	Single vehicle crash	Missing	Total
Pedestrian	100	46	284	19	77	332	0	54	912
Motorcyclist	51	29	274	41	80	165	60	21	721
Three wheeler occupants	15	4	47	12	9	13	28	2	130
Four wheeler occupants	3	7	41	8	27	6	48	1	141
Cyclist	3	4	11	0	0	5	0	0	23
Missing	2	0	2	0	1	5	1	6	17
Total	**174**	**90**	**659**	**80**	**194**	**526**	**137**	**84**	**1944**

Figure 21

Figure 21 shows road user types among non-fatal injuries and the vehicles at fault. Pedestrians were most frequently injured by motorcycles and car drivers, whereas motorcyclists were most frequently injured by cars and other motorcycle drivers.

LV: Light Vehicle
HV: Heavy Vehicle
MHV: Medium Heavy Vehicle

Road Crash Deaths Caused by Buses
2015 – 2021
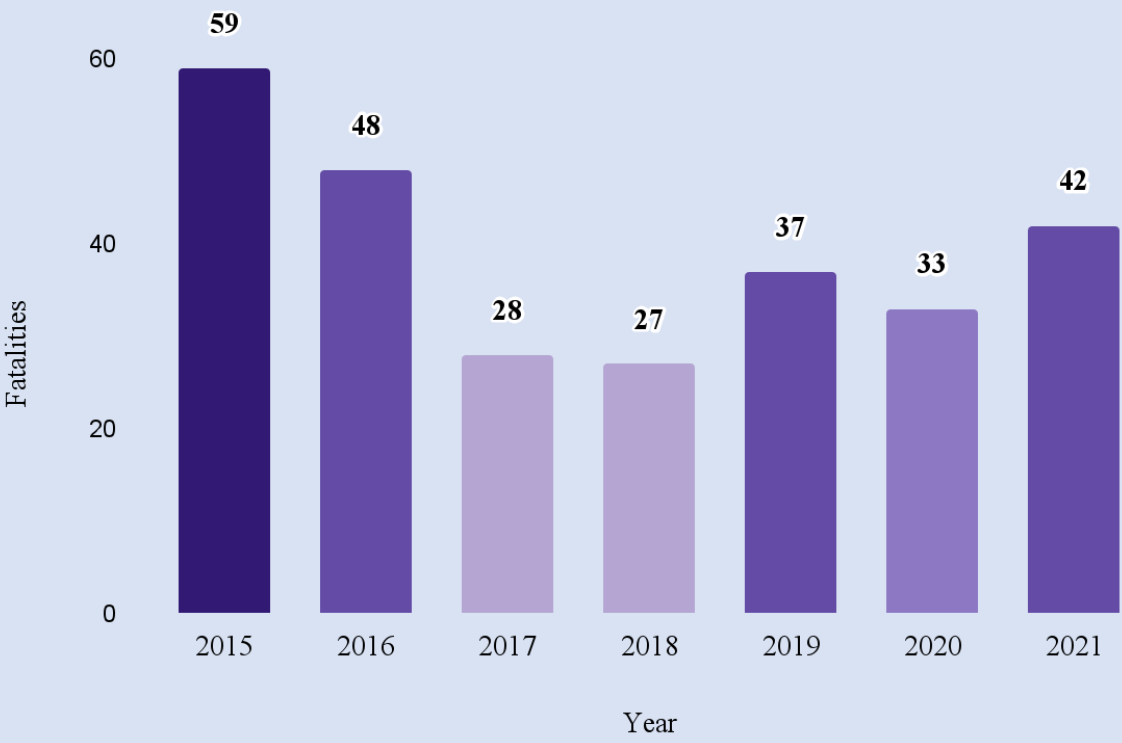
Figure 22

In 2021, buses caused 42 deaths, most of whom were pedestrians and motorcyclists. Deaths caused by buses slightly increased compared to 2020. This category includes BEST buses, private buses, school buses, and luxury buses.

Fatal and Non–Fatal Injury Crashes by Month 2021

Legend: ● Fatal Injury Crashes ● Minor Injury Crashes ● Serious Injury Crashes

Y-axis: No of Crashes

Serious Injury Crashes: Jan 101, Feb 101, Mar (high), Apr 45, May 106, Jun 101, Jul 117, Aug 99, Sept 98, Oct 125, Nov 116, Dec 134

Fatal Injury Crashes: Jan 54, Feb 35, Mar 37, Apr 28, May 19, Jun 20, Jul 25, Aug 30, Sept 31, Oct 33, Nov 36, Dec 29

Minor Injury Crashes: Jan 36, Feb 25, Mar 41, Apr 20, May 21, Jun 27, Jul 31, Aug 29, Sept 29, Oct 27, Nov 33, Dec 26

X-axis: Month

Figure 23

Figure 23 shows the number of road crash injury crashes by month for 2021. Serious injury crashes show a sharp drop in the number of crashes in April 2021. The numbers went down concurrently with restrictions on mobility during this month.

Road Crash Deaths by Time of Day 2021
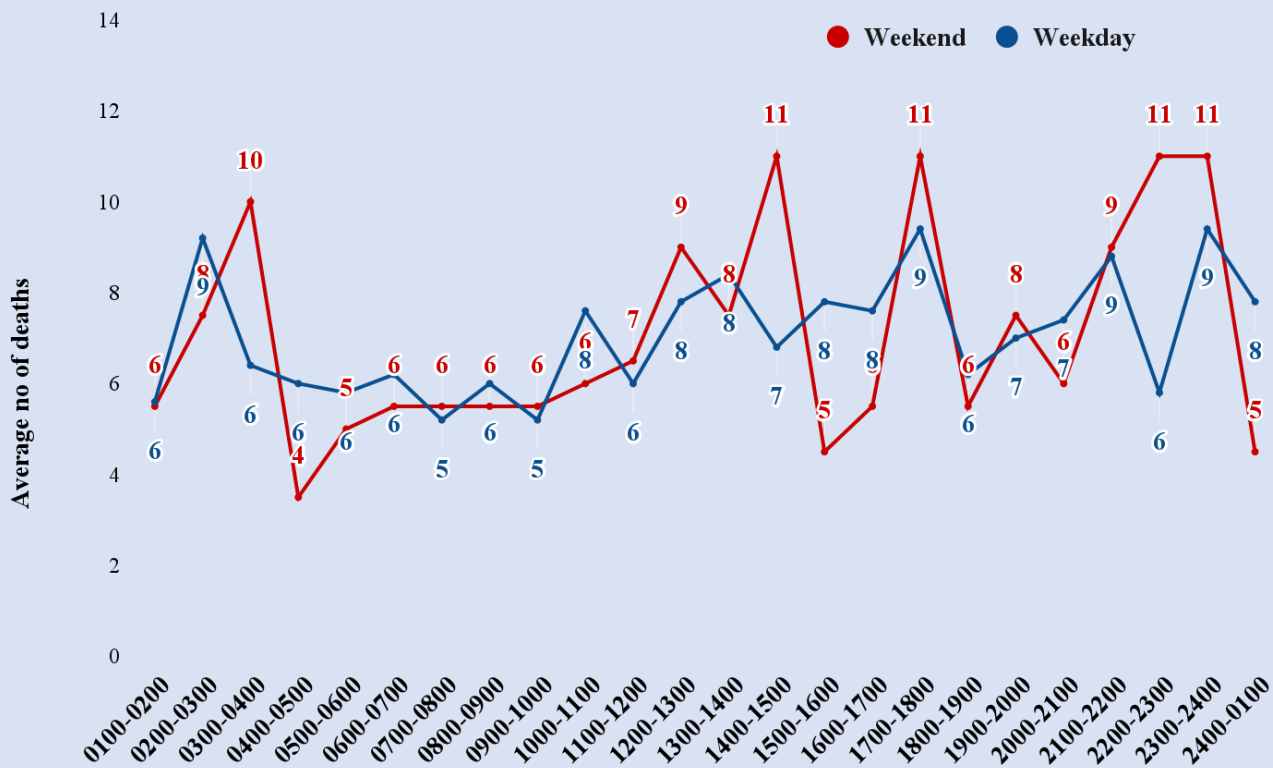
Figure 24

There was no clear pattern in time of day for fatal crashes on either weekends and weekdays.

Road Crash Deaths by Time and Day of Week
2019-2021

Time	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Grand Total
0100-0200	4	5	8	4	7	4	7	39
0200-0300	17	12	3	8	6	8	7	61
0300-0400	5	3	4	6	14	9	11	52
0400-0500	7	5	6	7	5	5	2	37
0500-0600	8	3	4	8	6	4	6	39
0600-0700	6	9	8	2	6	6	5	42
0700-0800	10	4	4	1	7	5	6	37
0800-0900	6	5	12	7	0	4	7	41
0900-1000	5	7	4	5	5	6	5	37
1000-1100	6	11	6	6	9	6	6	50
1100-1200	7	6	3	9	5	6	7	43
1200-1300	10	6	7	9	7	8	10	57
1300-1400	3	10	15	5	9	8	7	57
1400-1500	6	6	7	12	3	13	9	56
1500-1600	10	7	8	9	5	8	1	48
1600-1700	7	8	7	8	8	8	3	49
1700-1800	11	13	8	8	7	13	9	69
1800-1900	5	7	6	3	10	5	6	42
1900-2000	5	9	9	5	7	7	8	50
2000-2100	9	8	9	3	8	9	3	49
2100-2200	9	11	10	6	8	11	7	62
2200-2300	4	9	5	7	4	9	13	51
2300-2400	15	5	15	7	5	16	6	69
2400-0100	6	12	10	7	4	6	3	48
Total	**181**	**181**	**178**	**152**	**155**	**184**	**154**	**1185**

Table 2

Table 2 shows the highest number of deaths came from crashes occurring on Monday early morning between 2:00 to 3:00 hour in weekdays and on weekends most deaths occured on Saturday night between 23:00 to 24:00 hour in the past three years.

Road Crash Deaths and Injuries by Time and Day of Week, 2021

Time	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Grand Total
0100-0200	8	9	5	18	14	6	11	**71**
0200-0300	15	10	5	13	8	17	10	**78**
0300-0400	9	3	4	6	21	14	7	**64**
0400-0500	8	10	7	6	9	4	8	**52**
0500-0600	9	6	5	4	13	13	8	**58**
0600-0700	12	6	6	5	8	11	5	**53**
0700-0800	15	15	13	4	11	14	12	**84**
0800-0900	10	14	14	13	14	6	14	**85**
0900-1000	10	16	15	11	16	12	9	**89**
1000-1100	15	19	13	19	17	14	22	**119**
1100-1200	16	11	15	14	14	14	14	**98**
1200-1300	21	18	21	17	13	11	11	**112**
1300-1400	22	13	18	11	10	12	18	**104**
1400-1500	14	16	20	9	12	14	10	**95**
1500-1600	12	13	15	15	12	20	15	**102**
1600-1700	17	10	15	14	17	22	12	**107**
1700-1800	23	23	16	16	20	25	12	**135**
1800-1900	12	25	22	12	15	11	11	**108**
1900-2000	16	17	12	10	19	18	24	**116**
2000-2100	16	23	19	17	17	26	26	**144**
2100-2200	24	15	10	12	13	20	28	**122**
2200-2300	17	17	15	18	14	28	28	**137**
2300-2400	18	13	19	16	15	17	20	**118**
2400-0100	4	10	13	19	17	14	10	**87**
Total	**344**	**331**	**317**	**299**	**332**	**361**	**347**	**2331**

Table 3

Table 3 shows fatal and non-fatal injuries were more frequent between 19:00 to 24:00 hours on weekends. On weekdays there were generally more injuries in the evenings.

Fatal and Non-Fatal Injuries Attributed to Drink-Driving, 2015 - 2021

Fatalities ● **Injuries**

No of fatal and non-fatal injuries

	2015	2016	2017	2018	2019	2020	2021
Injuries	105	126	105	91	81	47	85
Fatalities	14	15	12	15	5	9	16
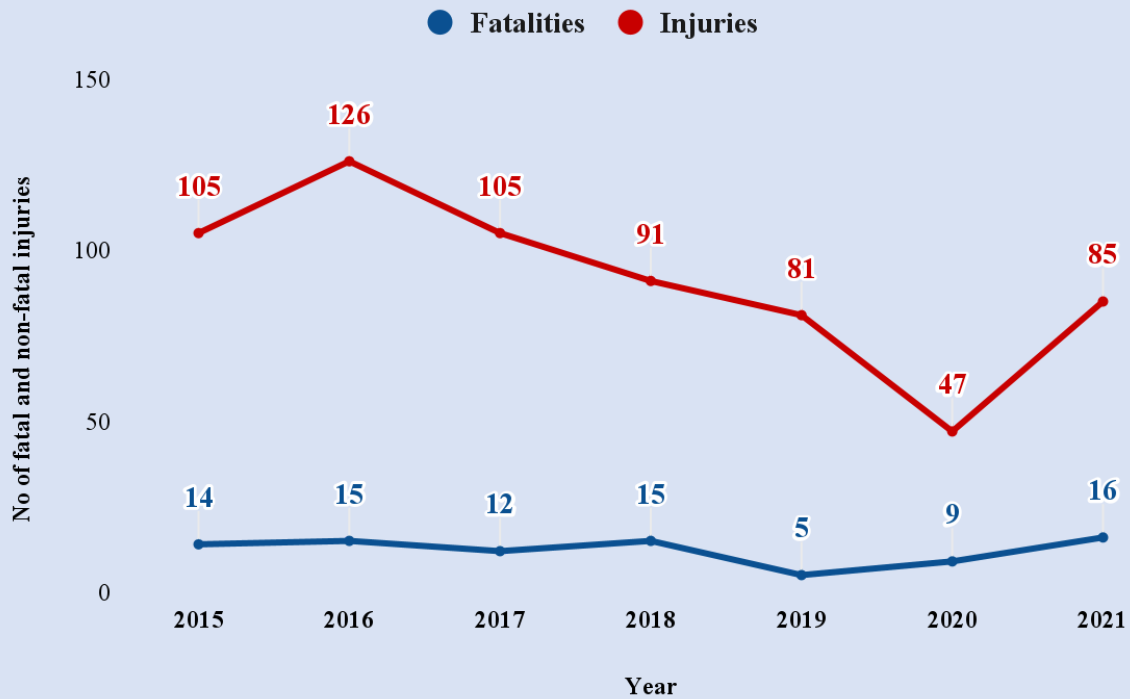
Year

Figure 25

Figure 25 shows the deaths and injuries attributed to drink driving have increased in the past two years. These figures reflect only those cases where a charge of alcohol-impaired driving was made, and is therefore a significant underestimate of the proportion of injury crashes where alcohol may have been a factor.

Traffic Code Violation in Fatal and Non-Fatal Injury Crashes 2021

Violation	Count
Rash and negligent driving(Sec 279)	2012
Causing grievous injury(Sec 338)	1486
Failure to report police station(Sec 134B)	926
Failure to give medical assistance(Sec 134A)	932
Causing simple injury(Sec 337)	810
Driving dangerously (Sec184)	615
Causing death by Negligence(Sec304A)	379
Damaging public property(Sec 427)	85
Endangering life(Sec 336)	103
Furnishing false information(Sec177)	76
Drink Driving(Sec 185)	54
Driving without license(Sec 181)	26
Minor traffic offense(Sec 177/304A(CLAUSE 3))	8
Not using helmet(Sec 129)	11
Triple Riding(Sec 128)	7

Figure 26

Figure 26 shows the list of traffic violation citations associated with fatal or injury crashes in 2021.

12 DISTRIBUTION OF FATALITIES BY LOCATION

High Risk Corridors
2019 – 2021

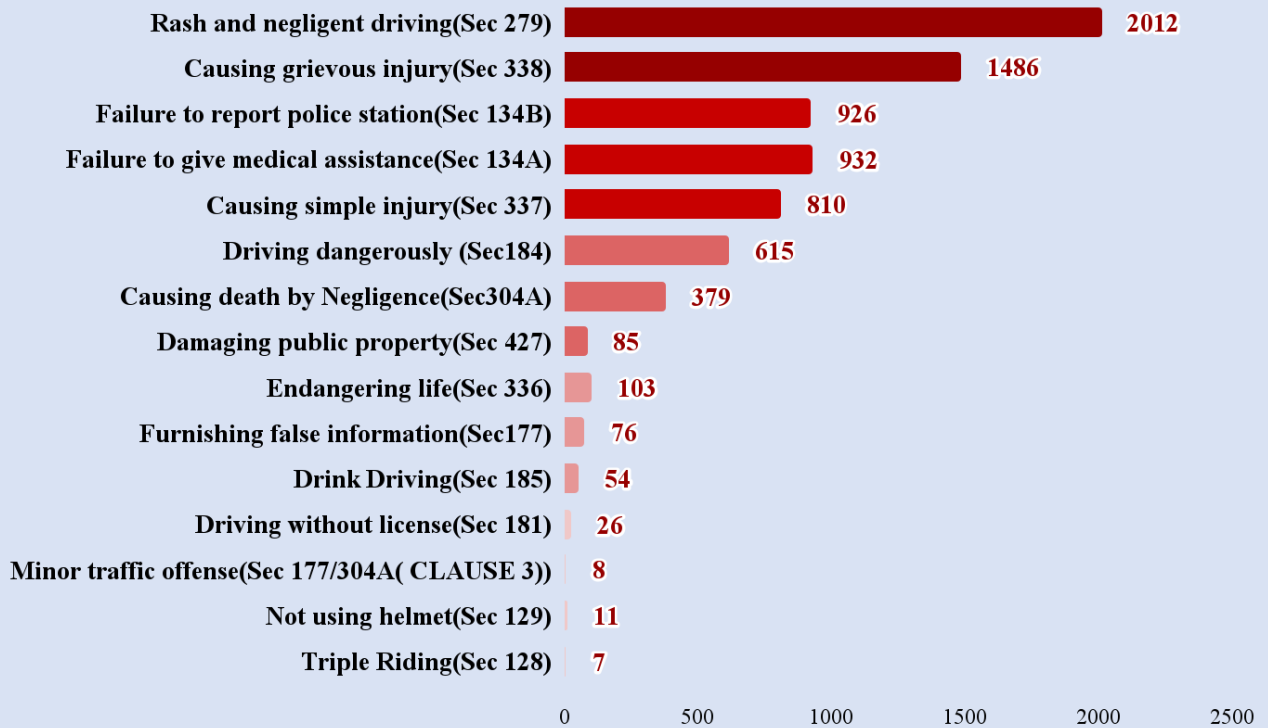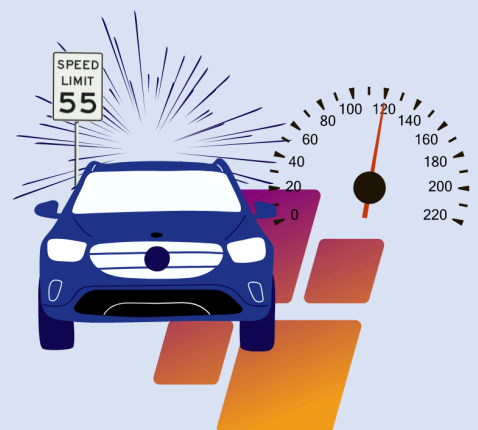| Rank	Road Name	Deaths per km	Serious injuries per km	Deaths and Injuries per km	Deaths 2019-2021	Serious Injuries 2019-2021	Pedestrians	Cyclists	Motorcycle rider and Pillion rider	Four wheeler occupants	Total deaths and serious injuries
1	Dr Babasaheb Ambedkar Marg (1.22km)	14	68	82	17	83	39	0	46	15	100
2	NS Road (1km)	3	35	38	3	35	14	1	19	4	38
3	Western Express Highway (25.33km)	5	14	19	135	362	132	7	248	110	497
4	Ghatkopar - Mankhurd Link Road (4km)	5	13	18	18	52	28	1	31	10	70
5	New Link Road (10km)	3	11	14	25	111	63	0	59	14	136
6	Eastern Express Highway (23.55km)	3	9	12	80	213	71	7	152	63	293
7	Sion Panvel Highway (9.1km)	2	8	10	19	75	41	0	38	15	94
8	Bombay Port Trust Road (3.9km)	3	6	9	11	24	9	0	25	1	35
9	Swami Vivekanand Road (25km)	1	7	8	29	176	113	2	67	23	205
10	Jogeshwari - Vikhroli Link Road (10.6km)	3	5	8	30	52	30	0	38	14	82
11	Marve Road (7.72km)	2	6	8	12	50	22	2	32	6	62
12	CST Road, Santacruz East (3.45km)	1	5	6	4	17	11	0	8	2	21
13	Lal Bahadur Shastri Marg (21km)	1	4	5	23	89	66	1	38	7	112
14	Senapati Bapat Marg (11.2km)	2	3	5	19	39	25	0	32	1	58
15	Aarey Colony Road (6.57km)	1	4	5	4	28	6	1	24	1	32

Table 3

Dr Babasaheb Ambedkar Marg and NS Road had the highest number of deaths per kilometer. However, Western Express Highway and Eastern Express Highway have recorded the highest total number of fatal and serious injuries. These corridors represent high potential to save lives with appropriate interventions. These junctions can be studied further to identify the causes of the crashes and redesigned in a manner to minimize pedestrian and vehicular conflicts. This list includes 9 new roads in addition to the list published in the year 2020 annual report.

High Risk Junctions
2019–2021

Rank	Junction	Deaths 2019-2021 within 250m radius	Serious Injuries 2019-2021 within 250m radius	Total deaths and serious injuries 2019-2021
1	Amar Mahal Junction, Tilak Nagar, Ghatkopar	24	46	70
2	Intersection of EEH and JVLR, Kanjurmarg East	13	47	60
3	Intersection of WEH and Sion Bandra Link Road (Kalanagar Junction), Bandra East	13	36	49
4	Intersection of WEH and Jawaharlal Nehru Road	8	26	34
5	Intersection Of Ghatkopar Andheri Link Road and Eastern Express Highway	9	23	32
6	Priyadarshini Junction	7	23	30
7	Intersection of WEH and JVLR	6	24	30
8	Intersection of Eastern Freeway and Ghatkopar - Mankhurd Link road	6	20	26
9	Sion Circle Junction	3	23	26
10	Intersection of WEH and Akurli Road	6	19	25
11	Intersection of WEH and Goregaon Mulund Link Road	6	19	25
12	King Circle Junction, Matunga	2	18	20
13	Intersection of WEH and N.S.Phadake Marg	3	16	19
14	Intersection of Santacruz Chembur Link Road and LBS Road	8	11	19
15	Intersection of Sion Panvel Highway and Ghatkopar - Mankhurd Link Road	5	14	19

Table 4

Table 4 shows the road junctions with the greatest number of fatal and serious injuries in the past three years. The Amarmahal junction and the intersection of EEH and JVLR recorded the most deaths and injuries during that time. This list includes 8 new junctions in addition to the list published in the year 2020 annual report.

Technical note*: Fatal and serious injuries were searched within 250 meters of radius for each junction for the past three years.*

EEH - Eastern Express Highway
WEH - Western Express Highway
JVLR - Jogeshwari Vikhroli Link Road

Road User Fatalities by Road User Type and Zone 2021

Zone	Cyclists	Four wheeler occupants	2&3 wheeler occupants	Pedestrians	Total
Port	0	1	7	3	11
Zone I	0	0	2	7	9
Zone II	0	0	0	7	7
Zone III	0	0	12	8	20
Zone IV	0	0	10	13	23
Zone V	0	0	14	9	23
Zone VI	1	9	38	17	65
Zone VII	1	2	18	32	53
Zone VIII	0	4	17	13	34
Zone IX	2	1	8	16	27
Zone X	0	1	15	12	28
Zone XI	2	3	19	12	36
Zone XII	0	4	23	24	51
Grand Total	**6**	**25**	**183**	**173**	**387**

Table 5

Table 5 shows the highest number of pedestrian deaths occurred in Zone VII.
Two- and three- wheeler occupant deaths were most frequent in Zone VI.

CRASH MAPS, 2019 – 2021
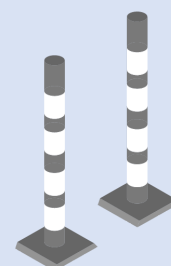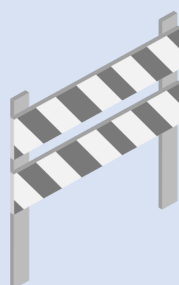
Mumbai is divided into five regions: North, West, East, Central, and South. Spot maps show the points representing fatal and injury crashes across Mumbai by region for years 2018 - 2021. These maps further show the victims road user type by colour, allowing risk locations to be identified for vulnerable road users.

Mumbai North Region, Fatal and Injury Crashes, 2019 - 2021

North Region

Road user type

- 🔴 Pedestrian
- 🟡 Two and three wheeler occupants
- 🟢 Four wheeler occupants
- 🔵 Cyclist

0 0.5 1   2   3   4
Kilometers
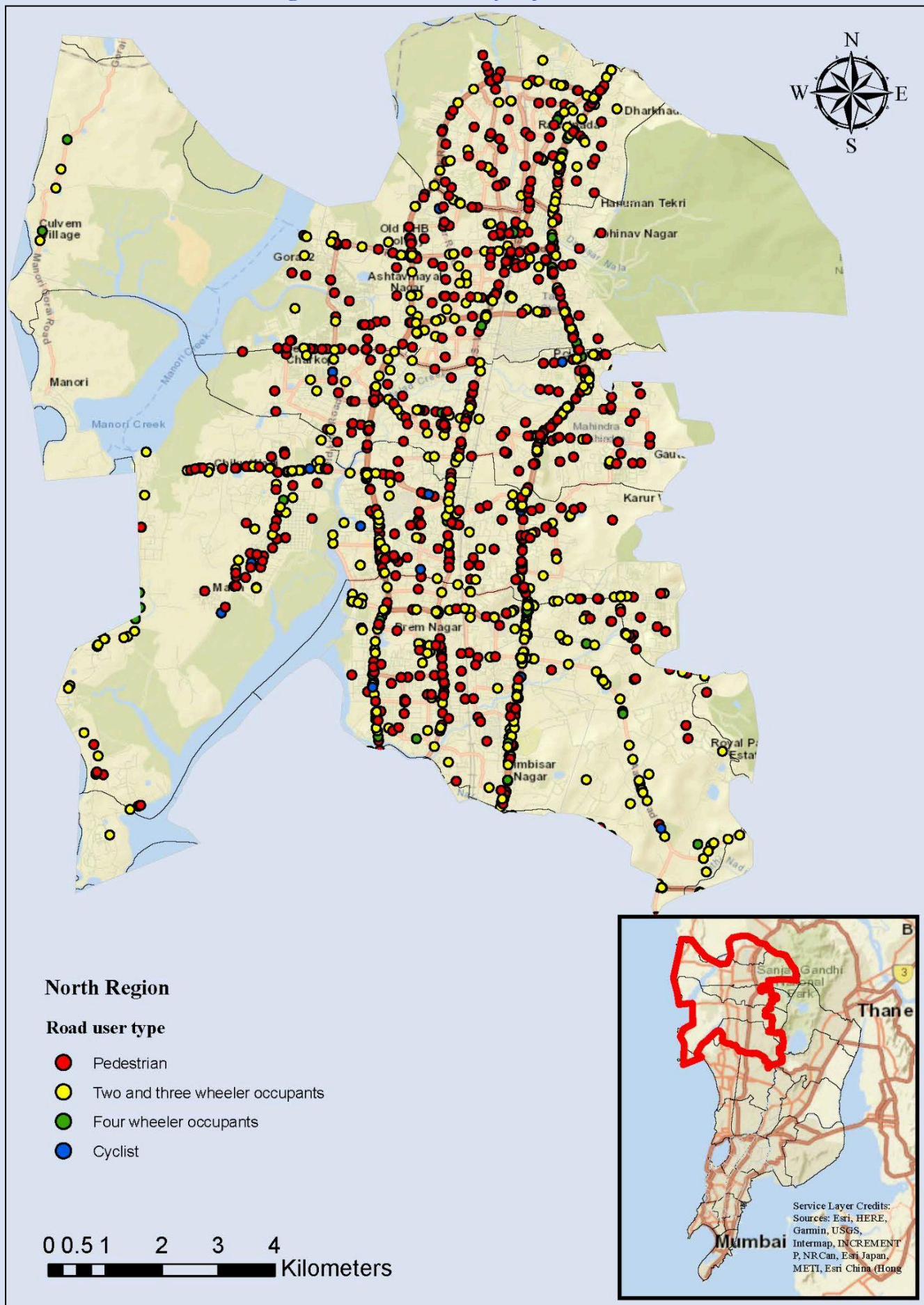
Mumbai West Region, Fatal and Injury Crashes, 2019 – 2021

West Region

Road user type
- 🔴 Pedestrian
- 🟡 Two and three wheeler occupants
- 🟢 Four wheeler occupants
- 🔵 Cyclist

Service Layer Credits:
Sources: Esri, HERE,
Garmin, USGS,
Intermap, INCREMENT
P, NRCan, Esri Japan,
METI, Esri China (Hong

0 0.5 1 2 3 4 Kilometers
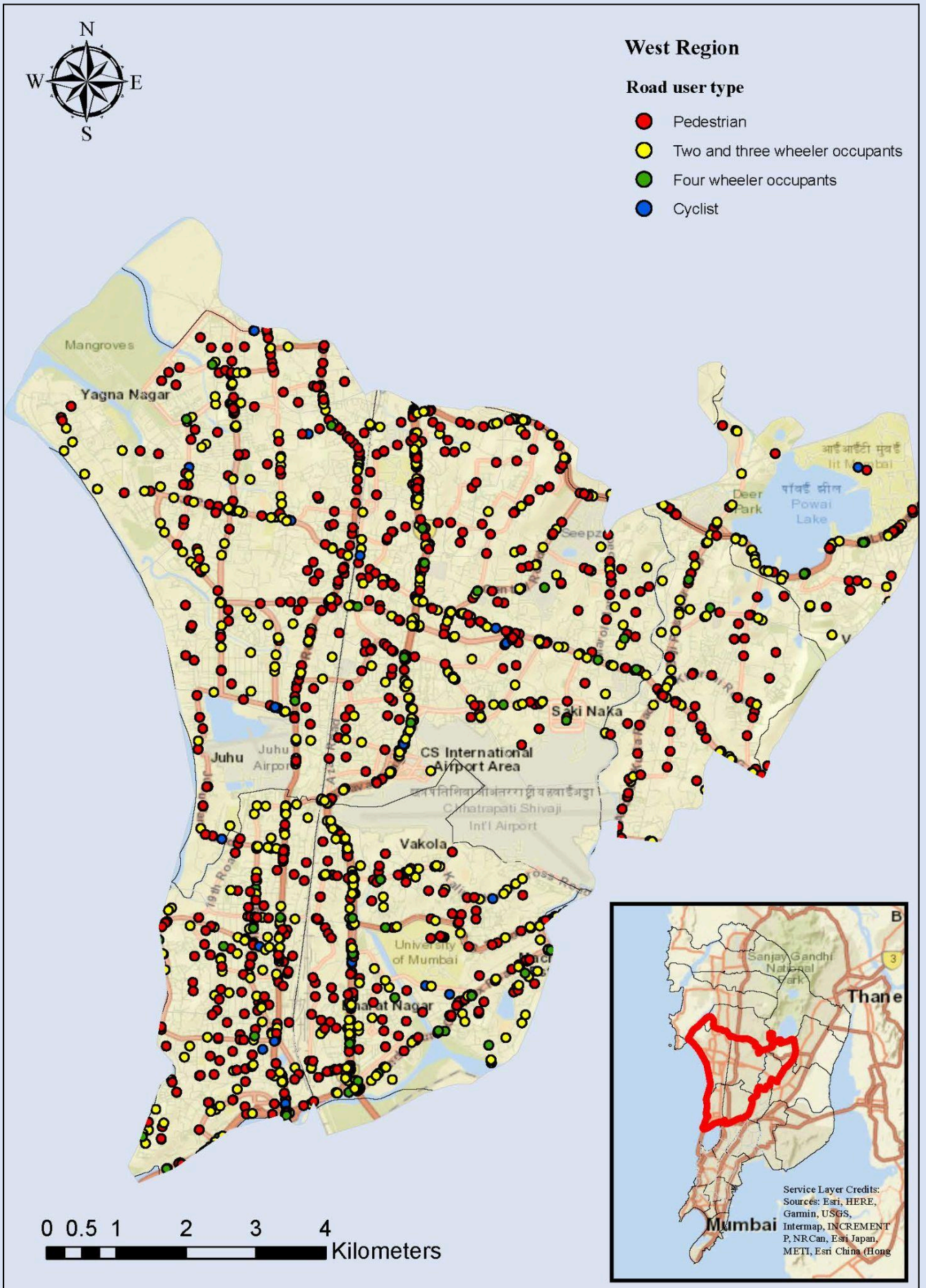
Mumbai East Region, Fatal and Injury Crashes, 2019 – 2021

East Region

Road user type

- 🔴 Pedestrian
- 🟡 Two and three wheeler occupants
- 🟢 Four wheeler occupants
- 🔵 Cyclist

Service Layer Credits:
Sources: Esri, HERE,
Garmin, USGS,
Intermap, INCREMENT
P, NRCan, Esri Japan,
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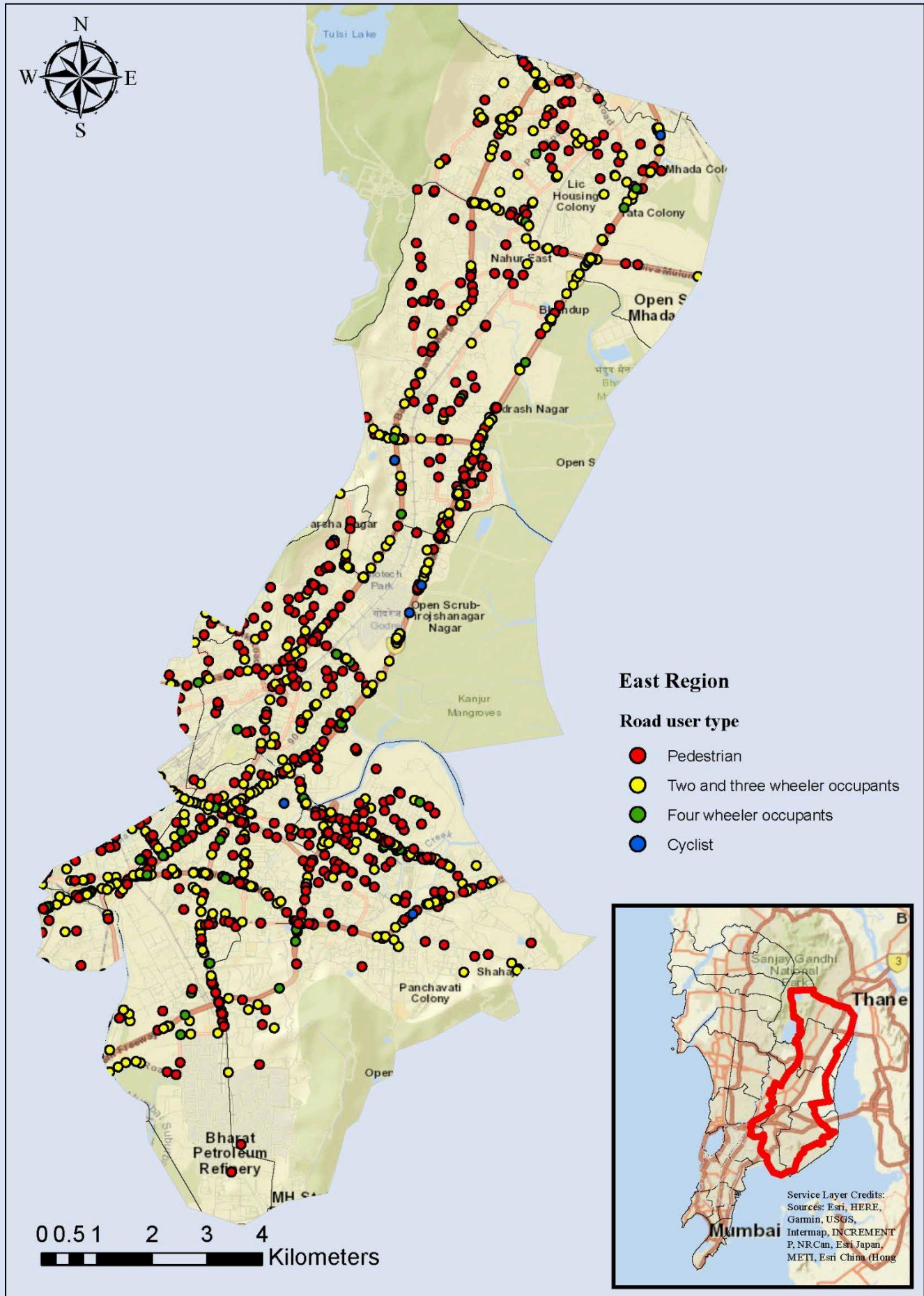
Mumbai Central Region, Fatal and Injury Crashes, 2019 - 2021

Central Region

Road user type
- 🔴 Pedestrian
- 🟡 Two and three wheeler occupants
- 🟢 Four wheeler occupants
- 🔵 Cyclist

0 0.5 1 2 3 4 Kilometers

Service Layer Credits:
Sources: Esri, HERE,
Garmin, USGS,
Intermap, INCREMENT
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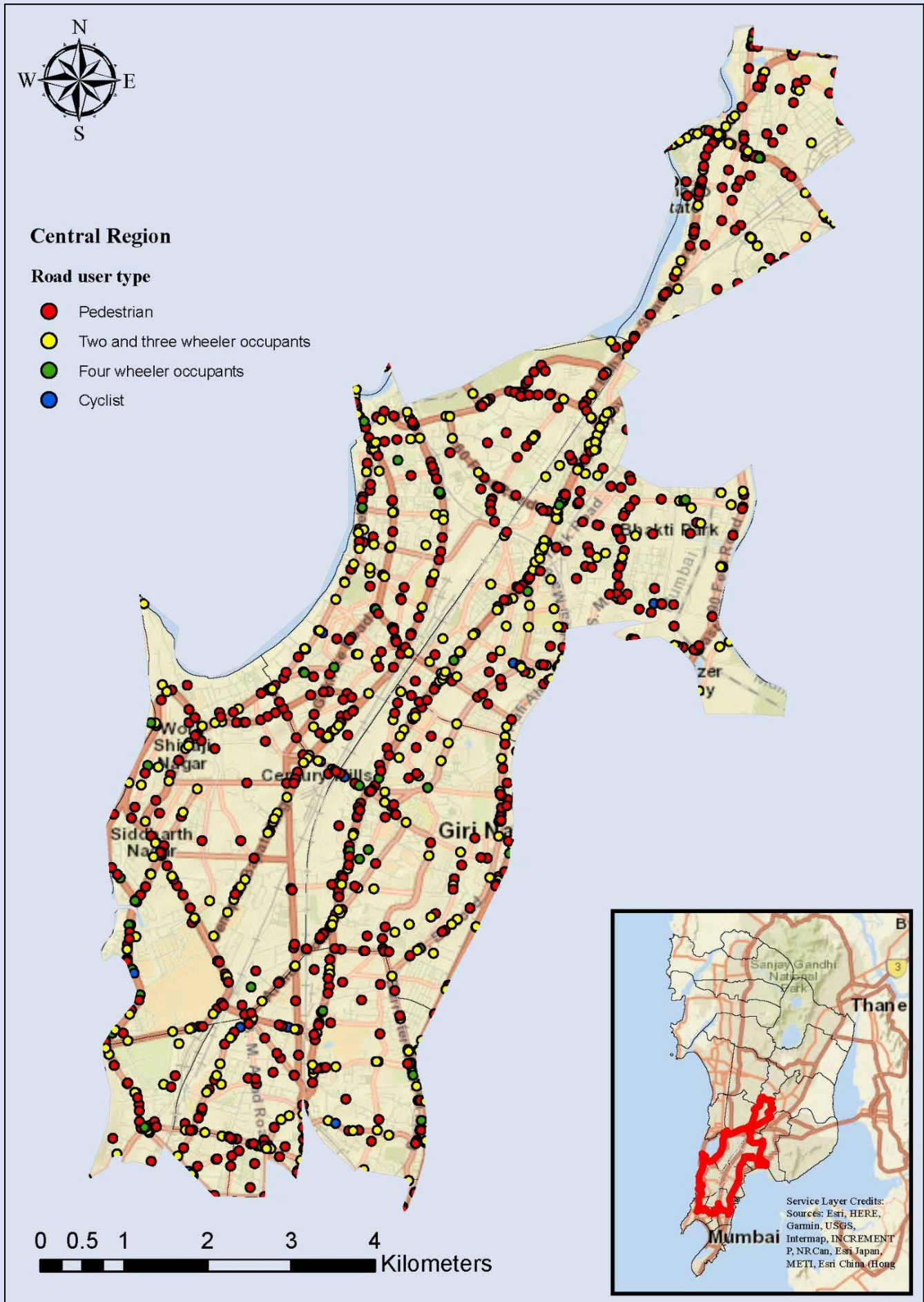
Mumbai South Region, Fatal and Injury Crashes, 2019 - 2021

South Region

Road user type

- 🔴 Pedestrian
- 🟡 Two and three wheeler occupants
- 🟢 Four wheeler occupants
- 🔵 Cyclist

Service Layer Credits:
Sources: Esri, HERE,
Garmin, USGS,
Intermap, INCREMENT
P, NRCan, Esri Japan,
METI, Esri China (Hong

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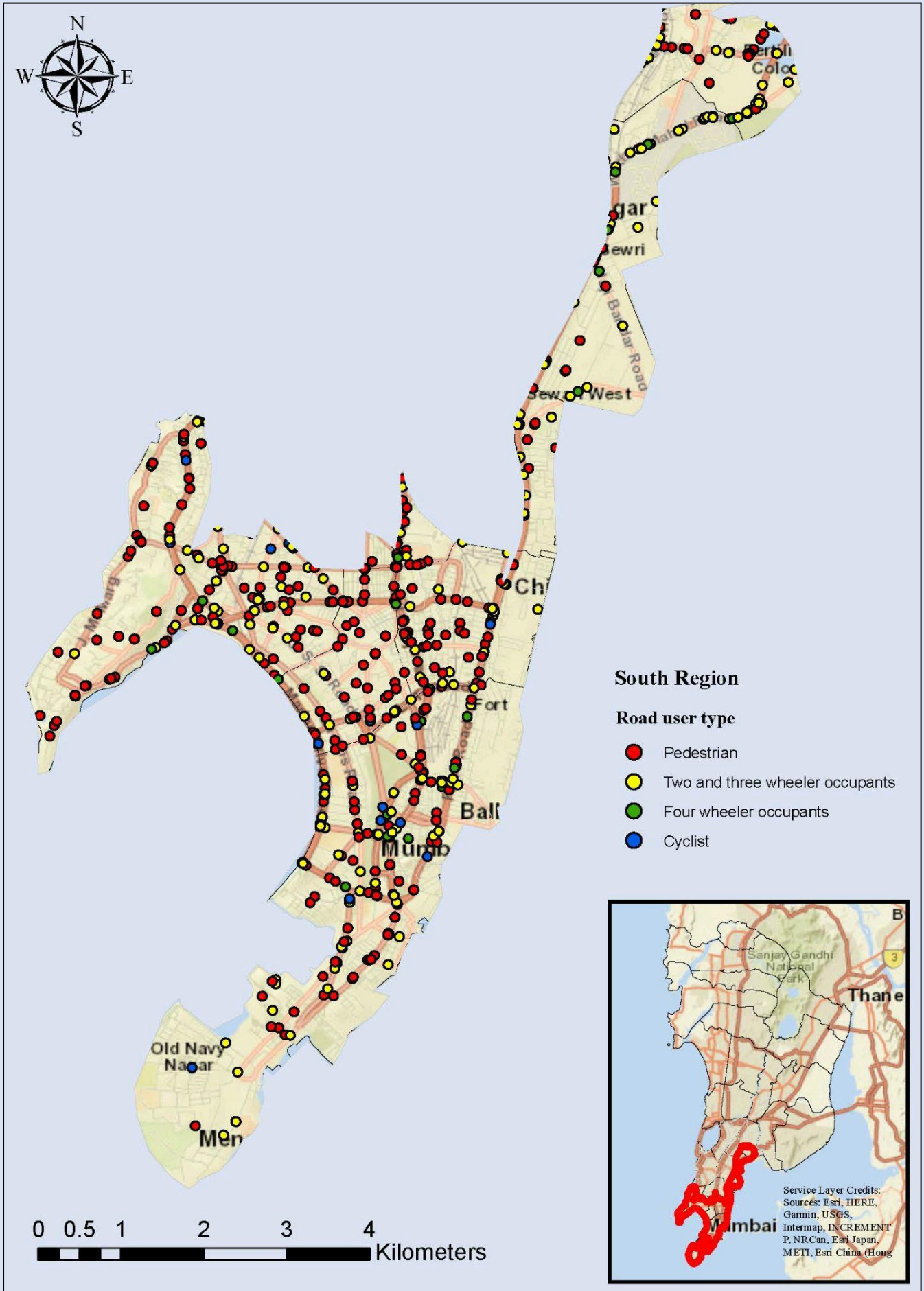
14 HEAT MAP OF FATAL CRASHES
2019 – 2021

Heat maps show the density of fatal and injury crashes throughout Mumbai in the past three years. Crash density is reflected in the "heat" or color ranging from green (lower density of fatal and injury crashes) to red (higher density). This gives a clear visual picture of higher risk locations throughout Mumbai to help identify priorities for targeted enforcement and engineering interventions.

Dattani park road, WEH, Kandivali

Int of Goregaon-Mulund link road and WEH

Int of JVLR and EEH, Vikhroli

Int of JVLR and WEH, Jogeshwari

Shankarwadi,WEH, Jogeshwari

EEH, Phirojshanagar, Vikhroli

Milan Subway junction, WEH, Santacruz

Ghatkopar BEST depot junction, EEH

Int of Nehru road and WEH, Santacruz

Kalanagar flyover, WEH, Kherwadi

Ghatkopar-Mankhurd link road, Mankhurd

Reclamation Garden junction, Bandra

Int of Amar mahal flyover & SCLR, Chedda Nagar junction, EEH

Int of EEH and VN Purav Marg, Sion

Sion Flyover, Sion

0   3   6   9   12 km

Notes:

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TRAFFIC CONTROL BRANCH
वाहतूक नियंत्रण शाखा
शिस्तबद्ध सुरक्षित प्रवास