Bloomberg Philanthropies

INITIATIVE FOR GLOBAL ROAD SAFETY

Mumbai

Road Safety Annual Report

2019

Contents

PREFACE

Yashasvi Yadav, IPS
Joint Commissioner of Police (Traffic), Mumbai Police
Maharashtra, India

Road traffic crashes remain the 8th leading cause of deaths and injuries, globally, and the 9th leading cause of death in India. About 1.35 million people die in road traffic crashes every year around the world. India has recorded 151,417 deaths in the year 2018.

Road traffic fatalities have indicated a consistent declining trend in Mumbai over the past five years. This improvement can be further continued through evidence-based traffic enforcement, road engineering, and media campaigns.

The Mumbai Traffic Control Branch has worked in partnership with the Bloomberg Initiative for Global Road Safety (BIGRS) to reduce the number of road crash related fatalities in Mumbai since 2015, and with a new six-year initiative phase just launched, we look forward to continuing this partnership. The initiative has contributed greatly in the strengthening of the crash monitoring system in the city.

This report presents a comprehensive analysis of fatal crash, deaths and injury data for the year 2019. During the year there were a total of 447 fatalities and 2,925 injuries. Mumbai has recorded a 27% reduction in the number of road crash deaths from a peak of 611 in 2015, when the Bloomberg Philanthropies Initiative for Global Road Safety began.

This declining trend is a result of evidence-based work on the part of the city of Mumbai and the BIGRS international partners; together we are moving forward to achieve India's commitment to the UN Decade of Action.

I appreciate the efforts by the team from Bloomberg Philanthropies Initiative for Global Road Safety and their continued partnership and shared commitment to reducing road crashes and deaths in Mumbai. We have produced this in-depth crash data report for four years now and will continue this practice in the future.

Yashasvi Yadav

Dr. Sara Whitehead
Public Health and Preventive Medicine Consultant
Vital Strategies

We are delighted to collaborate for a 5th year with the Mumbai Traffic Control Branch on this annual report. This report is no mere compilation of statistics. It represents a critical aspect of the sustained efforts of Mumbai city and police officials to prevent road crashes and save lives. It is through a clear understanding of where, when, how, and why crashes occur that we can take action to prevent them; and ongoing, sustained monitoring year after year lets us know when our efforts are working and when we need to change course.

The impressive success evident in these pages, with a 27% reduction in road traffic deaths over the past five years, is a testament to the commitment of MTCB and city officials. But there is still a long way to go: hundreds of preventable deaths every year, thousands of serious injuries, and thousands of families profoundly affected, call on us to continue our efforts. This means continuing to make citizens aware of the law and the consequences of crashes, working with the police to improve enforcement of risk behaviours such as drink driving, speeding, not wearing helmets or seatbelts, and improving infrastructure that makes streets safer for all road users including the most vulnerable pedestrians. Vital Strategies and The Bloomberg Philanthropies Initiative for Global Road Safety look forward to continuing to partner with our colleagues in Mumbai to work towards a safer and healthier community.

Dr. Sara Whitehead

ACKNOWLEDGEMENTS

Mumbai has partnered with Bloomberg Philanthropies as one of the ten cities participating in the Bloomberg Philanthropies Initiative for Global Road Safety (BIGRS). Since 2015, BIGRS has supported the city of Mumbai in implementing evidence-based road safety interventions to reduce road injuries and deaths. One element of the initiative is to strengthen road safety data available to city authorities in order to improve intervention planning and evaluation.

This work would not have been possible without the support of the Honourable Chief Minister of the State of Maharashtra, the Honourable Municipal Commissioner of Mumbai, the Joint Commissioner of Police (Traffic), Mumbai, and all the individuals and partners in working together to reduce road deaths not only in Mumbai, but around the world.

We gratefully acknowledge the financial support received from Bloomberg Philanthropies, which made possible the production of this report.

ABBREVIATIONS

BEST	Brihanmumbai Electric Supply and Transport Company
BIGRS	Bloomberg Philanthropies Initiative for Global Road Safety
GRSF	Global Road Safety Facility
GRSP	Global Road Safety Partnership
IIT-B	Indian Institute of Technology Bombay
iRAP	International Road Assessment Program
JHIIRU	Johns Hopkins International Injury Research Unit
JHU	Johns Hopkins Bloomberg School of Public Health
MCGM	Municipal Corporation of Greater Mumbai
MTCB	Mumbai Traffic Control Branch
MORTH	Ministry of Road Transport and Highways
NACTO	National Association of City Transportation Officials
RTO	Regional Transport Office
WHO	World Health Organization
WRI	World Resources Institute

EXECUTIVE SUMMARY

Road crashes result from human errors and road design. These human errors are preventable and yet continue to be the 8th leading cause of deaths and injuries globally. About 1.35 million people die of road traffic crashes every year across the globe. India accounts for 11% of world deaths by road crashes, whereas Maharashtra observed 13,000 deaths in 2018.

Mumbai has achieved 27% of reduction in road traffic deaths over the past five years. The annual number of road crash deaths decreased from 611 in 2015 to 475 in 2019. This results in a rate of 3.5 deaths per 100,000 population in 2019. Pedestrians (47%), motorcyclists (41%) and cyclists (2%) are the vulnerable road users accounting 90% of all road traffic deaths in Mumbai. Men accounted for 80% of total deaths, with men aged 20 – 29 years at highest risk. The Western and Eastern Express Highway were the highest-risk corridor over the past three years, whereas Amar Mahal junction on Eastern Express Highway was found to be the most dangerous junction in Mumbai.

Along with road deaths, the number of injuries has also decreased over the same period. Injuries happened most frequently during the evening hours.

The data source for this report was police crash data records. This report intends to provide an evidence base for city stakeholders to better plan interventions to reduce road crash injuries and deaths within the city.

INTRODUCTION

Road traffic crashes and injuries continue to be a major public health concern and a leading cause of death across the globe. Each year nearly 1.3 million people die as a result of road traffic crashes. About 20-25 million people survive of non-fatal injuries, which cause disabilities worldwide.[1] Crashes are the eighth leading cause of deaths and are most frequent among young adults of aged 5 to 29 years. More than half of deaths are amongst pedestrians, cyclists and motorcyclists. Over the past 15 years the global road traffic fatality rate has remained at approximately 18 deaths per 100,000 population.[2]

India ranks 1st in the number of road crash deaths across 199 countries reported in the World Road Statistics. India accounts for 11% of road crash death in the world.[3] Maharashtra has observed 13,000 road crash deaths and over 20,000 non-fatal injuries in year 2018.[4] On the other hand, Mumbai has experienced a declining trend in death over a period of five years and is progressing to achieve India's commitment of reducing the number of road traffic deaths by half by 2020 (the UN Sustainable Development goal).

Since 2015, when Mumbai joined the Bloomberg Philanthropies Initiative for Global Road Safety, there has been a 27% reduction in road deaths in the city. 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 data available 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 Mumbai Traffic Control Branch joined together with BIGRS to produce this report as a further step in enhancing road crash data monitoring in Mumbai. The following report presents an analysis of the Mumbai Traffic Control Branch's road crash injury data during 2019. It represents a process of digitizing data already at hand, mapping it, analysing it, and compiling it.

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 to prevent them can be undertaken. Media messaging for social marketing campaigns could 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 them, and monitor them. This report is a step in that process, and the BIGRS partners look forward to continuing to enhance Mumbai's road crash surveillance system, and helping the city reduce crashes, injuries, and deaths in Mumbai.

[1] Global Plan for the Decade of Action for Road Safety 2011-2020.
[2] World Health Organization, Global Status Report on Road Safety 2018.
[3] Ministry of Roads, Transport and Highways, Road Accidents in India – 2018.
[4] Road Accidents in Maharashtra – 2018.

METHODS

Data sources:
The source of road crash and injury data in Mumbai is 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 all crime reporting. The FIR can be filed by any witness or traffic police official, or even the victim themself. Based on the location of the crash, the FIR is filed at the nearest police station as per jurisdiction. It is the responsibility of the concerned police station to examine the crash further and investigate appropriately. Police gather data on the crash event circumstances, victims involved, manner and behaviour 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. On a monthly basis, selected details are summarized in a table format commonly referred to as the "data sheet," and sent by the concerned 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 filled for each crash and forwarded in place of the data sheet, but most police stations have not made this transition.

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

Analysis:
Records from these databases were analysed 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 best available information.

Limitations:
The current "data sheet" summary formats can be inadequate, and some variables are inconsistently or rarely captured. Crash location information is not very precise, and crash locations are manually pinned based on the available description. Information on helmet use, seatbelt use, and alcohol use is not available. The crash-recording form introduced by Ministry of Roads Transport and Highways (MORTH) in late 2017 is not followed by most police stations. Training and monitoring of crash form use are required. Piloting of an android version of the DRIVER platform was initiated in early 2020 to assess whether direct data collection on mobile devices improves data quality and eases the administrative burden of police officers.

Report preparation:
This work was made possible with the overview and direction from Hon. Shri. Yashasvi Yadav, IPS (Joint Commissioner of Police, Traffic, Mumbai Police).

Jagruti Karande (Surveillance Coordinator), BIGRS Maharashtra, was responsible for data management and analysis with support from Dr Sara Whitehead, and Grant Ennis, Vital Strategies; and Swati Shinde, Jagdish Sawant, Yogesh Ambe, Lievanta Millar and Bhargavi Pambhar from BIGRS Maharashtra, contributed critical guidance and support throughout the process.

RESULTS

TREND IN ROAD TRAFFIC DEATHS AND INJURIES IN MUMBAI

Fatal crashes and deaths, Mumbai, 2010 to 2019

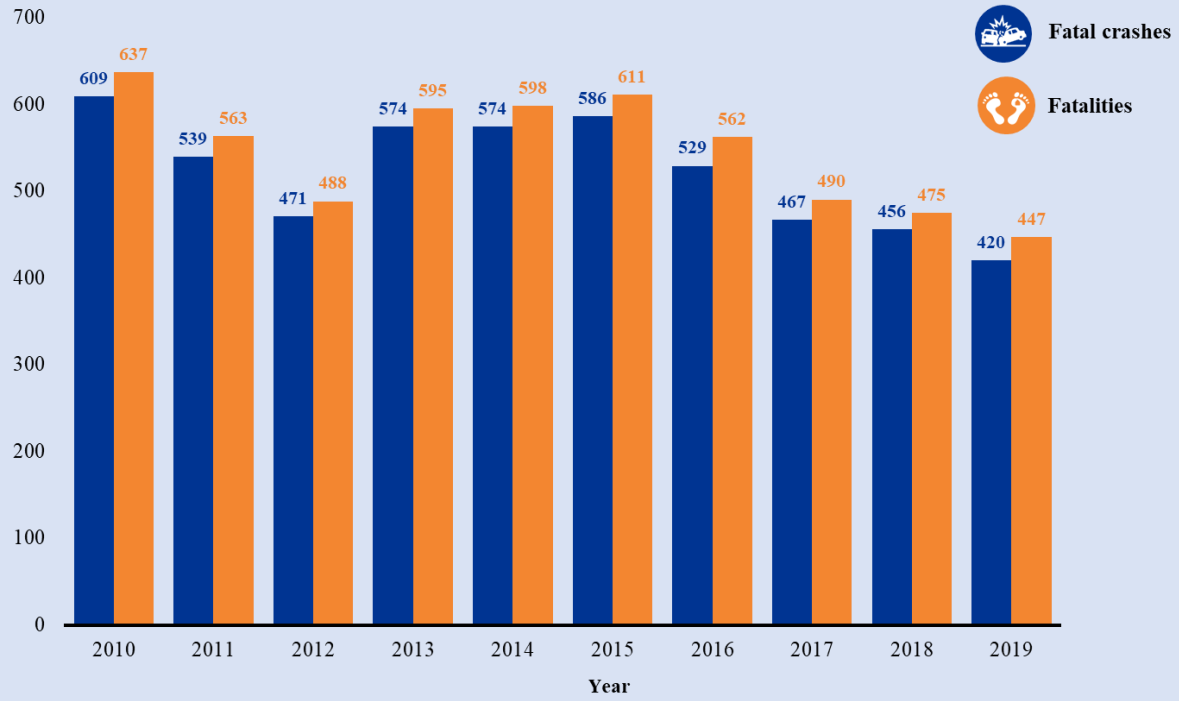


Figure 1

There were 447 reported road traffic deaths in 2019, compared to 611 in 2015, a decrease of 27% over the past five years and a decrease of 6% than previous year. Over the past ten years, fatalities decreased by 30%.

Road fatality rates, Mumbai, 2011 to 2019

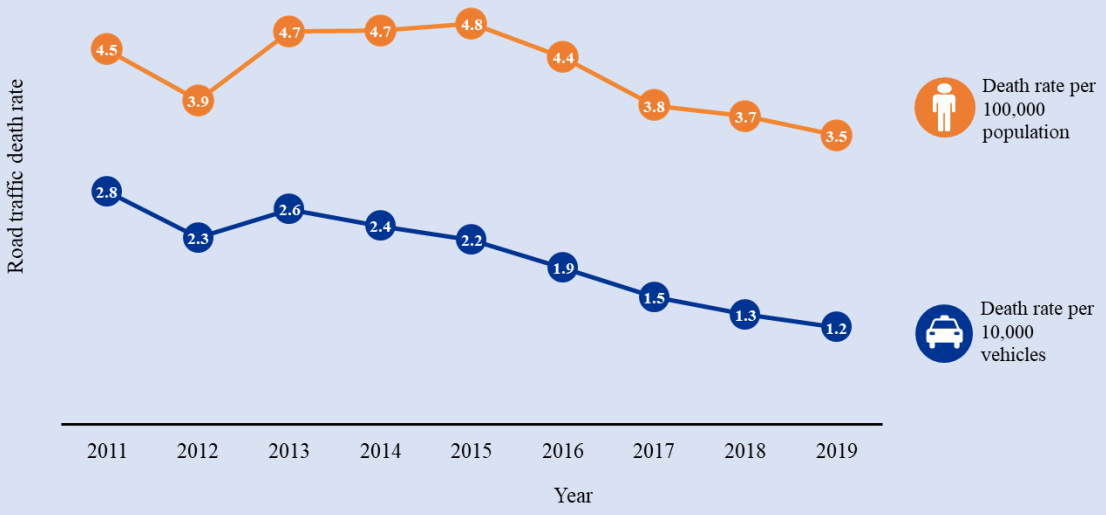


Figure 2

The above chart show death rates per 100,000 population and per 10,000 registered vehicles in Mumbai for 2011 to 2019. The trend in the death rate shows a gradual decrease since 2015.

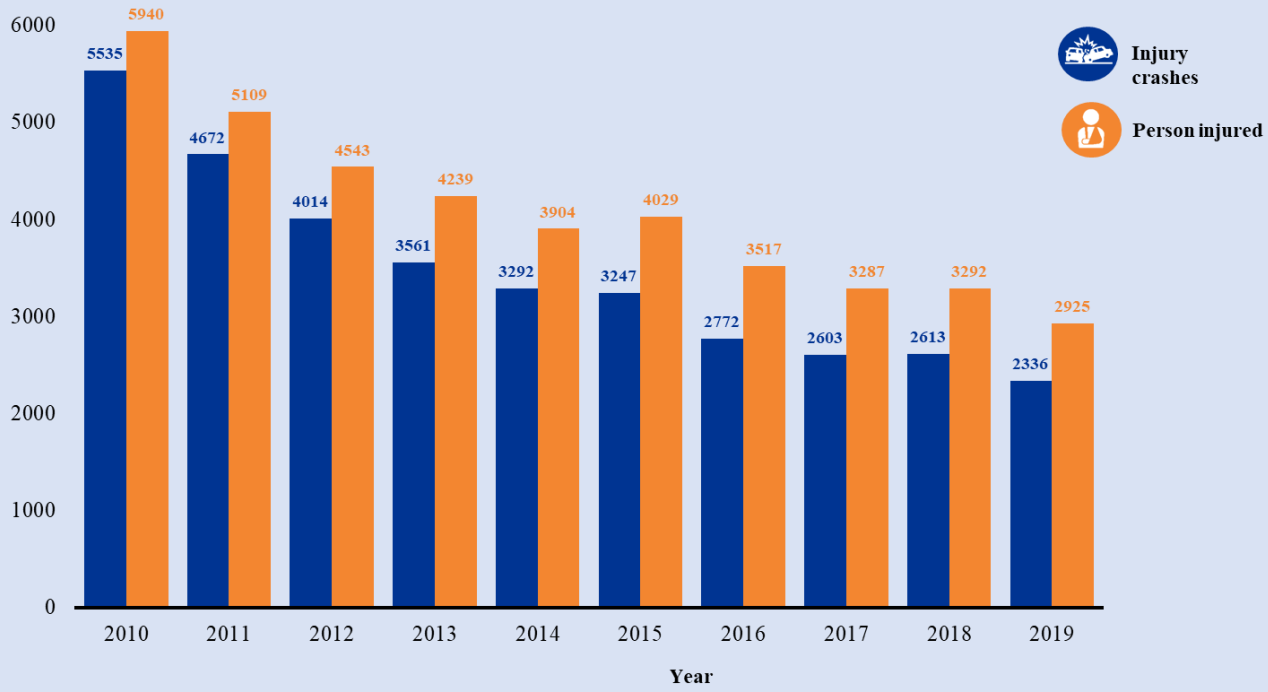


Figure 3

Almost 3,000 people were reported injured in crashes in Mumbai in 2019. Injury crashes and non-fatal injuries have decreased steadily since 2010.

DEATHS AND INJURIES BY TYPE OF ROAD USER

Fatalities by road user type, 2019

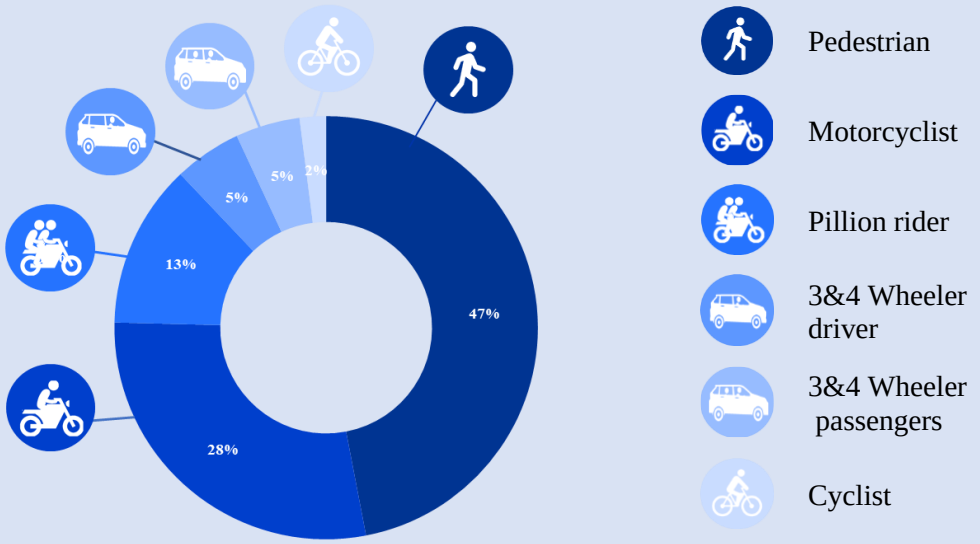


Figure 4

Pedestrians accounted for 47% of all deaths, and motorcycle riders (both drivers and pillion riders) 41%. A total of 90% of deaths were among vulnerable road users, that is, pedestrians, motorcyclists, and cyclists.

Non-fatal injuries by road user type, 2019

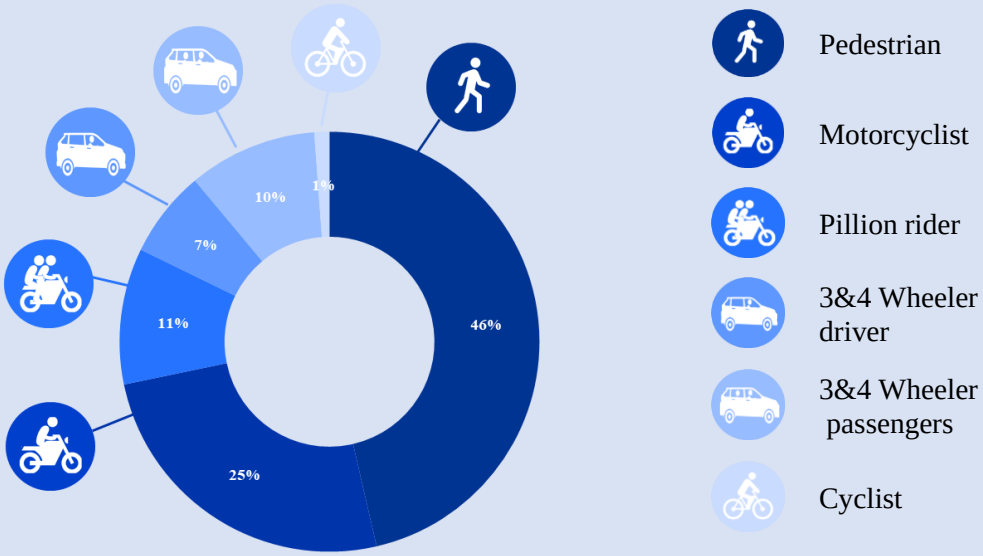


Figure 5

Pedestrians and motorcyclists accounted for 71% of non-fatal injuries. Three and four-wheeler occupants made up a larger proportion of injuries compared to deaths. This may reflect the lower risk for severe crash outcomes among vehicle occupants protected by a vehicle, compared to vulnerable road users.

Trend in deaths by road user type, 2015 to 2019

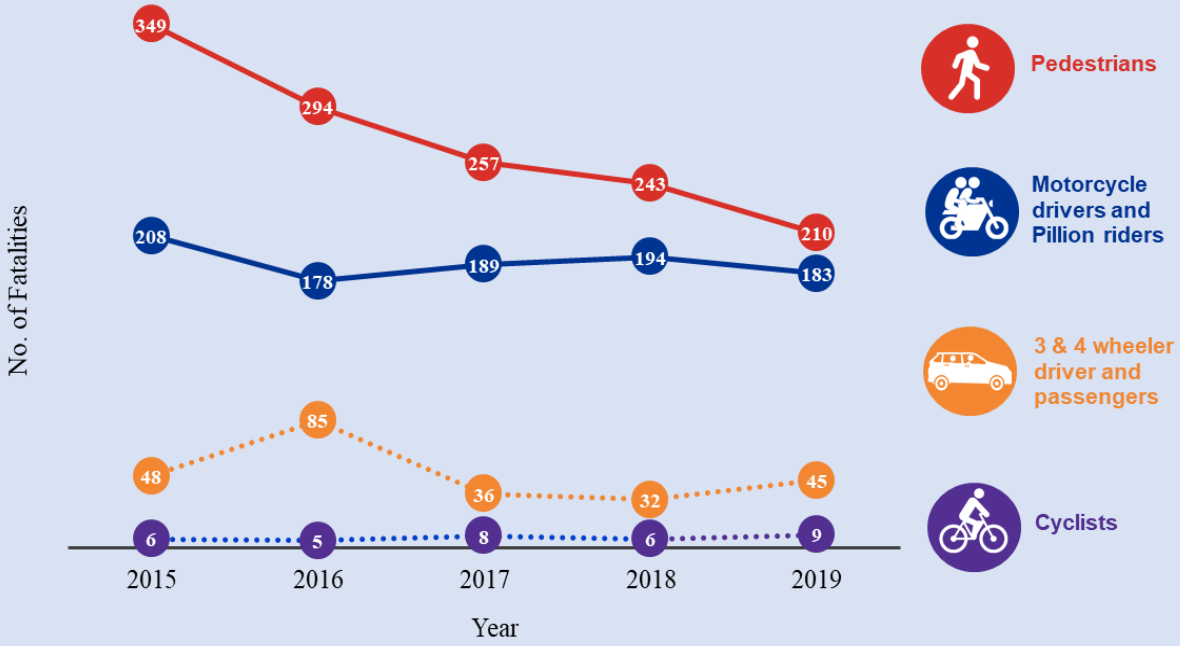
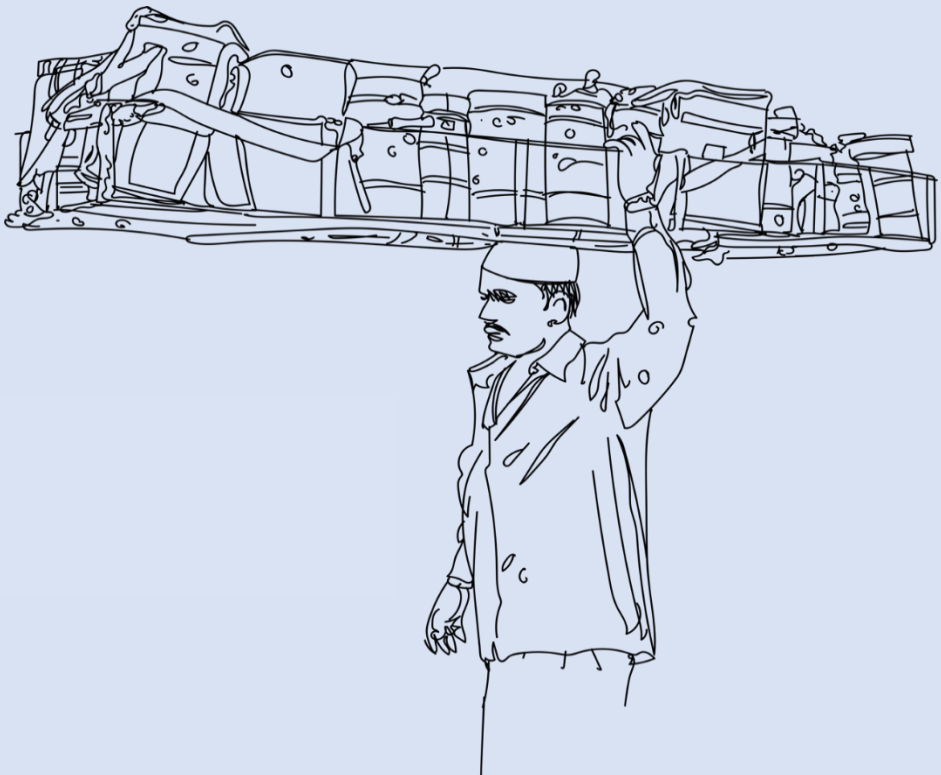


Figure 6

Pedestrian fatalities have decreased by 40% since 2015, although they still make up the largest group of road victims. Motorcycle fatalities have also dropped gradually over the same period. Deaths among cyclists and three and four wheeler occupants have remained largely stable.



Fatalities by gender, 2019

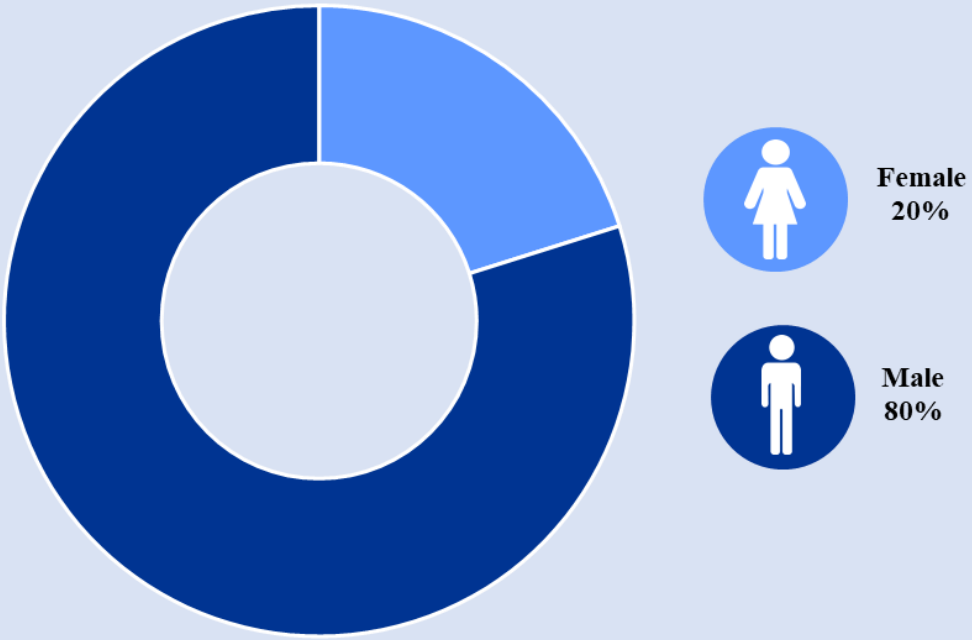


Figure 7

The pattern of deaths by gender was similar to previous years, with men accounting for 80% of road crash deaths.

Non-fatal injuries by gender, 2019

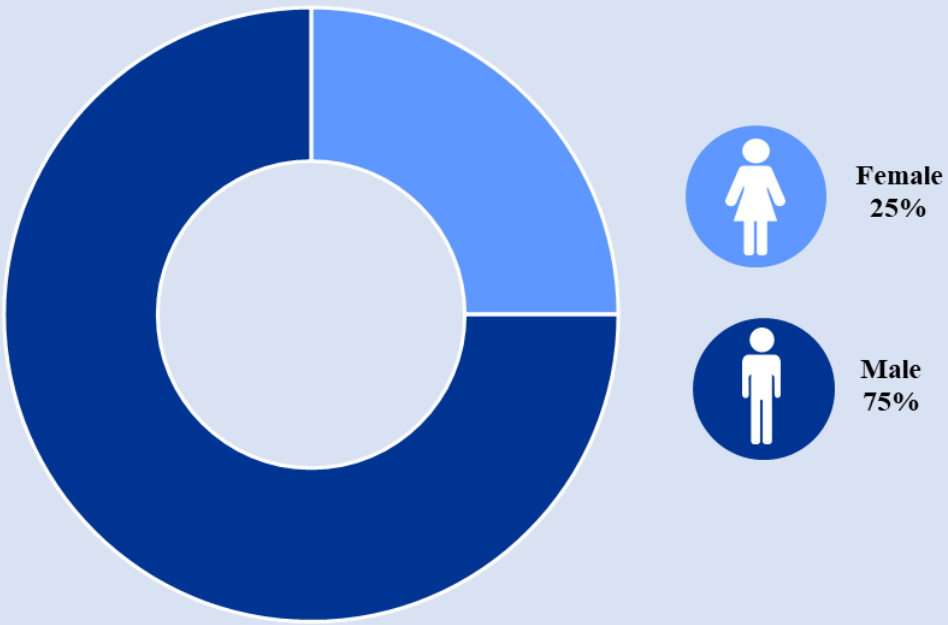


Figure 8

Similar to fatalities, men accounted for 75% of non-fatal road crash injuries.

Fatalities by age group and gender, 2019

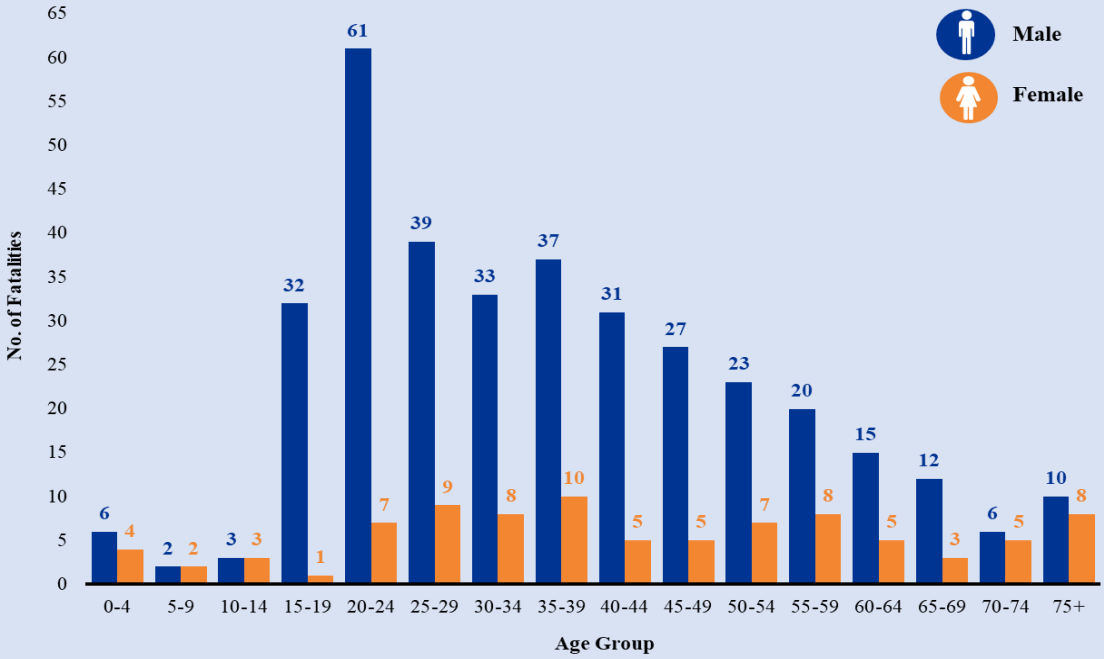


Figure 9

The largest proportion of road crash deaths was among young men aged between 20 and 29 years old.

Fatality rates by age group and gender, 2019

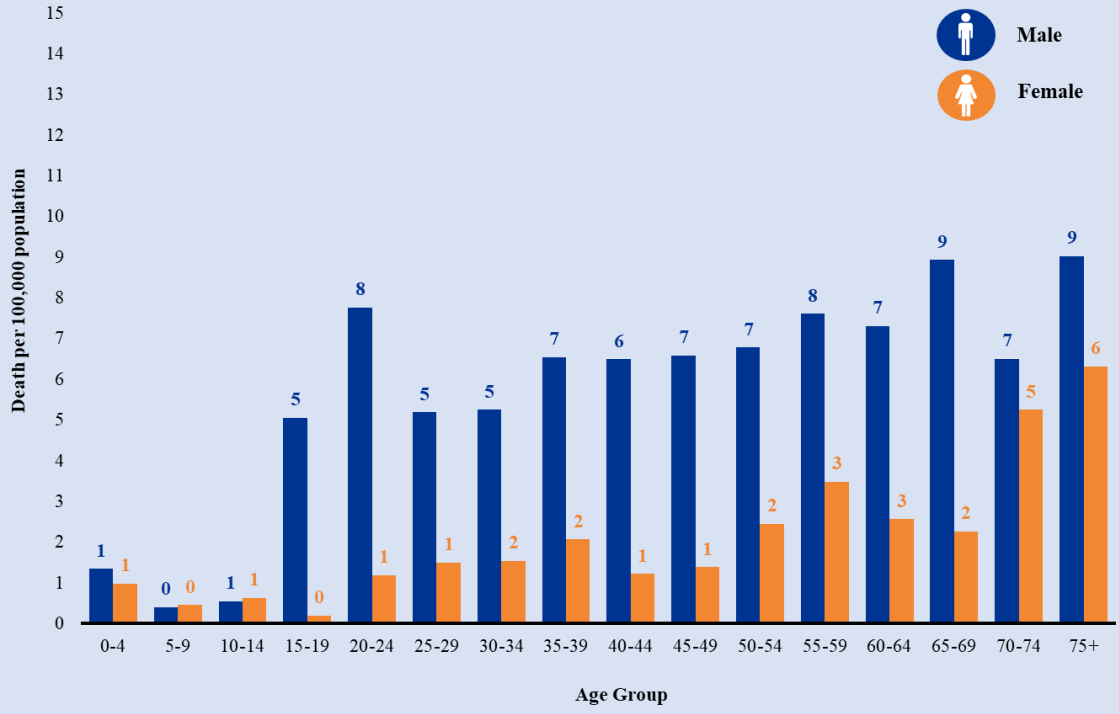


Figure 10

This chart show fatality rates per 100,000 population by age, and in this perspective the risk in younger ages was less pronounced. For women, risk actually increased with age. The highest fatality rates were among men and women over 75 years old.

Non- fatal injuries by age group and gender, 2019

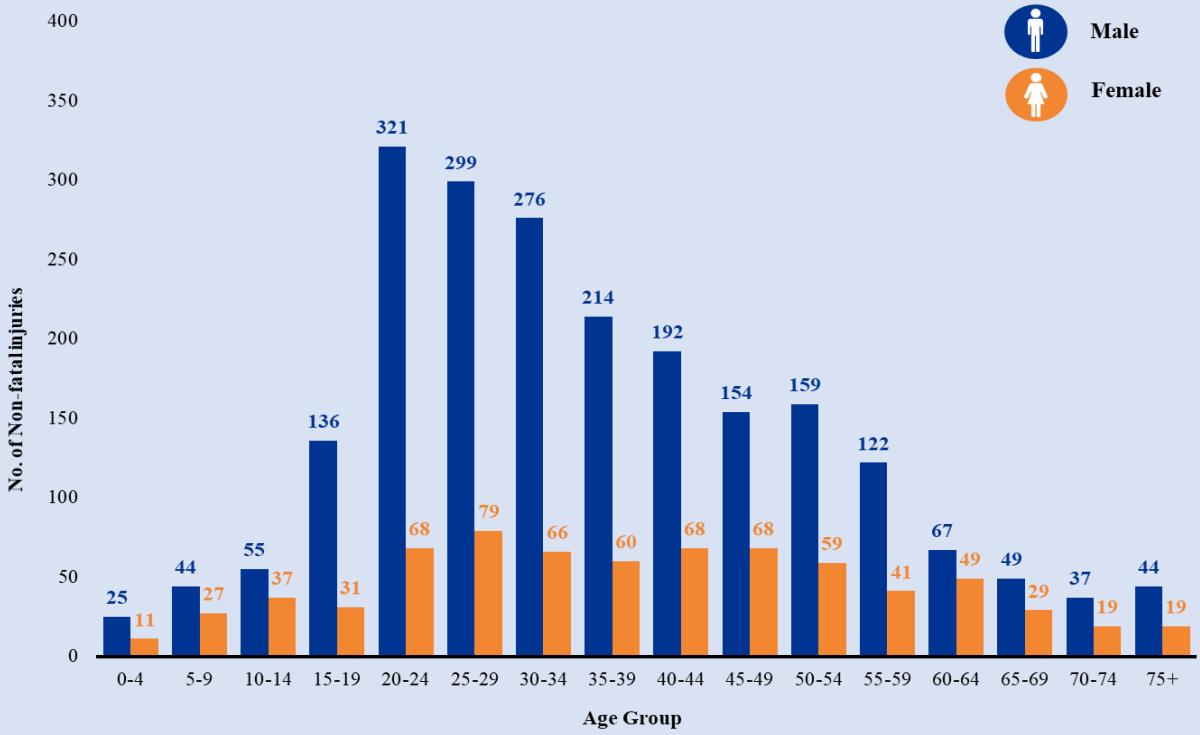


Figure 11

Young men aged 20 to 29 accounted for the highest proportion of non-fatal road crash injuries.

Motorcycle fatalities by age and gender, Mumbai, 2019

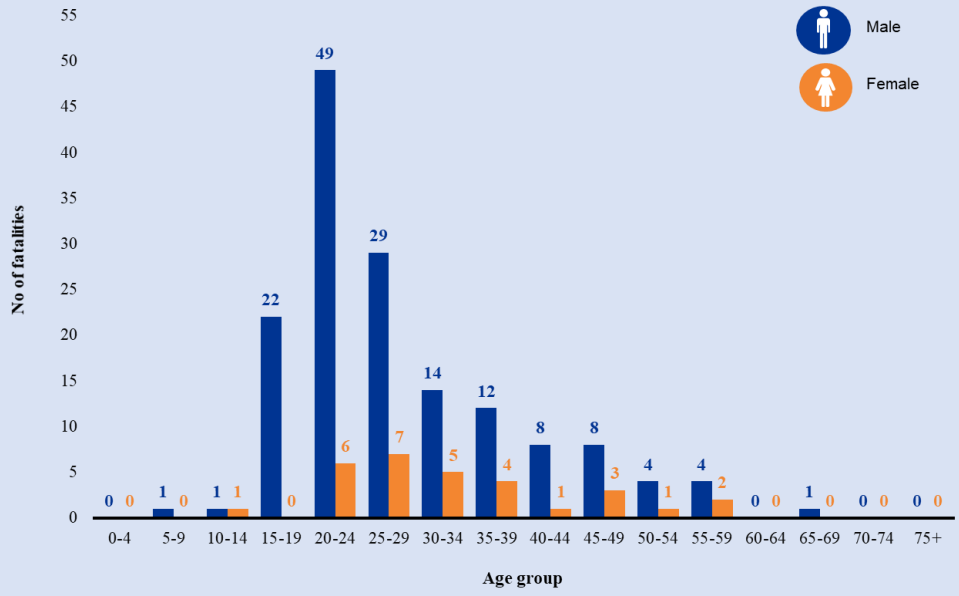


Figure 12

Younger men aged 20 – 29 years made up the highest number of motorcycle deaths, accounting for 51% of all motorcyclist deaths. Enforcement and awareness should continue to focus on this high risk group.

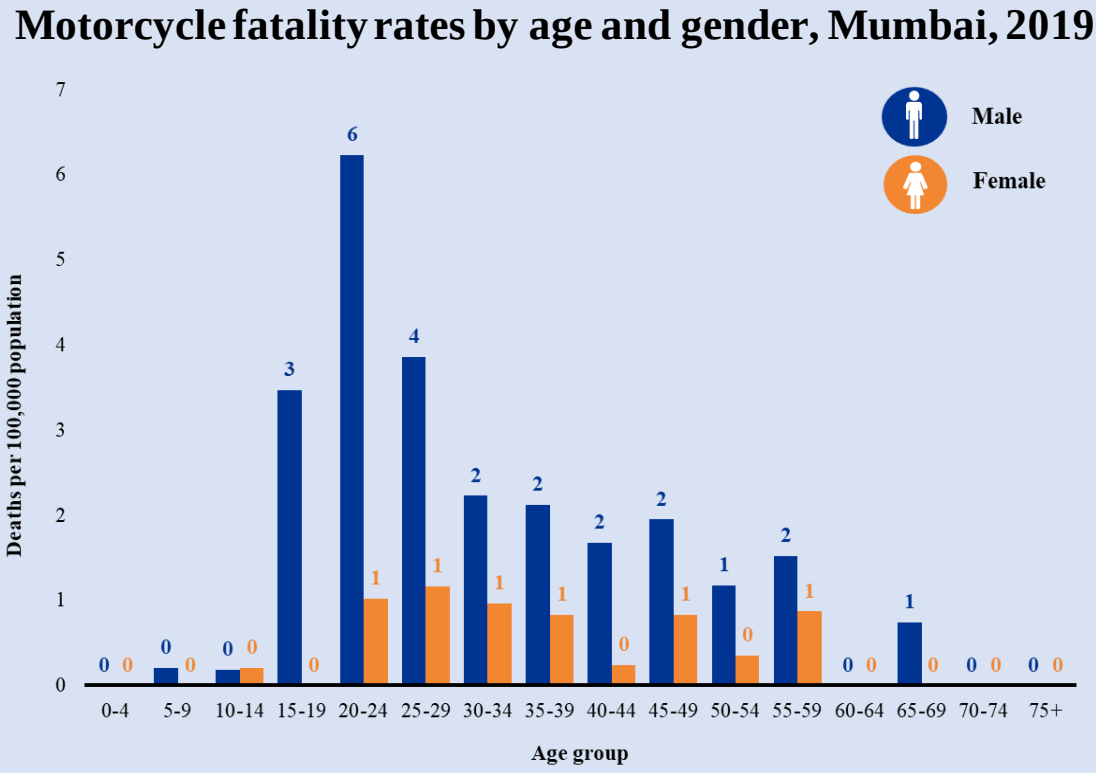


Figure 13

Age-specific motorcycle death rates per 100,000 population also reflected the high risk among 15 – 29-year-old men.

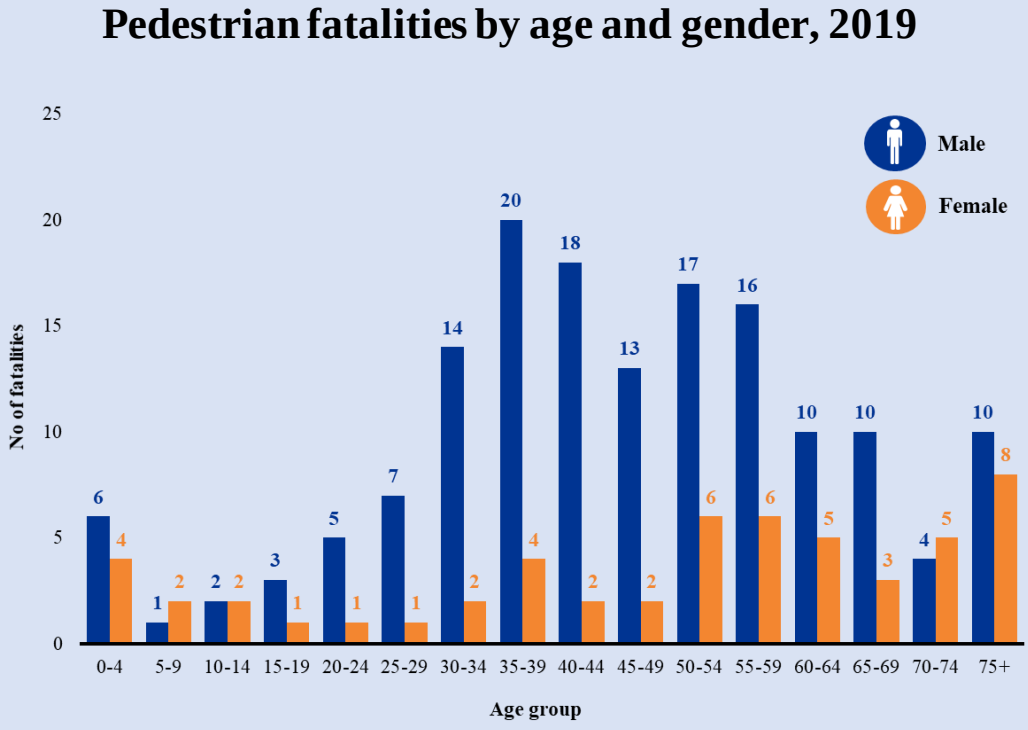


Figure 14

Pedestrian deaths had a very different pattern from motorcyclists, with the highest proportion among 35 to 59 year old men and a more even distribution across age and gender. Speed management and pedestrian infrastructure improvements are key to reduce deaths among these road users.

Pedestrian fatality rate by age and gender, 2019

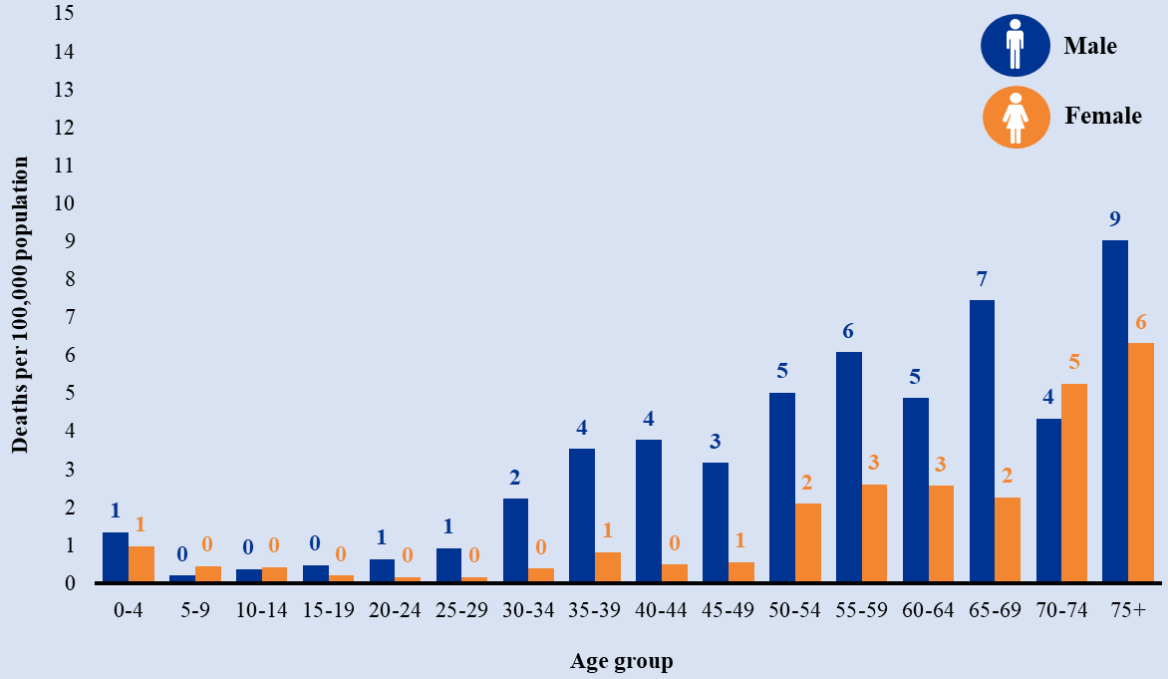
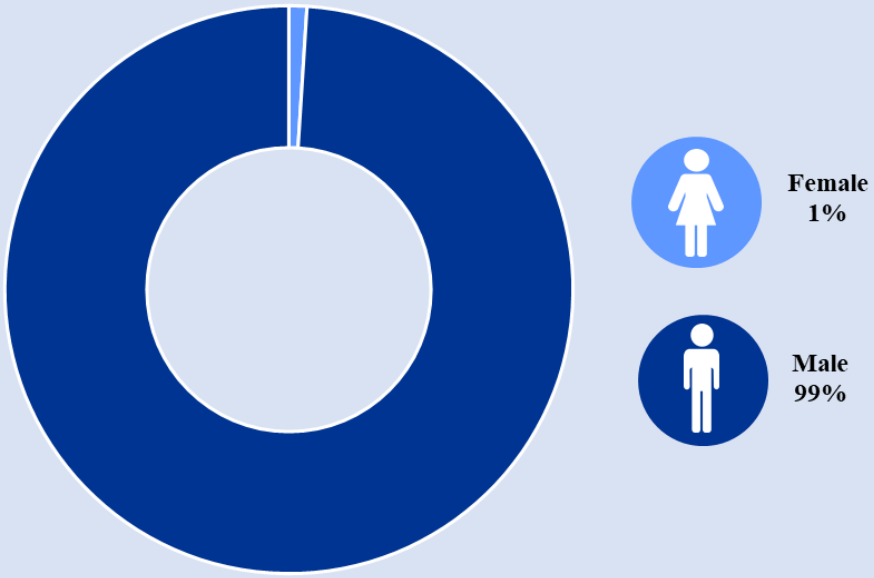


Figure 15

Age and gender-specific pedestrian death rates showed increasing risk by age among both men and women. The rates were significantly higher among those aged over 70 years.

"AT-FAULT" DRIVERS AND VEHICLE TYPES

Known "At-fault'' drivers by gender, 2015 to 2019

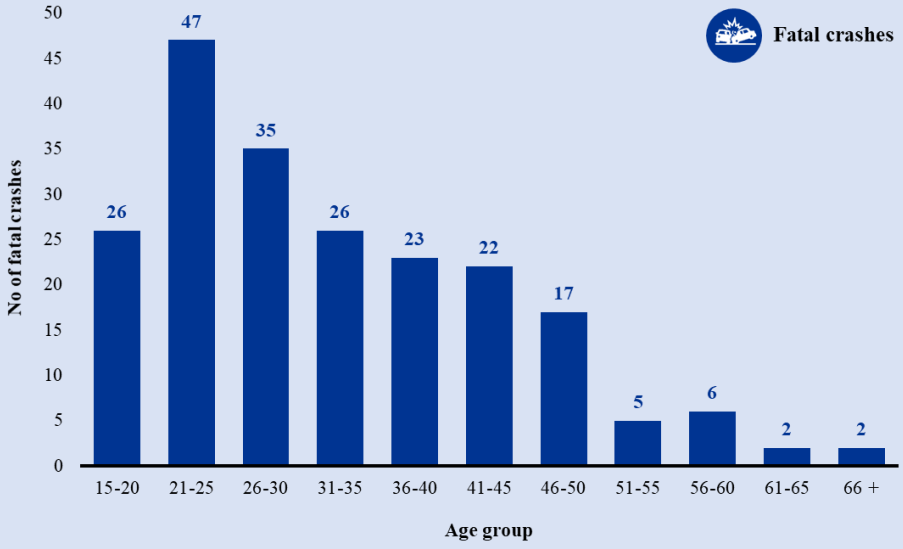


* Unknown drivers are not included in this chart

Figure 16

Male drivers were found at fault in most fatal crashes over past five years. 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 by age, 2019



* Among drivers whose age was documented

Figure 17

Among drivers whose age was documented, 21 – 25 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.

"At-fault" vehicles and fatal crash victim road user types, 2019

At – fault Vehicle / Road User Type	Auto rickshaw	Bus	LV	HV	MHV	3 &4 Wheeler total	Two wheeler	Single Vehicle	Unknown	Total
Pedestrian	16	17	46	17	30	126	41	0	43	210
MC Passengers	4	15	20	20	38	97	23	44	19	183
3 & 4 Wheeler Passengers	2	1	10	5	5	23	0	20	2	45
Cyclist	1	1	3	2	1	8	0	0	1	9
Total	23	34	79	44	74	254	64	64	65	447

Table 1

This matrix shows the relation between the victim and vehicle at fault. Cars, motorcycles, and trucks accounted for most pedestrian deaths. For motorcyclists, after single-vehicle crashes trucks accounted for the largest number of deaths.

"At-fault" vehicles and non-fatal crash victim road user types, 2019

At – fault Vehicle / Road User Type	Auto rickshaw	Bus	LV	HV	MHV	3 &4 Wheeler total	Bicycle	Two wheeler	Single Vehicle	Unknown	Total
Pedestrian	169	44	427	32	75	747	1	566	0	43	1357
MC Passengers	89	42	383	55	115	684	0	238	87	39	1048
3 & 4 Wheeler Passengers	37	18	222	28	46	351	0	23	106	6	486
Cyclist	1	3	12	5	7	28	0	6	0	0	34
Total	296	107	1044	120	243	1810	1	833	193	88	2925

Table 2

The above matrix shows the non-fatal injuries caused by the vehicle at fault. Pedestrians were most frequently injured by motorcycles and cars, whereas motorcyclists were most frequently injured by cars and other motorcycles.

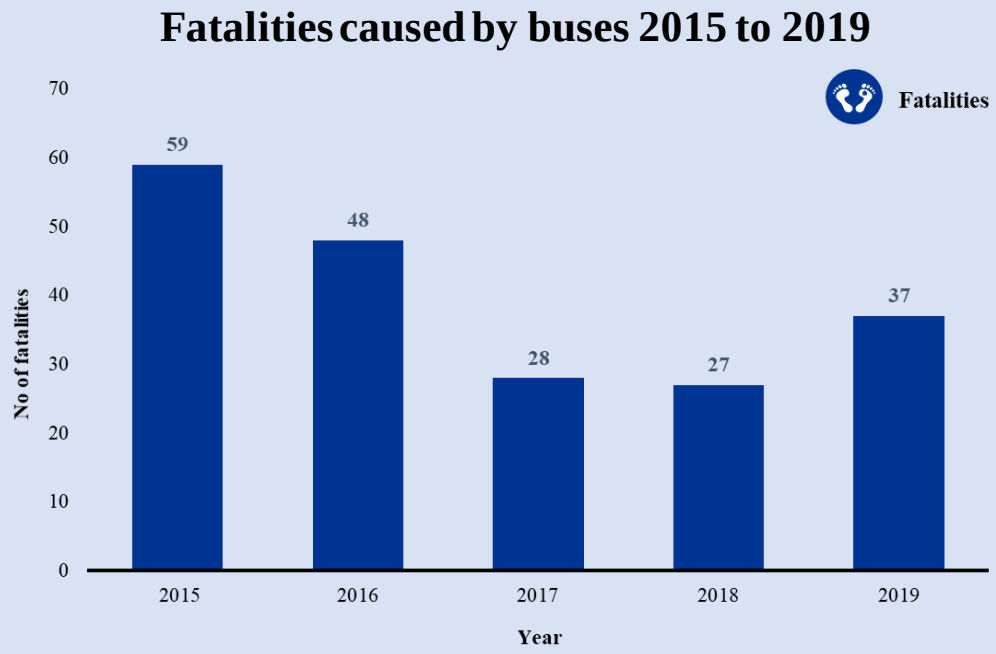


Figure 20

Although deaths caused by buses decreased overall in the past five years, there was an increase in 2019 to 37 from 27 the previous year. This category includes BEST buses, private buses, school buses, and luxury buses.

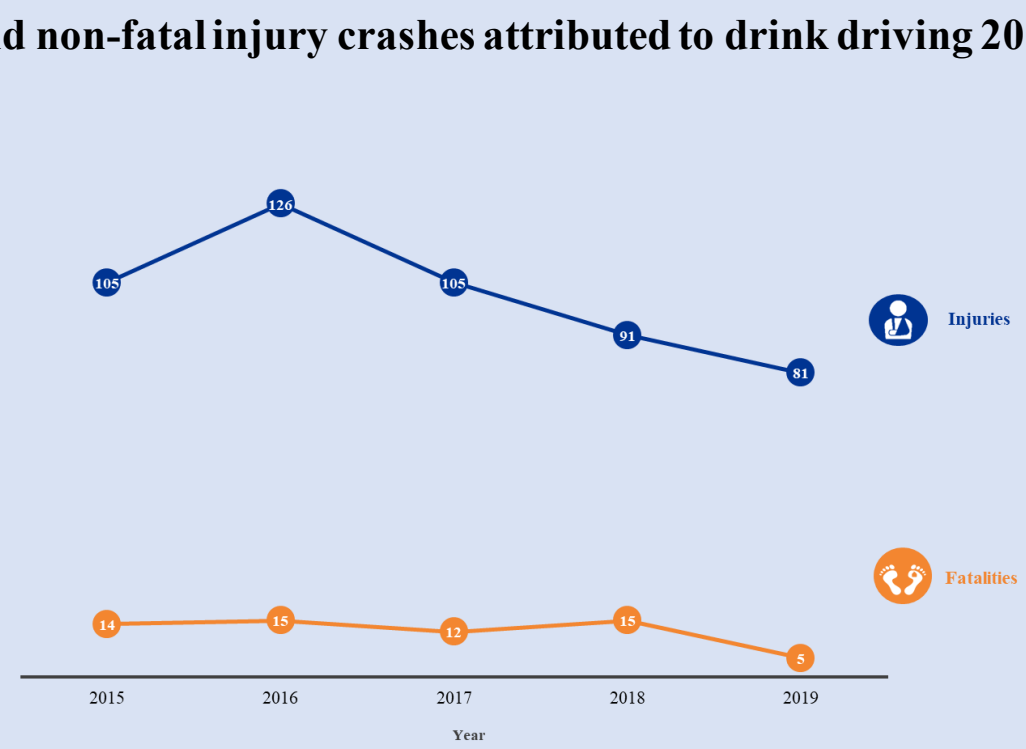


Figure 21

Road crash deaths and injuries attributed to drink driving have gone down over the past five years. These figures may be an underestimate because of limitations in availability of alcohol testing; these cases reflect an alcohol charge laid by police.

Fatal and non-fatal injury crashes by month, Mumbai, 2018 & 2019

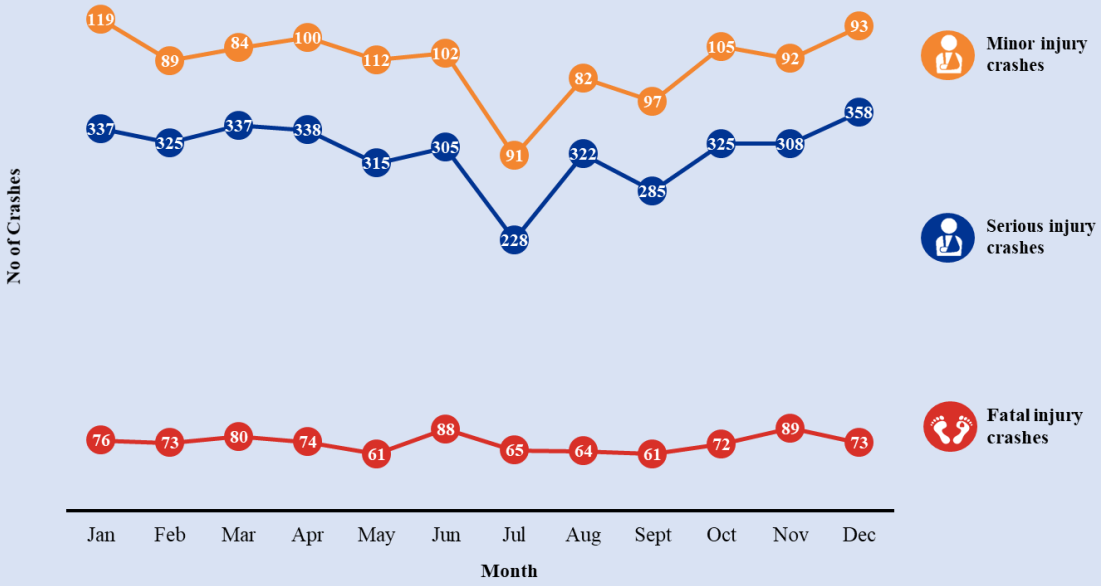


Figure 22

This graph shows number of road traffic injury crashes by month for 2018 & 2019. Fatal injury crashes were most frequent in November and June. There were fewer serious injury crashes reported in July. Overall, there was no clear seasonal pattern in injury or fatal crashes.

Fatalities by time of day, 2015 to 2019

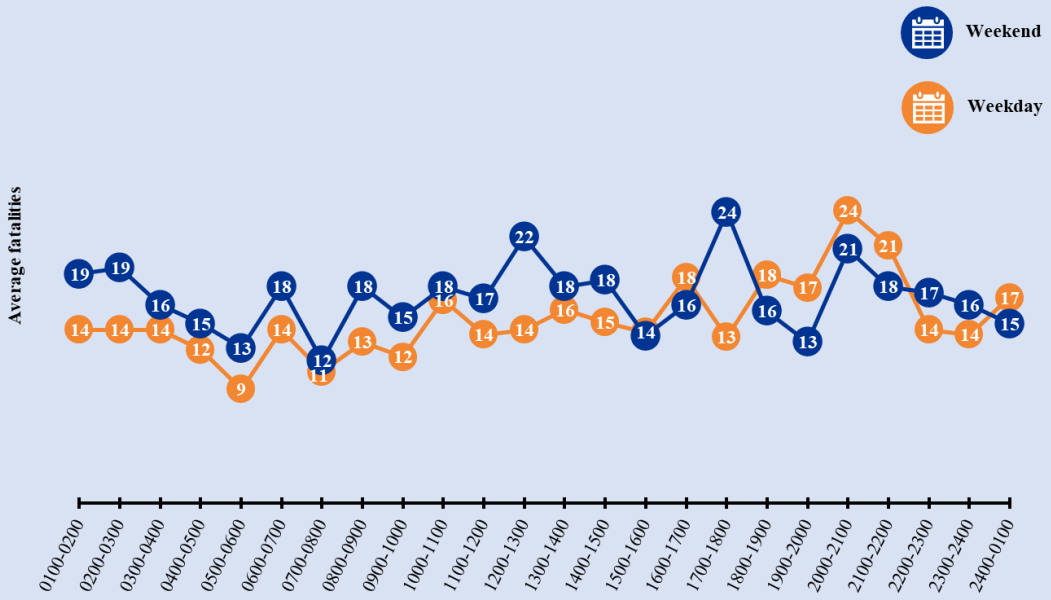


Figure 23

Over the past five years, the peak period of fatalities on weekdays was 20:00 – 21:00, whereas on weekends the peak period was 17:00 – 18:00.

Road traffic fatalities and injuries by day and time of week, Mumbai, 2019

Time	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Grand Total
0100-0200	17	19	17	18	26	17	19	133
0200-0300	23	18	14	15	20	13	18	121
0300-0400	16	10	13	28	19	10	20	116
0400-0500	4	9	10	17	5	16	5	66
0500-0600	10	15	12	9	9	19	10	84
0600-0700	22	25	10	13	21	9	12	112
0700-0800	23	22	9	12	15	22	13	116
0800-0900	13	19	16	19	18	14	13	112
0900-1000	17	18	9	13	20	15	16	108
1000-1100	18	24	21	12	23	20	16	134
1100-1200	24	25	19	20	15	20	23	146
1200-1300	19	18	26	18	22	17	23	143
1300-1400	14	31	23	15	29	21	19	152
1400-1500	19	23	11	16	37	19	33	158
1500-1600	25	23	16	23	18	12	25	142
1600-1700	15	20	25	36	20	21	15	152
1700-1800	31	20	20	16	32	32	34	185
1800-1900	22	20	17	21	29	20	20	149
1900-2000	39	28	32	18	36	25	31	209
2000-2100	30	14	23	36	28	31	25	187
2100-2200	20	24	24	28	23	27	29	175
2200-2300	21	19	20	22	23	34	36	175
2300-2400	20	11	25	18	19	25	19	137
2400-0100	43	29	22	12	17	19	18	160
Total	505	484	434	455	524	478	492	3372

Table 3

There were more injuries and deaths during evening peak hour travel times, and on weekends this risk period was extended through the evening with the highest number between 22.00-23.00.

DISTRIBUTION OF FATALITIES BY LOCATION

High risk corridors, Mumbai, 2017 to 2019

Sr.no	Road Name	Deaths per Km	Serious Injuries per Km	Deaths & Injuries per Km	Fatalities 2017-19	Serious Injuries 2018-19	Total
1	Ghatkopar Mahul Road (1.36Km)	14	27	41	19	37	56
2	Balasaheb Thackeray Flyover (1.1Km)	14	21	35	15	23	38
3	Vasantdada Patil Marg (1.3Km)	8	16	25	11	21	32
4	Mulund - Airoli Link Road (2.5Km)	7	11	18	17	28	45
5	Bandra Kurla Complex Road (3.6Km)	1	15	16	5	54	59
6	J.J. Flyover (2.5Km)	6	10	15	14	24	38
7	Western Express Highway (25.33Km)	5	9	14	118	228	346
8	Sion Panvel Highway (9.1Km)	5	7	12	46	62	108
9	Ghatkopar - Mankhurd Link Road (4Km)	4	8	12	14	33	47
10	Eastern Express Highway (23.55Km)	2	8	10	57	185	242
11	Malad Marve Road (3.7Km)	1	9	10	3	34	37
12	Santa Cruz – Chembur Link Road (6.45Km)	3	6	9	20	37	57
13	Mathuradas Vasanji Road (Andheri Kurla Road) (4.5Km)	2	6	8	7	29	36
14	Aarey Colony Road (7.1km)	1	5	7	8	39	47
15	Goregaon Mulund Link Road (6.2Km)	1	5	6	8	32	40

Table 4

Technical Note: *This chart does not include Serious Injury data for year 2017.*

The above list of corridors shows the highest road crash deaths and injuries rates per kilometre. Ghatkopar Mahul Road, Balasaheb Thackeray Flyover and Vasantdada Patil Marg have the highest rates per kilometre. However, Western Express Highway and Eastern Express Highway have recorded highest fatal and serious injuries in the past three years. High risk corridor identification supports Engineering and Enforcement interventions like infrastructure treatment and speed management.

High risk junctions, Mumbai, 2017 to 2019

Sr.No	Junction Name	Fatalites 2017 - 2019 with in 250mt radius	Serious Injuries 2018-2019 with in 250mt radius	Total
1	Amar Mahal Junction, Tilak Nagar, Ghatkopar East	25	40	65
2	Godrej junction, Pirojshanagar, Vikhroli	18	42	60
3	Int of EEH and JVLR, kanjurmarg East	5	47	52
4	Int of WEH and JVLR, Jogeshwari East	16	26	42
5	Int of WEH and SD Mandir Road, Bandra East	8	27	35
6	Int of WEH and Nehru Road, Santacruz East	7	26	33
7	Int of WEH and Sion Bandra Link Road, Bandra East	5	24	29
8	Int of EEH and Shiv Shrushti Road, Kurla East	11	16	27
9	Int of Nehru Road and Jain Mandir Road, Santacruz East	7	20	27
10	Int of WEH and Ananta Kanekar Marg, Bandra East	5	17	22
11	Int of Caves Road and Gupha Road, Jogeshwari East	6	14	20
12	Int of EEH & Ghatkopar-Mankhurd Link Road	4	16	20
13	Int of VN Purav Marg and Lal Dongra Road, Vikhroli East	7	9	16
14	Int of EEH and Kamraj Nagar Road,Goradiya nagar, near Kamraj nagar busstop, Ghatkopar East	3	9	12
15	Int of VN Purav Marg and SG Barve Marg, Chembur East	2	9	11

Table 4

***Technical note**: Fatal and Serious Injuries were searched, within 250 meters of radius for each junction for past three years. Data source does not include serious injuries for year 2017.*

The junctions listed above show the highest number of road crash deaths and injuries in the past three years. The Amar Mahal and Godrej junctions on the eastern express highway were the riskiest points in the city over the past three years. These junctions should be studied further to identify safety improvements.

Road user fatalities by road user type and zone, 2019

Zone	Cyclists	3&4 wheeler Passenger	MC Passenger	Pedestrian	Total
Port	0	0	5	9	14
Zone I	0	1	6	5	12
Zone II	0	0	1	9	10
Zone III	2	1	7	11	21
Zone IV	0	3	22	20	45
Zone V	0	0	15	17	32
Zone VI	0	9	26	31	66
Zone VII	2	4	18	36	60
Zone VIII	0	5	11	14	30
Zone IX	0	3	12	10	25
Zone X	0	5	21	18	44
Zone XI	2	6	13	16	37
Zone XII	3	8	26	14	51
Grand Total	9	45	183	210	447

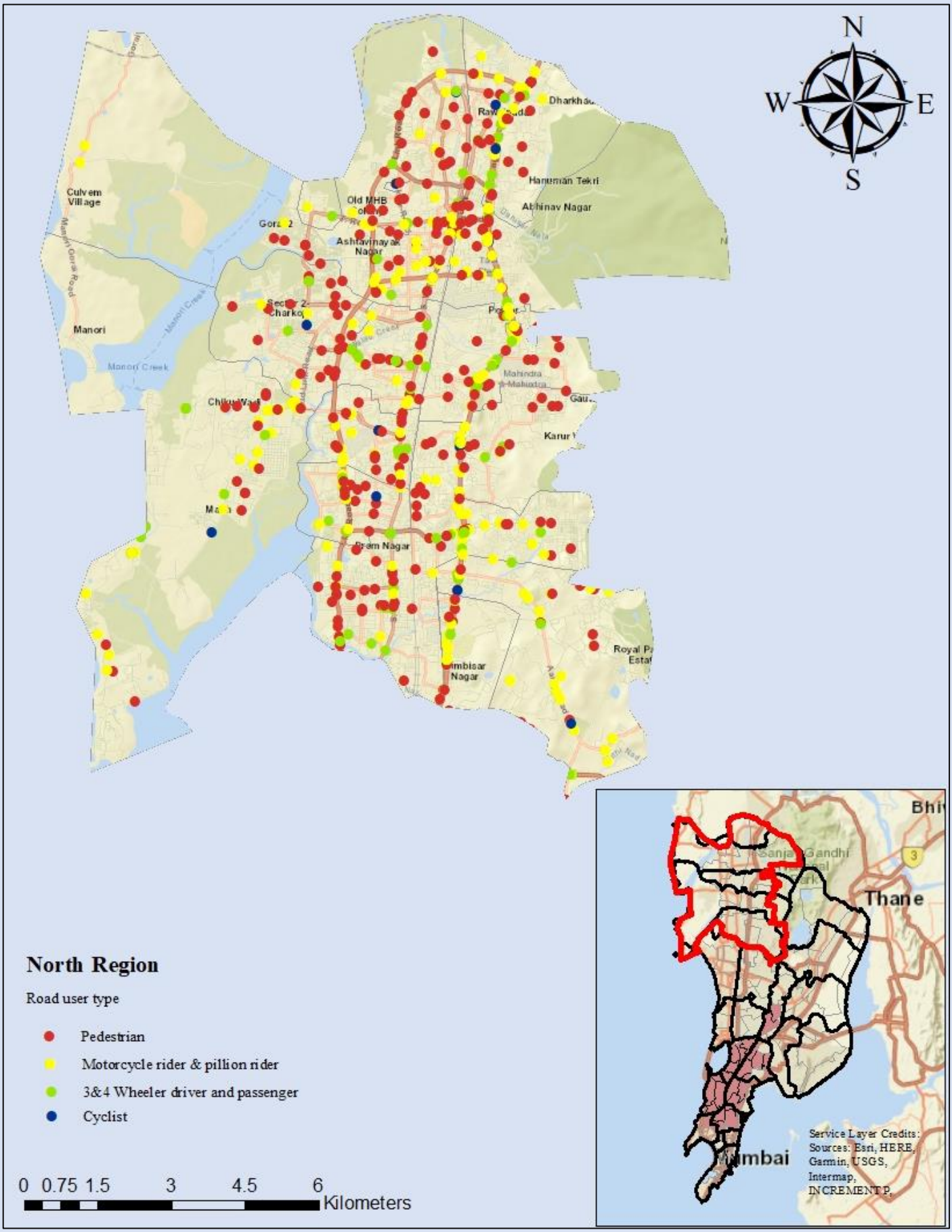
Table 6

The highest number of deaths occurred in Zone 6 and 7. Pedestrian deaths were most frequent in Zone 7. Motorcyclist deaths were most frequent in Zone 12.

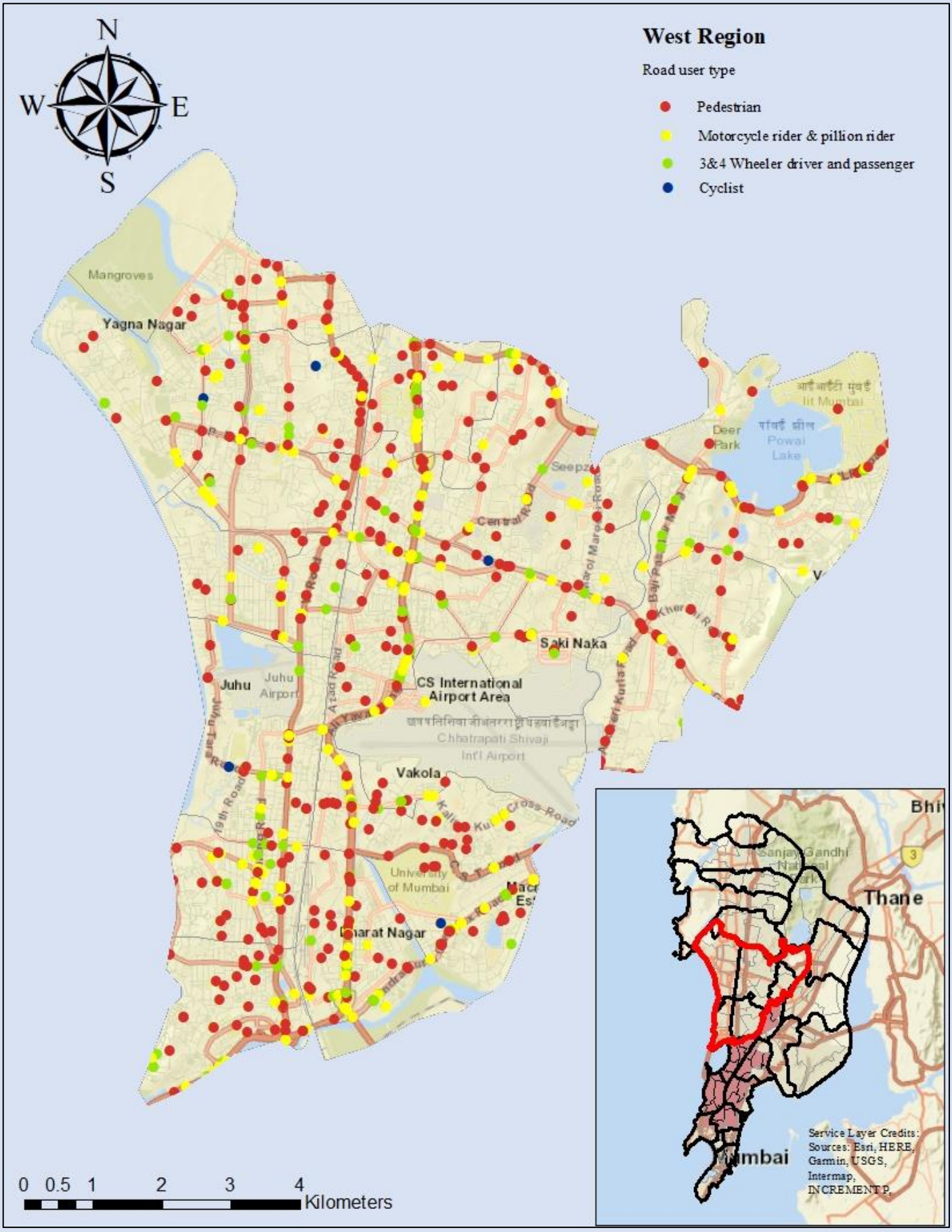
CRASH MAPS, MUMBAI, 2019

Mumbai is divided into five regions. Spot maps show the points representing fatal and injury crashes across Mumbai by region for year 2019. These maps further show the victims road user type by colour, allowing risk locations to be identified for vulnerable road users.

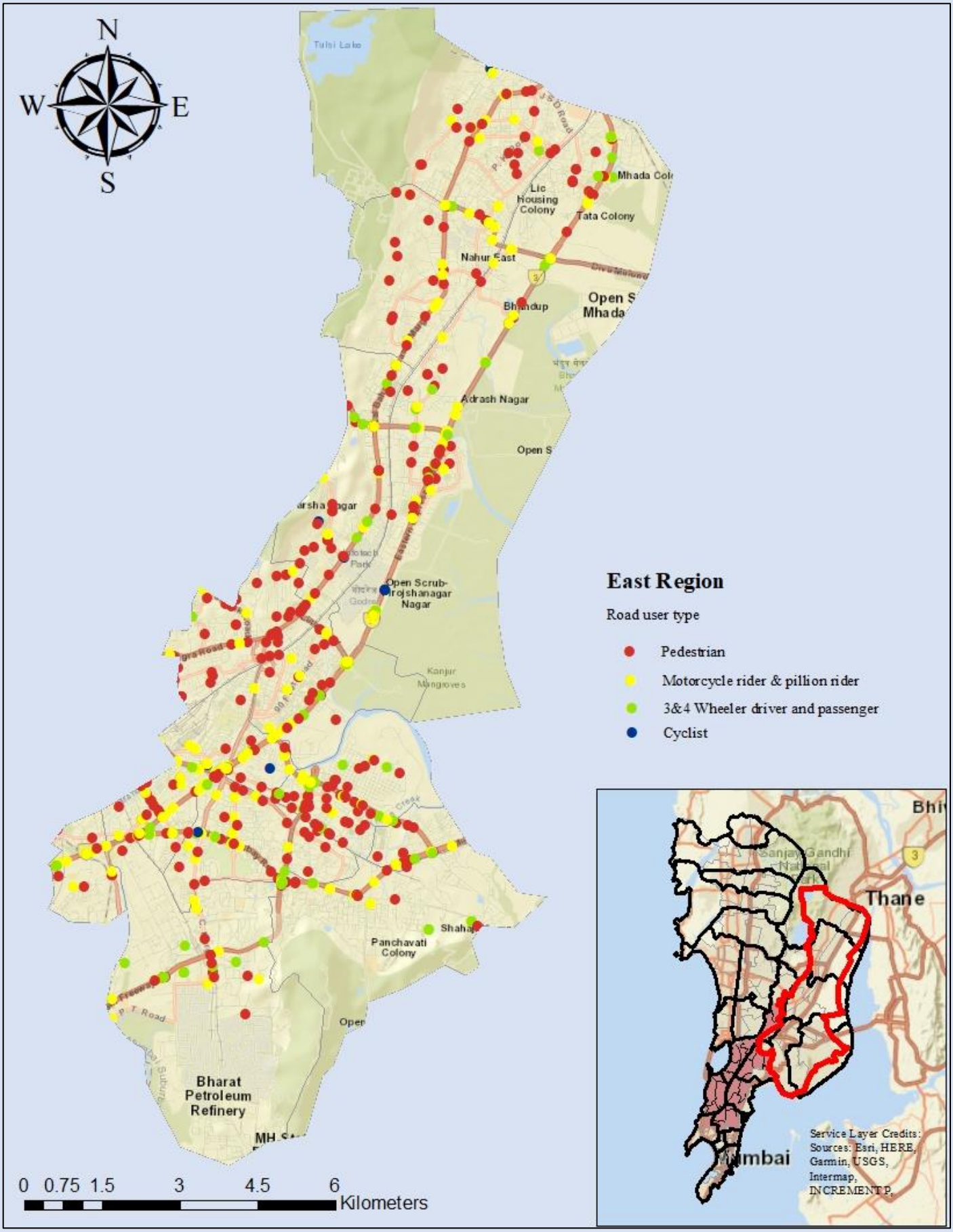
Mumbai North Region, fatal and injury crashes, 2019



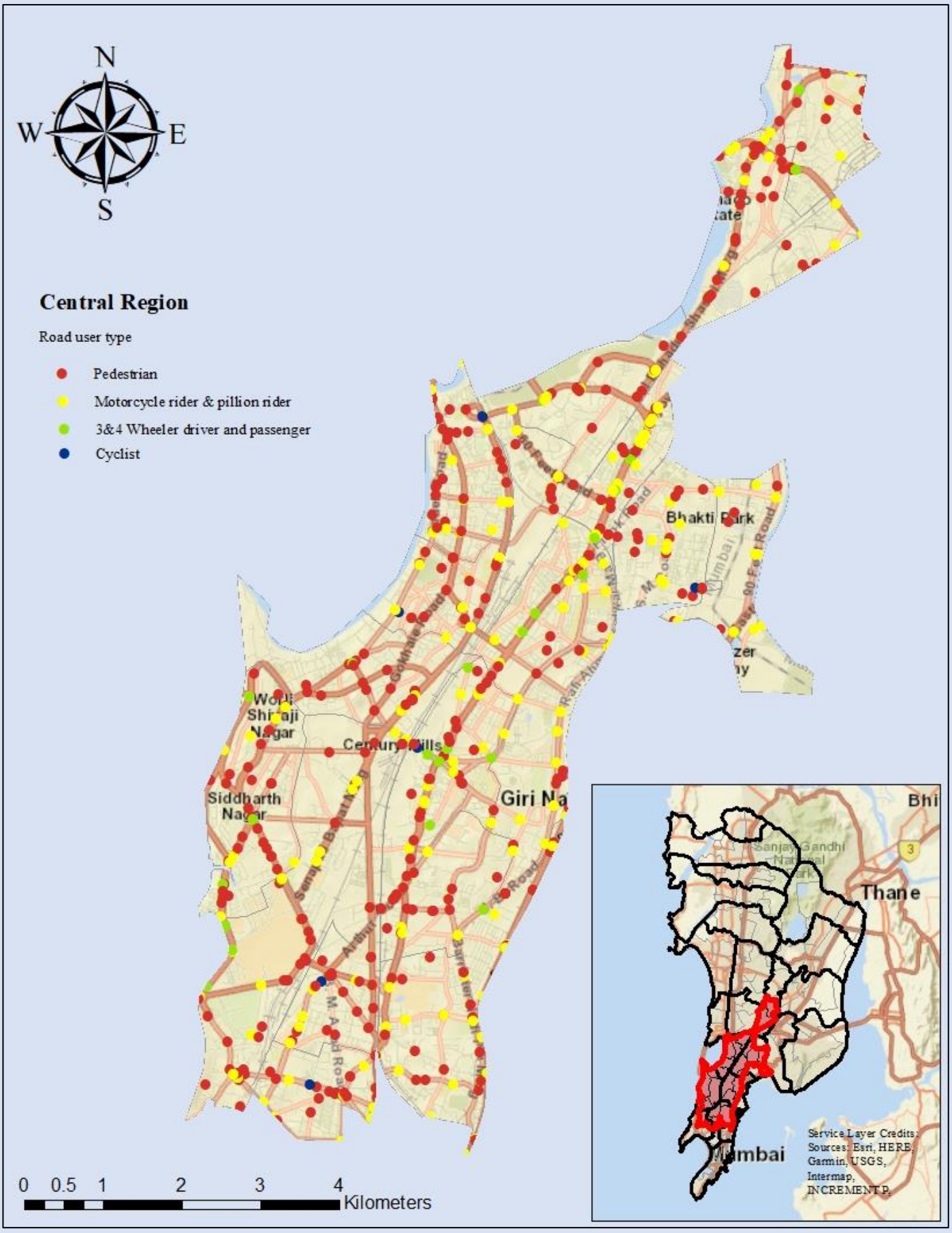
Mumbai West Region, fatal and injury crashes, 2019



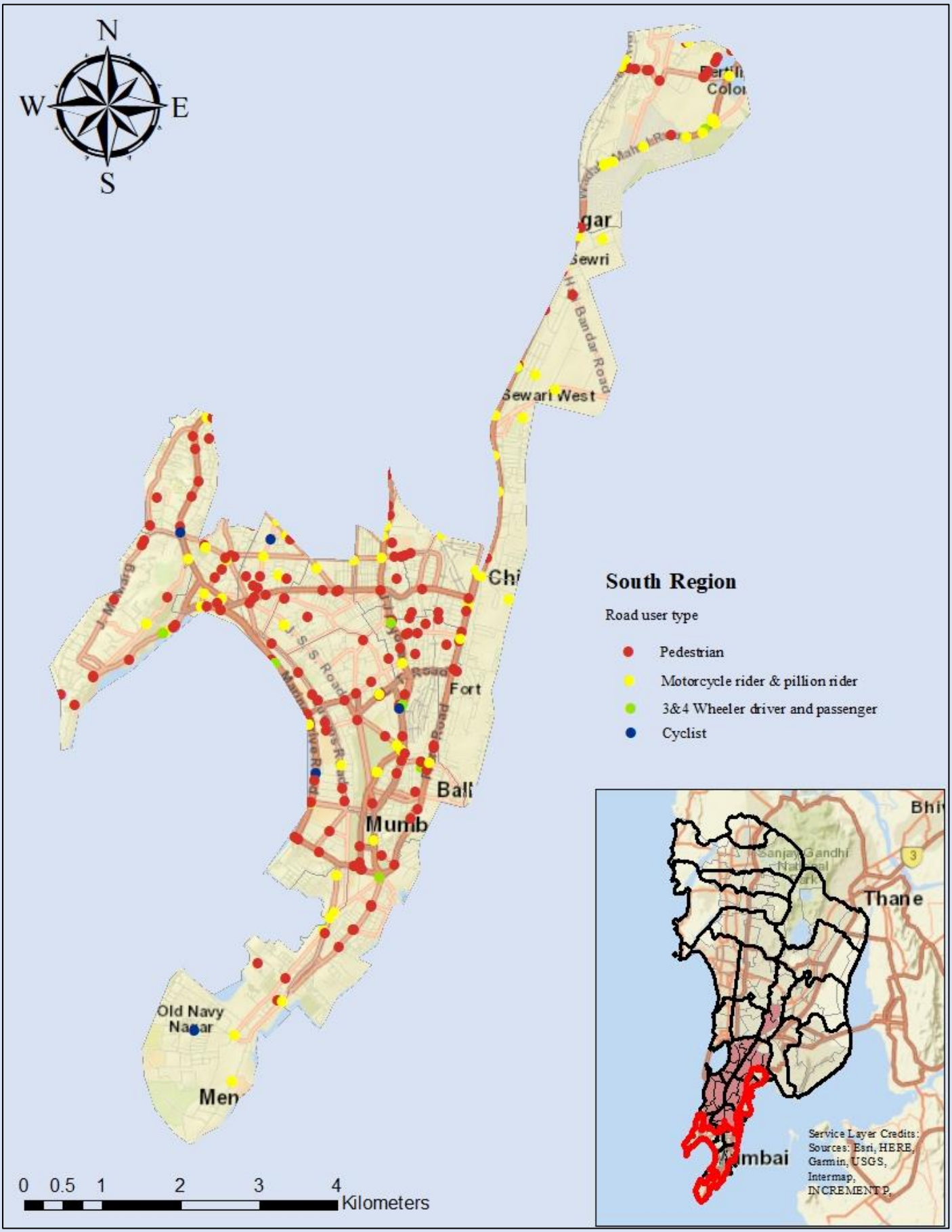
Mumbai East Region, fatal and injury crashes, 2019



Mumbai Central Region, fatal and injury crashes, 2019

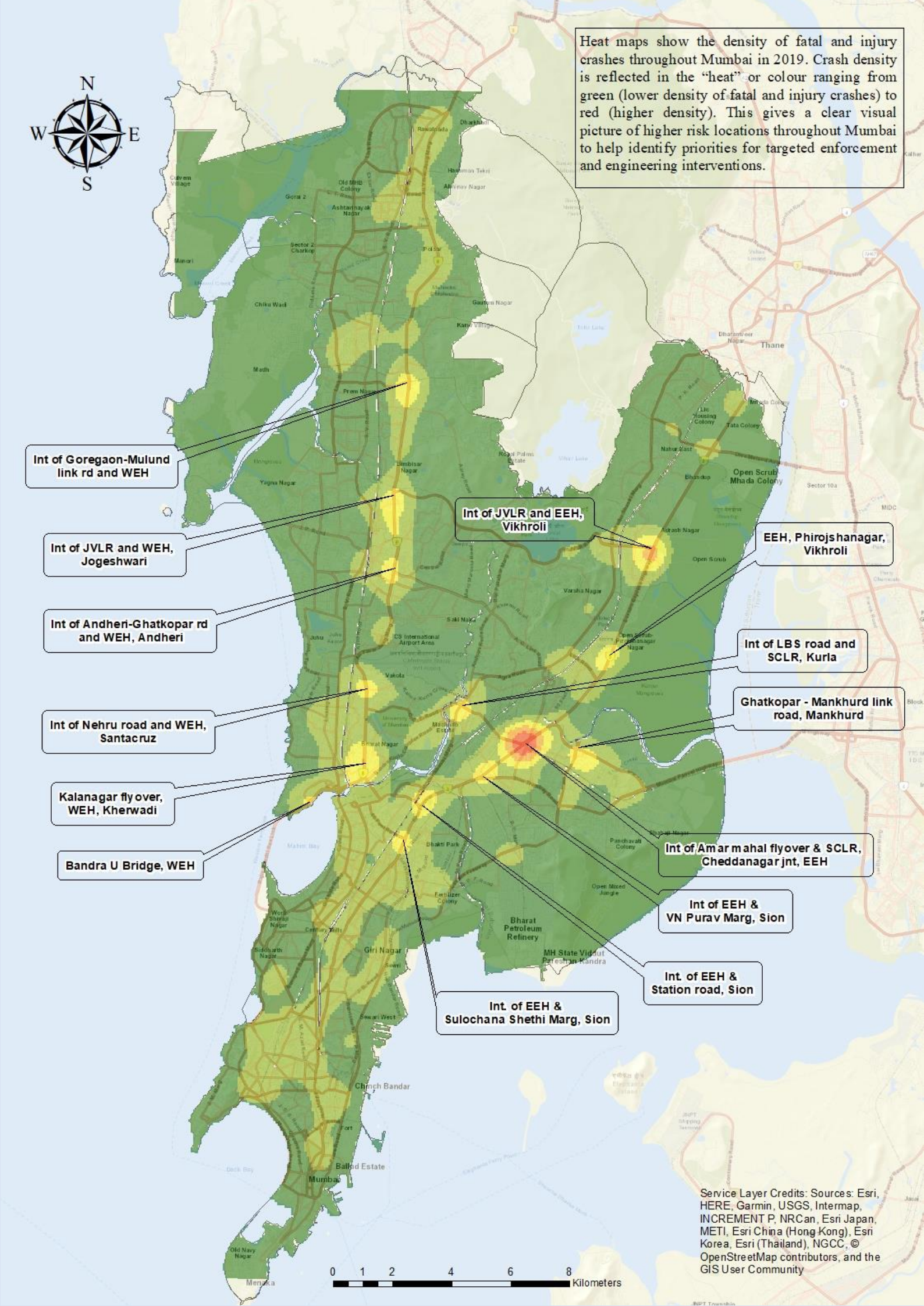


Mumbai South Region, fatal and injury crashes, 2019



Heat map of fatal and injury crashes, Mumbai, 2019

Heat maps show the density of fatal and injury crashes throughout Mumbai in 2019. Crash density is reflected in the “heat” or colour 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.


Heat maps show the density of fatal and injury crashes throughout Mumbai in 2019. Crash density is reflected in the "heat" or colour 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.
N
W
E
S
Int of Goregaon-Mulund link rd and WEH
Int of JVLR and WEH, Jogeshwari
Int of Andheri-Ghatkopar rd and WEH, Andheri
Int of Nehru road and WEH, Santacruz
Kalanagar flyover, WEH, Kherwadi
Bandra U Bridge, WEH
Int of JVLR and EEH, Vikhroli
EEH, Phirojshanagar, Vikhroli
Int of LBS road and SCLR, Kurla
Ghatkopar - Mankhurd link road, Mankhurd
Int of Amar mahal flyover & SCLR, Cheddanagar jnt, EEH
Int of EEH & VN Purav Marg, Sion
Int. of EEH & Station road, Sion
Int. of EEH & Sulochana Shethi Marg, Sion
Thane
Mumbai
Bharat Petroleum Refinery
Open Scrub
Open Mixed Jungle
Chinch Bandar
Ballard Estate
Giri Nagar
Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, © OpenStreetMap contributors, and the GIS User Community
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Kilometers

Notes:

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