



**Bloomberg
Philanthropies**

INITIATIVE FOR GLOBAL ROAD SAFETY

MUMBAI

Road Safety Annual Report 2020



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PREFACE



Shri. Hemant Nagrale, IPS
Commissioner of Police, Greater Mumbai
Maharashtra, India

Over the past decade Mumbai has witnessed an enormous increase in mega projects changing the landscape of our city. From flyovers to metro stations to Sea Link and the Coastal Road, the fundamental landscape of our city continues its transformation. These recent changes have made the role of traffic management all the more crucial - and the traffic police have risen to the occasion. But alongside this another responsibility is on the traffic police: that of enforcing road laws, such as proper helmet wearing, speeding, and fighting drunk driving, that saves lives by preventing fatalities. In this second role, the Mumbai Traffic Control Branch has worked closely with the Bloomberg Philanthropies Initiative for Global Road Safety over the past seven years, and has made great strides to prevent road crashes. I compliment them on their joint efforts and look forward to seeing more progress from this partnership.

Furthermore, I compliment this collaboration on its efforts to strengthen the data systems of the Mumbai police. Reports like this one, now released for the 5th time in as many years, do a great service to not only the police, but to the citizens of Mumbai, by educating them of the traffic scenario and trouble spots.

We know that well-designed pedestrian crossings and pedestrian islands saves lives. We know that with sufficient footpaths and foot over bridges, our citizens will have a safe place to walk and many preventable accidents can be avoided. We know that enforcing anti-drunk driving and clasped-helmet-wearing, stringently and rigorously, can further bring down these fatality figures.

The Mumbai police are committed to doing all out efforts to stop each and every death on the road. We know we have a long road forward and we are committed to cover it.

A handwritten signature in blue ink that reads 'Hemant Nagrale'.

Hemant Nagrale



Shri. Rajvardhan, IPS
Joint Commissioner of Police, Traffic, Greater Mumbai
Maharashtra, India

Road crashes are the eighth leading cause of death worldwide, and a similarly tragic problem in our city of Mumbai. Often referred to as “a silent pandemic,” over 1.35 million people are killed in road crashes each year. In India alone, over 150,000 people were killed in 2019, accounting for 11% of the total road traffic deaths globally in 2019.

From 2015 - 2019, Mumbai witnessed a 27% reduction in road crash related deaths. We were prepared to reduce these numbers further in 2020 when we were hit by the novel coronavirus pandemic and several cities across the world, including Mumbai, went into a lockdown. The low movement of vehicles on the road for much of the year has had an impact on road deaths and injuries.

As a result, in 2020 Mumbai witnessed a 22% decrease in fatalities and a 41% decrease in injuries as compared to 2019. From 2015 - 2020, we saw a reduction of 43% in these deaths and a 57% reduction in injuries.

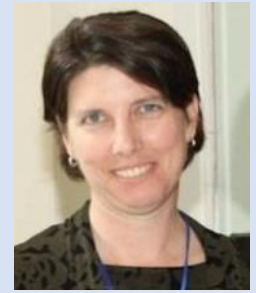
Despite this reduction being a positive highlight, we have to acknowledge that people are still dying in road crashes. These deaths are not inevitable “accidents” but instead are “crashes,” and they are something we can, should, and will work to reduce through various scientific and planned measures. These measures are driven by data and that is our very intent for publishing this detailed report each year.

For this and many other interventions, we have partnered with the Bloomberg Philanthropies Initiative for Global Road Safety since 2015. We have also been working in collaboration with other government stakeholders to implement interventions in areas of enforcement, engineering and media. Since before the lockdown, road deaths in Mumbai had seen a declining trend. 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.

We look forward to continuing our partnership with BIGRS and releasing this report each year to ensure that key decisions related to road safety are led with the evidence that lies in this report. We thank the efforts of each and every individual that went into making this available for everyone.

The Mumbai Traffic Control Branch is forever committed to making efforts to ensure that people do not die on our streets. Together we can achieve our vision for zero deaths on the streets of Mumbai.

Rajvardhan



Dr Sara Whitehead
Public Health and Preventive Medicine Consultant
Vital Strategies

We are pleased to collaborate with the Mumbai Traffic Control Branch for a 6th year on this annual report of road safety. The great challenge of responding to the COVID - 19 pandemic has required great effort, while preventing road traffic injuries and deaths remains a priority. Each of these events places an additional strain on healthcare resources, while behind the number's families face loss of loved ones, caregivers and breadwinners.

During the past five years from 2015 - 2019 there was a steady declining trend in road traffic fatalities in Mumbai. When COVID-19 control restrictions sharply reduced mobility, a more profound drop was observed in 2020, by 22% for fatalities and 41% for injuries since 2019. We cannot assume this more recent decrease will be sustained when mobility returns to pre-pandemic levels.

This report, like its predecessors, provides clear analysis of where, when, and how crashes occur and who suffers their consequences. The information is key to targeting prevention interventions, monitoring the success of those interventions, and correcting courses as needed. Key strategies include continuing to ensure citizens understand the law and consequences of crashes, supporting effective operational practice among police to enforce traffic laws such as speeding, drink-driving, and not wearing helmets or seat-belts, and improving street infrastructure design to make them safer for all road users, especially pedestrians who are most vulnerable.

Vital Strategies and the Bloomberg Philanthropies Initiative for Global Road Safety look forward to continuing this fruitful partnership in Mumbai to create safer streets for all citizens.

Dr Sara Whitehead

ACKNOWLEDGEMENTS

Mumbai is one of the multiple cities globally 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.

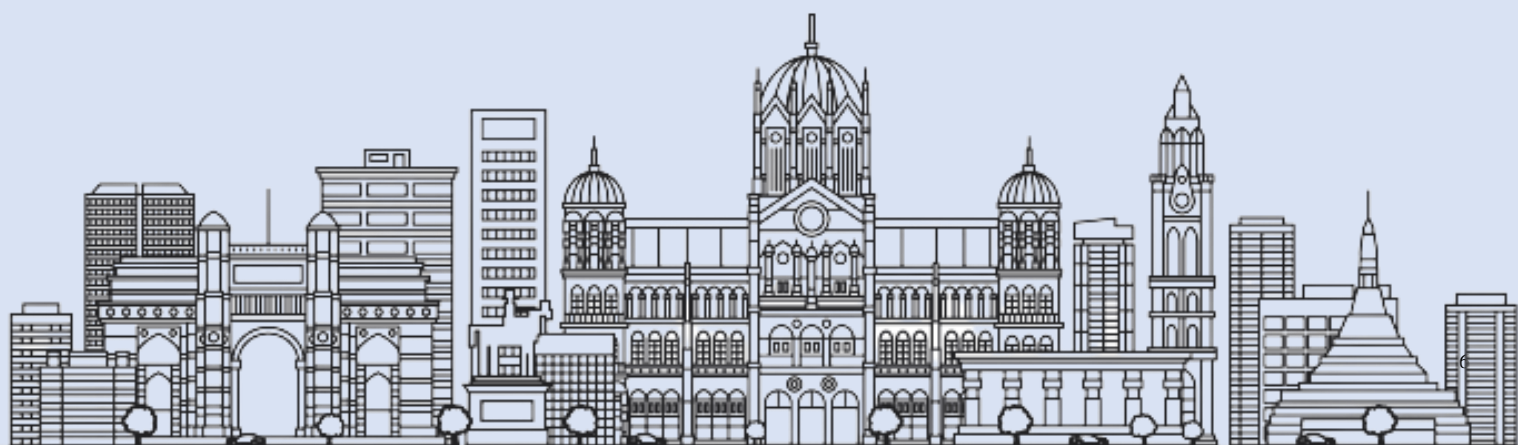
This work would not have been possible without the support of the Honourable Chief Minister of the State of Maharashtra, the Honourable Municipal Commissioner of Mumbai, the Commissioner of police, Mumbai and Joint Commissioner of Police (Traffic), Mumbai, and all the individuals and partners in working 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 the production of this report possible.

This report was published in November 2021.

ABBREVIATIONS

BEST	Brihanmumbai Electric Supply and Transport Company
BIGRS	Bloomberg Philanthropies Initiative for Global Road Safety
DRIVER	Data for Road Incident Visualisation, Evaluation and Reporting System
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
JHSPH	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

Every year more than 1.35 million people are killed by road crashes globally, of which 93% of deaths occur in low-and middle-income countries.¹ India accounts for 11% of the world's road crash deaths. In 2019, India reported 151,113 deaths, with 12,788 of those deaths taking place in Maharashtra.²

This report provides an overview of road traffic deaths and injuries in Mumbai during 2020. Mumbai has reported a 43% reduction in road crash deaths over the past six years, with the annual number of road crash deaths decreasing from 611 in 2015 to 350 in 2020. This results in a 2020 death rate of 2.7 per 100,000 population. The largest decrease was among pedestrians, which for the first time dropped below motorcyclists as the leading road user group among fatalities.

Motorcyclists (49%) pedestrians (42%), and cyclists (2%) are the most vulnerable road users, accounting for 93% of overall deaths in Mumbai. Men accounted for 87% of total deaths, with men aged 20 to 34 years making up the highest number. Men in this age group also made up the majority of motorcyclist deaths.

The number of crashes, injuries, and fatalities dropped sharply during the lockdown period from March to June, then rose again. The peak periods of fatal crashes on weekdays were 16:00 - 17:00 and 20:00 - 22:00, which have remained consistent for the past three years.

The Ghatkopar-Mahul Road had the highest number of deaths per kilometre, whereas Amar Mahal junction on the eastern Express Highway continued to be the most dangerous junction in Mumbai.

Along with road traffic deaths, the number of non-fatal injuries also decreased by 41% in 2020 compared to 2019.

The data source for this report was police crash data records. This report aims to provide an evidence base for city stakeholders to make the city safer through the use of well-targeted engineering, enforcement, and policy interventions.

¹ World Bank (2019). *Guide for road safety opportunities and challenges: Low - and middle - income country profiles*. Washington DC, USA: World Bank.

² Ministry of Road Transport and Highways, 2019. *Road Accidents in India 2019*. Report, New Delhi: Ministry of Road Transport and Highways.

INTRODUCTION

Road crashes kill more than 1.35 million and injure more than 50 million annually throughout the world. They are the leading cause of death in people aged 5 to 29 years. About 93% of the global road crash deaths occur in low-and middle-income countries. This drastically impacts the development of low-and middle-income countries as economically productive lives are lost.³

Road crashes in India kill almost 1.5 lakh people annually, accounting for 11% of road crash deaths in the world. In 2019, India reported 449,002 road crashes, resulting in 151,113 deaths and 451,361 injuries.⁴

Maharashtra has reported 32,925 crashes that caused 12,788 deaths and 28,628 non-fatal injuries in 2019.⁵ Mumbai has seen a decline in deaths over a period of six years and continues to reduce the number of deaths and injuries year by year. The year 2020 was marked by a novel coronavirus pandemic that disrupted the world's traffic pattern, decreasing road deaths and injuries.

This report documents the situation of road traffic deaths and injuries in Mumbai during the pandemic year. Mumbai has reported a 43% reduction in road crash deaths since 2015, when it began partnering with Bloomberg Philanthropies as one of 10 cities working collaboratively to reduce crashes, injuries, and deaths through the Bloomberg Philanthropies Initiative for Global Road Safety. 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 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 2020 road crash injury data. It represents a process of digitizing existing data and mapping, analysing, 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 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. This report is a step in that process, and the BIGRS partners look forward to continuing to enhance Mumbai's road crash surveillance system, thereby helping the city reduce crashes, injuries, and deaths.

³ World Bank (2019). *Guide for road safety opportunities and challenges: Low - and middle - income country profiles*. Washington DC, USA: World Bank.

⁴ Ministry of Road Transport and Highways, 2019. *Road Accidents in India 2019*. Report, New Delhi: Ministry of Road Transport and Highways.

⁵ Highway police of Maharashtra, 2019. *Road Accidents in Maharashtra*. Report, Mumbai: Accident research cell, Maharashtra.

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 appropriately. Police gather data on the crash 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. 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.

At the MTCB HQ, the summarized information is cross-checked to avoid duplicate reporting, then manually tallied. These 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 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 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 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 together with four or more-wheelers, this year’s report shifts to standard global practice for comparability.⁶ This also reflects the vulnerability of three-wheeler auto rickshaw occupants who, like motorcyclists, are not protected by a vehicle shell.

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 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 2019 to assess whether direct data collection on mobile devices improves data quality and eases the administrative burden of police officers, but this application was not taken up. These challenges will need to be addressed during the rollout of the new national Integrated Road Accident Database (iRAD) system, scheduled to occur later in 2021.

Report preparation:

This work was made possible with the overview and direction from Hon. Shri. Hemant Nagrale, IPS, Commissioner of Greater Mumbai and Shri. Rajvardhan, 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. Swati Shinde, Jagdish Sawant, Yogesh Ambe, and Lievanta Millar from BIGRS Maharashtra contributed critical guidance and support throughout the process. The report was officially launched in November 2021.

⁶ Global status report on road safety 2018. Geneva: World Health Organization; 2018. Licence: CC BYNC-SA 3.0 IGO.

RESULTS

TREND IN ROAD TRAFFIC DEATHS AND INJURIES IN MUMBAI

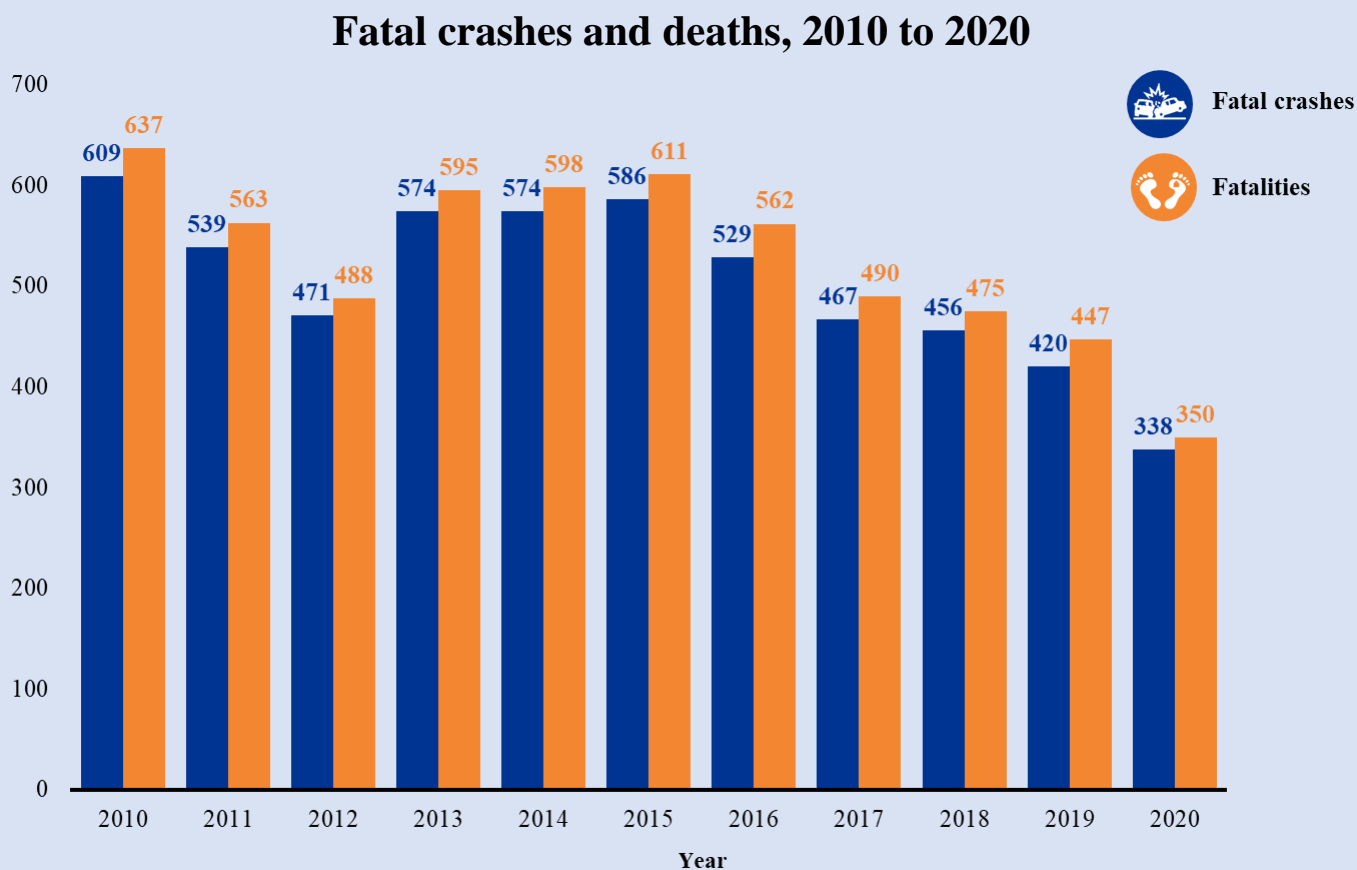


Figure 1

Mumbai has seen a decreasing trend in road traffic deaths over a decade. Deaths have decreased by 45% since 2010 with almost all of that progress (43%) occurring since 2015. Lockdowns and mobility restrictions associated with the 2020 COVID-19 pandemic resulted in a sharp decline in road traffic deaths and injuries. Mumbai reported 350 road traffic deaths in 2020, a 22% decrease from 2019.



Road traffic fatality rates, 2011 to 2020

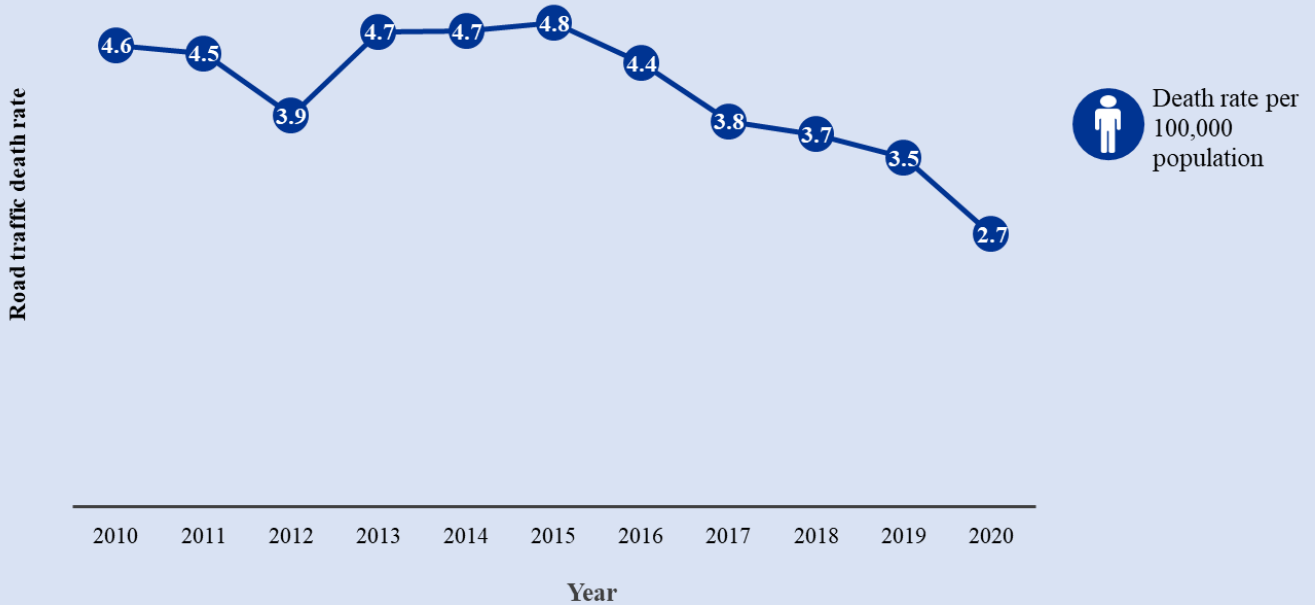


Figure 2

Figure 2 shows that 2.7 persons per 100,000 population died in road traffic crashes in Mumbai in 2020. Death rates show an overall decline over the years.

Injury crashes and non-fatal injuries, 2010 to 2020

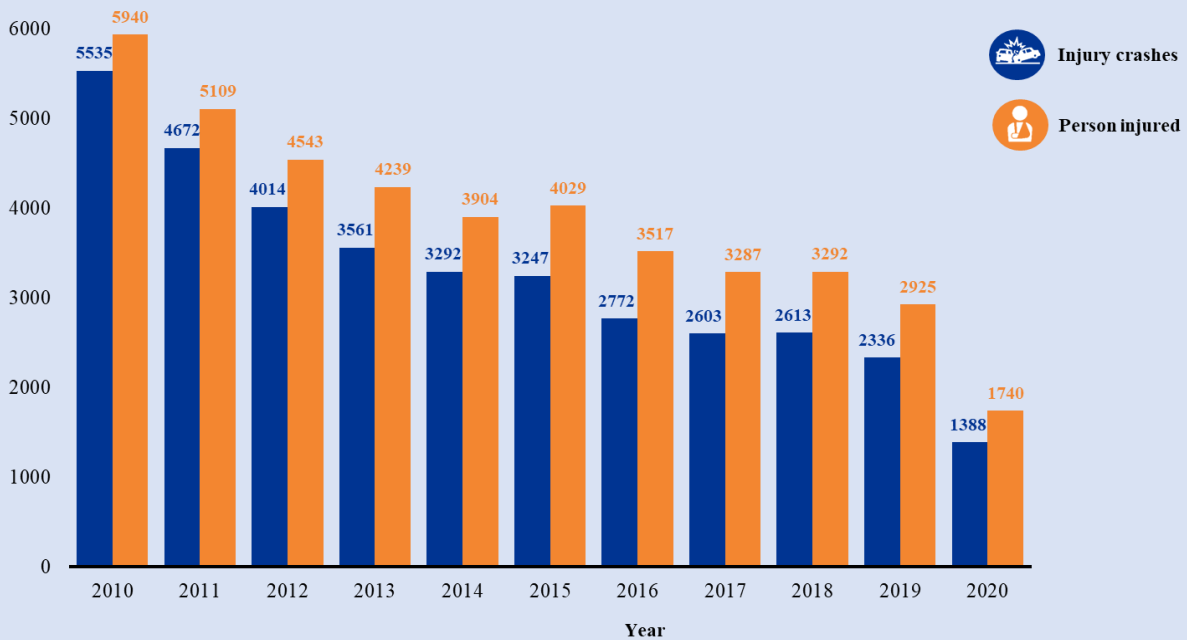


Figure 3

Mumbai has reported a 57% decrease since 2015 and a 41% decrease over a year in injury crashes and non-fatal injuries. The trend shows a substantial decline in the number of injury crashes and non-fatal injuries over a decade.

DEATHS AND INJURIES BY TYPE OF ROAD USER

Trend in road traffic deaths by road user type, 2015 - 2020

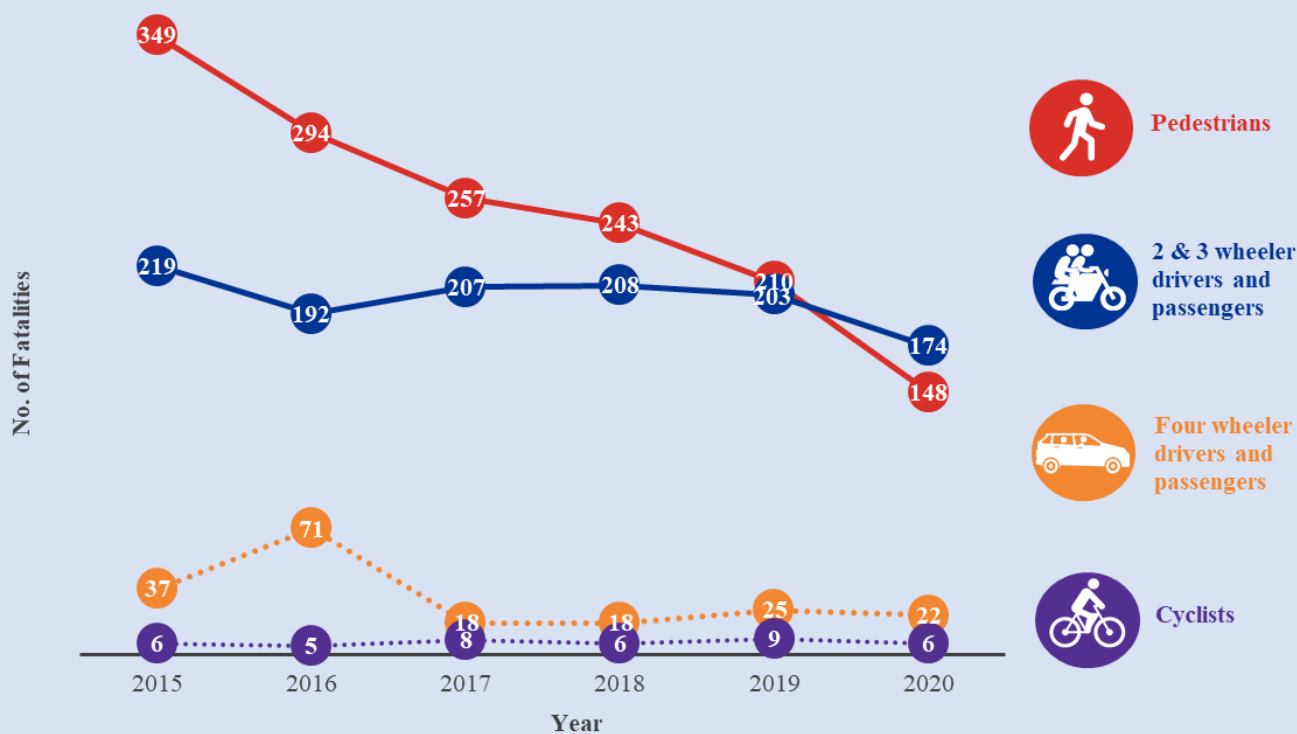


Figure 4

Figure 4 shows trends in road user deaths since 2015. Deaths were highest among two and three-wheeler riders in 2020. These 174 deaths include 166 two-wheeler riders and 8 three-wheeler (auto rickshaw) occupants. These road users are grouped together according to standard global practice because they all lack a protective exterior shell around them, whose absence exposes them to greater risk of injury and death.

**Special methodological note: This is a change in categorization from previous years, where 3-wheelers had been combined with 4-wheeler vehicles. Now, according to standard global practice, 3-wheelers are combined with 2-wheelers in summary statistics.*



Road traffic deaths by road user type, 2020

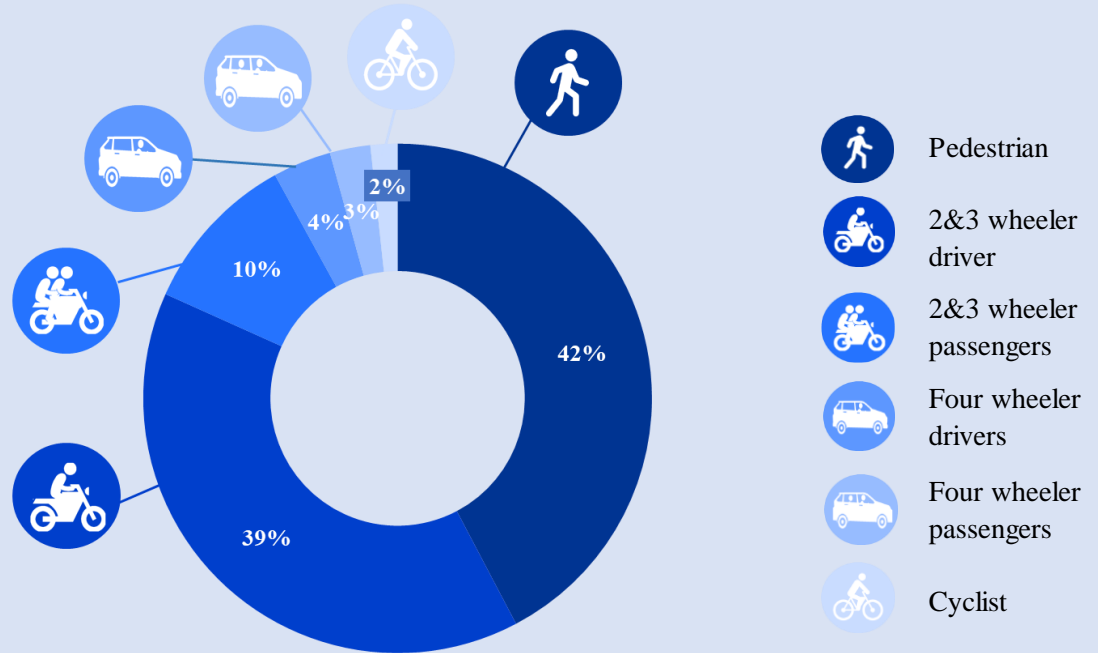


Figure 5

Figure 4 shows the distribution of deaths by type of road user. Pedestrians accounted for 42% of all deaths, and two and three-wheelers (both drivers and passengers) 49%. 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, 2020

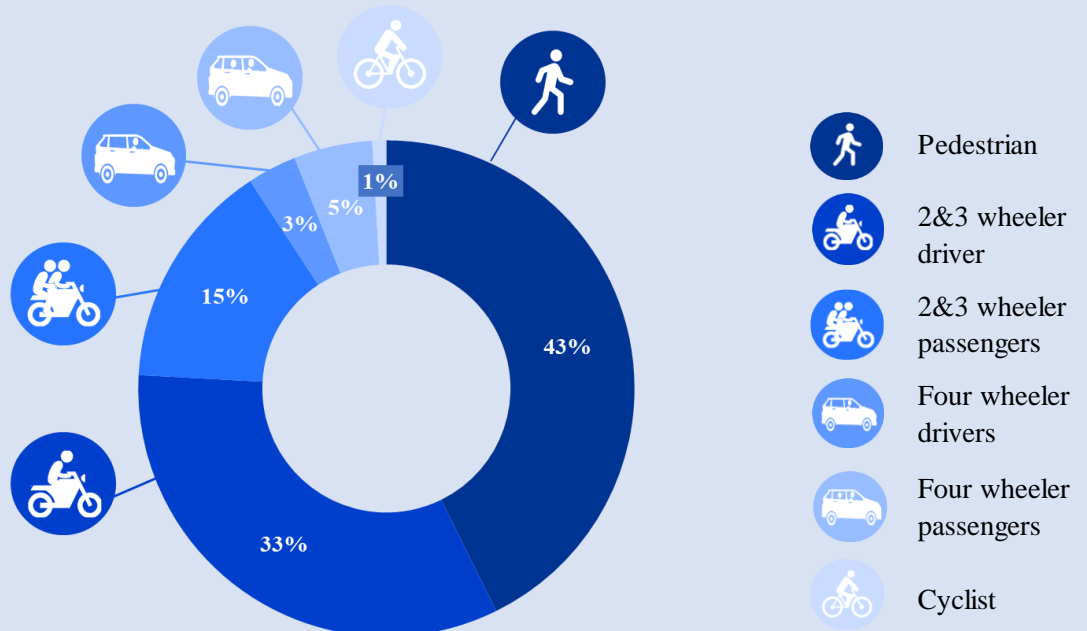


Figure 6

Pedestrians, motorcyclists, three-wheeler occupants and cyclists accounted for 92% of non-fatal injuries. Similar to deaths, these vulnerable road users account for most non-fatal injuries. The more protected occupants of four-wheeled vehicles made up a somewhat larger proportion of non-fatal injuries (14%) compared to deaths, where they made up only 8%.

DEATHS AND INJURIES BY AGE AND GENDER

Fatalities by gender, 2020

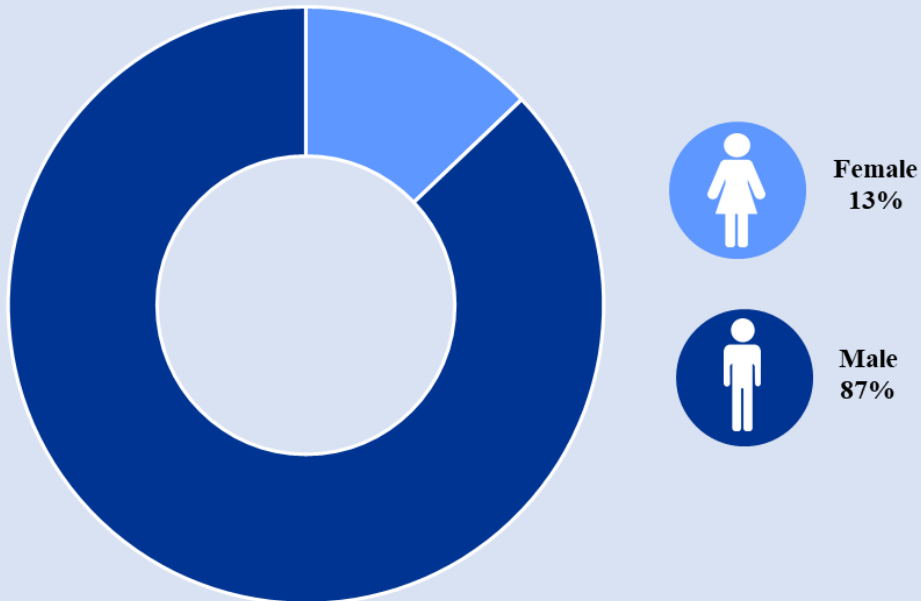


Figure 7

Men accounted for 87% of road crash deaths in the year 2020.

Non-fatal injuries by gender, 2020

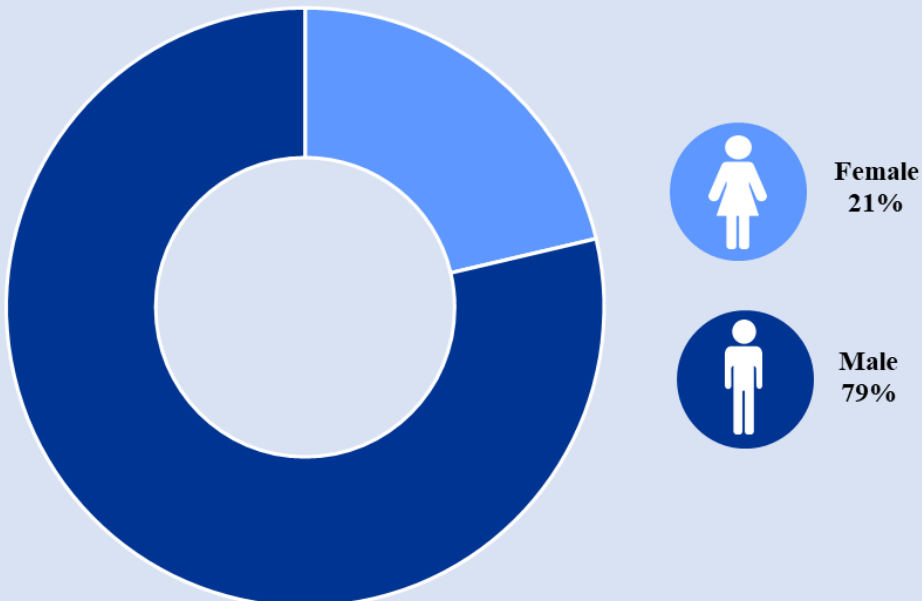


Figure 8

Similar to fatalities, men accounted for 79% of non-fatal road crash injuries.

Road traffic deaths by age group and gender, 2020

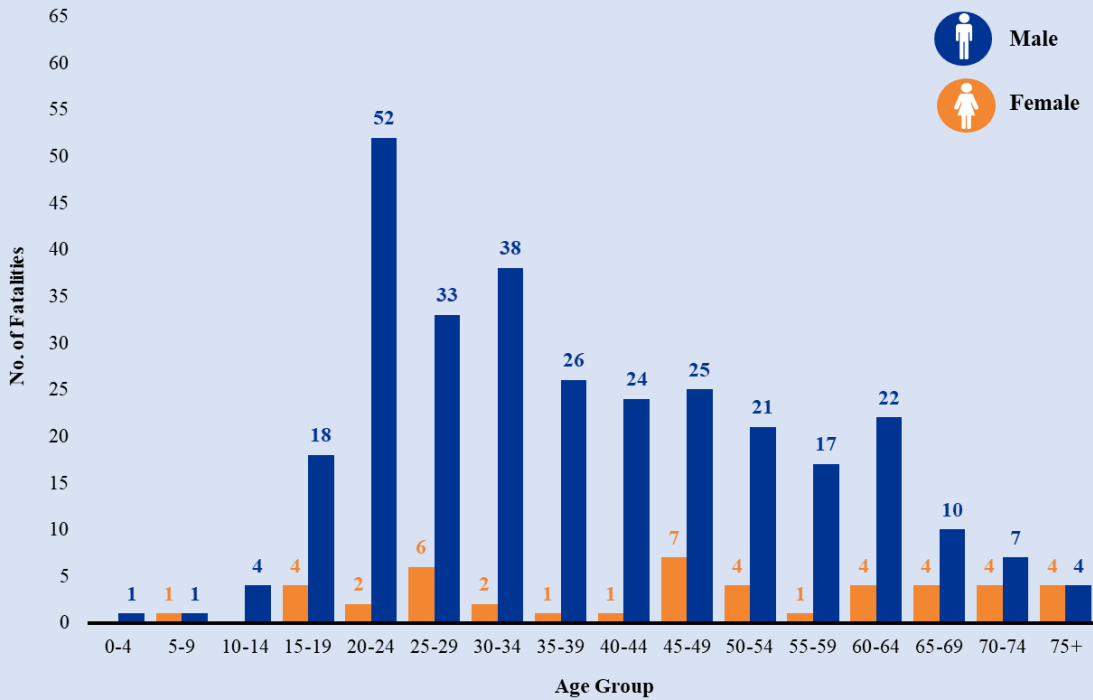


Figure 9

The largest proportion of road crash deaths occurred among young men between 20 and 34 years of age. There was no clear age pattern in the much smaller number of deaths among women.

**Persons missing age and gender information excluded.*

Road traffic death rates by age group and gender, 2020

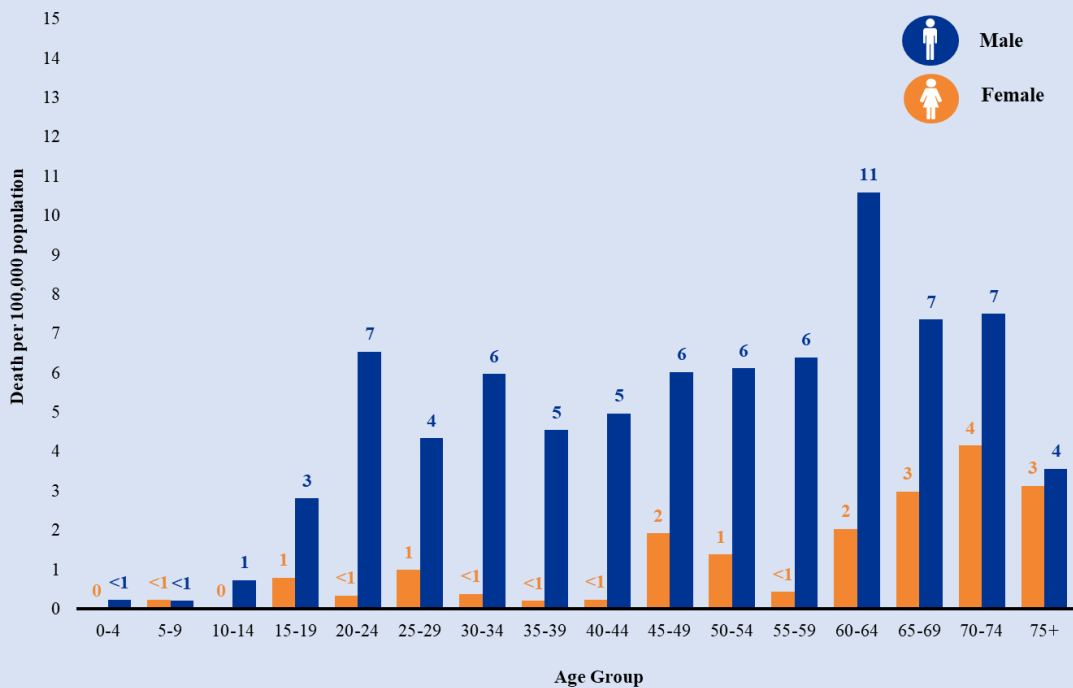


Figure 10

Figure 10 shows fatality rates per 100,000 population by age. With this population-adjusted view, the risk in younger ages was less pronounced. The highest fatality rates overall were among men over 60 years old, while among women the highest risk was among those over 70 years old.

Non-fatal injuries by age group and gender, 2020

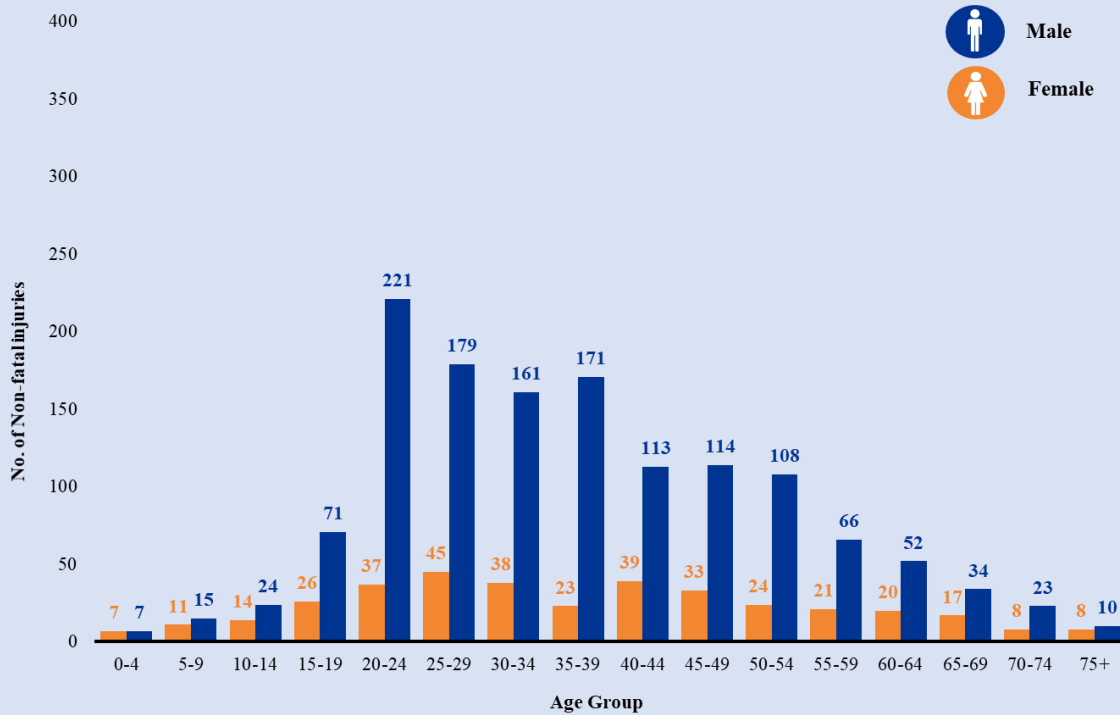


Figure 11

Non-fatal road crash injuries were concentrated in men aged 20 to 39. Among women the age pattern was much less pronounced, with a small peak at age 25 to 29.

Motorcycle deaths by age and gender, 2020

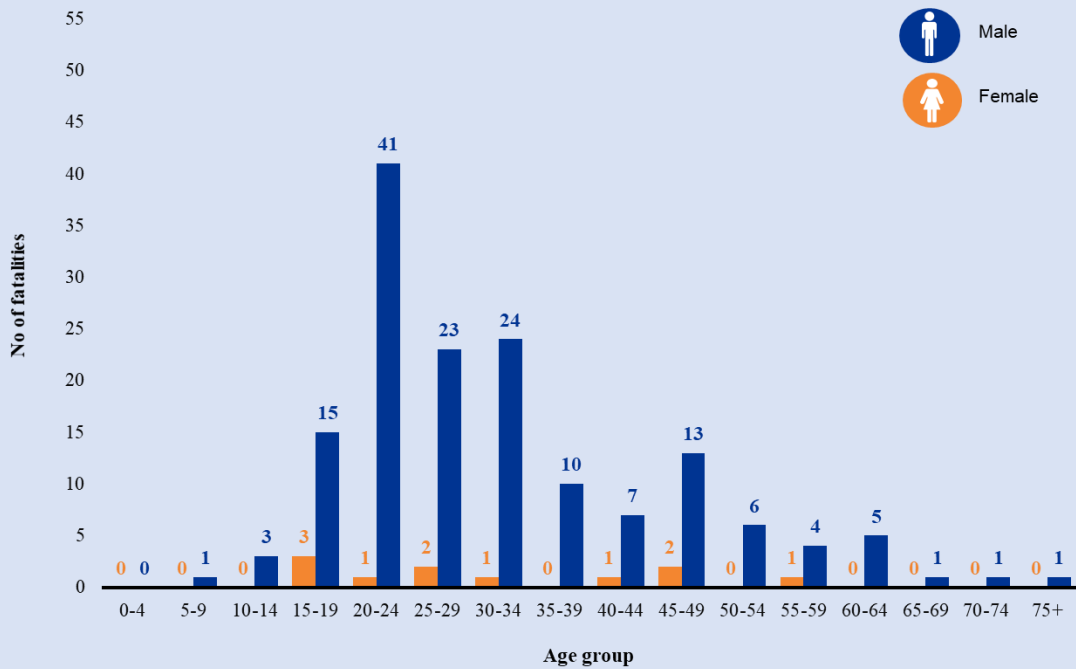


Figure 12

Younger men aged 20 – 34 years made up the highest number of motorcycle deaths, accounting for 57% of all such deaths. Enforcement and awareness should continue to focus on this high-risk group.

Motorcycle fatality rates by age and gender, 2020

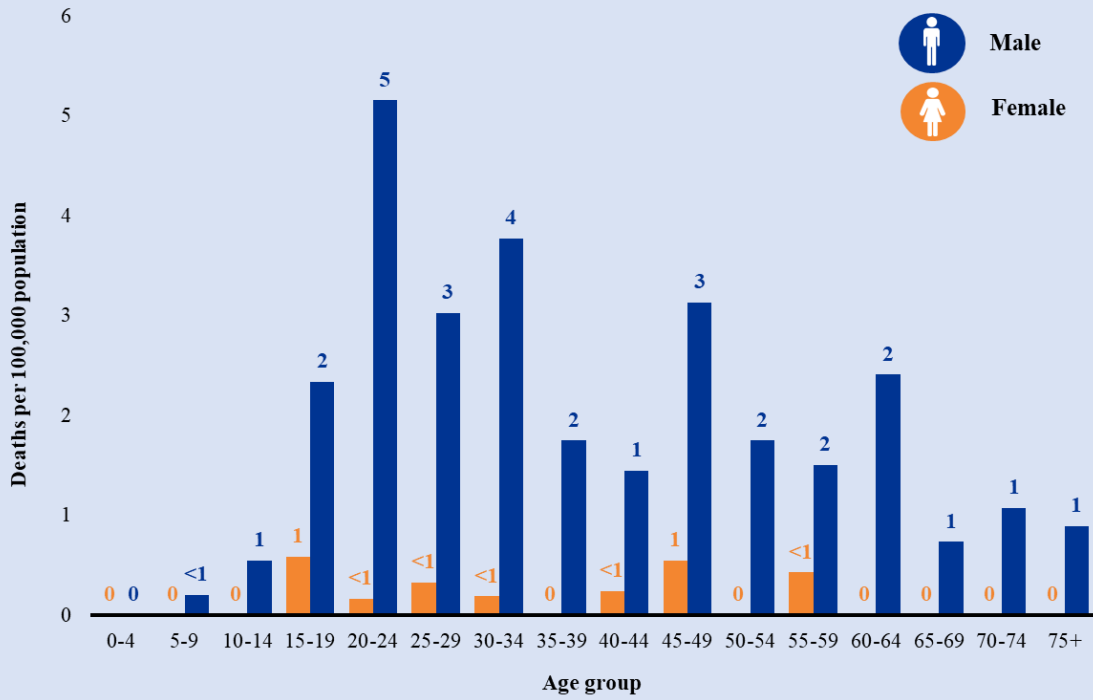
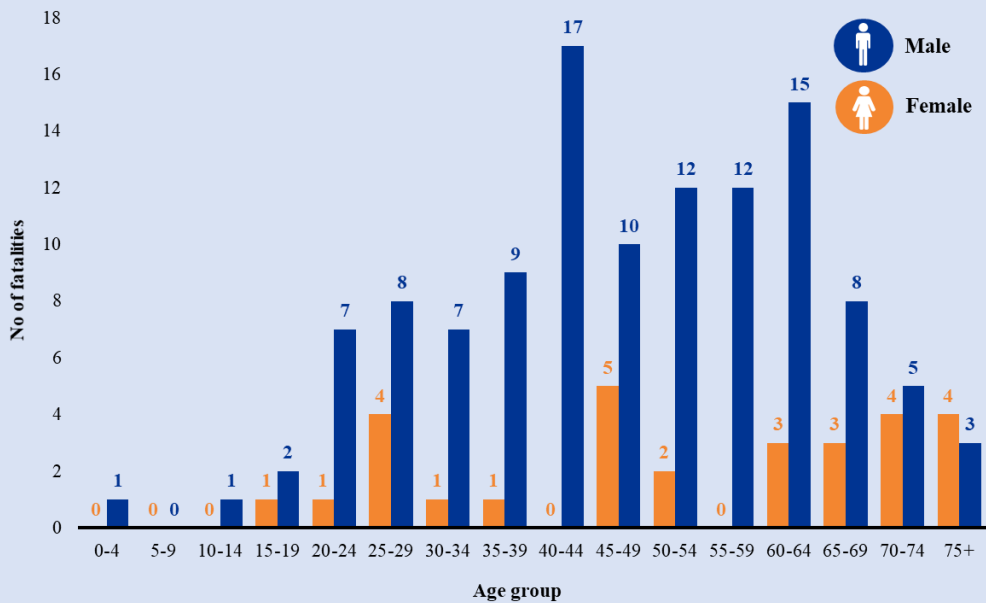


Figure 13

Motorcycle death rates per 100,000 population reflected the high risk among men aged 20 to 34, even after adjusting for population.

Pedestrian fatalities by age and gender, 2020



Pedestrians missing age and gender information excluded.

Figure 14

The highest number of pedestrian deaths was among 40 - 64 year-old men.

Pedestrian fatality rate by age and gender, 2020

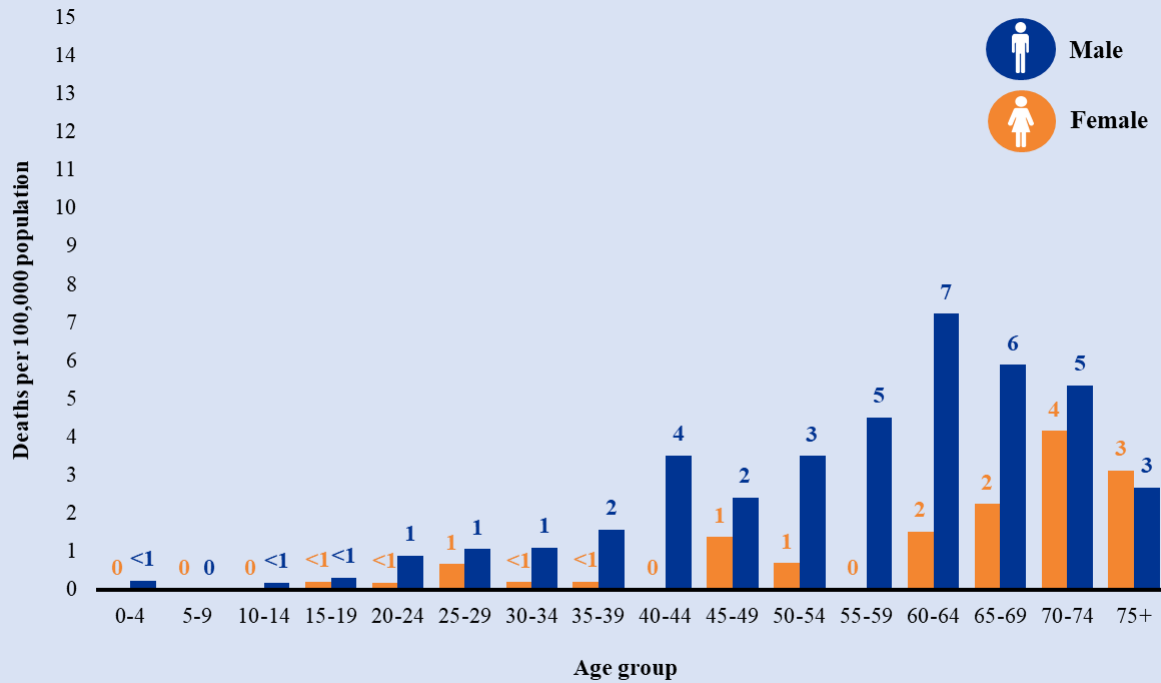


Figure 15

Age- and gender-specific pedestrian death rates showed increasing risk by age among both men and women. The rates were significantly higher among those more than 60 years old. Speed management and pedestrian infrastructure improvements are key to reducing deaths among vulnerable pedestrians.



AT-FAULT DRIVERS AND VEHICLE TYPES

At-fault drivers in fatal crashes by gender, 2015 - 2020

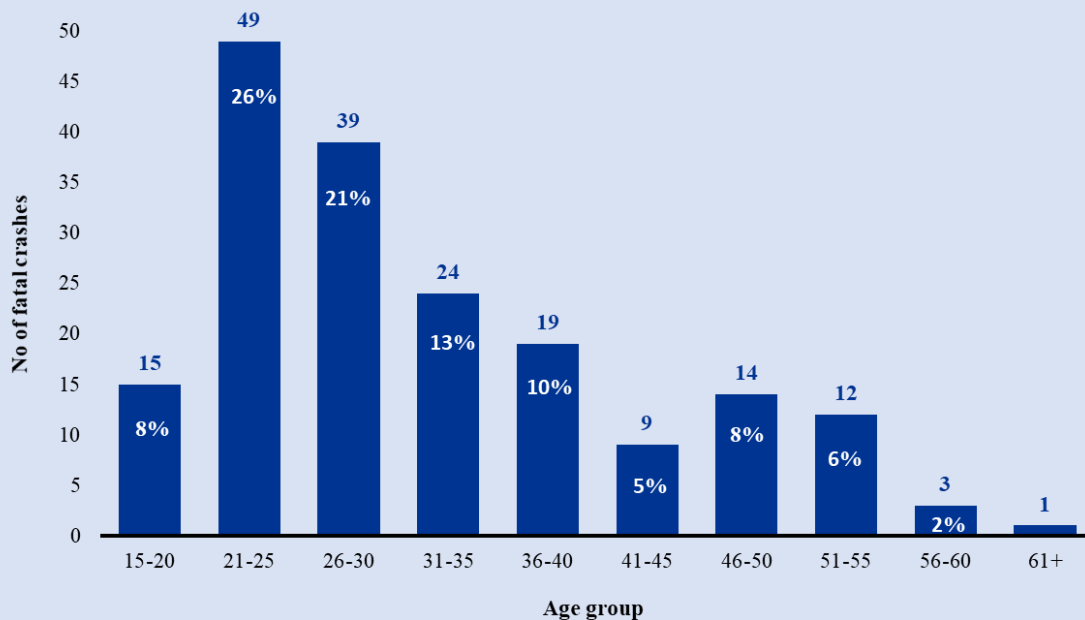


*Unknown drivers excluded

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, 2020



*Drivers with unknown age excluded

Figure 17

Among drivers whose age was documented, 21- 30-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, 2020

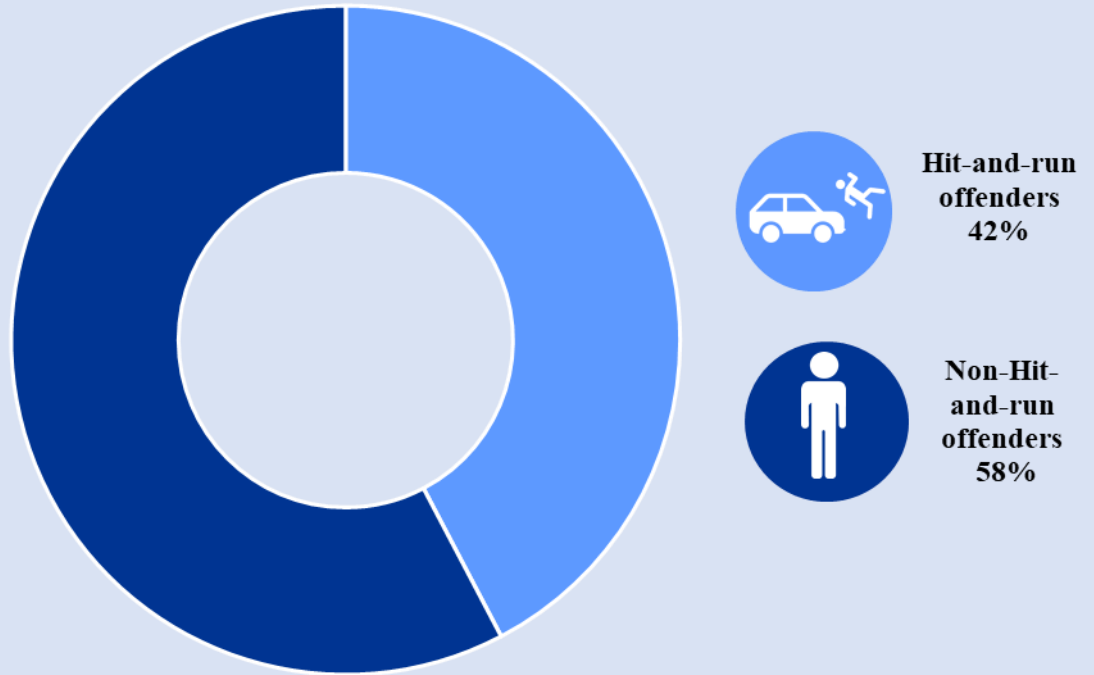


Figure 18

Figure 18 shows that 42% of all fatal crashes were caused by hit-and-run drivers.

Hit-and-run fatal crash victim road user type, 2020

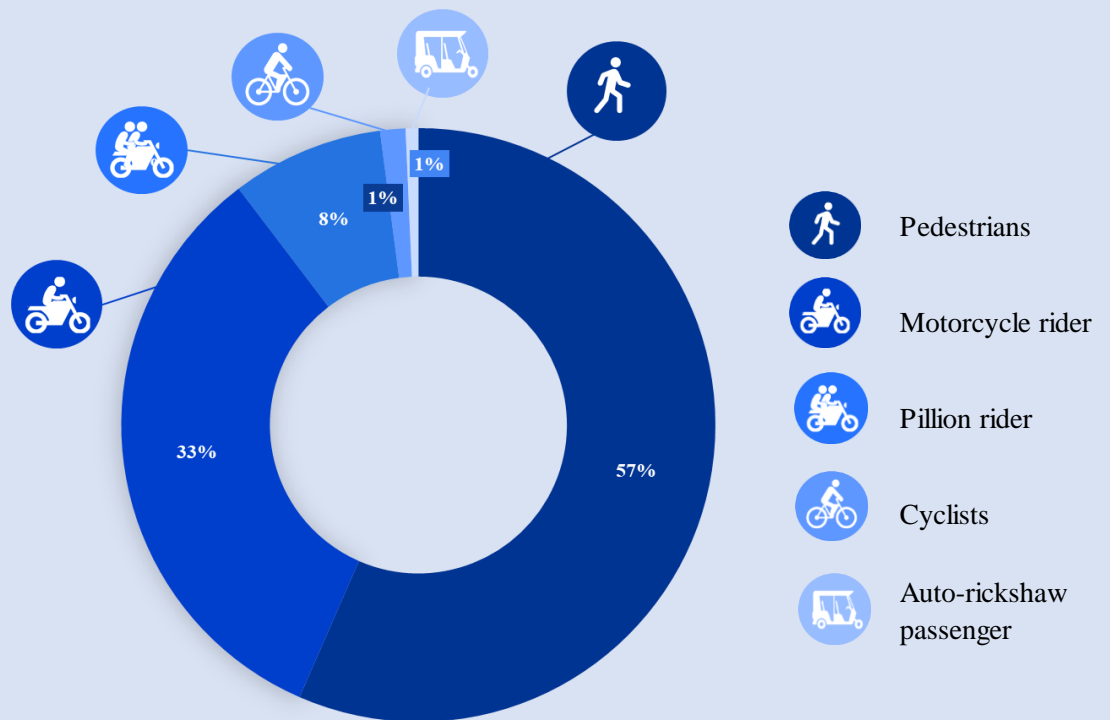


Figure 19

Figure 19 shows that all people killed by hit-and-run drivers were vulnerable road users, primarily pedestrians (57%) and motorcyclists (41%).

High risk junctions for pedestrian hit-and-run fatalities, 2018 - 2020

Rank	Junction Name	Pedestrian hit-and-run fatalities 2018-20 within 250m radius
1	Intersection of Bombay Port Trust Road and Santa Savta Mali Marg, Byculla	4
2	Intersection of Veer Sawarkar Marg and Vikhroli Parksite Road No 7, Vikhroli West	4
3	Godrej Junction, Pirojshanagar, Vikhroli East	4
4	Intersection of A B Holkar Marg and Lal Bahadur Shastri Marg, Vikhroli West	4
5	Intersection of Dr Baba Sahab Ambedkar Road and RL Kelkar Road, Sion West	4
6	Chatrapati Shivaji Maharaj Circle, Govandi East	4
7	Intersection of Eastern Express Highway and Postal Colony Road, Chembur East	3
8	Intersection of Swami Vivekanand Road and GK Gokhlale Bridge, Andheri West	3
9	Intersection of Western Express Highway and Nehru Road, Santacruz East	3
10	Intersection of Western Express Highway and Sir Mathurdas Vasanji Road, Andheri East	3
11	Intersection of V N Purav Marg and Ramkrishna Chemburkar Marg, Chembur	3
12	Mulund Airoli Interchange, Mulund East	3
13	Intersection of Western Express Highway and Jogeshwari - Vikhroli Link Road, Joeshwari East	3
14	Intersection of Jogeshwari - Vikhroli Link Road and Reserved Forces Camp Road, Andheri East	3
15	Intersection of Eastern Express Highway and VN Purav Marg, Chembur	3

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 for the hit-and-run crashes, and also redesigned in a manner to minimise pedestrian and vehicular conflicts.

At-fault vehicles and fatal crash victim road user types, 2020










At – fault Vehicle Road User Type	 Auto rickshaw	 Bus	 LV	 HV	 MHV	 3 & 4 Wheeler total	 Two wheeler	 Single vehicle crash	 Unknown	Total
Pedestrian	7	10	39	20	21	97	21	NA	30	148
Motorcyclist	6	20	20	32	22	100	19	32	15	166
Three wheeler occupants	0	1	2	2	1	6	0	1	1	8
Four wheeler occupants	0	1	7	0	4	12	0	10	0	22
Cyclist	0	1	2	1	1	5	1	0	0	6
Total	13	33	70	55	49	220	41	43	46	350

Figure 20

Figure 20 shows which types of vehicles were responsible for which type of road user victim. Most of the pedestrian deaths were caused by car drivers (26%) and unknown vehicles (20%). The highest number of motorcyclist deaths were caused by truck drivers (19%) and single-vehicle crashes (19%).

At-fault vehicles and non-fatal crash victim road user types, 2020











At – fault Vehicle Road User Type	 Auto rickshaw	 Bus	 LV	 HV	 MHV	 3 & 4 Wheeler total	 Bicycle	 Two wheeler	 Single Vehicle crash	 Unknown	Total
Pedestrian	70	21	225	12	52	380	0	335	NA	28	743
Motorcyclist	58	29	266	42	62	457	1	180	80	11	729
Three wheeler occupants	17	5	42	6	5	75	0	9	19	4	107
3 & 4 Wheeler Passengers	1	18	57	14	9	99	0	4	40	2	145
Cyclist	2	1	5	1	0	9	1	6	0	0	16
Total	148	74	595	75	128	1020	2	534	139	45	1740

Figure 21

Figure 21 shows road user types among non-fatal injuries and the vehicles at fault. Pedestrians were most frequently injured by motorcycles (45%) and cars drivers (30%), whereas motorcyclists were most frequently injured by cars (36%) and other motorcycle drivers (25%).

LV - Light vehicle
 HV - Heavy vehicle
 MHV - Medium heavy vehicle

Road traffic deaths caused by buses 2015 – 2020

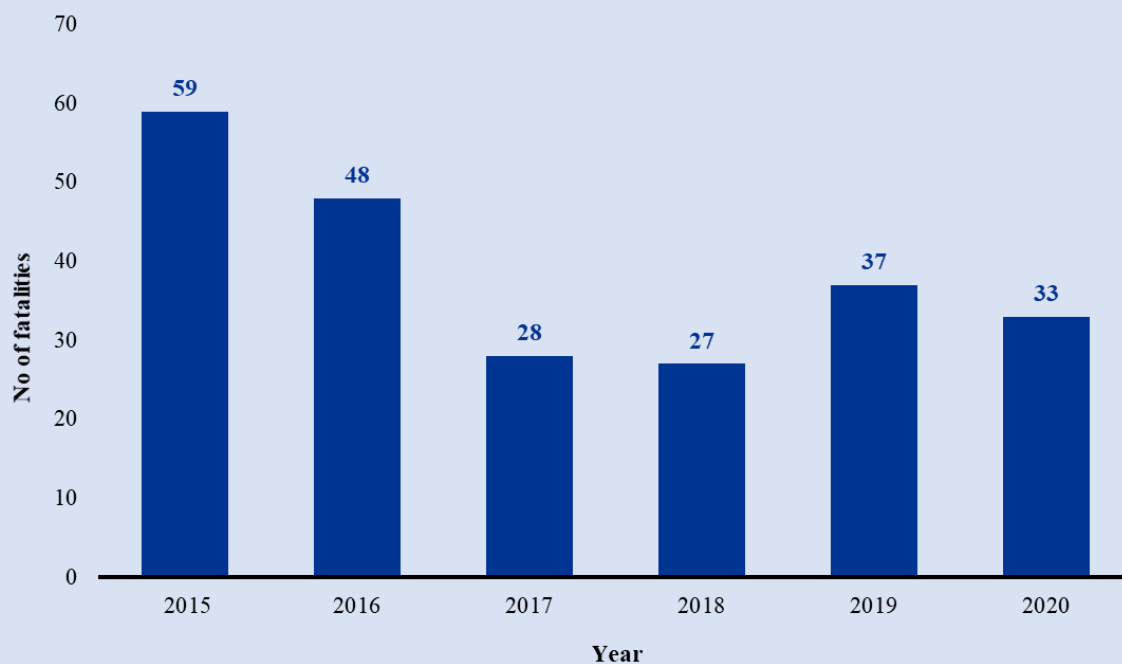


Figure 22

Deaths caused by buses slightly decreased compared to last year. This category includes BEST buses, private buses, school buses, and luxury buses. In 2020, buses caused 33 deaths, most of which were pedestrians and motorcyclists.

DEATHS AND INJURIES BY MONTH, DAY AND TIME

Fatal and non-fatal injury crashes by month, Mumbai, 2020

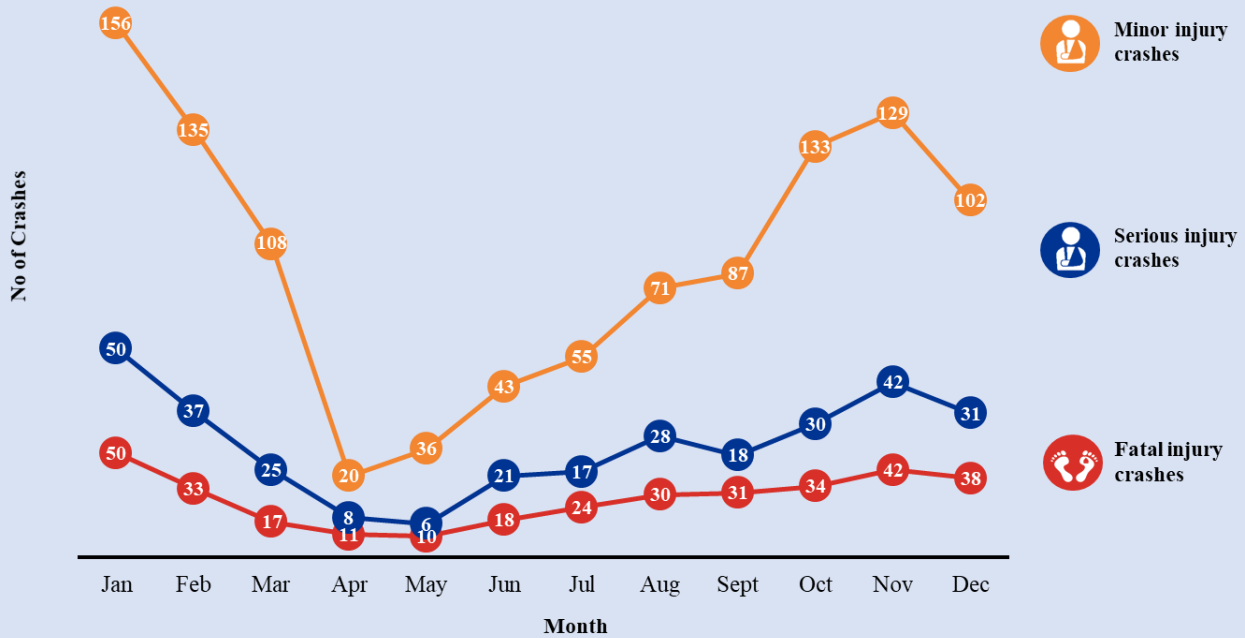


Figure 23

Figure 23 shows the number of road traffic injury crashes by month for 2020. Fatal and injury crashes dropped significantly during the lockdown period of March to June.

Road traffic deaths by time of day, 2018 - 2020

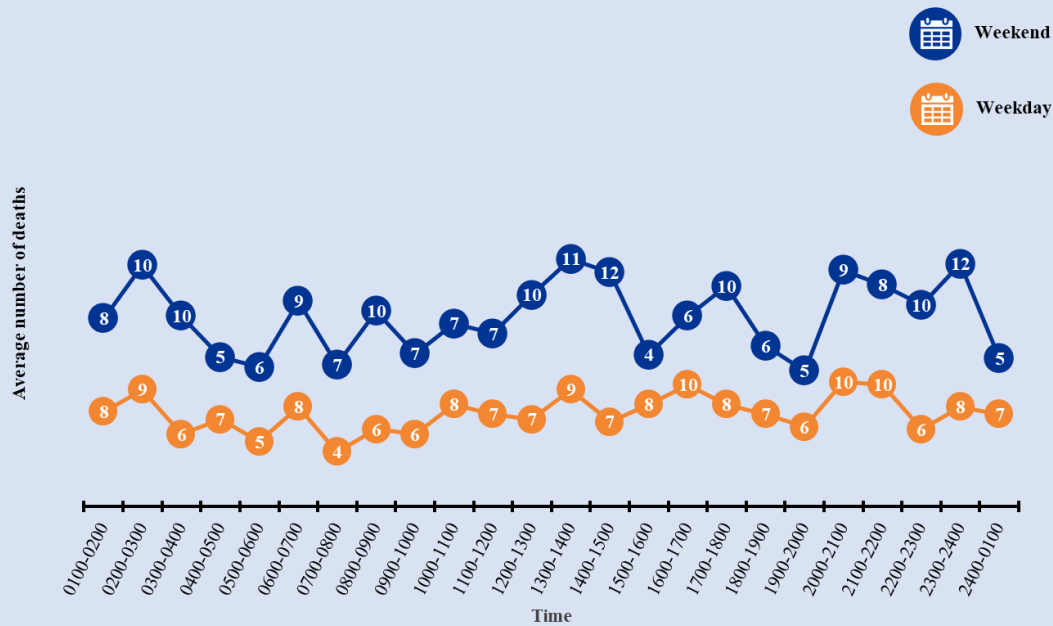


Figure 24

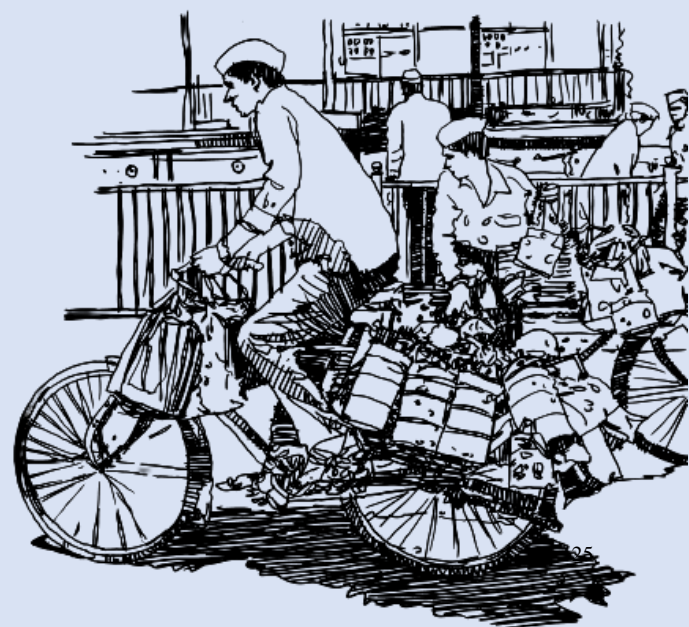
Figure 24 shows the average number of deaths in 2018 - 2020 from crashes at each hour, separated for weekends and weekdays. The peak periods for fatal crashes on weekdays were 16:00 - 17:00 and 20:00 - 22:00. No clear pattern was seen on weekends.

Road traffic deaths by time and day of week, 2018 - 2020

Time	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Grand Total
0100-0200	4	8	8	7	11	7	8	53
0200-0300	15	10	8	6	8	9	12	68
0300-0400	5	3	6	6	9	7	11	47
0400-0500	9	6	7	7	6	4	7	46
0500-0600	8	2	5	7	4	7	5	38
0600-0700	5	11	8	3	12	9	8	56
0700-0800	8	3	3	3	5	7	7	36
0800-0900	5	8	10	5	3	7	12	50
0900-1000	4	7	5	6	7	6	7	42
1000-1100	7	12	9	4	9	9	4	54
1100-1200	8	6	9	7	6	9	5	50
1200-1300	6	7	8	6	8	8	12	55
1300-1400	7	10	10	10	10	10	11	68
1400-1500	4	6	5	12	7	12	13	59
1500-1600	12	5	6	9	8	4	3	47
1600-1700	9	14	8	10	9	5	5	60
1700-1800	10	8	6	8	9	8	11	60
1800-1900	7	8	6	5	11	5	6	48
1900-2000	5	7	8	4	8	5	4	41
2000-2100	12	13	8	10	7	16	2	68
2100-2200	13	12	14	4	7	8	8	66
2200-2300	5	11	3	6	6	11	9	51
2300-2400	14	4	9	8	4	16	7	62
2400-0100	8	12	7	6	5	2	7	47
Total	190	193	176	159	179	191	184	1272

Table 2

Table 2 shows the highest number of deaths came from crashes occurring on Saturday evenings, but with a much less concentrated pattern than is seen in many cities.



Road traffic deaths and injuries by time and day of week, Mumbai, 2020

Time	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Grand Total
0100-0200	16	18	17	12	15	8	16	102
0200-0300	11	11	7	17	8	8	8	70
0300-0400	9	6	5	8	7	10	8	53
0400-0500	5	13	15	3	4	8	8	56
0500-0600	10	6	5	4	13	7	6	51
0600-0700	2	9	5	10	6	10	12	54
0700-0800	9	7	12	5	11	6	12	62
0800-0900	9	3	13	8	9	7	8	57
0900-1000	5	10	14	17	10	12	22	90
1000-1100	18	17	11	7	14	22	8	97
1100-1200	19	13	17	16	21	8	13	107
1200-1300	12	17	11	39	15	14	10	118
1300-1400	8	9	12	8	11	14	15	77
1400-1500	10	13	16	14	14	16	5	88
1500-1600	16	15	9	13	16	6	12	87
1600-1700	13	11	13	15	8	16	11	87
1700-1800	13	16	18	12	14	19	18	110
1800-1900	18	4	17	17	17	8	13	94
1900-2000	12	9	18	14	10	13	14	90
2000-2100	24	17	7	11	17	17	26	119
2100-2200	24	26	23	14	11	14	16	128
2200-2300	20	8	18	10	20	14	17	107
2300-2400	21	14	18	17	15	17	16	118
2400-0100	10	15	9	12	5	8	9	68
Total	314	287	310	303	291	282	303	2090

Table 3

More injuries and deaths occurred between 20:00 and 24:00. (Note that the high figure for Thursday (12:00 to 13:00) was influenced by a single multi-injury crash involving 17 injuries.)

Fatal and non-fatal injuries attributed to drink-driving, 2015 - 2020

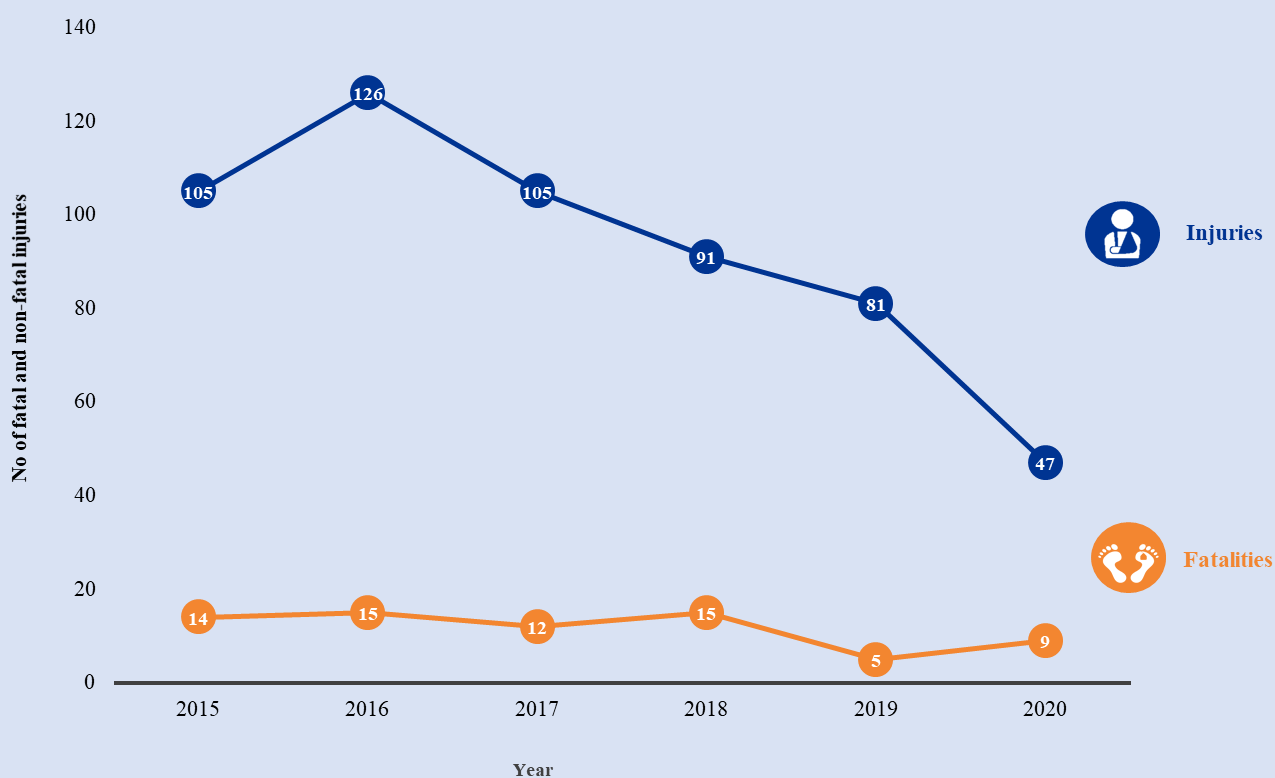


Figure 25

Road crash deaths and injuries attributed to drink-driving have decreased over the past six years. These figures reflect cases where a drink-driving charge was laid, and therefore is likely to undercount cases with alcohol involvement.

Traffic code violation in fatal and non-fatal injury crashes, 2020

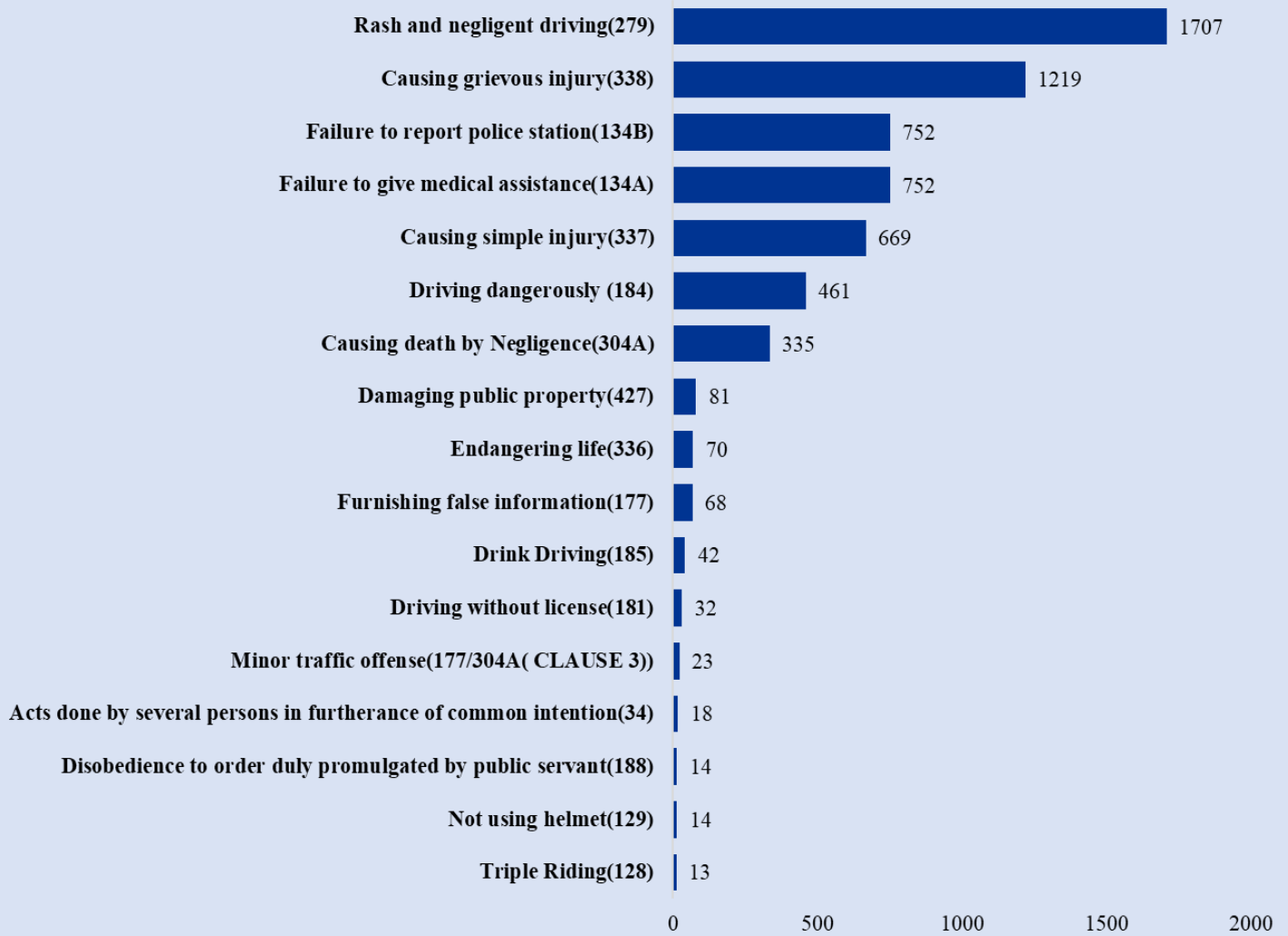


Figure 26

Figure 26 shows the list of traffic violation citations associated with fatal or injury crashes in 2020.



DISTRIBUTION OF FATALITIES BY LOCATION

High risk corridors, Mumbai, 2018 - 2020

Rank	Road Name	Deaths per Km	Serious Injuries per Km	Deaths & Injuries per Km	Fatalities 2018-20	Serious Injuries 2018-20	Total
1	Ghatkopar - Mahul Road (1.36km)	12	36	48	16	49	65
2	Ghatkopar Flyover (1km)	10	25	35	10	25	35
3	Asha Nagar Road (1.3km)	9	20	29	12	26	38
4	Bandra Kurla Complex Road (3.6km)	3	20	23	10	73	83
5	Western Express Highway (25.33km)	5	15	20	124	376	500
6	General A K Vaidya Marg (2.3km)	3	13	17	8	30	38
7	Sion - Panvel Highway (9.1km)	5	12	16	43	107	150
8	Ramakrishna Chemburkar Marg (Ghatkopar - Mahul Road) (2.9km)	4	10	14	11	30	41
9	Eastern Express Highway (23.55km)	3	10	13	71	227	298
10	Malad - Marve Road (3.7km)	1	11	12	3	42	45
11	Ghatkopar - Mankhurd Link Road (4km)	3	9	11	11	34	45
12	Adi Sankaracharya Marg (6.34km)	2	8	10	14	51	65
13	Mathuradas Vasanji Road (Andheri - Kurla Road) (4.5km)	1	8	10	5	38	43
14	Lal Bahadur Shastri Marg (21km)	1	8	9	29	164	193
15	Rafi Ahmed Kidwai Marg (5.7km)	3	6	9	15	36	51

Table 3

Table 3 shows the corridors in Mumbai with the highest road crash death and injury rates per kilometre over the past three years. Ghatkopar Mahul Road, Ghatkopar Flyover and Asha Nagar Road had the highest rates per kilometre. 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 minimise pedestrian and vehicular conflicts.

High risk junctions, Mumbai, 2018 to 2020

Rank	Junction Name	Fatalities 2018 - 2020 within 250m radius	Serious Injuries 2018-2020 within 250m radius	Total
1	Amar Mahal junction, Tilak Nagar, Ghatkopar East	23	54	77
2	Godrej Junction, Pirojshanagar, Vikhroli	16	57	73
3	Intersection of EEH and JVLR, Kanjurmarg East	11	57	68
4	Intersection of EEH and Mulund - Airoli Link Road, Mulund East	12	36	48
5	Intersection of WEH and JVLR, Jogeshwari East	13	32	45
6	Intersection of WEH and SD Mandir Road, Bandra East	4	36	40
7	Intersection of WEH and KC Marg, Bandra West	12	27	39
8	Intersection of WEH and Nehru Road, Santacruz East	9	29	38
9	Intersection of WEH and Sion - Bandra Link Road, Bandra East	5	33	38
10	Intersection of EEH and Sion Station Road, Sion East	8	29	37
11	Intersection of EEH and Andheri - Ghatkopar Link Road, Ghatkopar East	10	26	36
12	Intersection of EEH and RL Kelakar Road, Sion Circle	5	27	32
13	Intersection of Eastern Freeway and Ghatkopar - Mankhurd Link Road	8	20	28
14	Intersection of VN Purav and Ghatkopar - Mankhurd Link Road	8	20	28
15	Intersection of WEH and Ananta Kanekar Marg, Bandra East	3	25	28

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, Godrej junction and the intersection of EEH and JVLR recorded the most deaths and injuries during that time.

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, 2020





Zone	 Cyclists	 Four wheeler occupants	 2&3 wheeler occupants	 Pedestrian	Total
Port	0	0	8	4	12
Zone I	2	1	3	5	11
Zone II	0	0	0	8	8
Zone III	1	4	8	8	21
Zone IV	0	1	19	11	31
Zone V	0	0	8	7	15
Zone VI	0	4	26	7	37
Zone VII	2	7	25	28	62
Zone VIII	0	0	18	20	38
Zone IX	1	0	8	12	21
Zone X	0	3	15	9	27
Zone XI	0	0	16	13	29
Zone XII	0	2	20	16	38
Grand Total	6	22	174	148	350

Table 5

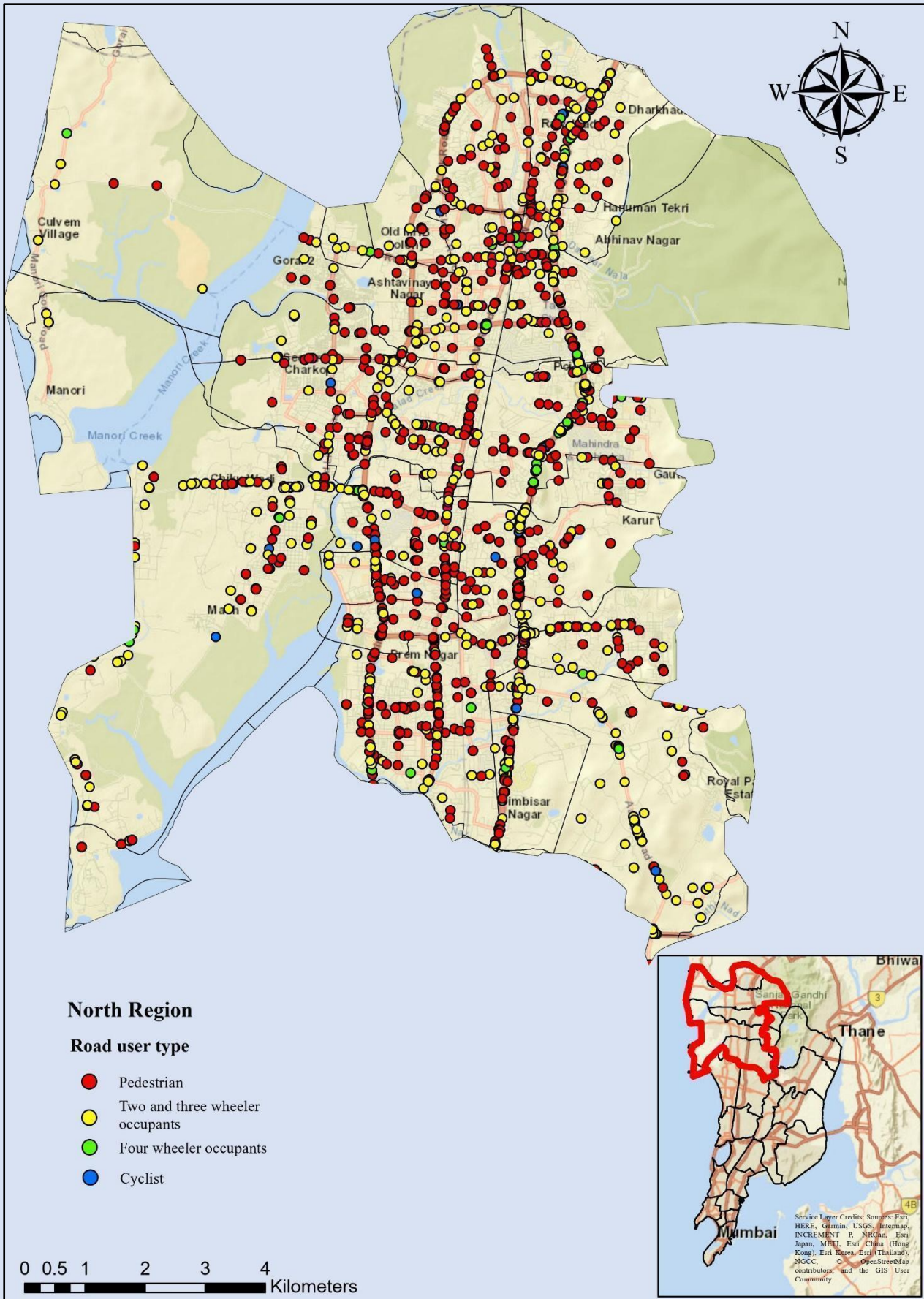
The highest number of deaths occurred in Zone VI and VII. Motorcyclist deaths were most frequent in Zone VII and VIII. Pedestrian deaths were most frequent in Zone VII.



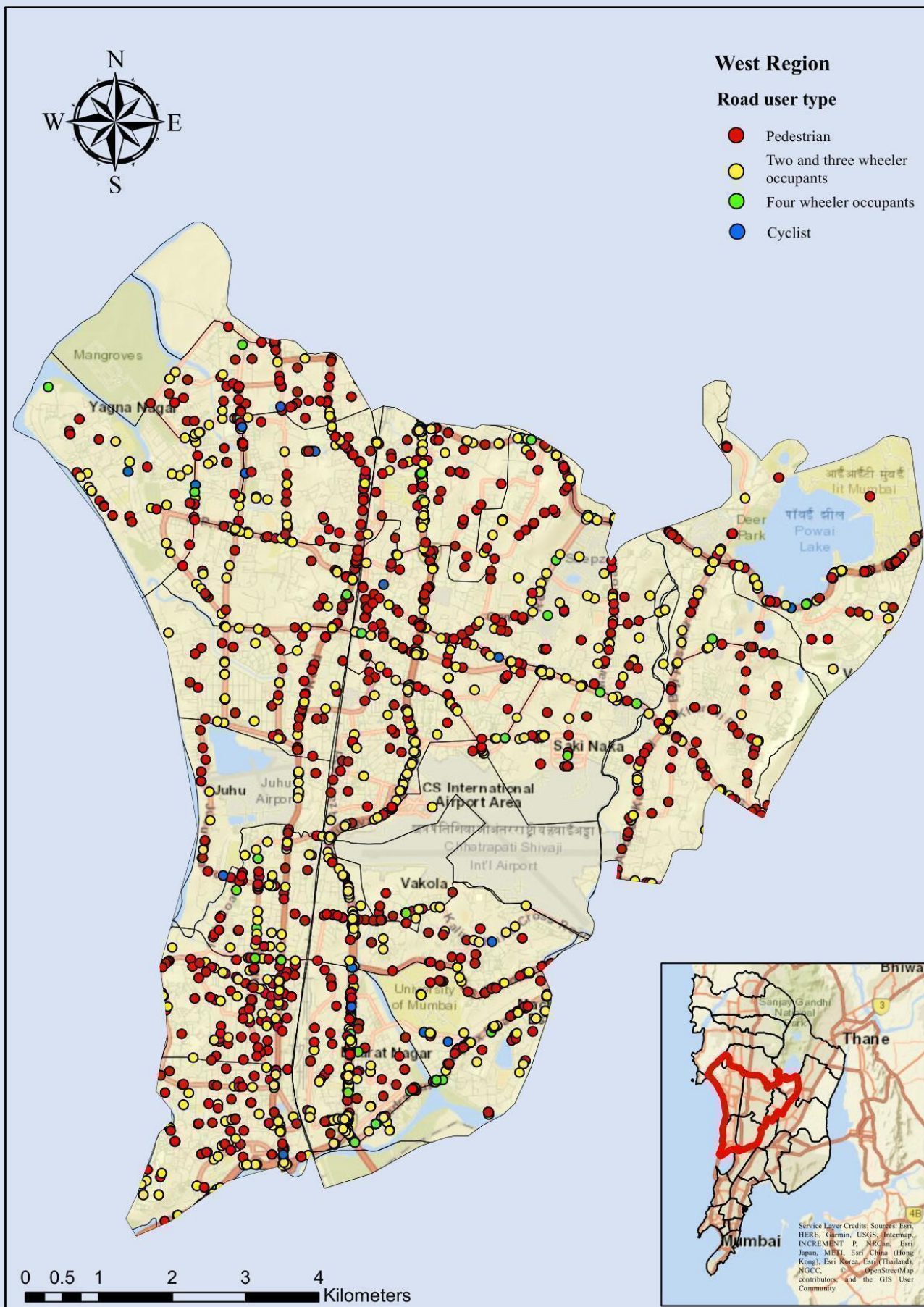
CRASH MAPS, 2018 - 2020

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 - 2020. These maps further show the victims road user type by colour, allowing risk locations to be identified for vulnerable road users.

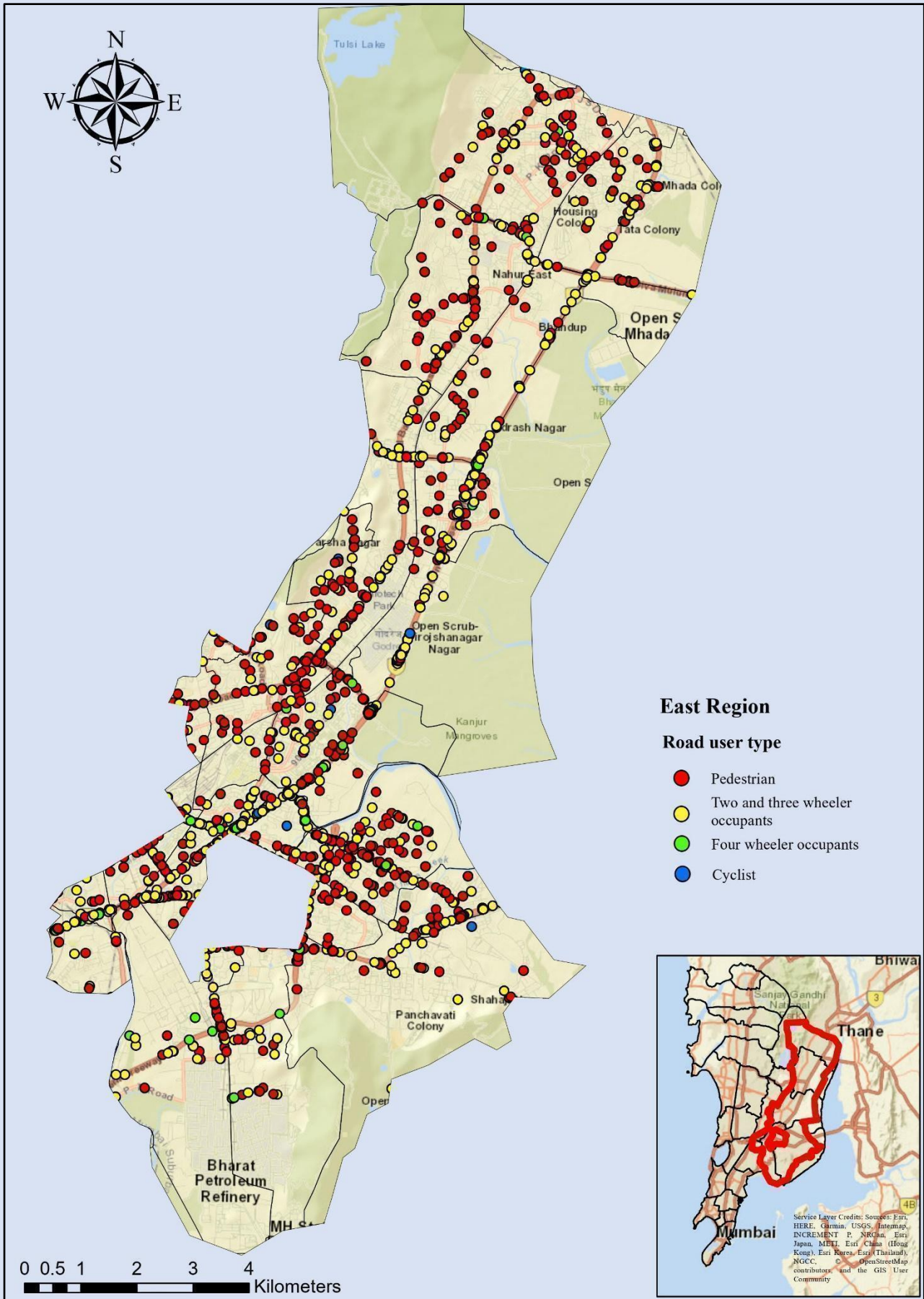
Mumbai North Region, fatal and injury crashes, 2018 - 2020



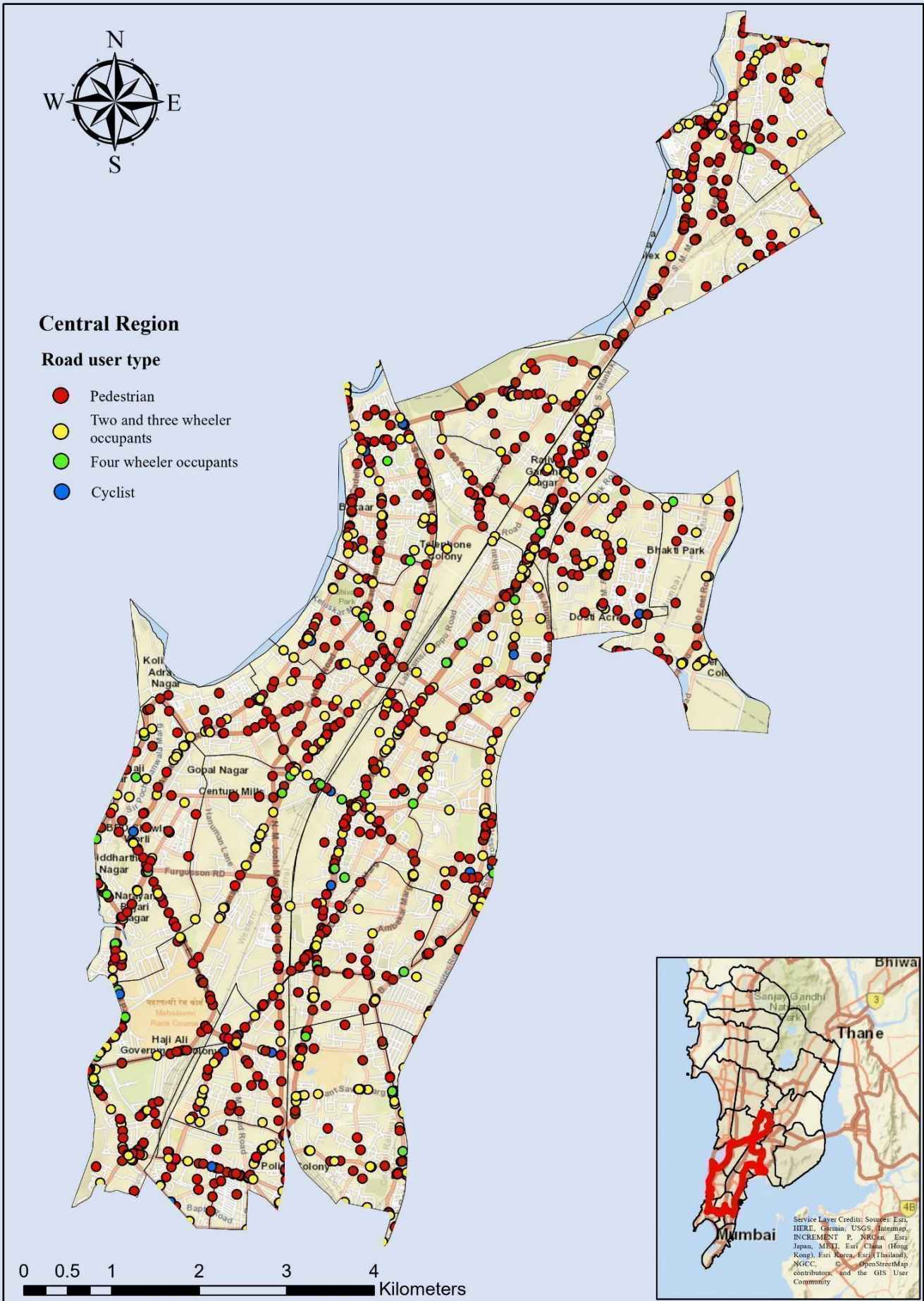
Mumbai West Region, fatal and injury crashes, 2018 - 2020



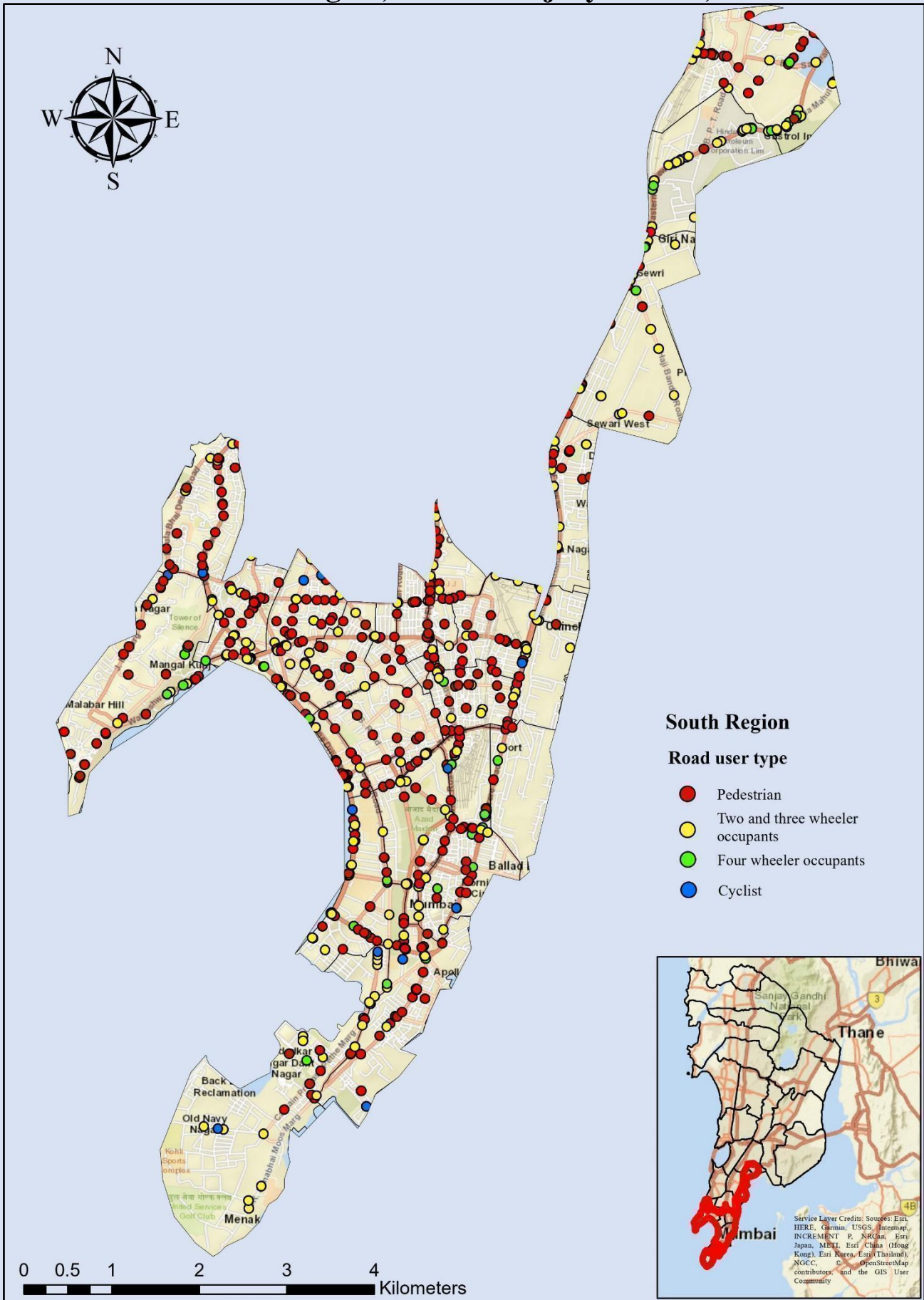
Mumbai East Region, fatal and injury crashes, 2018 - 2020



Mumbai Central Region, fatal and injury crashes, 2018 - 2020



Mumbai South Region, fatal and injury crashes, 2018 - 2020



Heat map of fatal and injury crashes, 2018 – 2020

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 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.

Goregaon-Mulund link rd and WEH

JVLR and WEH, Jogeshwari

Andheri-Ghatkopar rd and WEH, Andheri

Nehru road and WEH, Santacruz

Link Road and CD rd, Khar

Kalanagar fly over, WEH, Kherwadi

Mulund Goregaon link rd and EEH, Mulund

JVLR and EEH, Vikhroli

EEH, Phirojshanagar, Vikhroli

LBS road and SCLR, Kurla

Ghatkopar - Mankurd link road, Mankurd

Ghatkopar - Mankurd link road and VN Purav Marg, Mankurd

Amar mahal flyover & SCLR, Cheddanager jnt, EEH

EEH & VN Purav Marg, Sion

Sion Fly over, Sion

