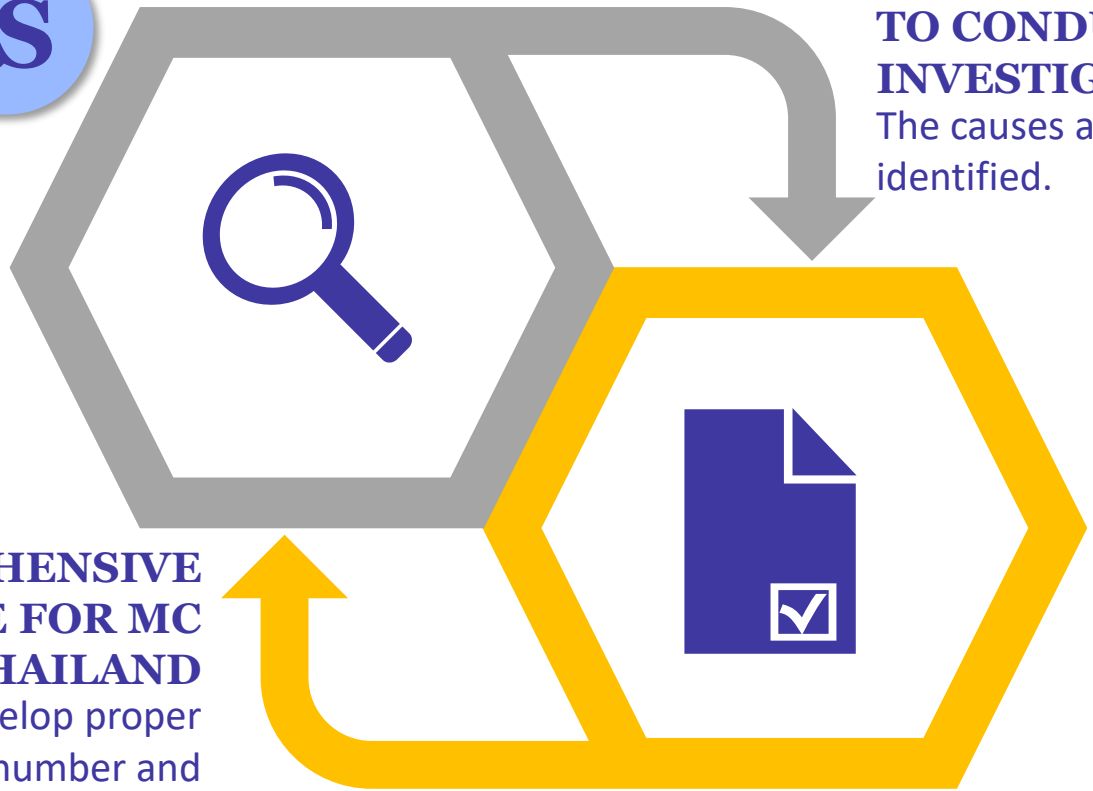
การแถลงสรุปผลโครงการวิจัยเพื่อเมืองไทยไร้อุบัติเหตุ

The Summary of Research Finding In-depth Accident Investigation in Thailand

Thailand Accident Research Center (TARC)
Asian Institute of Technology (AIT)
4 March 2021

OBJECTIVES



TO CONDUCT IN-DEPTH MC ACCIDENT INVESTIGATION

The causes and consequences of MC accidents are identified.

TO MAINTAIN COMPREHENSIVE AND RELIABLE DATABASE FOR MC ACCIDENT IN THAILAND

The data then can be used to develop proper countermeasures to reduce the number and severity of MC accidents in Thailand.

What is Accident Investigation?

- Accident investigation is to determine the causes of crashes and to answer "what happened and how to prevent the recurrence of those types of accident?"

- How to do the investigation

" Inspection of crash site and gathering evidences in all contributing factors related to crashes (human factors, vehicles, and road and environment)"

Case Control Conditions

>60%	MC vs Car Crashes
>30%	MC Fatal Crashes (AIS>=3)
>10%	MC Single Crashes
>10%	MC vs Other Vehicle Crashes

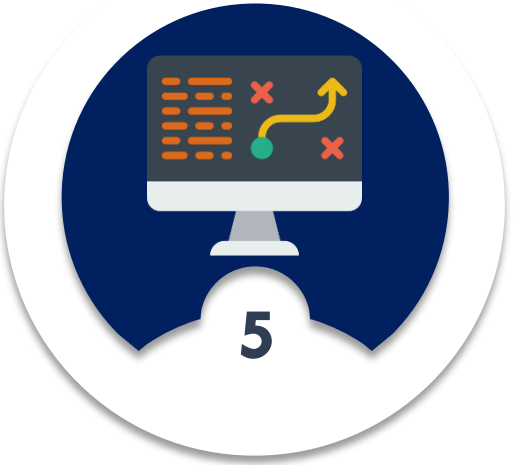
Motorcycle Accident Investigation Process

Accident Notification

MC Accident Investigation

Assemble and coding data

Data entry to database

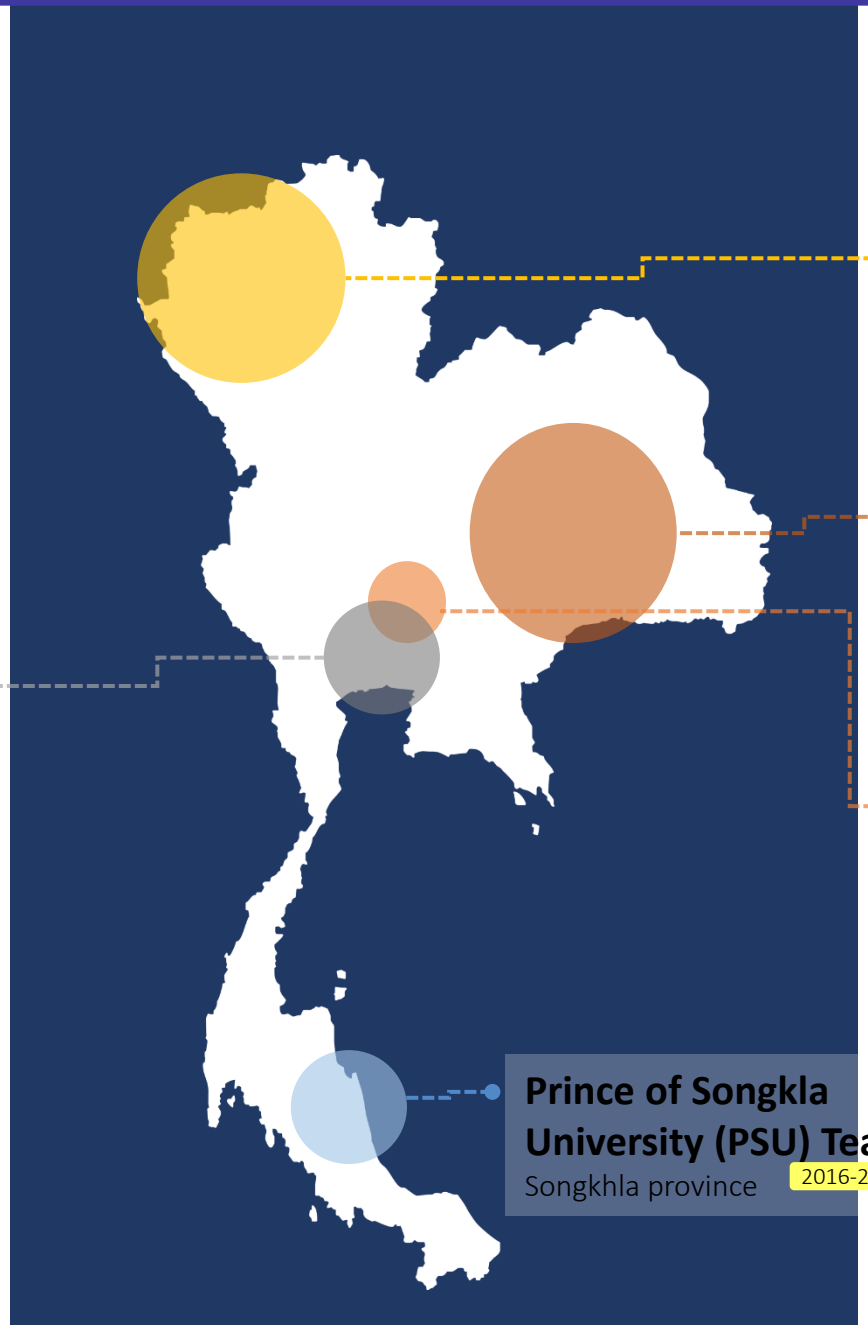


Statistical Analysis

Propose Countermeasure

MOTORCYCLE ACCIDENT INVESTIGATION PROCESS

MOTORCYCLE ACCIDENT INVESTIGATION TEAM



King Mongkut University Thonburi (KMUTT) Team

2018-2020

Bangkok province
- Central Region
- Total area is about 1,568.7 km^2 with 50 districts
- Population is about 8,280,925

Samut Sakhon province
- Central Region
- Distance is 48 km from Bangkok
- Total area is about 872.35 km^2 with 3 districts
- Population is about 491,887

Samut Prakarn province
- Central Region
- Distance is 25 km from Bangkok
- Total area is about 1,004.1 km^2 with 3 districts
- Population is about 1,310,766

Chiang Mai University (CMU) Team

2016-2020

Chiang Mai province
- Northern Region
- Distance is 685 km from Bangkok
- Total area is about 20,107 km^2 with 25 districts
- Population is about 1,700,000

Suranaree University (SUT) Team

2016-2020

Nakhon Ratchasima province
- North Eastern Region
- Distance is 260 km^2 from Bangkok
- Total area is about 20,494 km2 with 32 districts
- Population is about 2,700,000

Asian Institute of Technology (AIT) Team

2016-2020

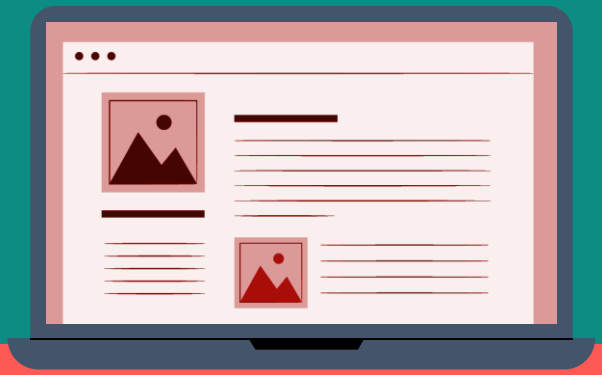
Pathum Thani province
- Central Region
- Distance is 40 km from Bangkok
- Total area is about 1,525 km^2 with 7 districts
- Population is about 1,000,000

Ayutthaya province
- Central Region
- Distance is 80 km from Bangkok
- Total area is about 2,556 km^2 with 16 districts
- Population is about 800,000

Prince of Songkla University (PSU) Team

2016-2018

Songkhla province



RESULTS AND ANALYSIS

DATA COLLECTION FROM 2016 - 2020

Total Number of MC Accident Cases Collected

Team	Phase I	Phase II	Phase III	Phase IV	Total
	2016-2017	2018	2019	2020	
AIT Team	76	45	41	28	190
CMU Team	85	54	64	48	251
SUT Team	94	54	64	48	260
PSU Team	85	49	-	-	134
KMUTT Team	-	54	64	48	166
Total	340	256	233	172	1001

DATA COLLECTION FROM 2016 - 2020

Total 1,001 cases

NON-FATAL CRASHES
732 cases

27 % FATAL CRASHES
269 cases

Number of Fatal Cases and Non-Fatal Cases

KMUTT Team

Non-Fatal crashes: 132 cases
Fatal crashes: 34 cases

CMU Team

Non-Fatal crashes: 172 cases
Fatal crashes: 79 cases

SUT Team

Non-Fatal crashes: 186 cases
Fatal crashes: 74 cases

AIT Team

Non-Fatal crashes: 143 cases
Fatal crashes: 47 cases

PSU Team

Non-Fatal crashes: 99 *cases*
***Fatal crashes**: 35 cases*

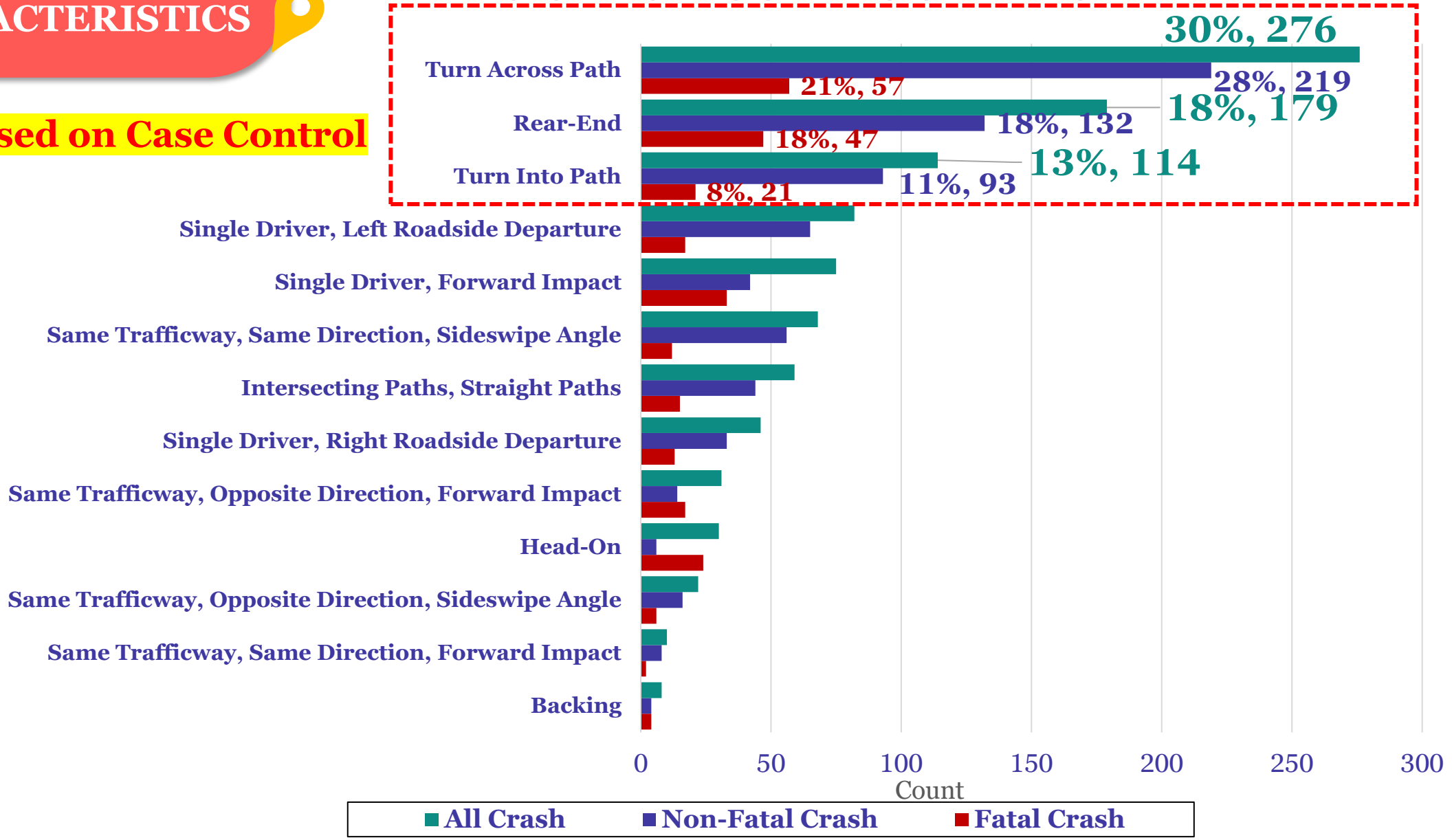
Case Control Conditions

>60%	MC vs Car Crashes
>30%	MC Fatal Crashes (AIS>=3)
>10%	MC Single Crashes
>10%	MC vs Other Vehicle Crashes

GENERAL ACCIDENT CHARACTERISTICS

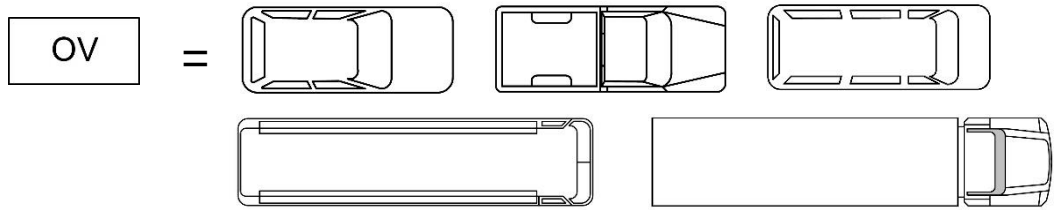
MC CRASH CONFIGURATION

Based on Case Control

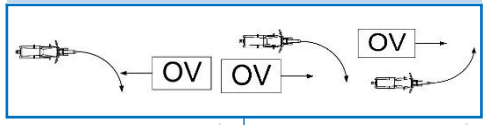


GENERAL ACCIDENT CHARACTERISTICS

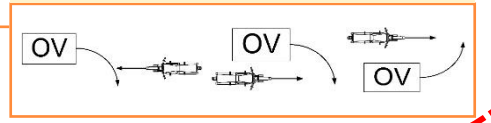
MC Crash Configuration (All cases)

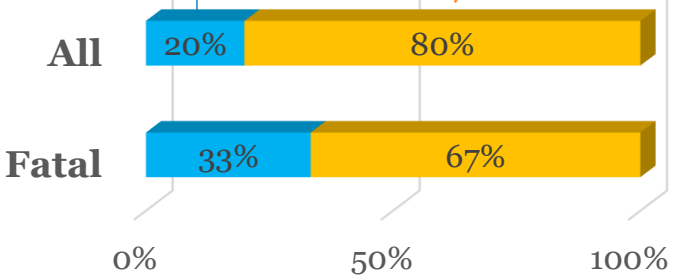


MC turn across OV's path



OV turn across MC's path

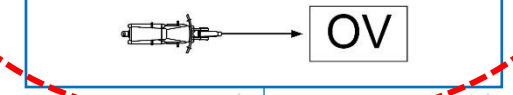




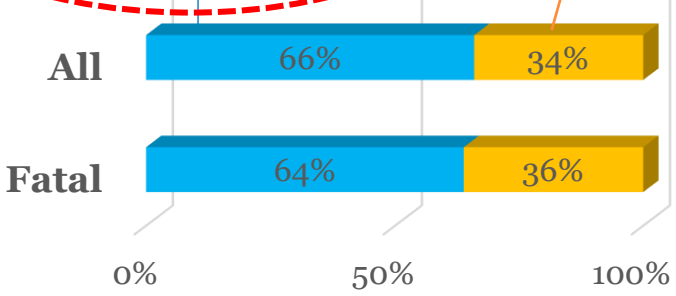
Number of cases (%)

Turn Across Path

MC hit at rear-end of OV



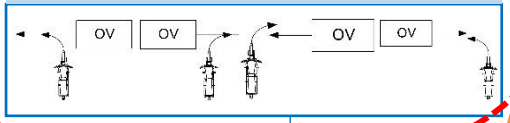
OV hit at rear-end of MC



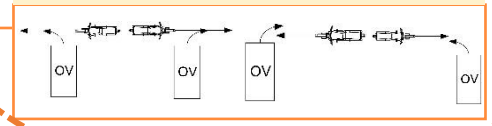
Number of cases (%)

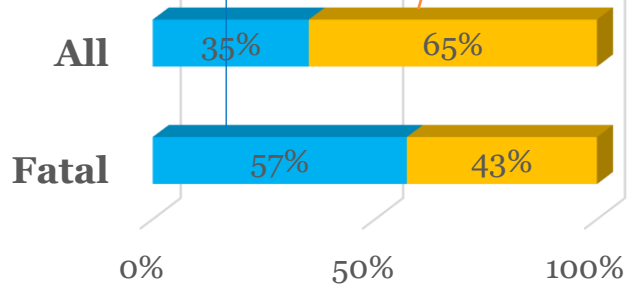
Rear-End

MC turn into OV's path



OV turn into MC's path



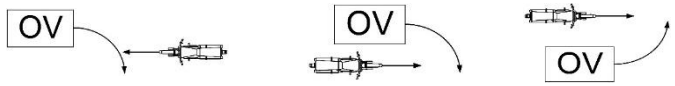


Number of cases (%)

Turn Into Path

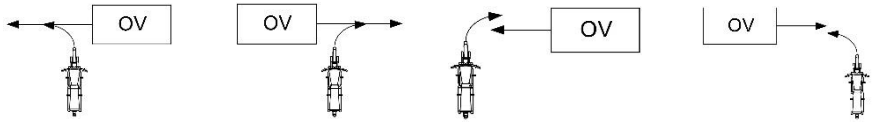
ACCIDENT CAUSATION

Turn Across Path



Rear-End

Turn Into Path



Accident causation (All cases)

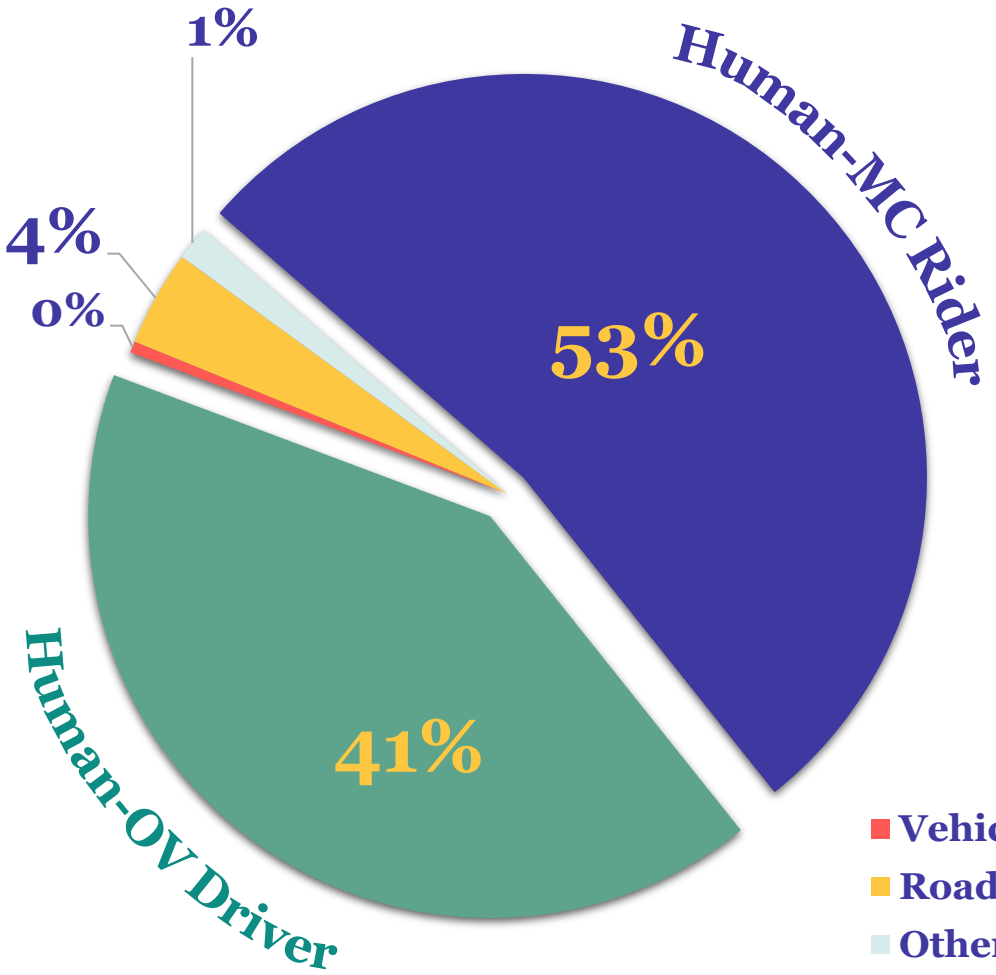
7%	Reckless	> เปลี่ยนช่องจราจร/ แซง โดยไม่เช็ครถข้างหน้าก่อน > ขับตามรถคันอื่นโดยไม่ได้เช็ครถด้วยตัวเอง
49%	Aggressive	> ขับเร็ว/ ฝ่าฝืนสัญญาณไฟจราจร > ไม่ลดความเร็ว/ เร่งความเร็วแทนที่จะเบรก
19%	Inattentive + Distracted	> ไม่ได้มองด้านหน้า/ หลับใน/ เมา
11%	Did not notice	> ไม่สังเกตสภาพจราจรรอบๆ ที่ชะลอ/หยุดให้รถที่กำลังจะเลี้ยว > ไม่สังเกตเห็นไฟเลี้ยวของรถคันที่จะเลี้ยว
13%	Misunderstood	> เข้าใจผิดคิดว่า OV จะหยุดให้ > ไม่คาดคิดว่า OV จะเลี้ยว

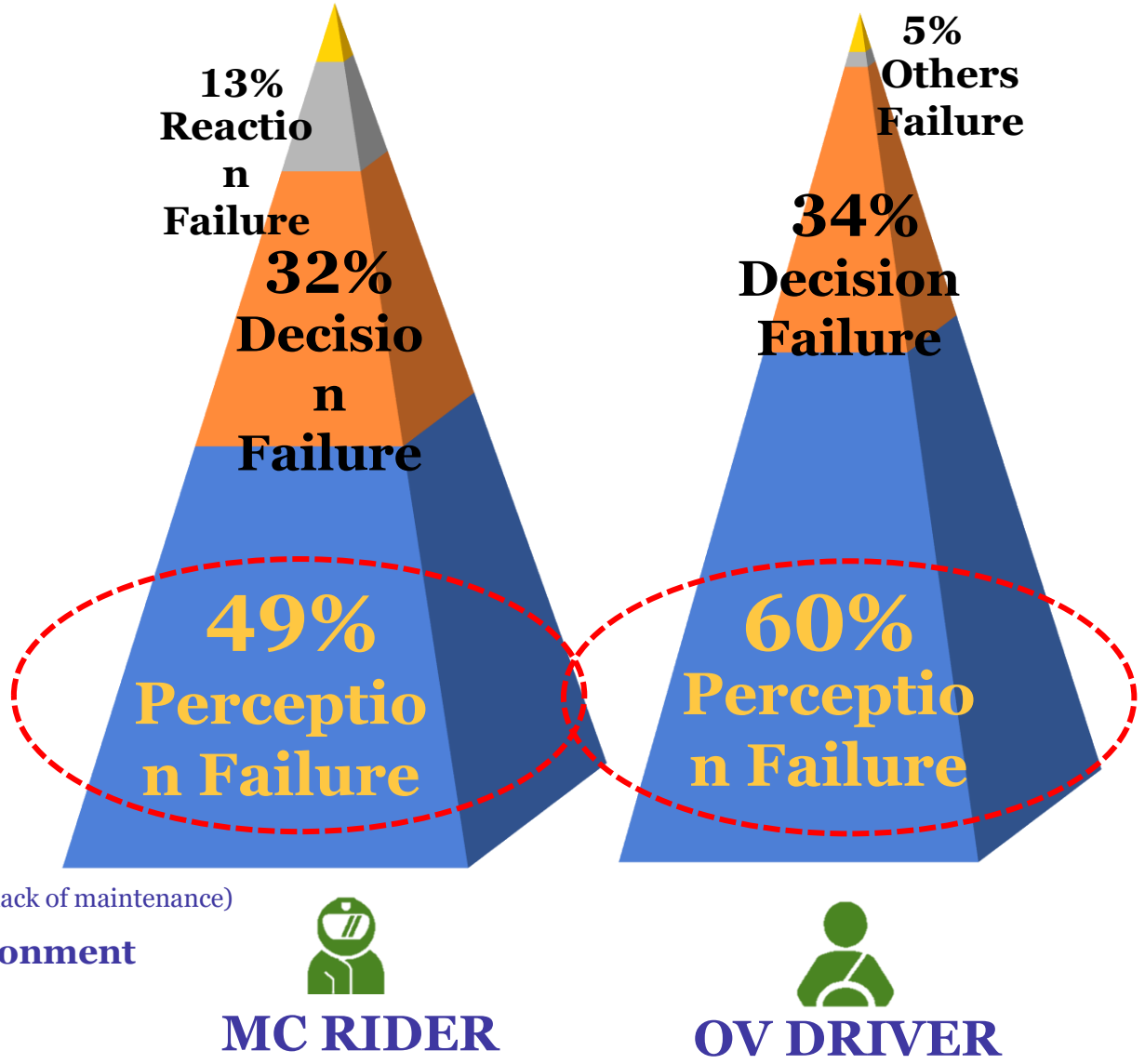
11%	Reckless	> เปลี่ยนช่องจราจร/ แซง โดยไม่เช็ครถข้างหน้าก่อน
39%	Aggressive	> ขับจี้/ ขับเร็ว/ ฝ่าฝืนสัญญาณไฟจราจร
51%	Inattentive + Distracted	> ไม่ได้มองด้านหน้า/ หลับใน/ เมา

58%	Reckless	> ไม่มองก่อนเลี้ยวออกจากซอย > ขับตามรถคันอื่นโดยไม่ได้เช็ครถด้วยตัวเอง
23%	Aggressive	> ขับเร็ว/ ฝ่าฝืนสัญญาณไฟจราจร > ไม่ลดความเร็ว/ เร่งความเร็วแทนที่จะเบรก
3%	Inattentive + Distracted	> ไม่ได้มองด้านหน้า/ หลับใน/ เมา
16%	Misunderstood	> เข้าใจผิดคิดว่า OV จะหยุดให้ > คิดว่าตัวเองมีสิทธิ์ไปก่อน > กะระยะผิดคิดว่าจะเลี้ยวได้ทัน

ACCIDENT CAUSATION

PRIMARY ACCIDENT CONTRIBUTING FACTOR





VEHICLE

COLLISION DYNAMICS

COLLISION AVOIDANCE PERFORMED BY MC RIDER

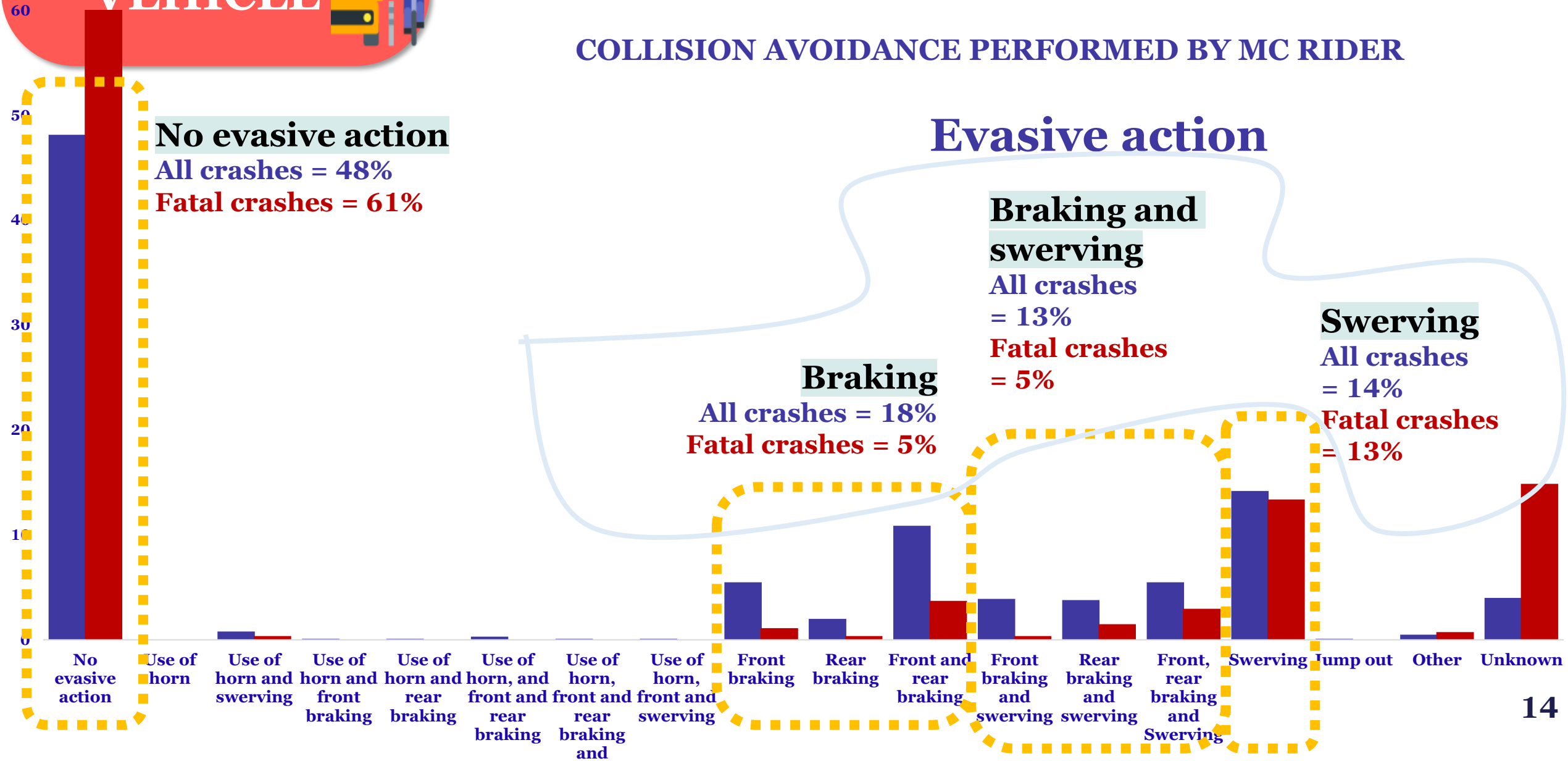
No evasive action
All crashes = 48%
Fatal crashes = 61%

Evasive action

Braking
All crashes = 18%
Fatal crashes = 5%

Braking and swerving
All crashes = 13%
Fatal crashes = 5%

Swerving
All crashes = 14%
Fatal crashes = 13%

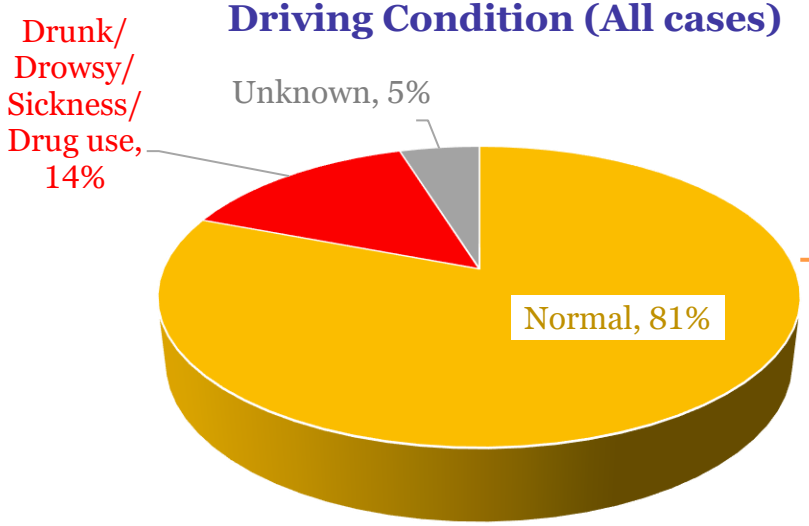


HUMAN FACTORS

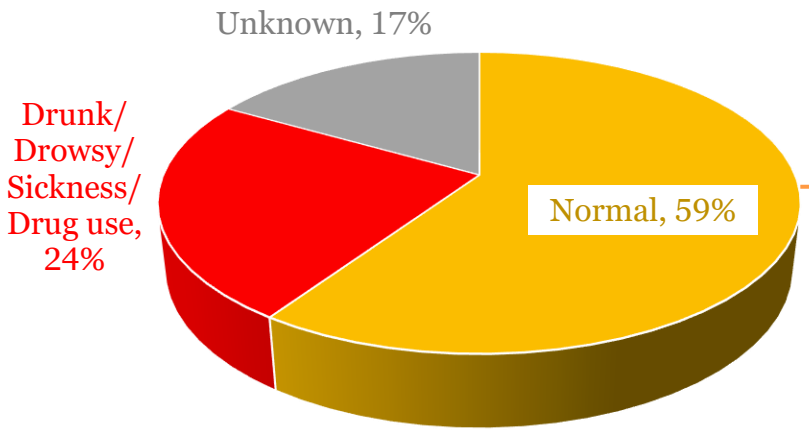
MC RIDER

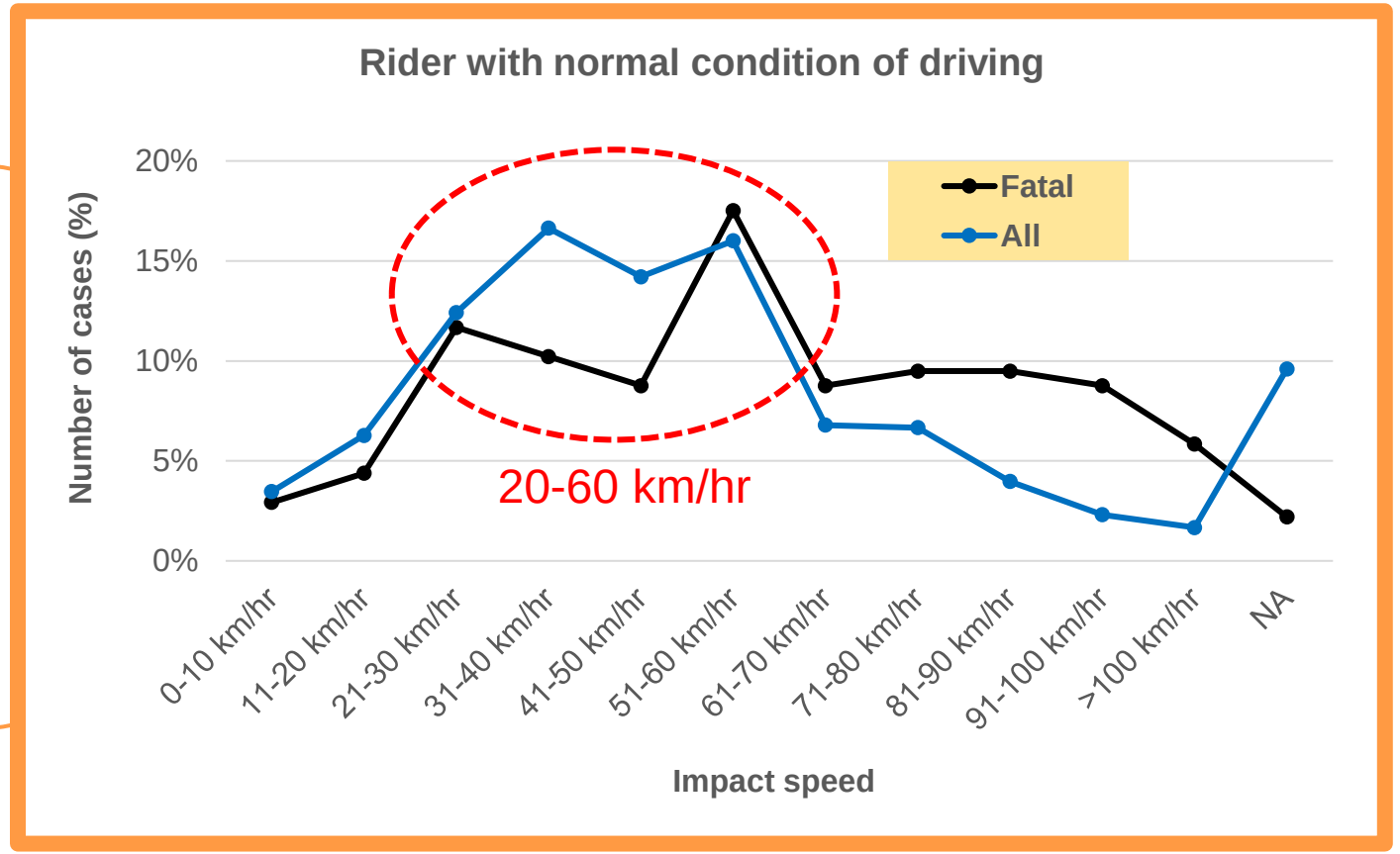
DRIVING CONDITION OF MOTORCYCLE RIDER

Driving Condition (All cases)



Driving Condition (Fatal cases)

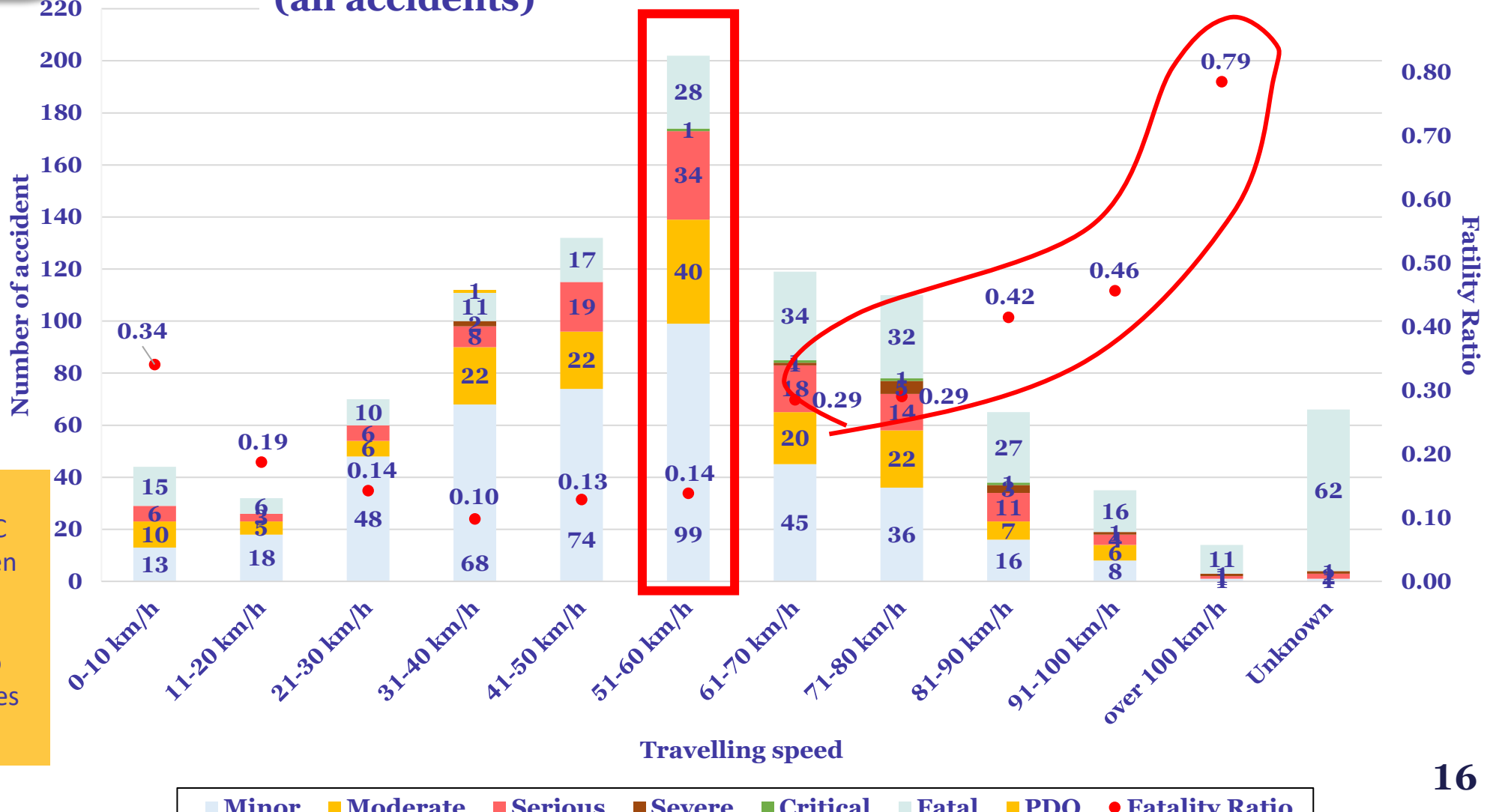




VEHICLE

COLLISION DYNAMICS

Comparison of MC Travelling Speed for Fatal and Non-Fatal Cases (all accidents)

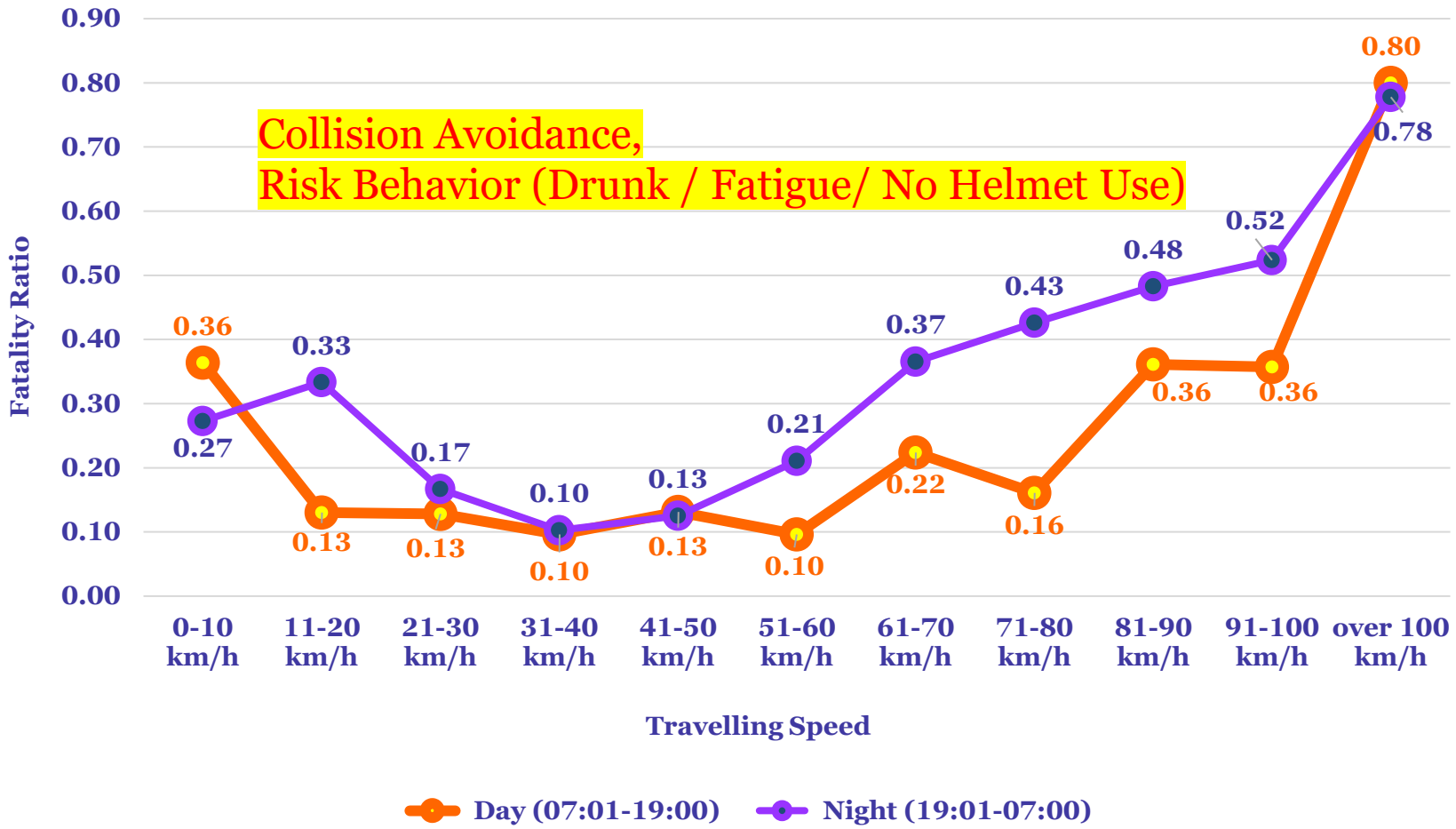


- The greatest percentage of MC travelling speeds were between 50 km/h and 60km/h.
- fatal crashes are more likely to occur when the speed increases up to 100 km/h.

VEHICLE

COLLISION DYNAMICS

Comparison of MC Travelling Speed for Fatal and Non-Fatal Cases (all accidents)

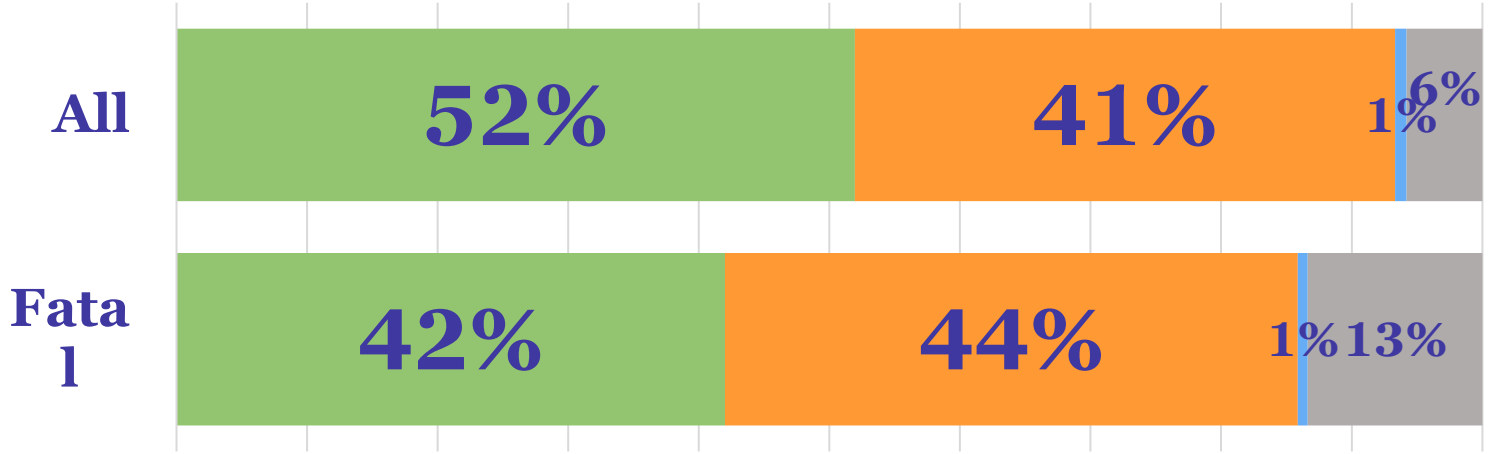


- Fatality ratio at nighttime tends to be higher than at daytime.
- fatal crashes are more likely to occur when the speed increases from 80 km/h.

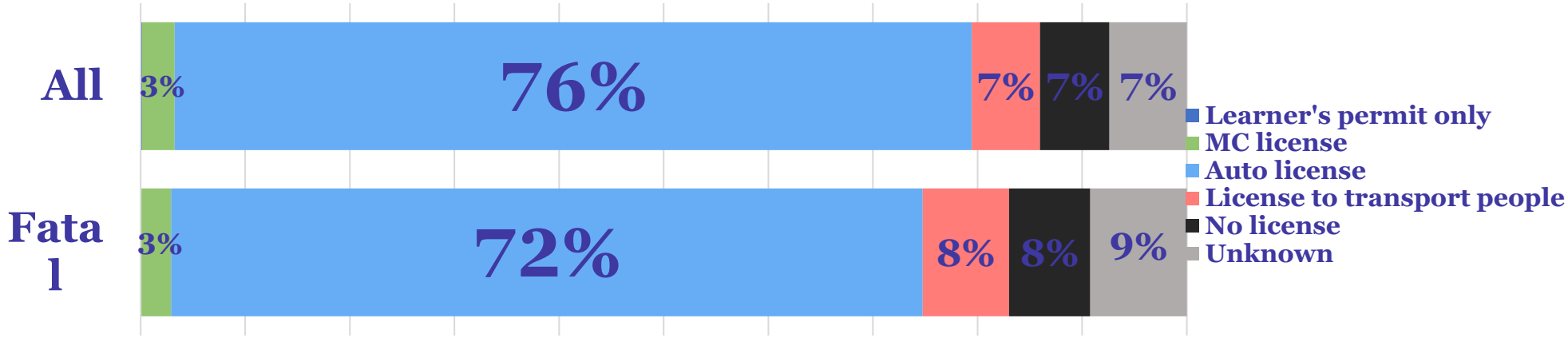
HUMAN FACTORS

DRIVER LICENSE QUALIFICATION

MC RIDER

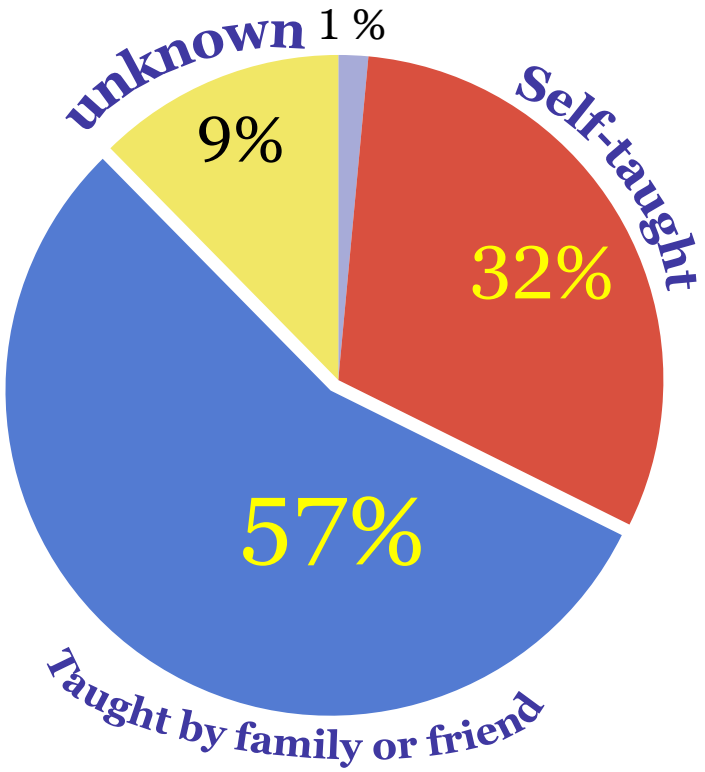


OV DRIVER

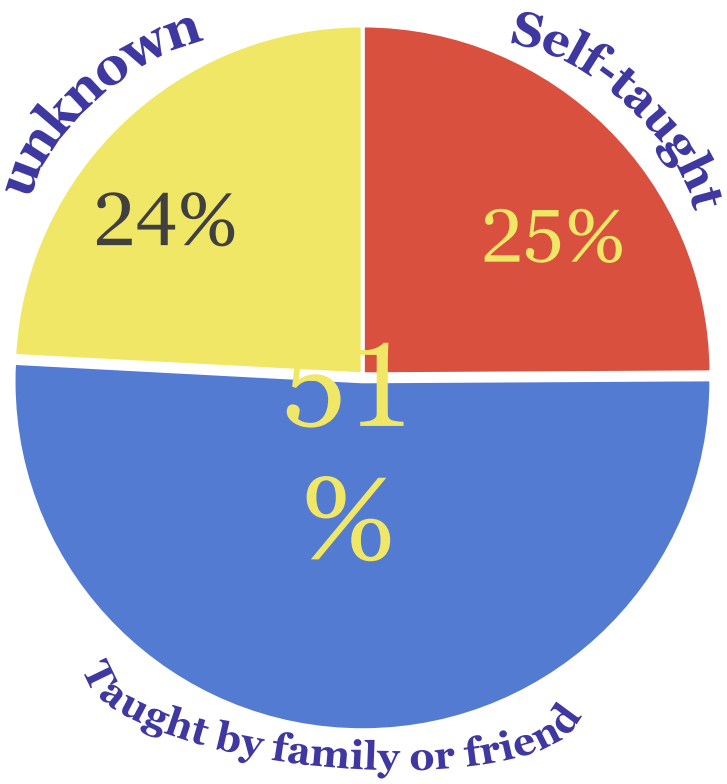


HUMAN FACTORS

MC RIDER TRAINING



All

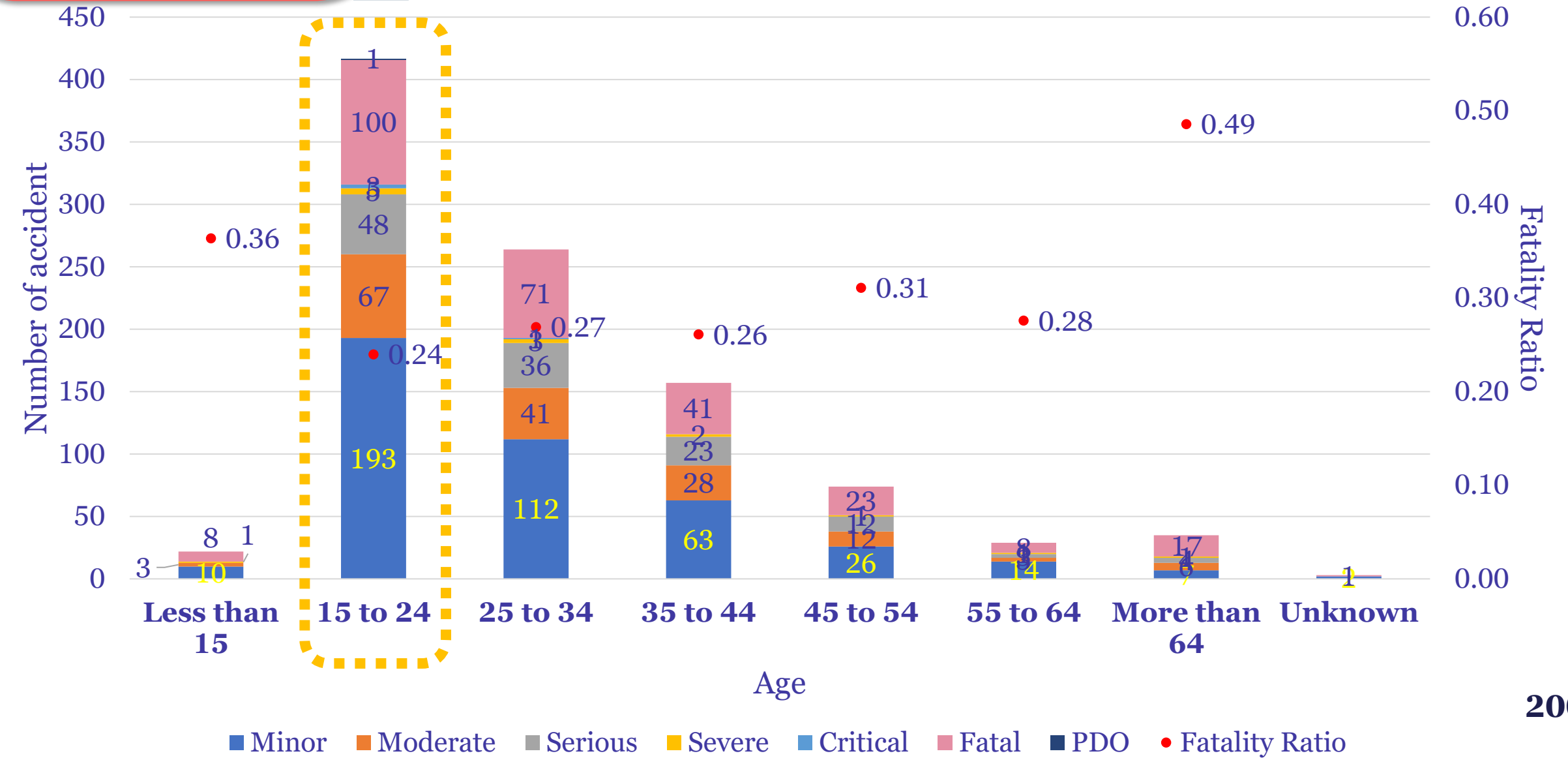


Fatal

Special mandatory training

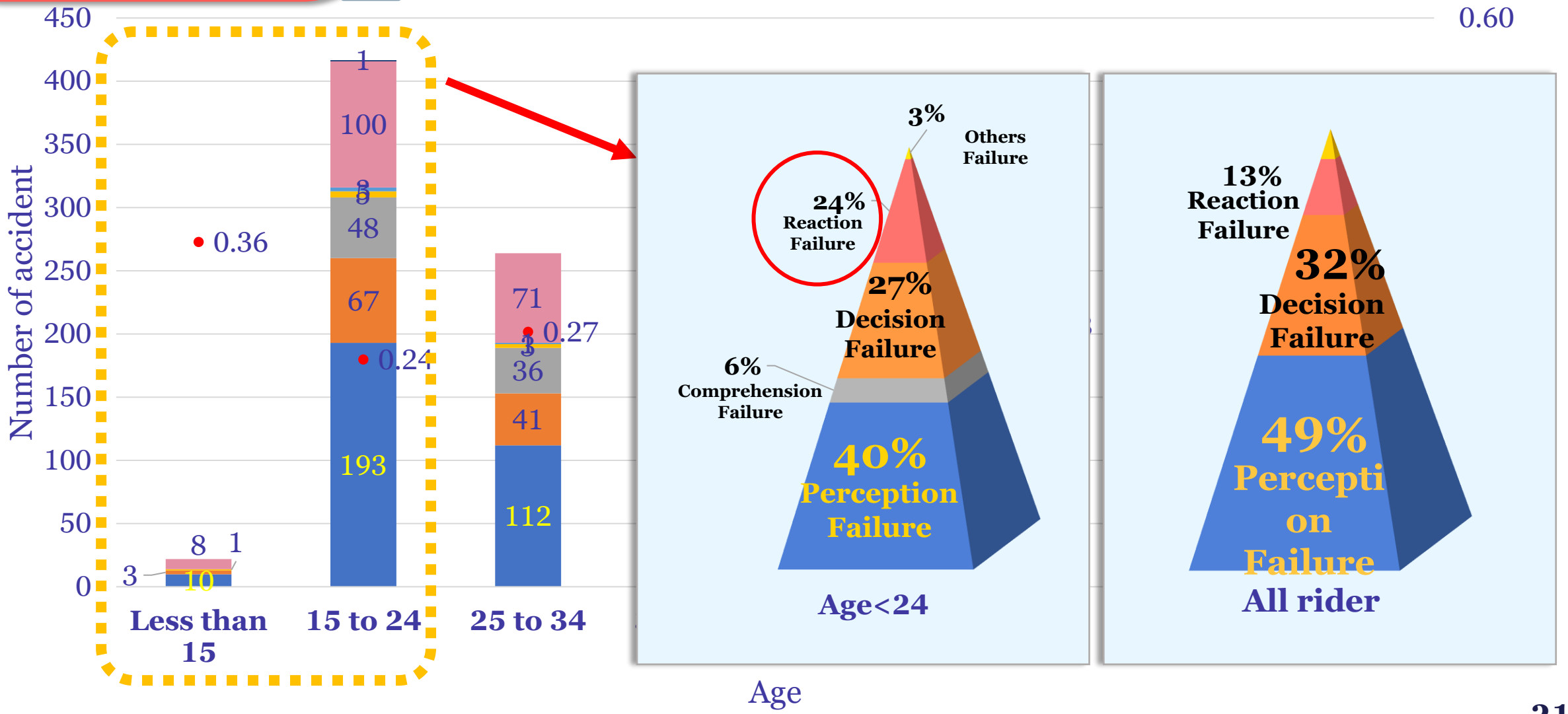
HUMAN FACTORS

MC RIDER AGE



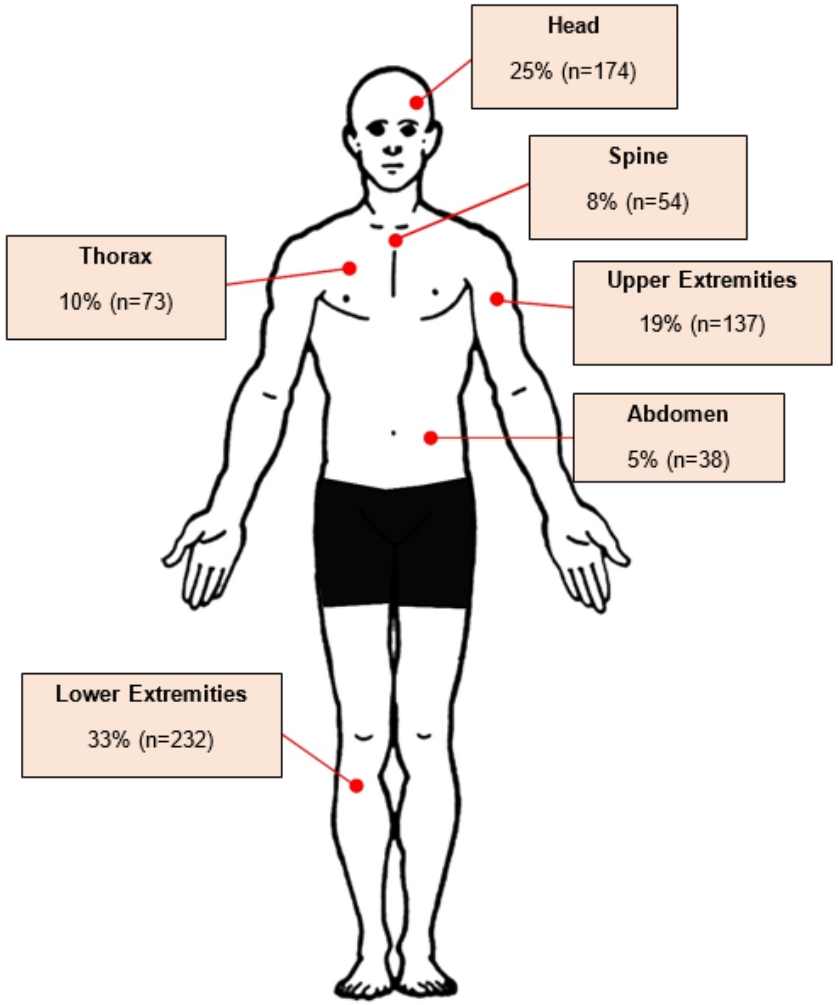
HUMAN FACTORS

MC RIDER AGE

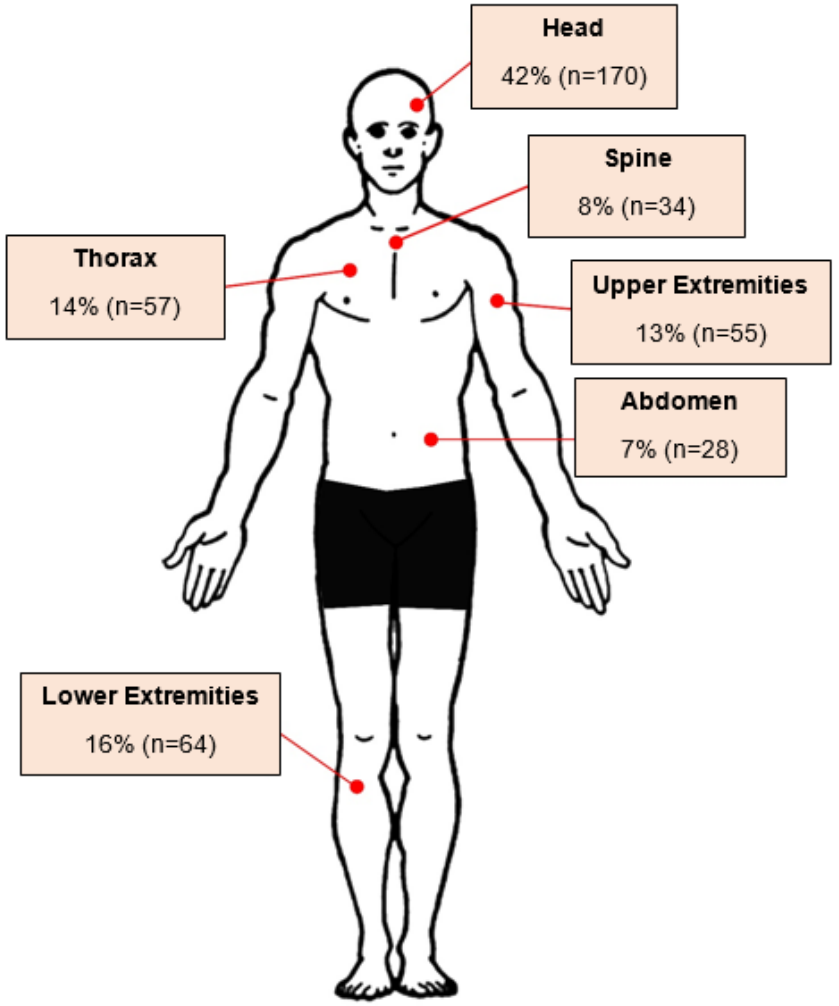


MC RIDER PROTECTION

MC RIDER INJURY



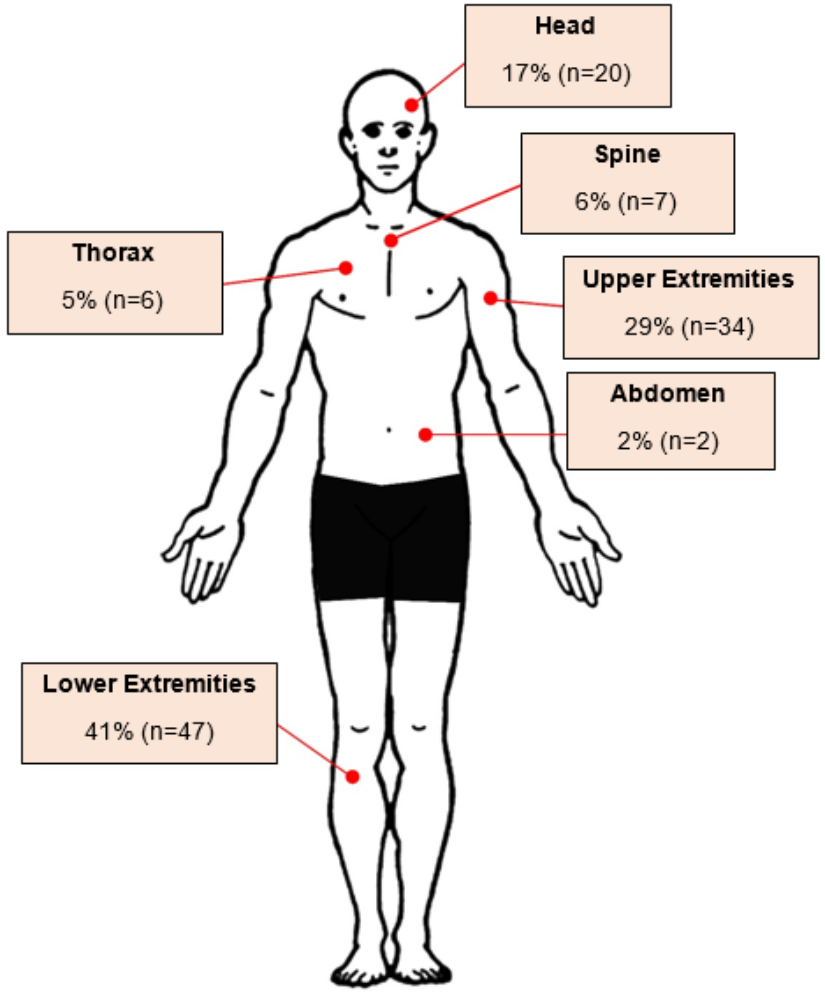
MC Rider Injuries Greater than AIS=1



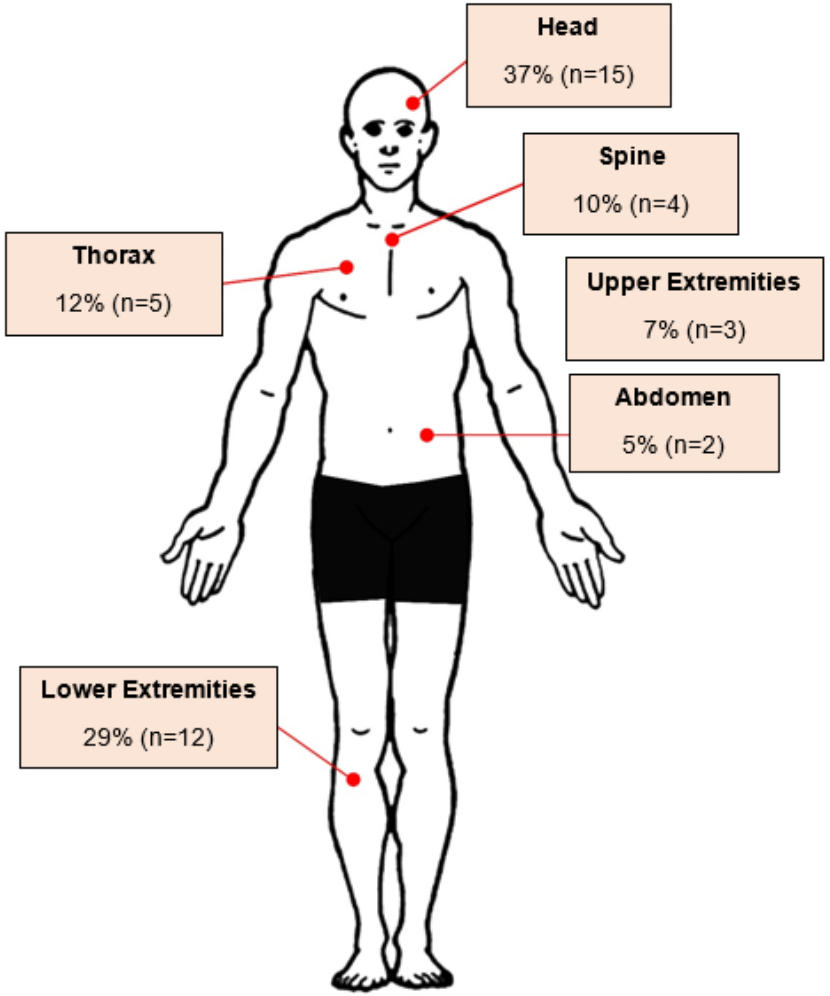
MC Rider Injuries – Fatal Cases Only

MC RIDER PROTECTION

MC PASSENGER INJURY



MC Passenger Injuries Greater than AIS=1

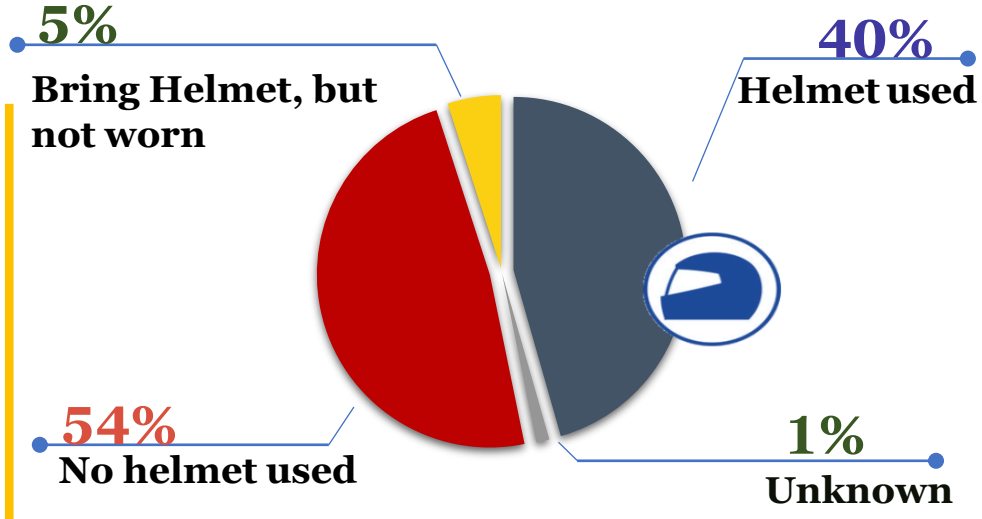


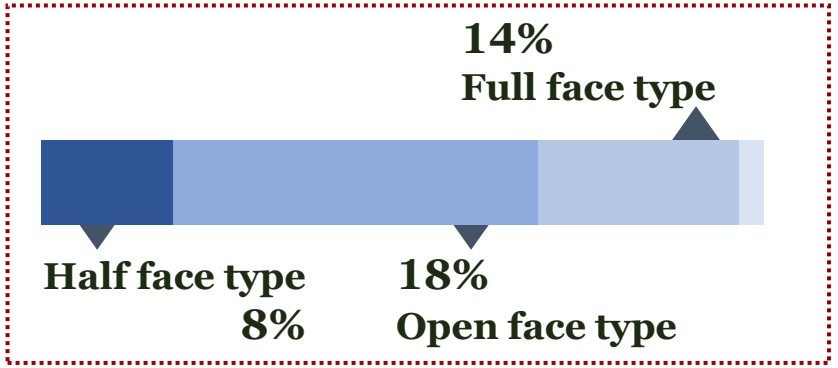
MC Passenger Injuries – Fatal Cases Only

MC RIDER PROTECTION

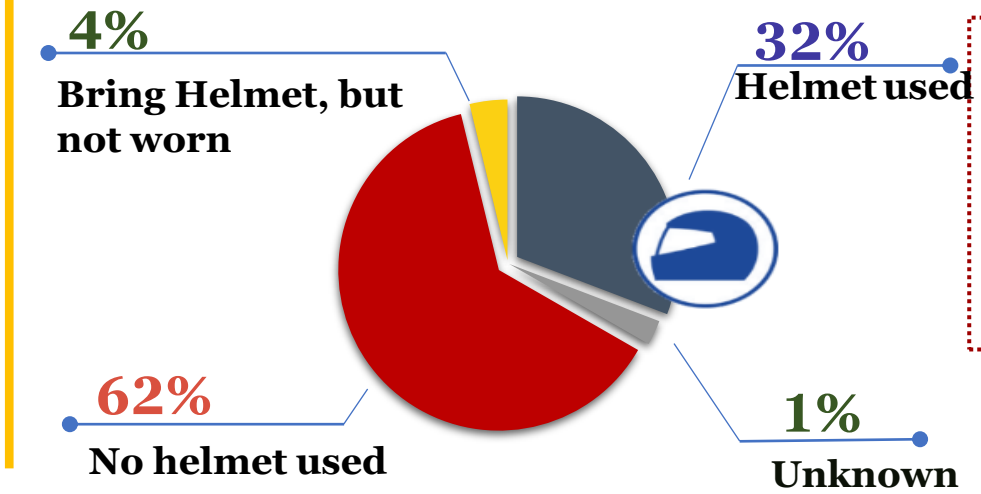
RIDER HELMET TYPE

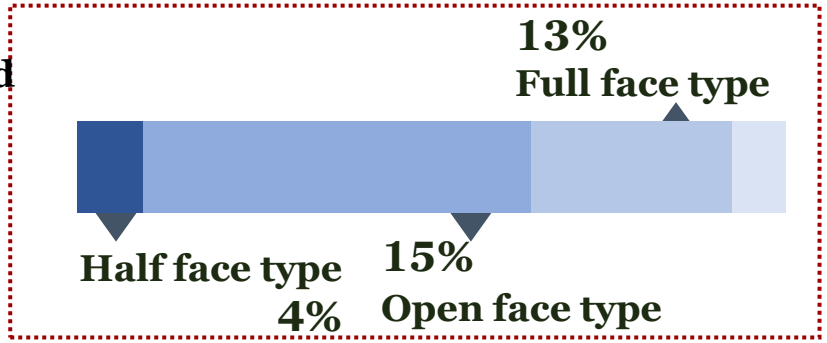
ALL CRASHES





FATAL CRASHES

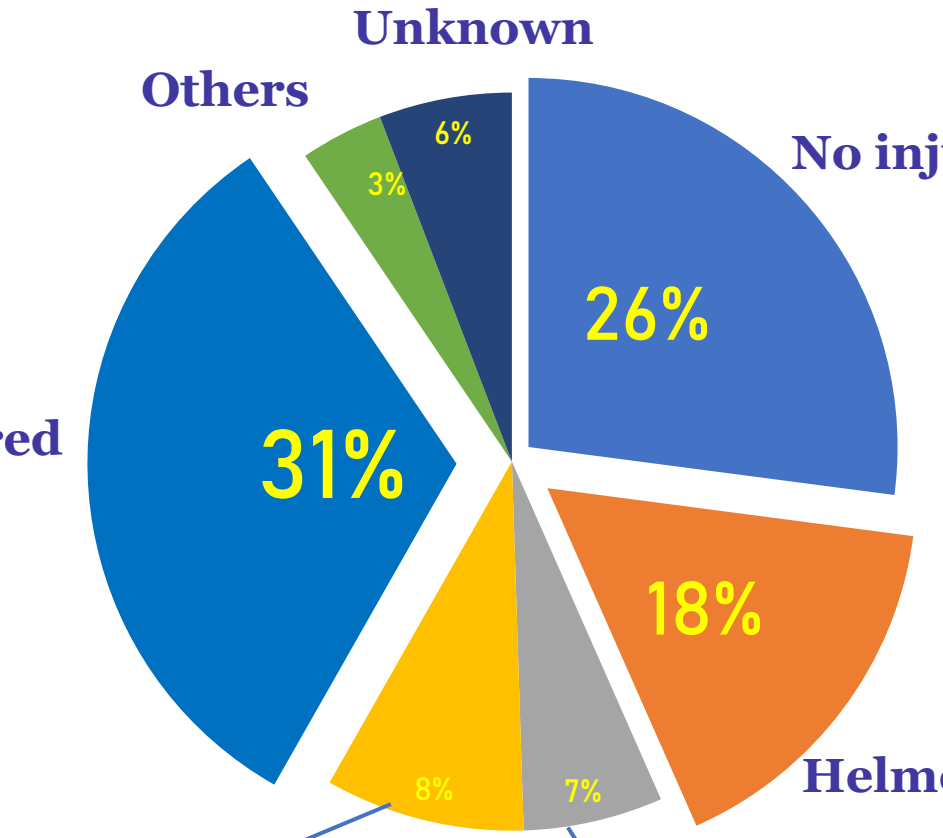




MC RIDER PROTECTION

HELMET RETENTION UPON HEAD INJURY (MC RIDER)

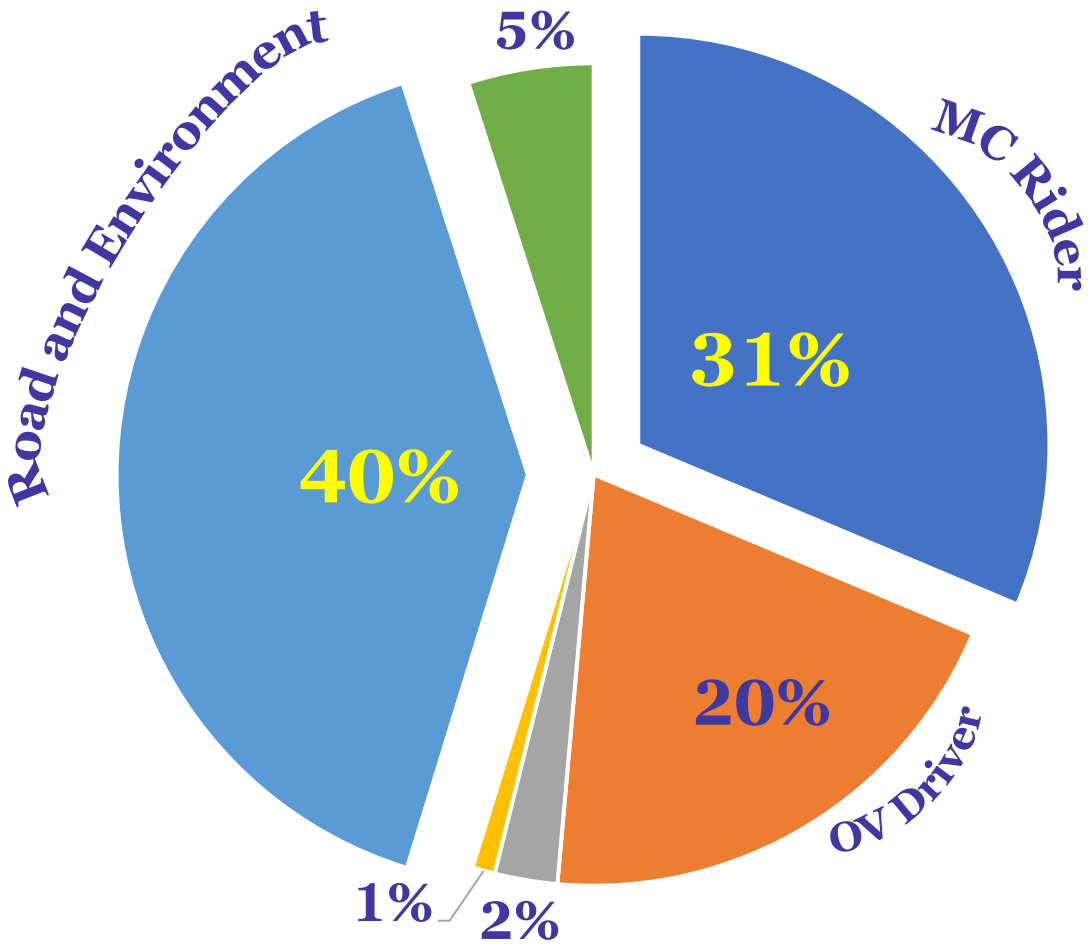
ALL CRASHES



In all cases with head injuries, 66.17% did not wear helmet.

ACCIDENT CAUSATION

SECONDARY ACCIDENT CONTRIBUTING FACTORS



The majority of other contributing factors was road and environment

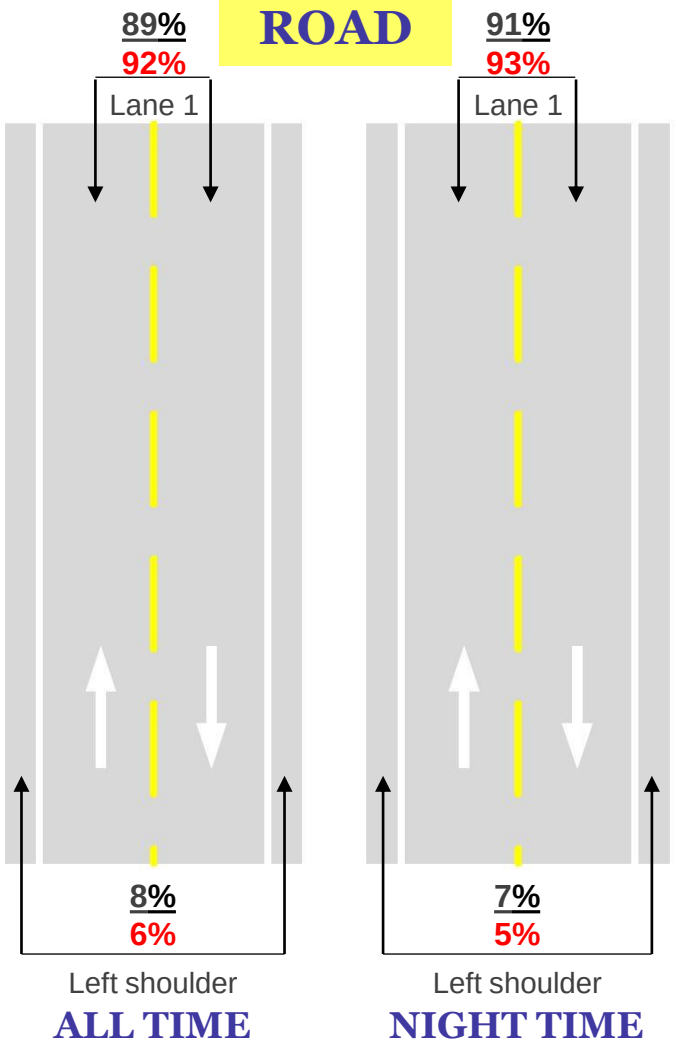
- Others
- MC Technical Failure
- OV Technical Failure

ENVIRONMENTAL FACTORS

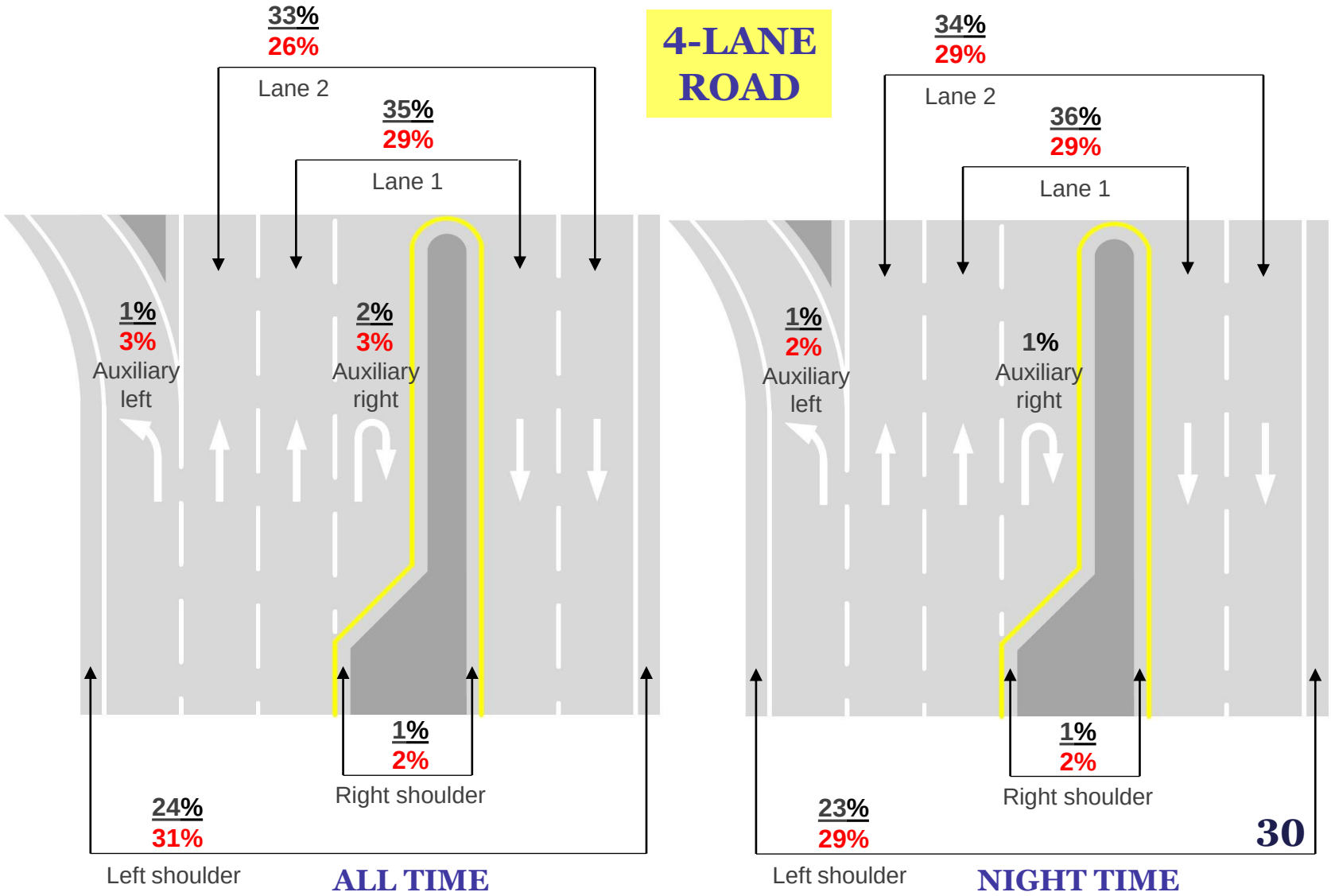
MC TRAVELED LANE BY NUMBER OF LANES

■ ALL CASES ■ FATAL CASES

2-LANE ROAD



4-LANE ROAD

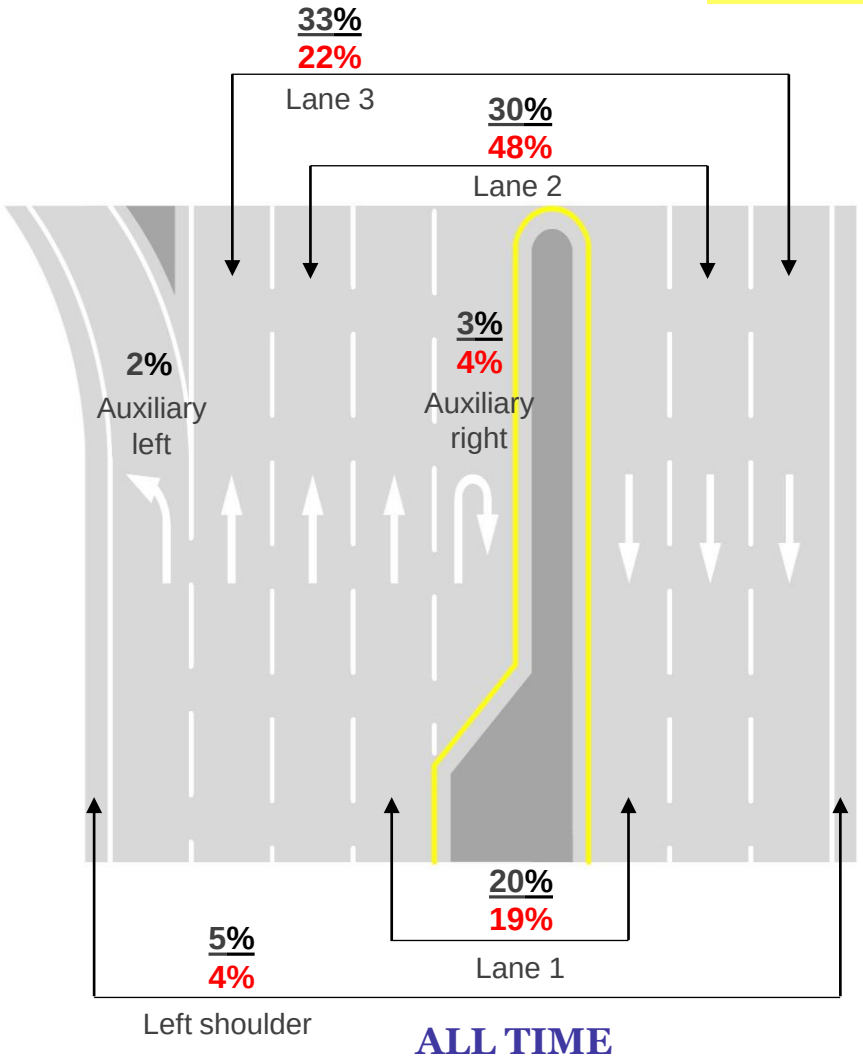


ENVIRONMENTAL FACTORS

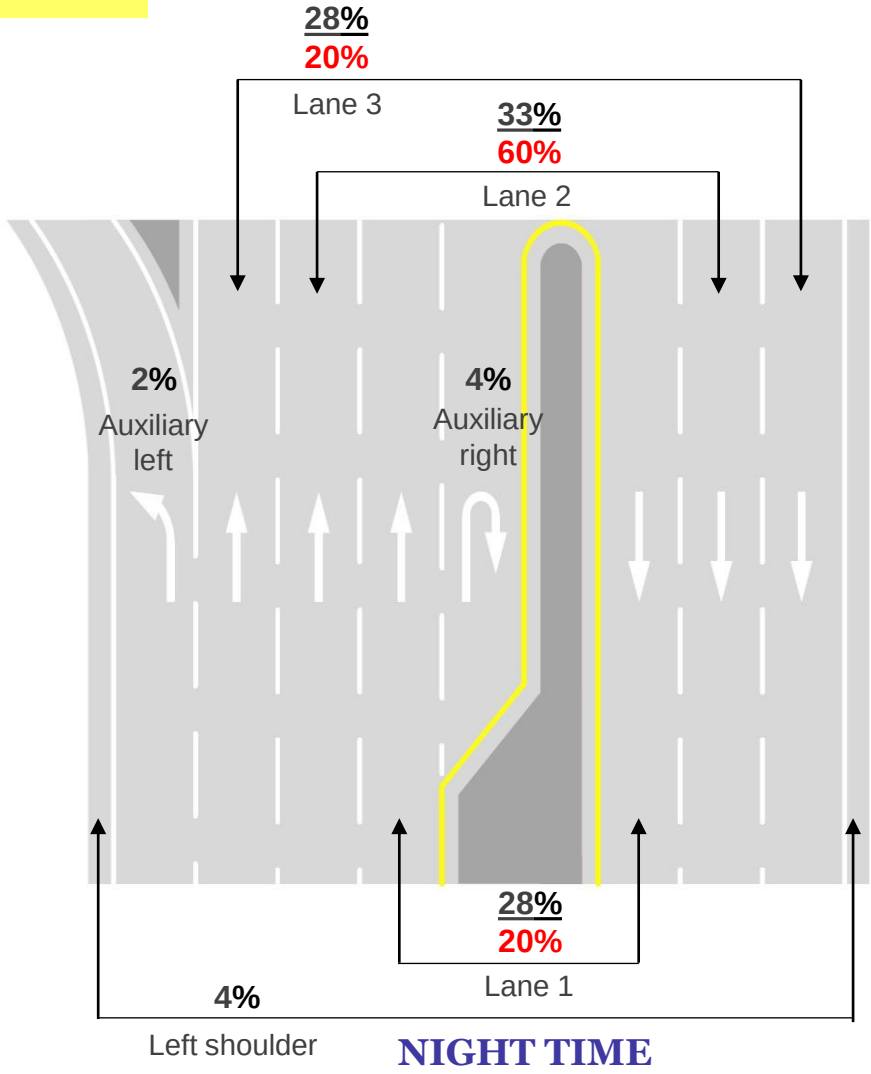
MC TRAVELED LANE BY NUMBER OF LANES

■ ALL CASES ■ FATAL CASES

6-LANE ROAD



ALL TIME



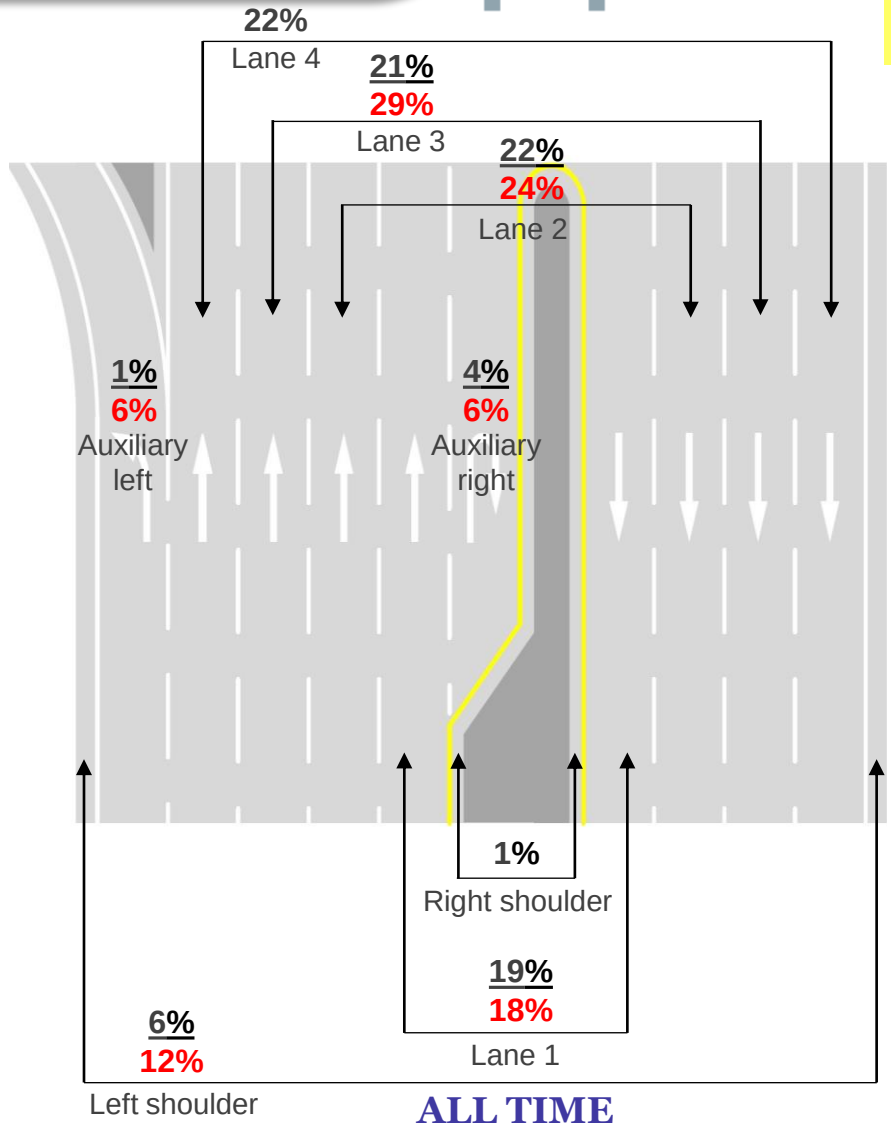
NIGHT TIME

ENVIRONMENTAL FACTORS

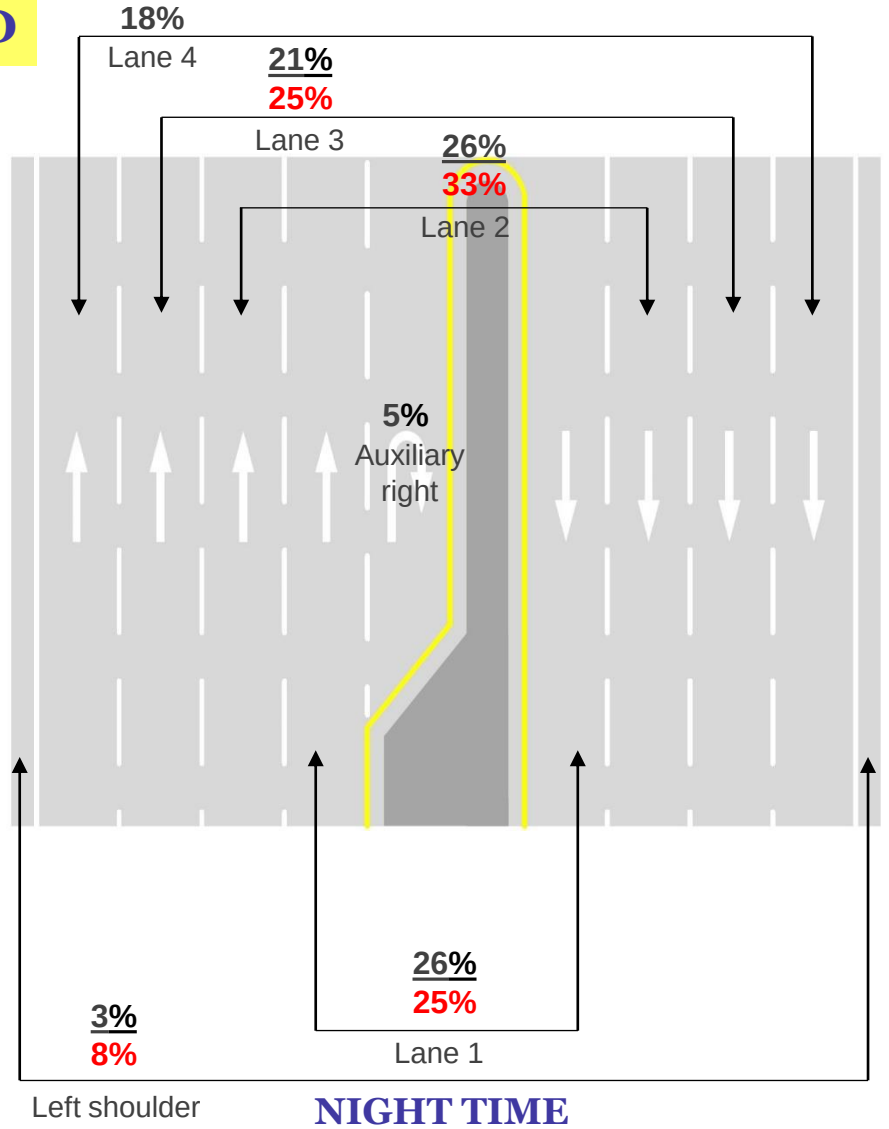
MC TRAVELED LANE BY NUMBER OF LANES

■ ALL CASES ■ FATAL CASES

8-LANE ROAD



ALL TIME

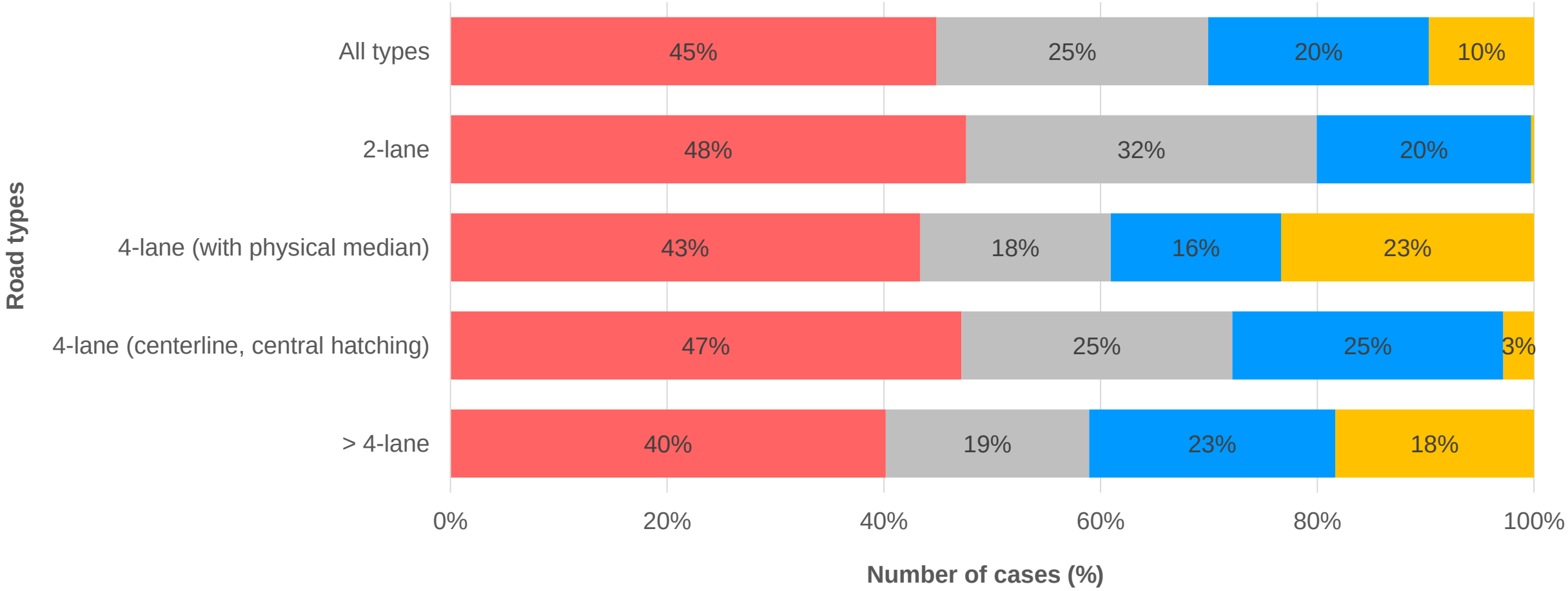


NIGHT TIME

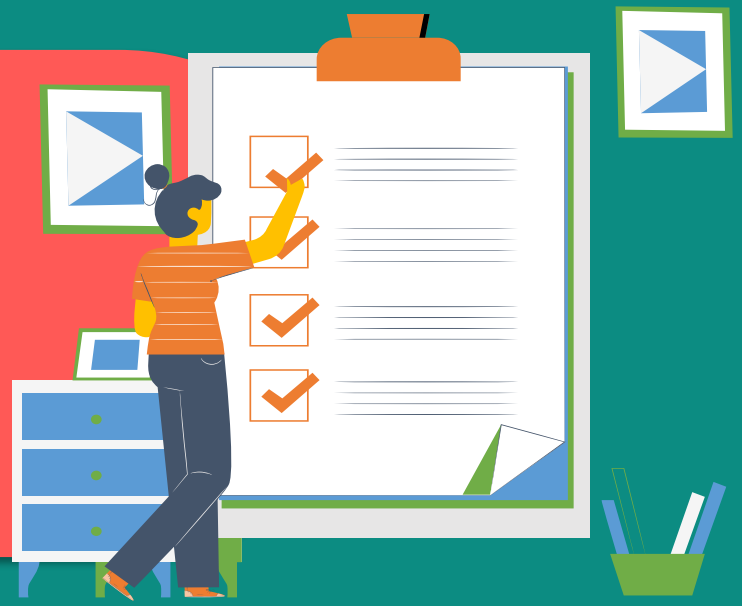
ENVIRONMENTAL FACTORS

ROADWAY TYPES

ROADWAY TYPE (ALL CASES)



Recommended Countermeasures and Policies



RIDER TRAINING

- Improve the contents of safe riding training by focusing on **Risk Perception, Defensive driving, and Collision Avoidance Skill**. (make the risk perception/collision avoidance skills to be well known by road safety trainer)
- Train of the trainer/instructors.
- Encourage other NGOs/Private organizations to include the abovementioned contents in their training courses.
- Riding training courses in schools/universities should be proposed as selective courses.

DRIVER LICENSES

- Need to pass **riding training courses** before license examination
- **Accident Prediction** should be included in the examination
- Improve the process of practical license examination
- Need to attend **safe riding training courses** (w/ accident prediction contents) for those who are **renewing licenses.**

ENFORCEMENT

- Strict enforcement and record keeping for **traffic violations**
- Strong regulation and enforcement for **illegal parked vehicles on all highways** especially for large trucks. They should be required to install high reflection signs at the rear-end of all large trucks.
- Strong regulation and enforcement for **modified motorcycle**
- Speeding enforcement (Max. 80 km/hr for MC)
- Speeding enforcement for cars and large trucks
- Improving crash database by police
- Strong enforcement for helmet wearing
- Strong enforcement for drunk driving

ROAD INFRASTRUCTURE

- Promote more on **traffic calming to reduce car speed** in villages/urban areas
- Implement more **infrastructures to reduce conflicts** between MC and Cars
- Improve and control **road access**
- Improve **sight distance** at intersection and access
- Support **policies to reduce conflicts on highways** especially at U-turn sections.
- Design **safe turning lanes**

VEHICLE

- Study the **safety devices for frontal impacts**
- Study the **safety devices to prevent rear-end collision**
- Study the **efficiency of MC light beam** whether it is long enough for visibility at nighttime or not.

RESTRAINT SYSTEM

- Continually promote the **use of helmet** especially in risk groups.
- Implement new technology for helmet enforcement