

Comprehensive Analysis of Traffic Collisions in Westmount: Identifying Risks and Strategies for Safer Roads

2012–2021 COLLISION DATA ANALYSIS

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Why Analyze Traffic Collisions?

- Identifies patterns and high-risk areas for targeted safety interventions.
- Supports evidence-based urban planning and transportation safety measures.
- Highlights vulnerabilities of specific groups (e.g., children, seniors, cyclists).

Benefits

- Provides empirical evidence of past incidents to inform safety measures.
- Highlights recurring trends and specific problem areas based on real-world data.
- Identifies groups disproportionately impacted by collisions (e.g., seniors, children).
- Enables better understanding of the effectiveness of existing safety measures

Introduction

- Overview of Traffic Safety in Westmount**

- Urban areas face increasing challenges in managing road safety amidst growing transportation demands.
- The City of Westmount, with its mix of residential, commercial, and pedestrian-heavy zones,
- experiences unique collision dynamics.

- Purpose of the Analysis**

- To explore patterns in traffic collisions over a ten-year period (2012–2021).
- To identify key factors influencing collision frequency and severity, such as location, time, and demographics

Provides actionable insights into real-world collision trends.

Methodology

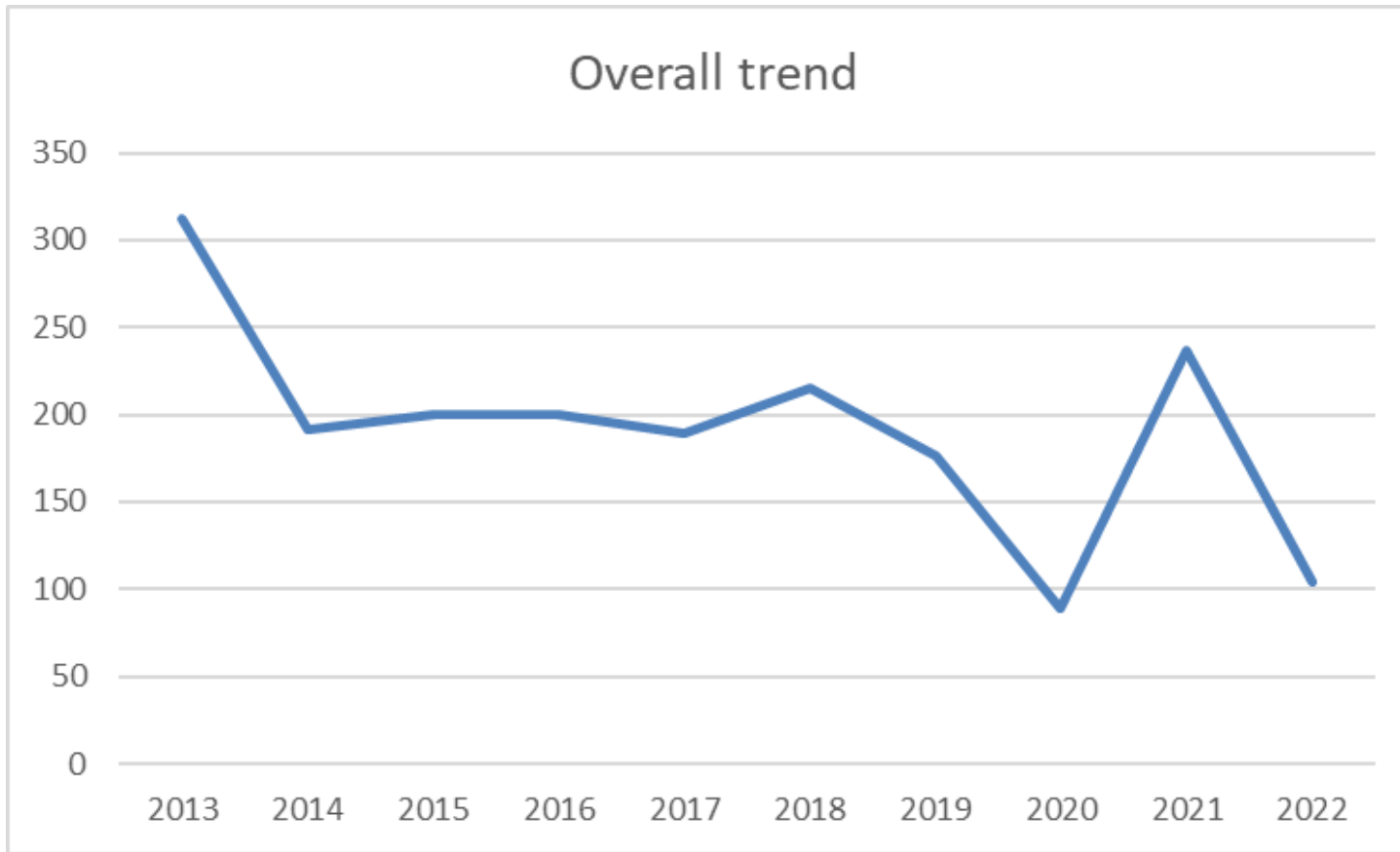
Data Sources:

- Open data Montreal
- Westmount dataset
- Statistics Canada

Analysis Approach:

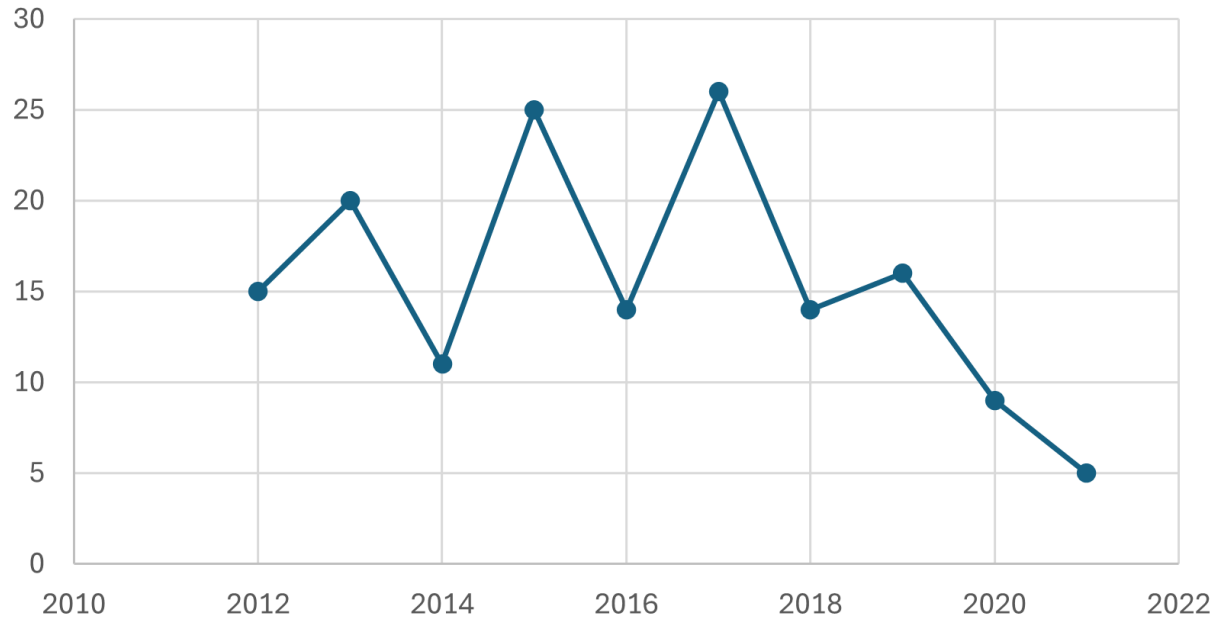
Statistical analysis,
spatial mapping, and
trend analysis.

Key Metrics: Collision frequency, severity, types of collisions, locations, and contributing factors.

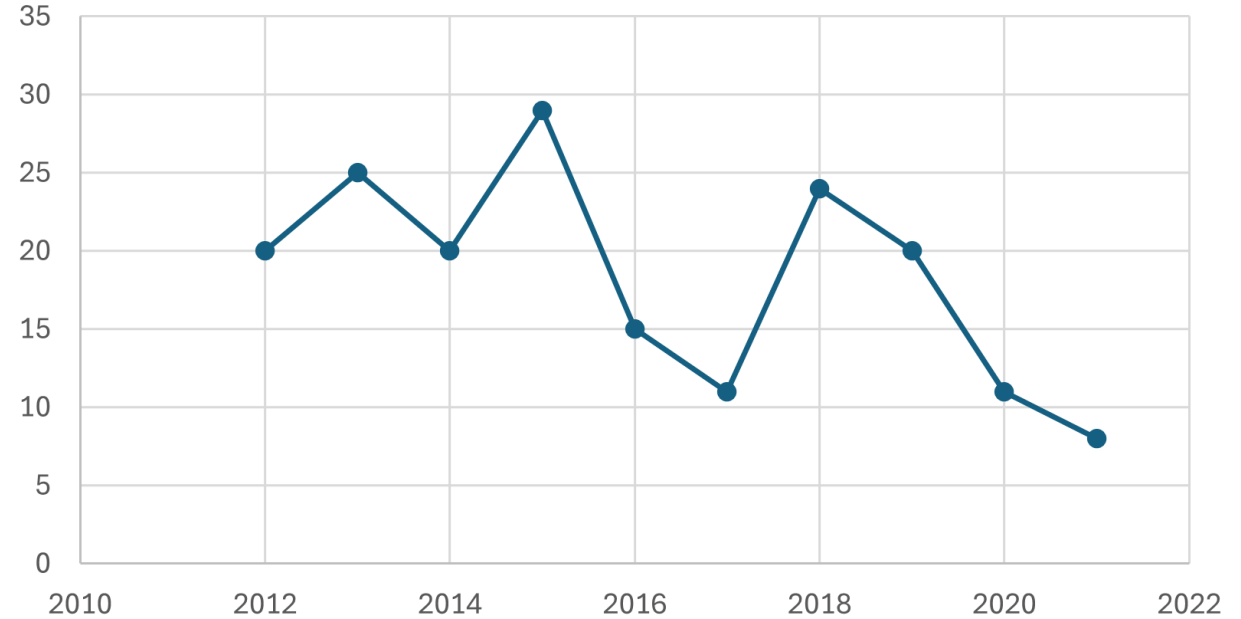


Total Collisions:
Summary of
annual
collisions from
2012 to 2022

Collision Type

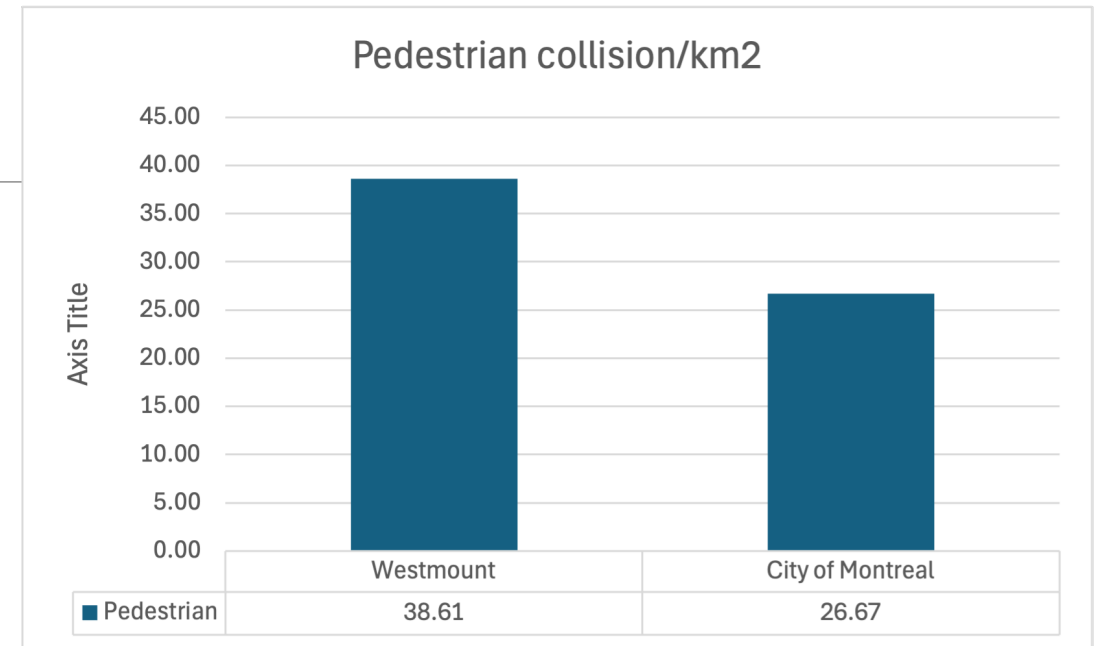
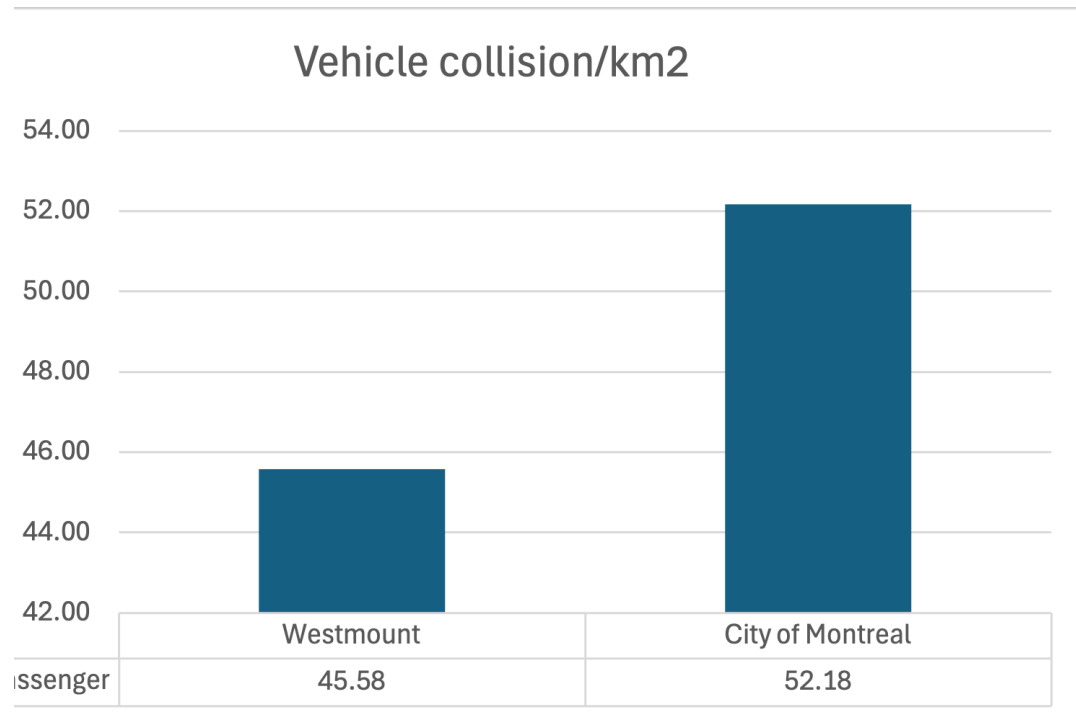


Vehicle-Pedestrian collision



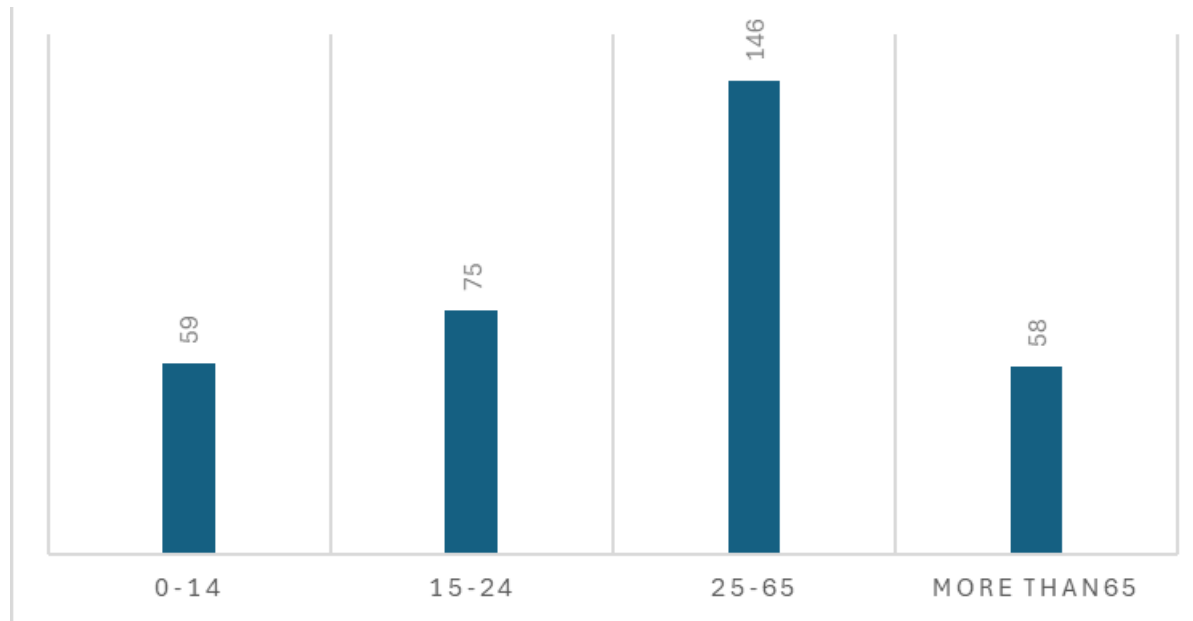
Vehicle-Vehicle collision

Both trends show a decline, likely due to changes in urban mobility patterns during the pandemic.



Comparison with City of Montreal

Age Group and Collision Severity



Age group	Severe injury (%)	Minor injury (%)	Fatality (%)	No important injury (%)
0-14	8	14	0	25
15-24	25	19	0	29
25-65	42	47	33	36
More than 65	25	20	67	10

- Children (0–14): Lower injury rates but higher vulnerability in certain locations.
- Seniors (65+): Highest proportion of severe injuries (25%) and fatalities (67%).
- Adults (25–64): Highest number of total collisions

users	Serious injury	Minor injury	Fatalities	No injury
Passenger	1	97	0	85
Pedestrian	11	113	3	28
Cyclist	0	67	1	34

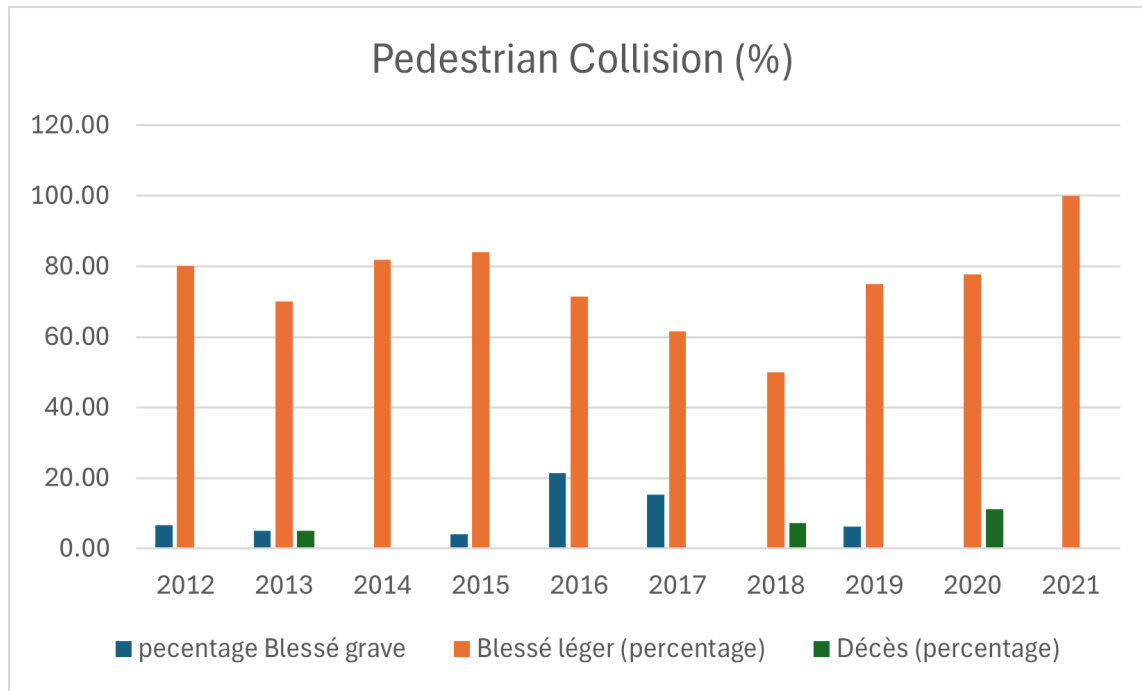
Prioritize interventions for pedestrians and cyclists as the most vulnerable road users.

Severity of collision for different users



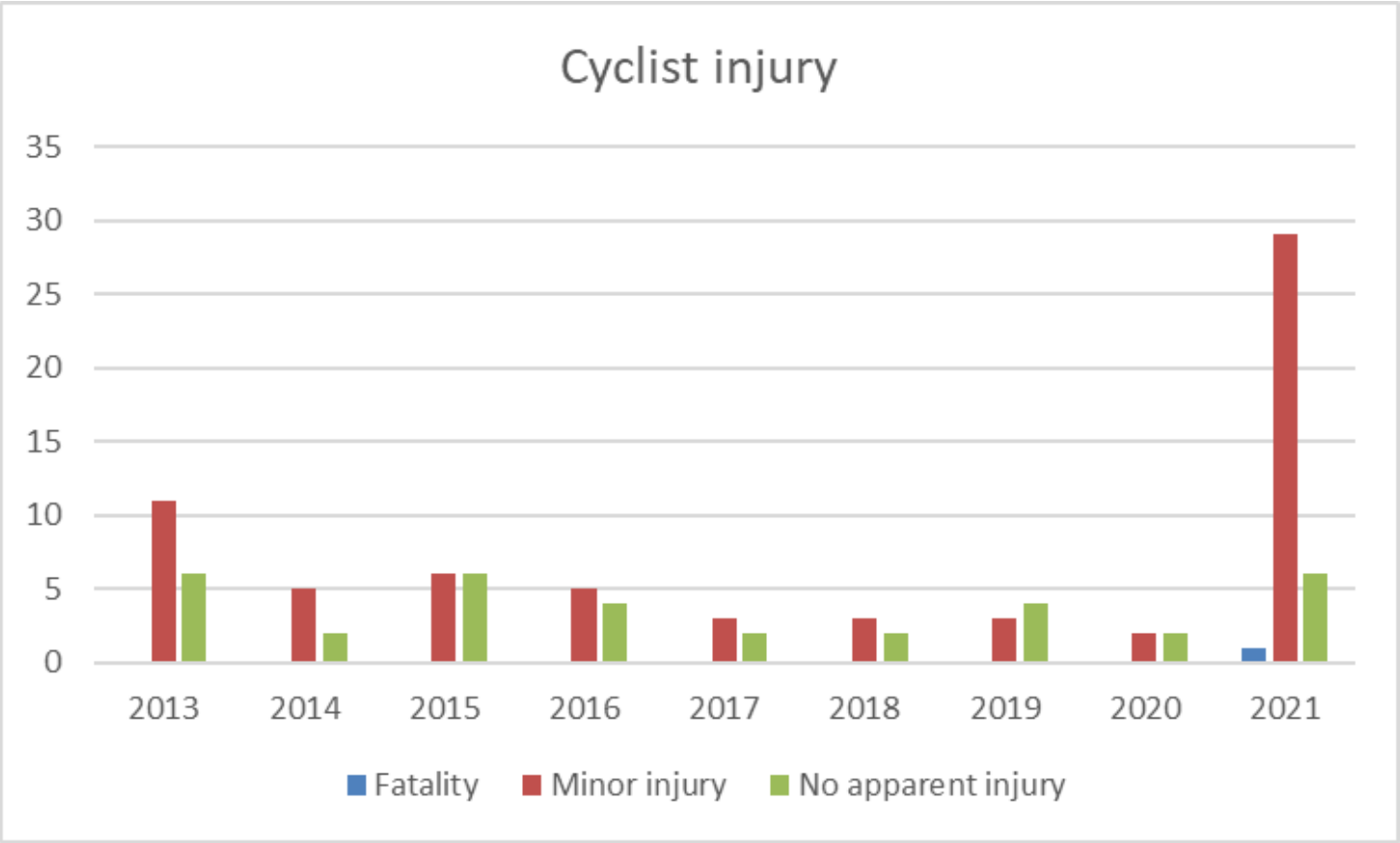
Active
Mode

Severity Trends in Pedestrian Collisions



- Minor injuries in pedestrian collisions show an upward trend.
- Severe injuries and fatalities remain relatively low but still critical concerns.

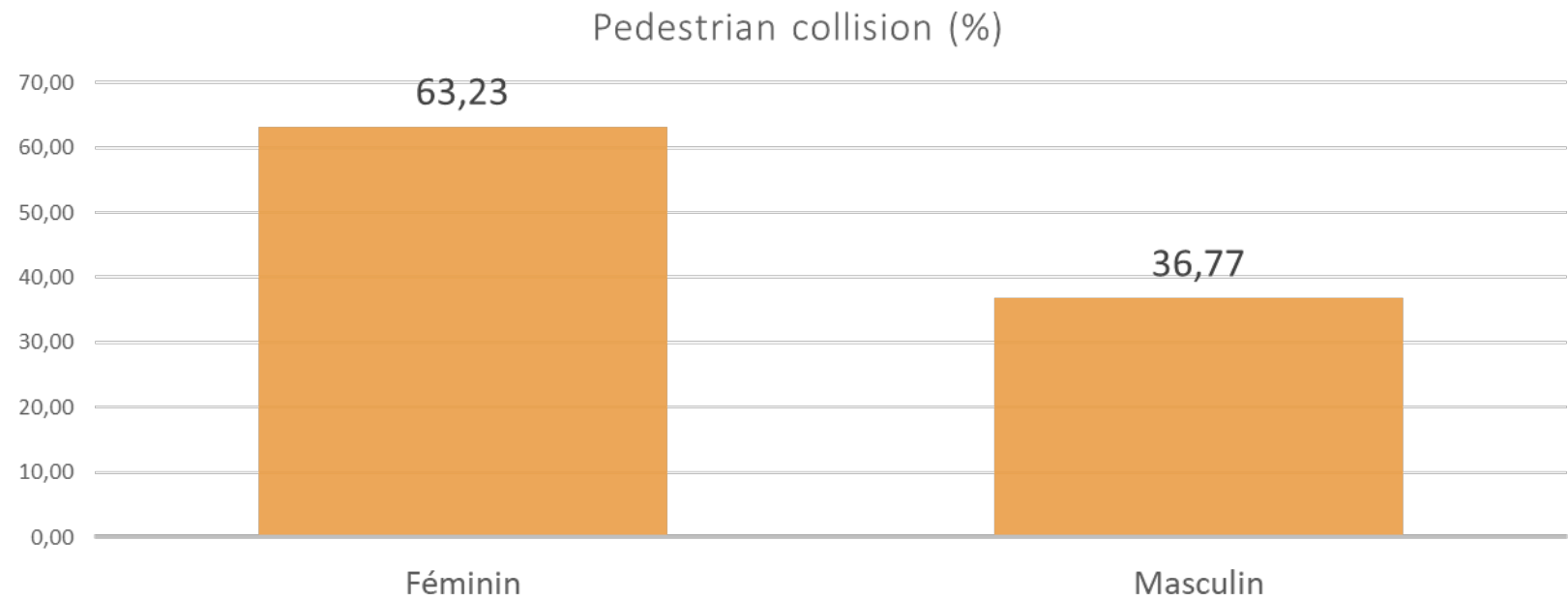
Serious injury	Minor injury	Fatality	No apparent injury
7%	73%	2%	18%



Cyclist Collision Severity Trends

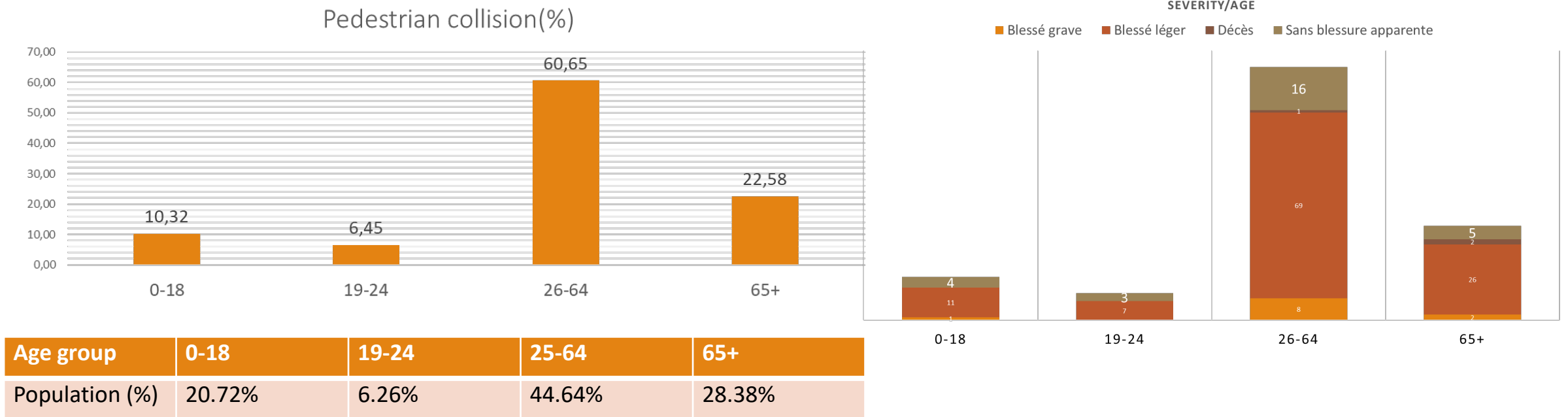
Serious injury	Minor injury	Fatality	No apparent injury
0%	64%	1%	35%

Gender Distribution in Pedestrian Collisions



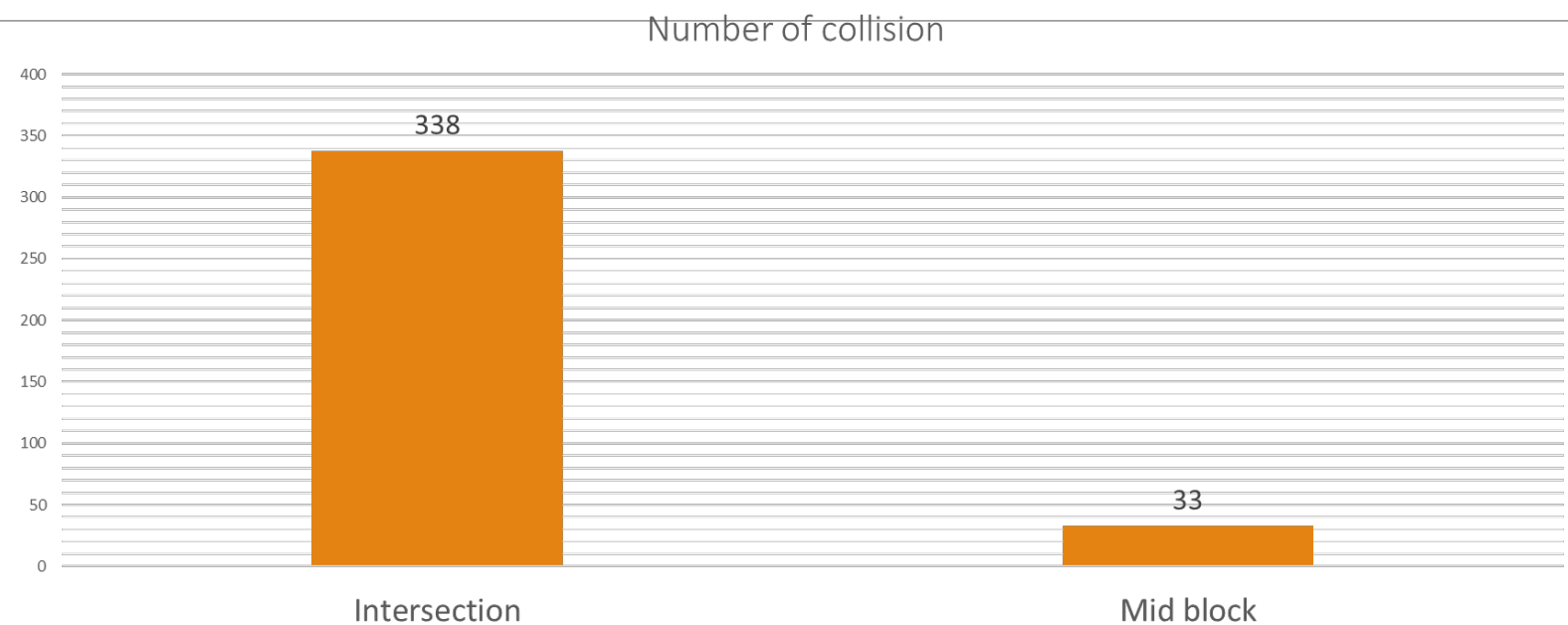
Severity	Fatality	Severe injury	Minor injury	No apparent injury	All collision
Female	5	79	3	11	98
Male	6	34		17	57

Age Group Breakdown of Pedestrian Collisions

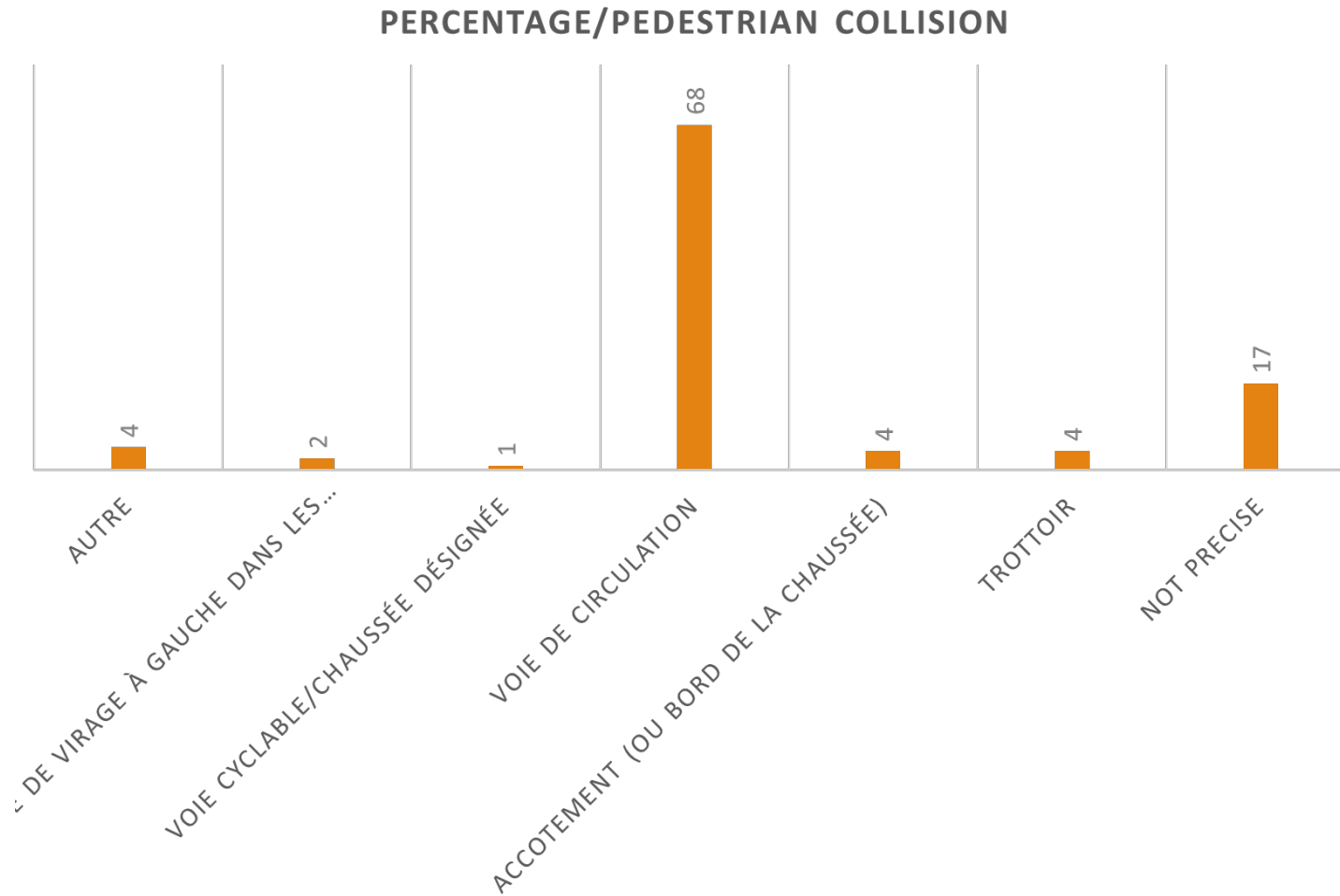


- Adults (25–64): Highest collision frequency.
- Seniors (65+): Lower collision count but higher risk of severe outcomes.

Pedestrian Collision Locations



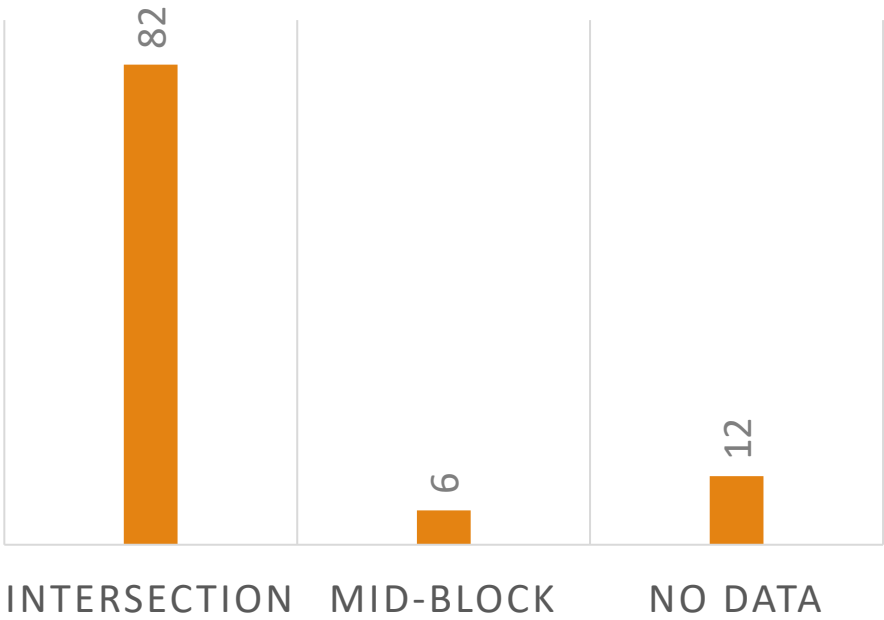
Severity	Intersection	Mid-block	No data
Fatality	2	0	1
Severe injury	7	0	3
Minor injury	71	3	12
No apparent injury	19	2	2



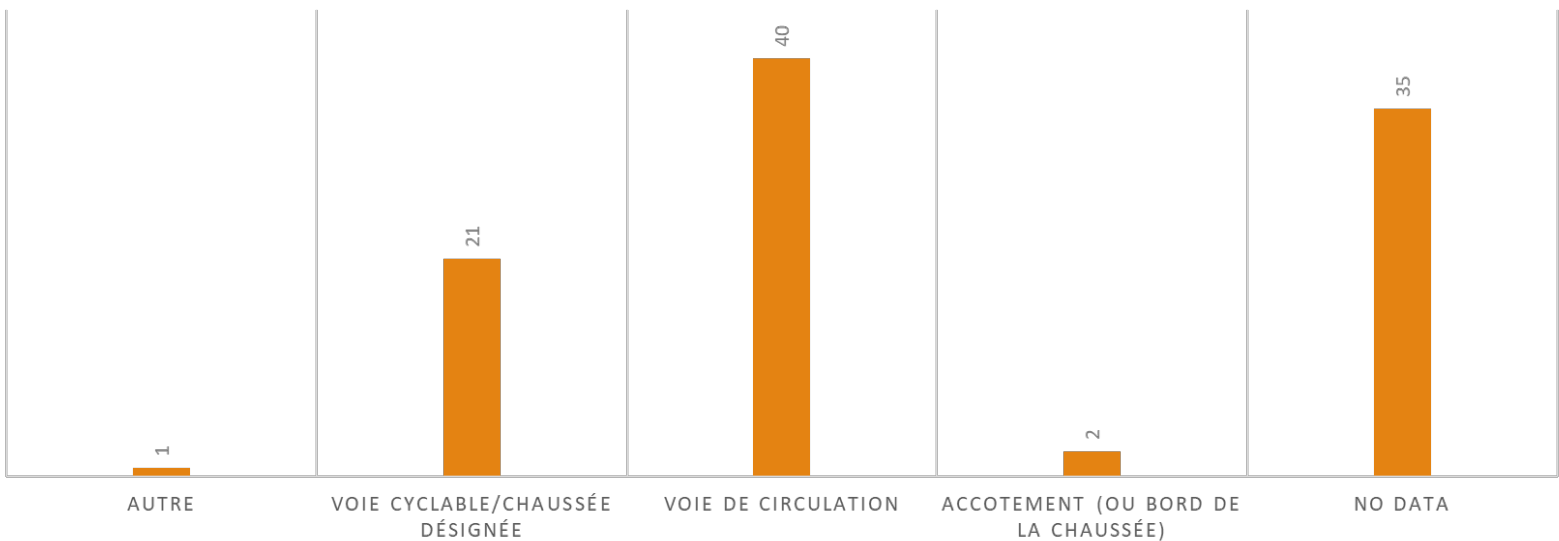
Pedestrian Collision Locations

Cyclist Collision Locations

CYCLIST COLLISION(%)

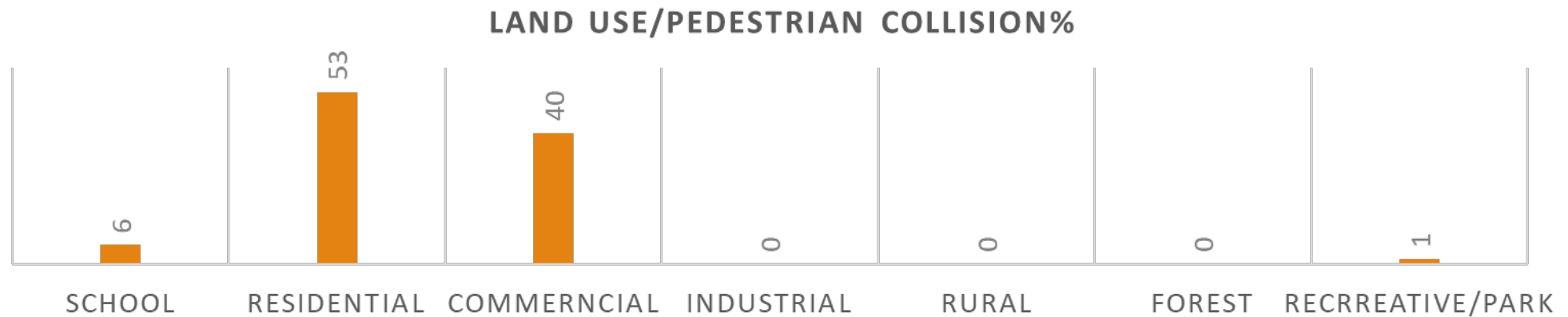


PERCENTAGE/CYCLIST

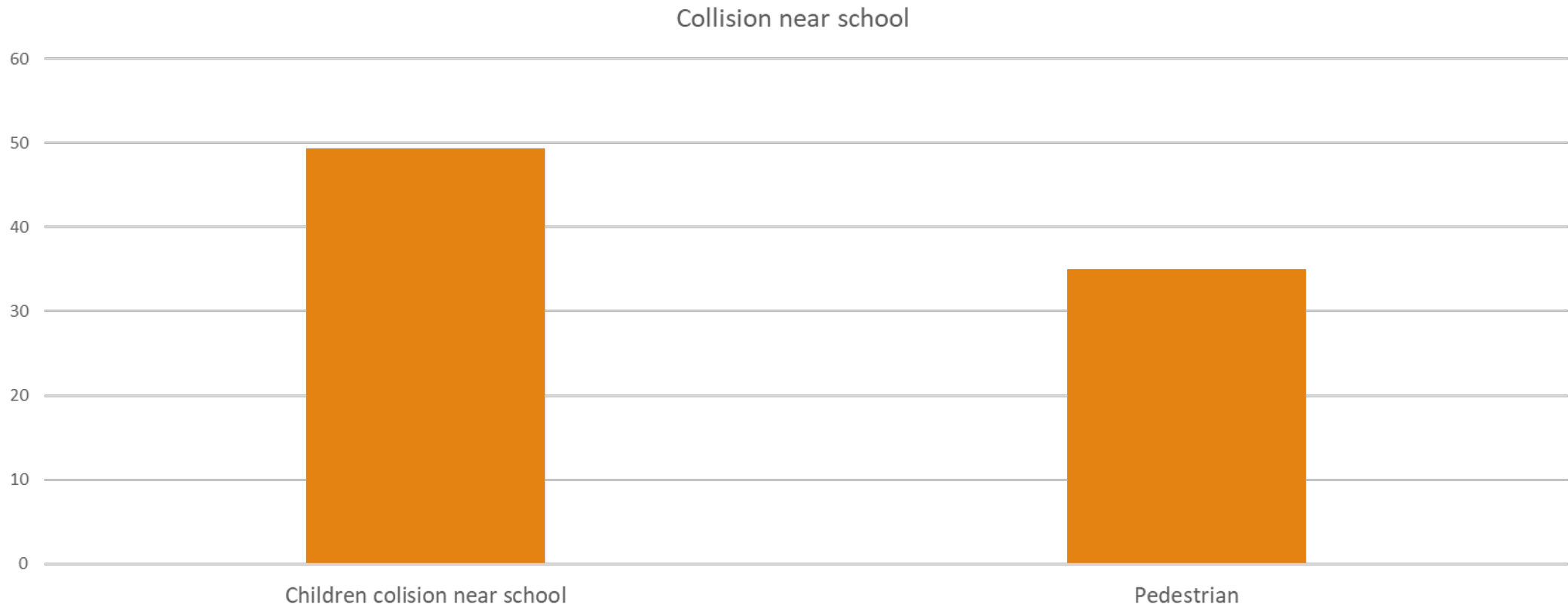


Location/Severity	Intersection	Mid-block	No data
Fatality	1		
Minor collision	57	4	6
Material damage	26	2	6

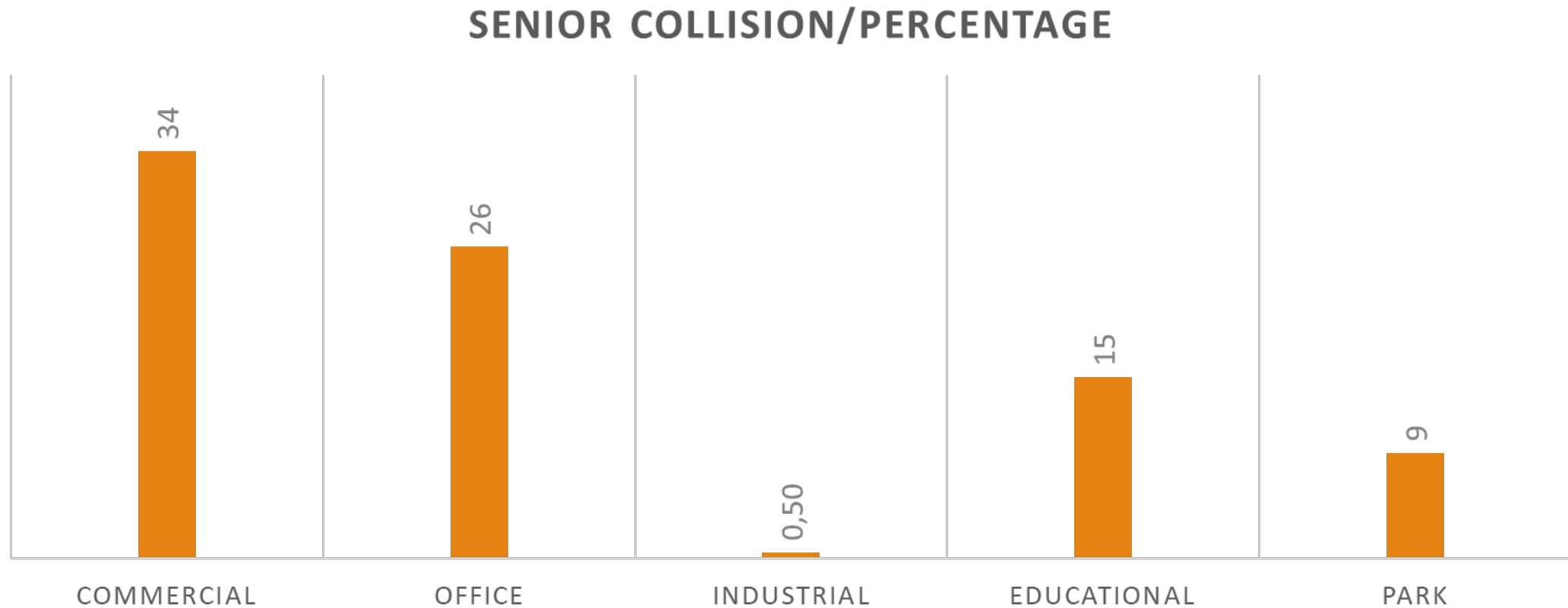
Land Use and Pedestrian Collisions



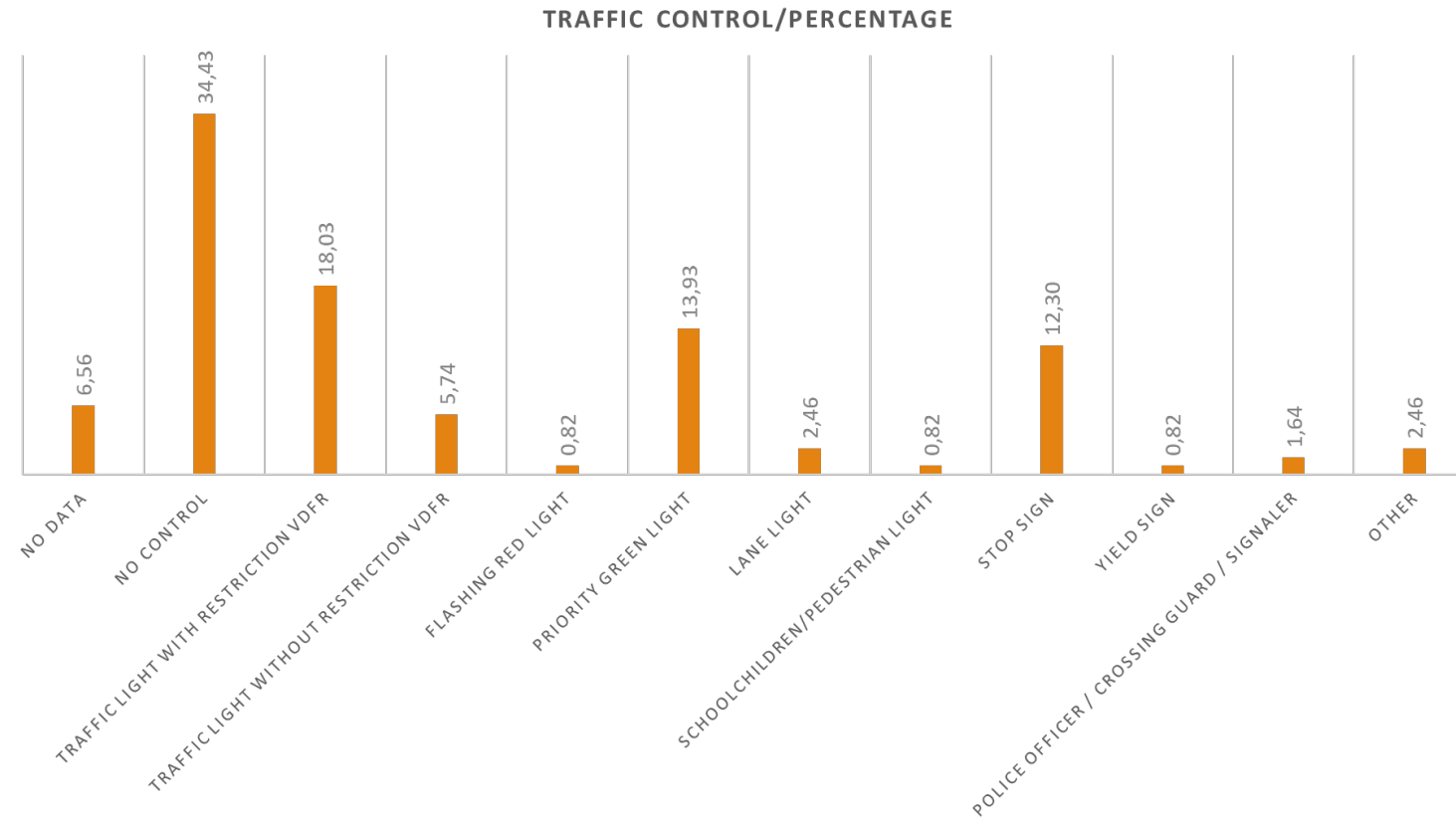
Collisions Near Schools (Child vs. General Pedestrians)



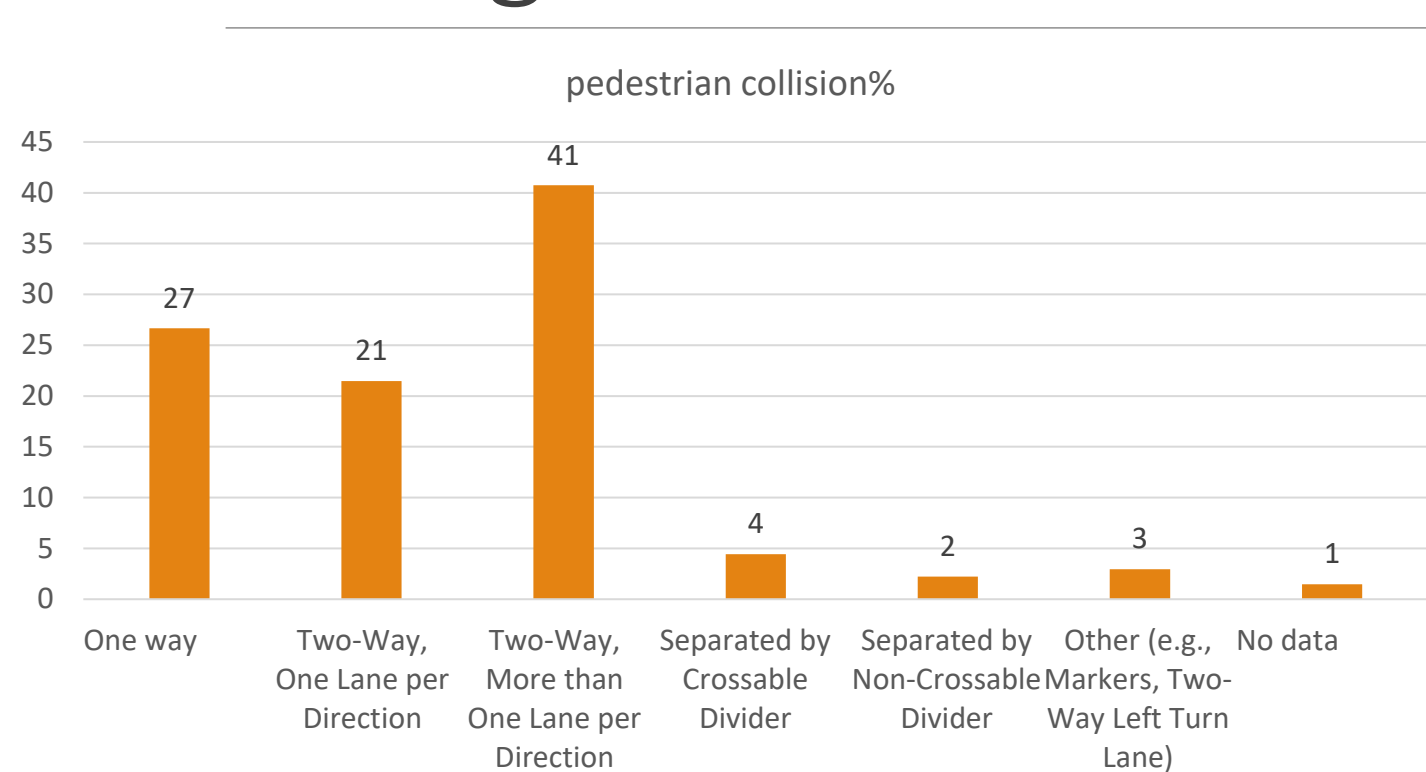
Senior Collisions by Land Use (Percentage Analysis)



Traffic Control and Pedestrian Collision Distribution



Pedestrian Collisions by Road Configuration



Lane characteristics	Dommages			
	matériels inférieurs au seuil de rapportage	Grave	Léger	Mort
One way	8	6	21	1
Two-Way, One Lane per Direction	7	3	19	
Two-Way, More than One Lane per Direction	8	2	43	2
Separated by Crossable Divider			6	
Separated by Non-Crossable Divider		:	2	
Other (e.g., Markers, Two-Way Left Turn Lane)			4	
No data		:	1	

multi-lane two-way roads

Pedestrian Collision-Intersection

- 0 - 0
- 0 - 1
- 1 - 2
- 2 - 4
- 4 - 8



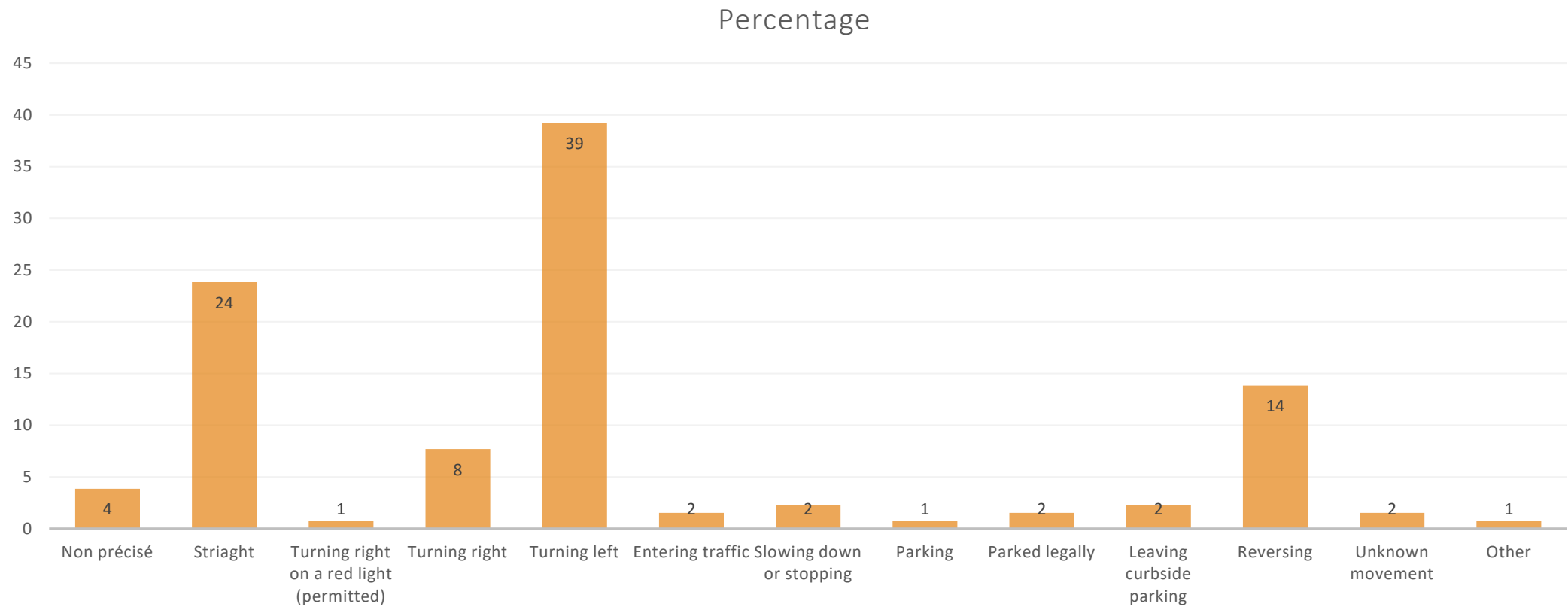
Pedestrian collision

- 0 - 0
- 0 - 1
- 1 - 2
- 2 - 5
- 5 - 8

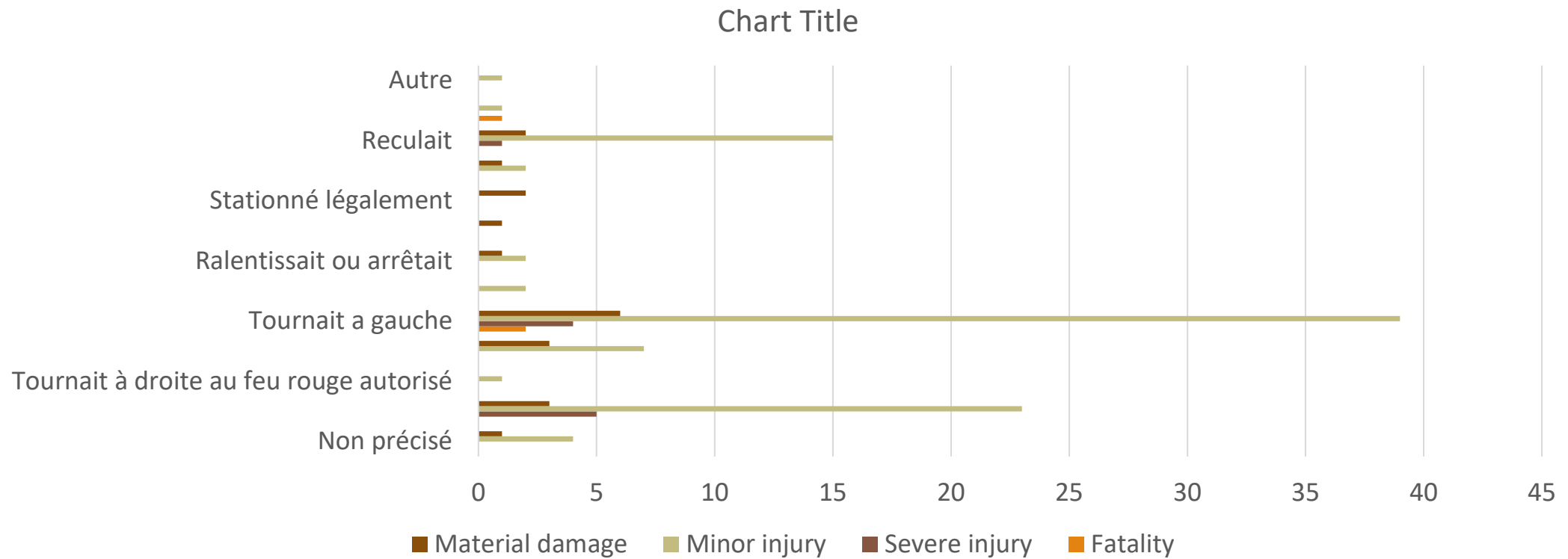


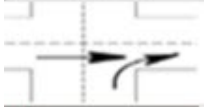
Pedestrian Collision Hotspots

Pedestrian Collisions by Vehicle Movement



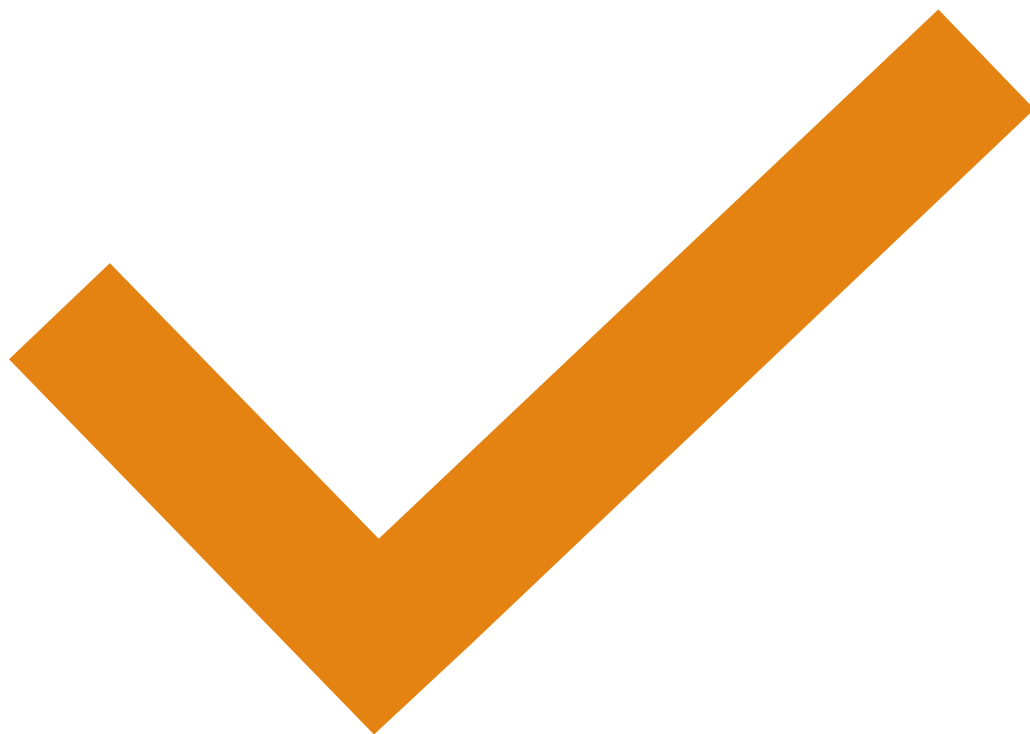
Severity Analysis of Collision vs Vehicle Movement



	97
	12
	11
	9
	3
	60
	13

	2
	2
	200
	58
	57
	5
	15
	7

Distribution of Vehicle Movements in Vehicle-Vehicle Collisions



Temporal Analysis

Collision Frequency by Month

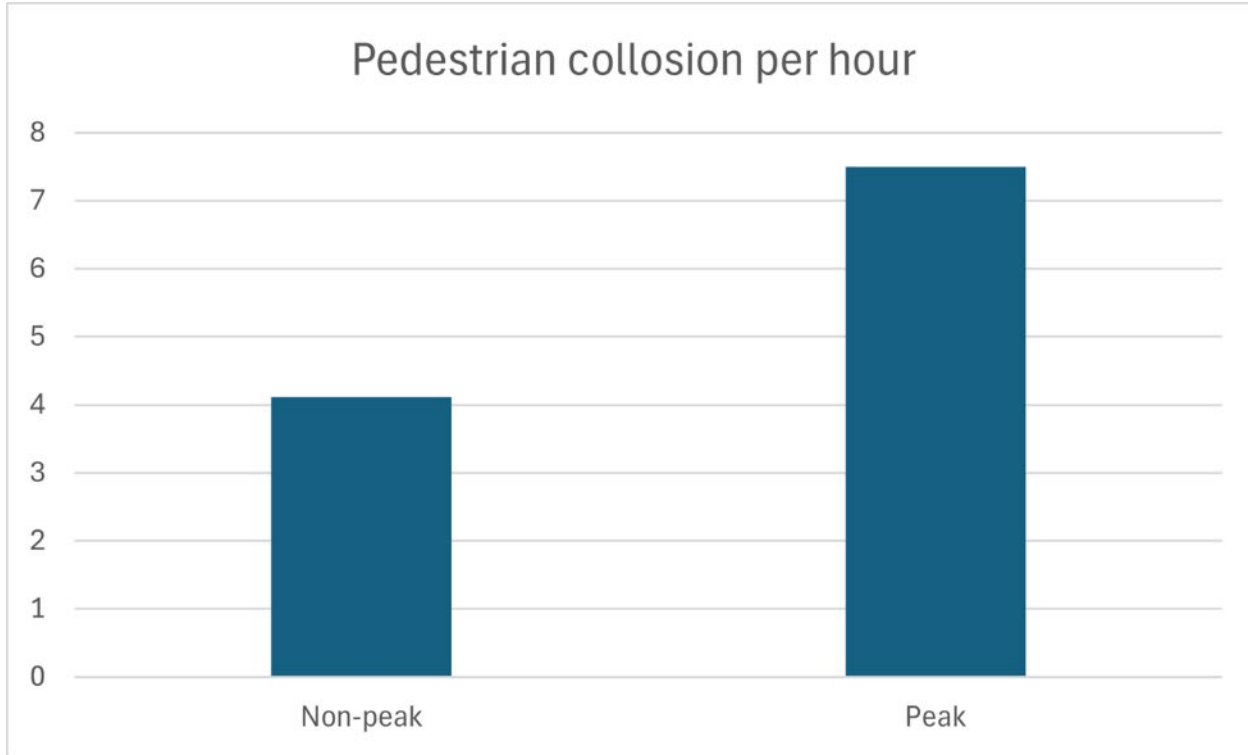
Higher collision rates in colder months compared to warmer months.

Month	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Total	%
Jan	0	4	2	2	1	1	2	2	2	1	17	11
Feb	0	0	2	1	2	3	2	1	2	0	13	8
Mar	0	1	0	3	1	5	0	1	1	1	13	8
Apr	1	1	0	0	1	2	1	1	1	0	8	5
May	0	1	1	2	0	1	2	2	0	0	9	6
June	1	3	1	2	2	2	0	2	1	0	14	9
July	1	1	1	1	2	2	0	1	2	0	11	7
Aug	2	2	1	1	0	1	2	0	0	0	10	6
Sept	1	2	1	6	0	2	1		0	1	14	9
Oct	6	1	1	1	4	0	0	1	0	0	14	9
Nov	1	1	1	1	0	1	3	3	0	1	12	8
Dec	2	3	0	5	1	6	1	1	0	1	20	13

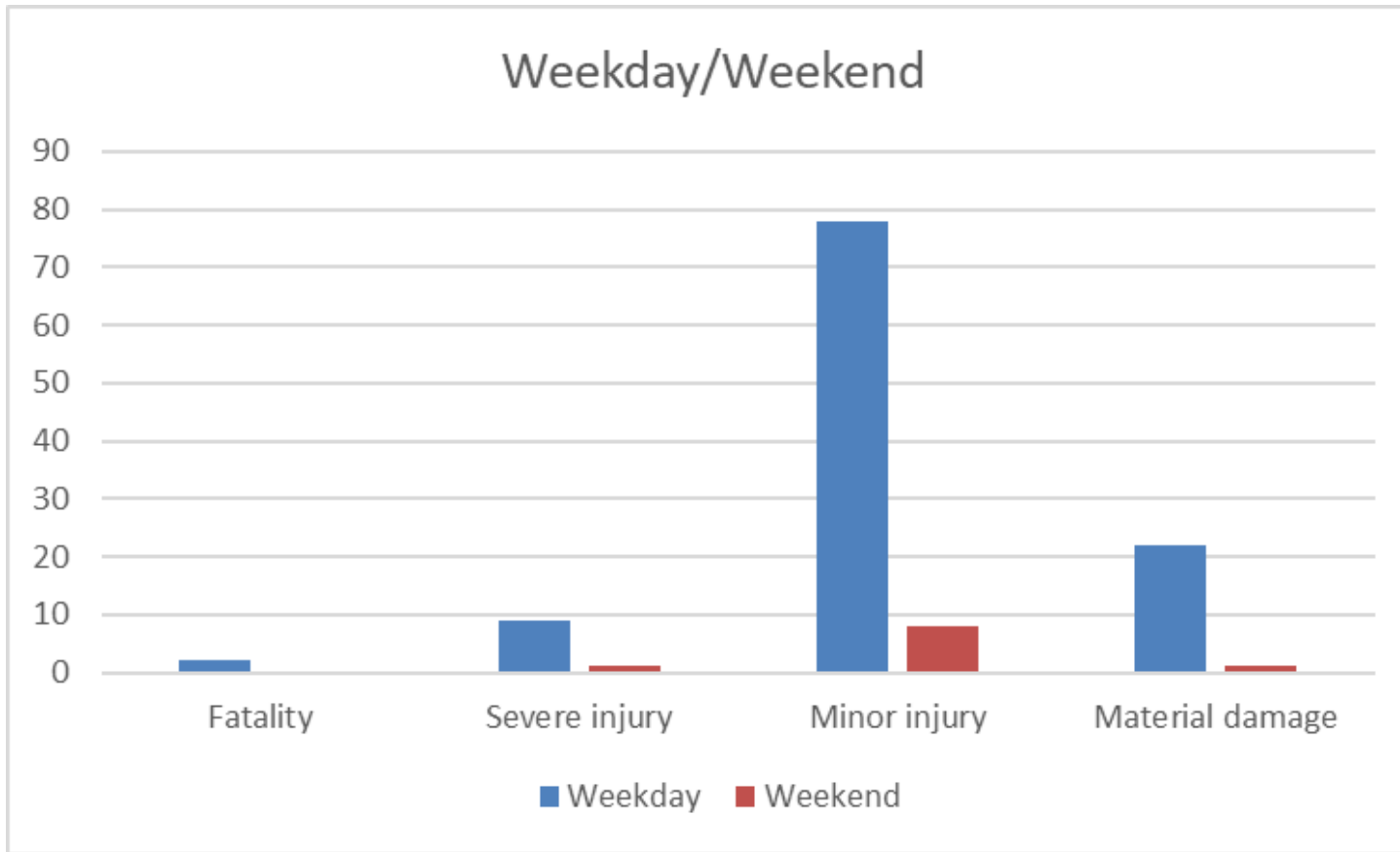
Month	MD	Major	Minor	Fatality	%	Physical injury rate
Jan	4	2	11	0	13	16
Feb	2	1	10	0	10	15
Mar	2	0	10	0	9	15
Apr	3	2	3	0	6	4
May	2	0	5	0	5	7
Jun	1	2	11	0	10	16
Jul	1	1	6	1	7	10
Aug	0	0	6	0	4	9
Sep	3	0	7	0	7	10
Oct	1	2	8	1	9	13
Nov	5	0	8	0	10	12
Dec	1	1	11	1	10	17

Collision Severity and Physical Injury Rates by Month

HIGHER PHYSICAL INJURY RATES IN WINTER MONTHS (JANUARY AND DECEMBER).



Pedestrian Collisions Per Hour - Peak vs. Non-Peak



Pedestrian Collisions - Weekday vs. Weekend

Discussion of Findings

Key Insights:

- **High-Risk Locations:**

- Intersections identified as critical hotspots, with a majority of severe injuries and fatalities.

- **Temporal and Seasonal Patterns:**

- Peak traffic hours and colder months show higher collision rates due to increased interaction and reduced visibility.

- **Vulnerable Groups:**

- Children near schools and seniors in commercial areas face disproportionate risks.

- **Vehicle Movement:**

- Left-turning vehicles are a significant contributor to pedestrian collisions.

Future Steps for Analysis

- Driver Behavior Analysis:**

- Conduct surveys or observations to evaluate speed compliance, distractions, and awareness.
- Study the role of impaired or distracted driving in collision severity.

- Spatial Accessibility Analysis:**

- Assess road network design and "walkability" in key areas.

- Land Use and Traffic Volume Correlation:**

- Explore how land use and traffic volume influence collision patterns.

- Mode-Specific Risk Assessment:**

- Extend analysis to motorcyclists, heavy vehicles, and detailed cyclist data.

Proposed Advanced Studies

- Safety Infrastructure Effectiveness:**

- Identify locations with the highest potential for infrastructure upgrades.

- Predictive Modeling of Exposure:**

- Leverage machine learning to predict exposure (pedestrian, vehicle)

- Cross-Jurisdictional Comparisons:**

- Benchmark Westmount's collision trends with similar municipalities.

- Traffic Safety Framework:**

- Develop a Vision Zero and Safe Systems-based framework tailored to Westmount's needs.



Thank You