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Cycling Safety Analysis: A Close Look at Vehicle Type Association with Bicycle Collisions, Injuries, and Fatalities

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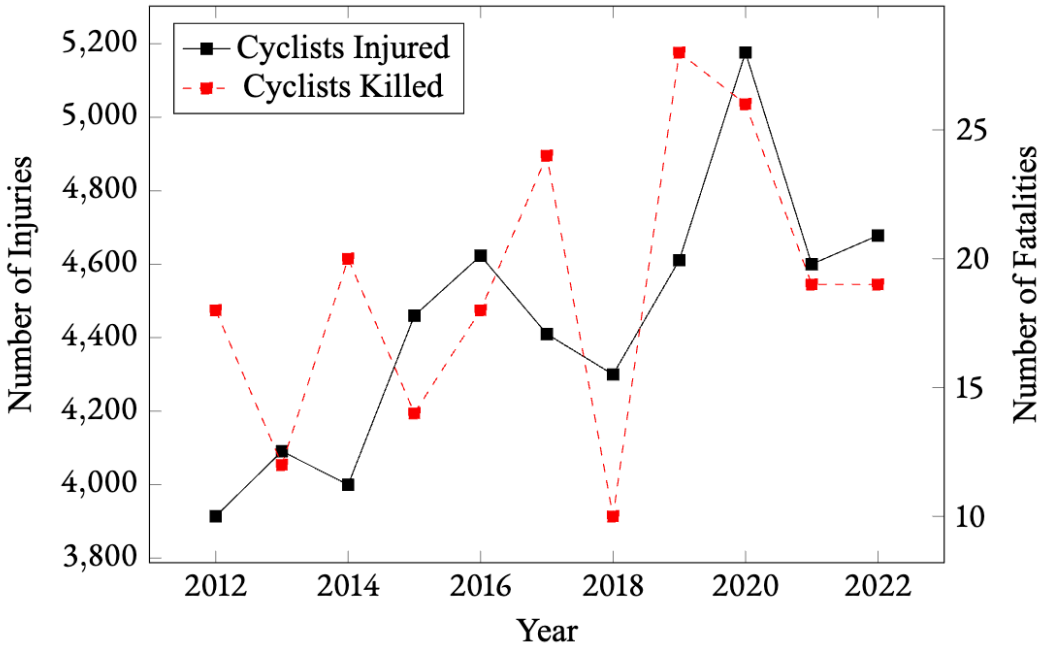
Presentation Outline

NYC Bicycle Scenario

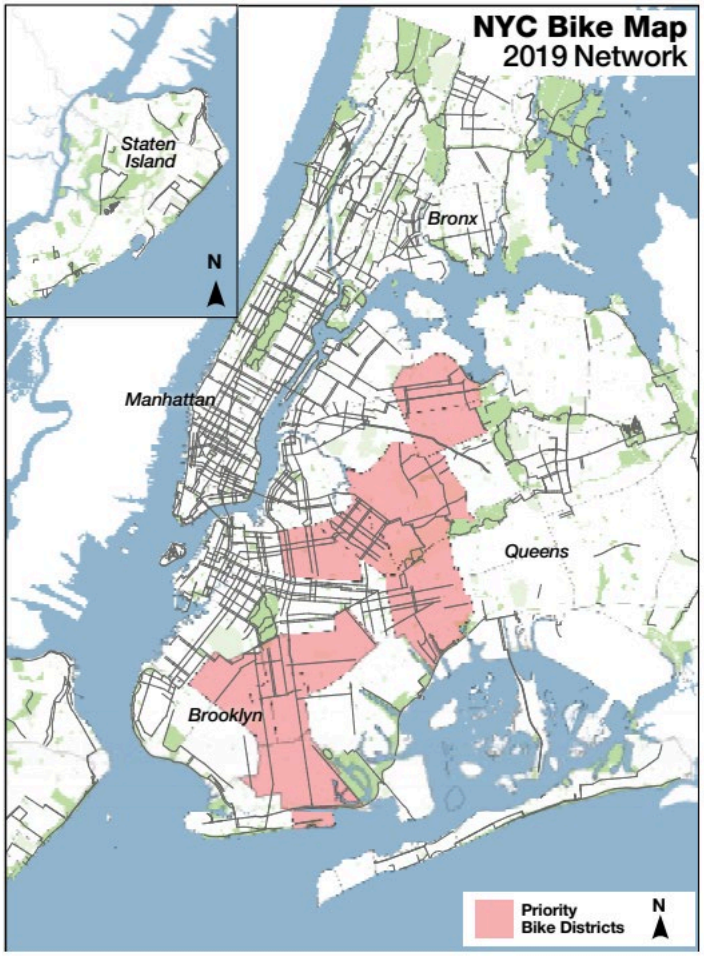
- 1234+ miles of bicycle lanes
- 116% increase in daily bicycle ridership from 2009 to 2019.



Source: Google Images (Adapted using AI)

NYC Bicycle Scenario

- **Safety priority districts (e.g., higher number of cyclists injured or killed) in areas farther from Manhattan.**
- **Less access to bicycle infrastructure.**
- **Lower incomes than other areas.**



Source: NYCDOT, 2019. Green Wave: A Plan for Cycling in New York City

Collision Data

- Motor Vehicle Collisions - Crashes

CRAS...	CRAS...	BORO...	ZIP C...	LATI...	LONG...	LOCA...	ON S...	CROS...	OFF S...	NUM...	NUM...	NUM...
04/13/20...	0:00	BROOKLYN	11222	40.726444	-73.95233	(40.7264...			745 MAN...	0	0	0
04/13/20...	0:00	BROOKLYN	11231	40.678524	-74.0021	(40.6785...			667 HEN...	0	0	0
04/13/20...	0:00	QUEENS	11420	40.677498	-73.8276	(40.6774...	111 STRE...	ROCKAW...		0	0	0
04/13/20...	0:00						ALEXAND...			0	0	0
04/13/20...	0:00			40.877235	-73.91781	(40.8772...	JOHNSO...			0	0	0
04/13/20...	0:00			40.90021	-73.8865	(40.9002...	MOSHOL...			1	0	0
04/13/20...	0:07	BRONX	10456	40.82942	-73.91226	(40.8294...	EAST 166...	CLAY AV...		1	0	0
04/13/20...	0:15	QUEENS	11378	40.727432	-73.90713	(40.7274...	LONG ISL...	MAURICE...		0	0	0
04/13/20...	0:45			40.843956	-73.8978	(40.8439...	CROSS B...			1	0	0
04/13/20...	10:00	BRONX	10463				Ft indepe...	Bailey pla...		0	0	0
04/13/20...	10:00	BROOKLYN	11207	40.686226	-73.9124	(40.6862...	BUSHWIC...	COVERT ...		0	0	0
04/13/20...	10:00	BROOKLYN	11209	40.634743	-74.03529	(40.6347...	NARROW...	73 STREET		0	0	0
04/13/20...	10:00			40.81782	-73.915276	(40.8178...	3 AVENUE	EAST 152...		0	0	0

< Previous Next >

Showing Motor Vehicle Collisions 1 to 13 out of 2,043,611

Passenger Vehicles

- **Light:**

Source: Google Images

Source: Google Images

- **Medium:**

Source: Google Images

Source: Google Images

Commercial Vehicles

- **Light:**

Source: Google Images

Source: Google Images

- **Medium:**

Source: The New York Times

Source: Google Images

Commercial Vehicles

- **Heavy:**

Source: Google Images

Source: Google Images

Source: Google Images

Source: Google Images

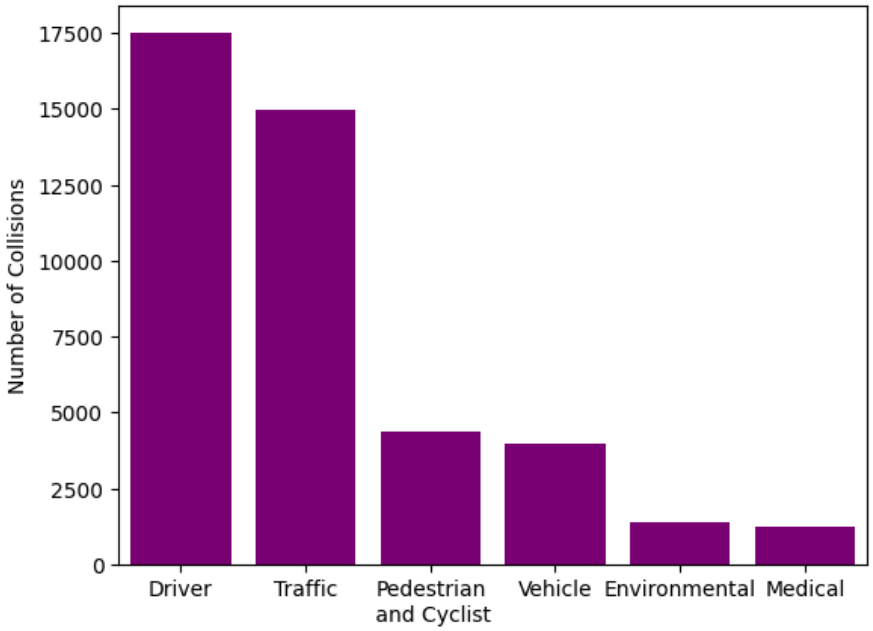
Other Categories

- Two-wheeled and Light Open Vehicles,
  - Light (e.g., Bicycles, E-Bicycles, E-Scooters)
- Emergency and Service Vehicles
  - Light (e.g., Snow Plow)
  - Medium (e.g., Ambulance, Garbage Truck)
  - Heavy (e.g., Fire Truck)
- Public Transport
  - Heavy (e.g., Bus)
- Special or Unclassified
  - Light (e.g., Skateboard)
  - Medium (e.g., Limousine)
  - Heavy (e.g., Dodge Ram)
- Unknown

Source: NYC DOT

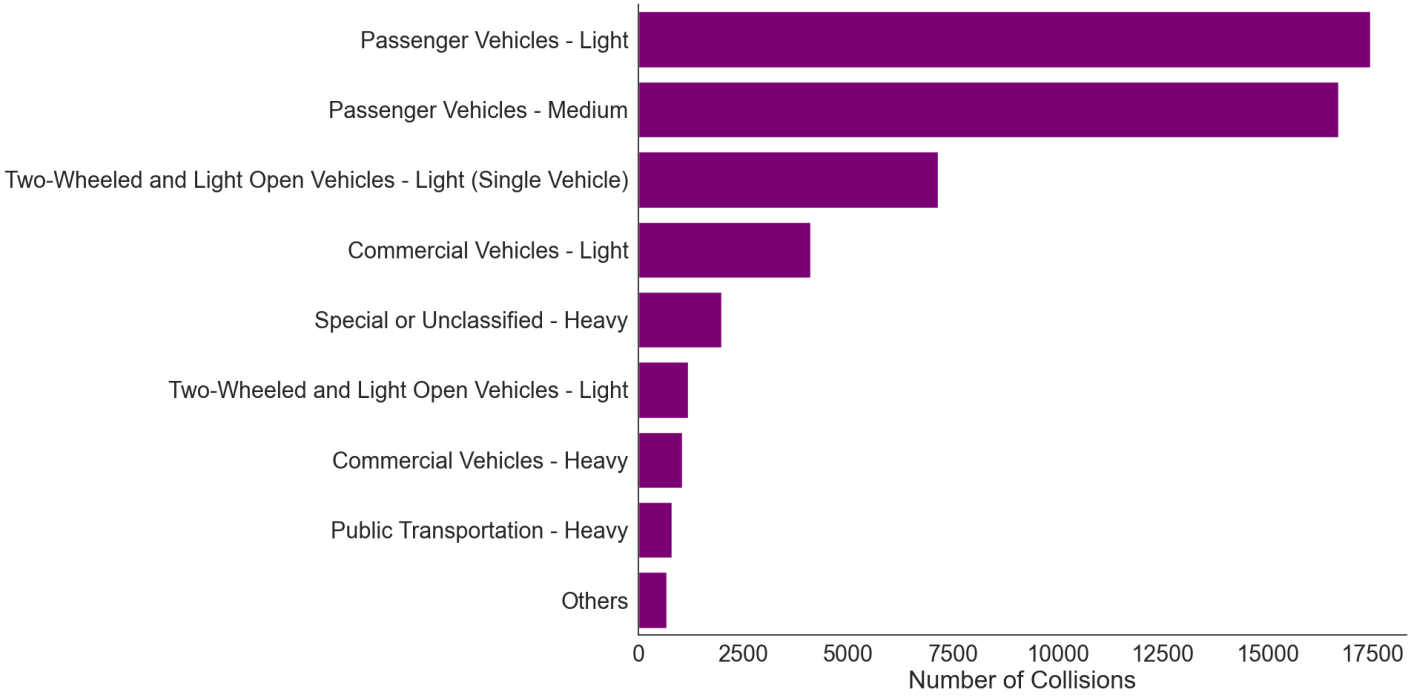
Contributing Factors

- According to the NYPD data, most of the bicycle collisions were caused by factors related to the driver (e.g., Driver Distraction, Aggressive Driving, Alcohol Involvement) or traffic violations (e.g., Failure to Yield Right-of-Way, Turning Improperly, Passing Too Closely).



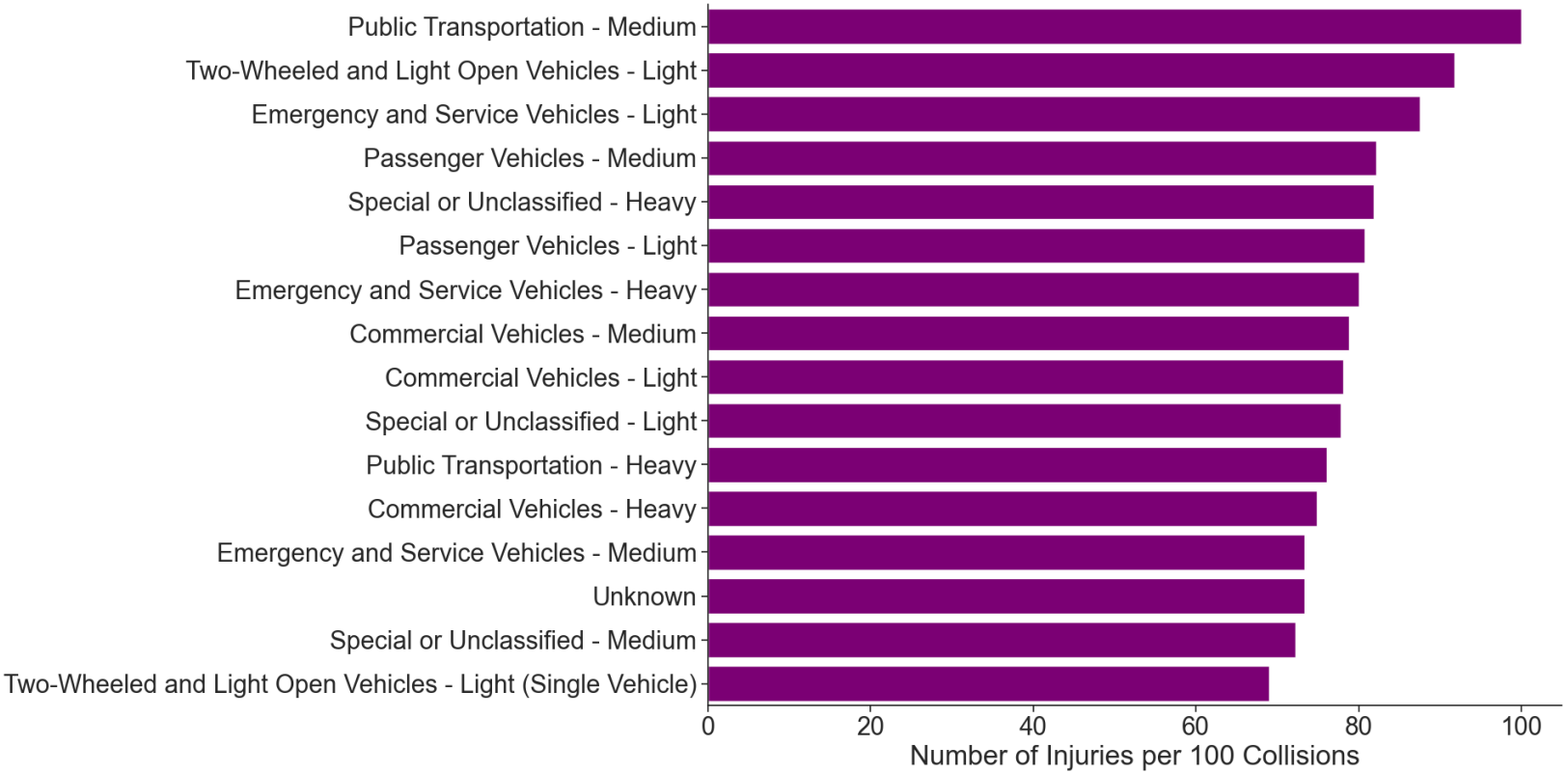
Frequency per Type of Vehicle

- We identified 62,832 bicycle collisions in the last decade.
- 97.98% of this total involved only two or less vehicles.
- 1.88% of this total involved two bicycles.



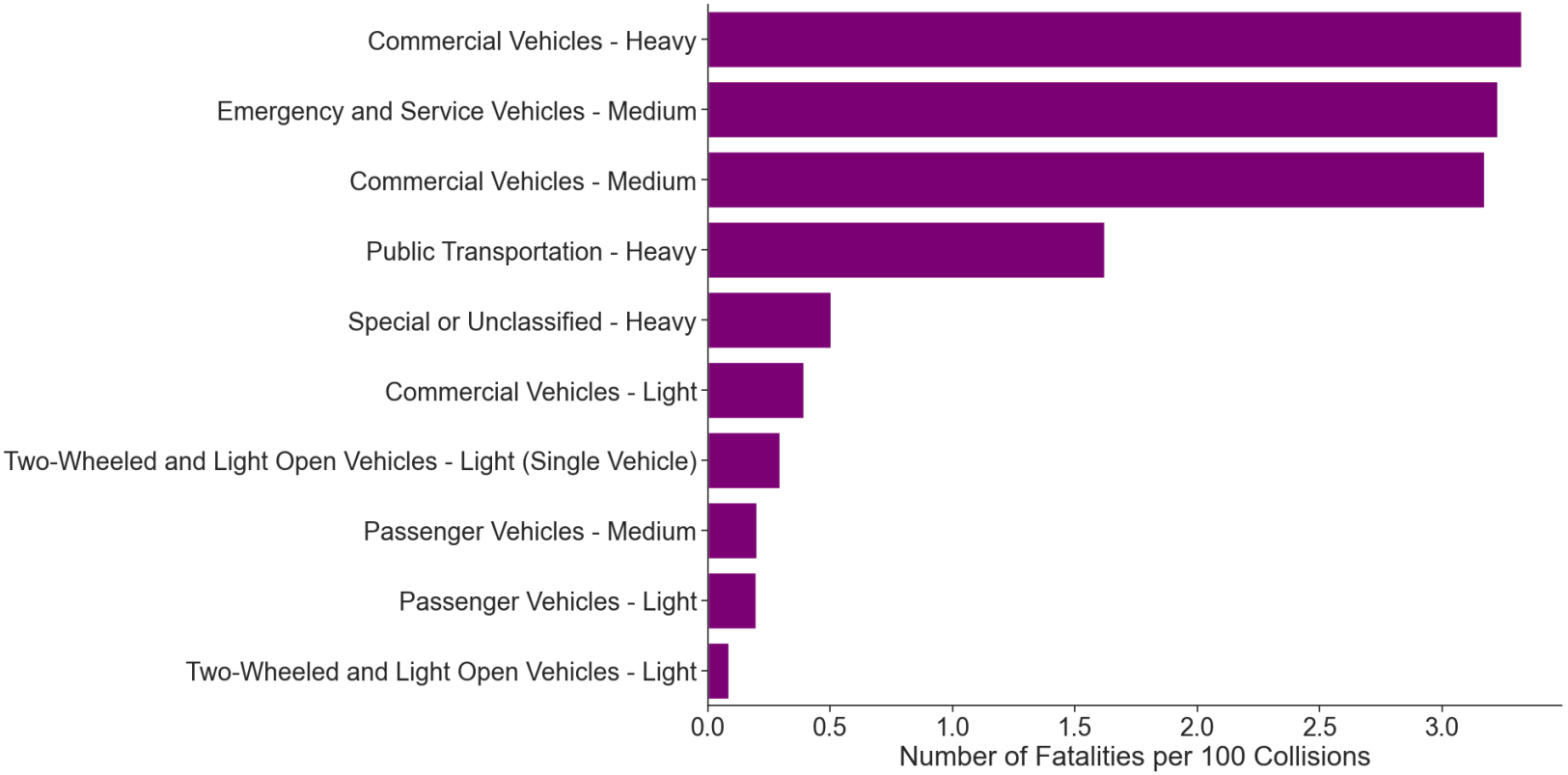
INJURIES PER VEHICLE TYPE

- Injuries were observed in most vehicle types. However, those in the medium to heavy type observed more injuries. The only exception being those with two bikes and/or e-bikes.



FATALITIES PER VEHICLE TYPE

- Fatalities are associated mostly with medium and heavy vehicles, especially those of a commercial or service nature.



Conclusion

- Bicycle safety can still benefit from target policies and initiatives as injuries and fatalities continue to occur.
- It is clear that bigger vehicles are associated with more fatalities. Such patterns can be explained by the characteristics of such vehicles, like blind spots, and overall impact force of such vehicles.
- Initiatives to instruct cyclists on best practices for safe interactions with bigger vehicles and these vehicle drivers on best practices to stay aware of their blind spots.
- It would also be interesting to consider infrastructure alternatives to reduce interactions between cyclists and such vehicles. For example, include physical barriers between bicycle lanes and traffic where these vehicles are common.

Thank You!

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