Original Research Article

Traffic Collision Patterns and Risk Factors in Seattle, Washington (2004–2022): A Data-Driven Framework for Urban Road Safety

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ABSTRACT

This study analyzes 242,131 traffic collisions from Seattle, Washington, from 2004 to 2022 to understand how factors such as weather, driver, and road conditions relate to collisions. Collision frequency and severity were examined by time, location, and weather conditions. While the initial hypothesis was that most collisions occur on highways, the analysis showed that most collisions occur mid-block on city streets, and ones at intersections were far more likely to cause injury. Pedestrian and cyclist collisions account for only 6.2% of collisions but represent 47.7% of all fatalities. During the evening rush hour there are 51.6% more collisions (38,683 vs 25,515) than during the morning rush. Speeding-related collisions are only 4.5% of collisions but account for 23.2% of fatalities. These findings support targeted safety recommendations such as enhanced pedestrian and cyclist infrastructure, evening rush-hour traffic management, and continued speed-limit programs. Annual collisions also fell 35.5% during the first year of the COVID-19 pandemic, consistent with a link between reduced traffic volume and fewer collisions.

Keywords: traffic safety; collision analysis; pedestrian safety; Vision Zero; speeding collisions; Seattle traffic; safety risks

INTRODUCTION

Traffic collisions are a major public health problem. Each year, more than 40,000 people die in motor vehicle collisions in the United States, and many more are seriously injured (1). Beyond the human cost, collisions place large economic and social burdens on cities. Because most of these deaths are considered preventable, understanding when, where, and why collisions happen is an important step toward reducing them.

Previous research has identified several risk factors. Pedestrians and cyclists make up a disproportionately large share of deaths, because they have little protection in a collision (2, 3). Vehicle speed is another major factor; higher speeds give drivers less time to react and increase the force of a crash. The World Health Organization estimates that even a 5% reduction in average speed can cut fatal crashes by about 30% (4).

In response to these patterns, many cities have adopted Vision Zero, a policy framework that aims to eliminate traffic deaths and serious injuries. Seattle adopted it in 2015 (5). Although these national and international patterns are well documented, far less attention has been paid to how they play out within a single city over a long period. Seattle is a growing metro area with a mix of dense urban streets, high-speed arterials, uneven terrain, and significant rainfall

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that creates unusual traffic patterns. It publishes detailed open collision data going back to 2004. Most existing analyses focus on national summaries, leaving a gap in long-term, city-specific understanding of which times, locations, and conditions have the most collisions and highest injury rates. This study aims to fill that gap, and also identify where Seattle departs from national norms.

The initial hypothesis was that most collisions would occur on highways, where speeds are highest. To test this and related questions, the study addresses five questions: 1. What time patterns occur in Seattle traffic collisions (daily, monthly, yearly)? 2. Which collision types and locations result in the highest injury and fatality rates? 3. How do environmental conditions (weather, road surface, lighting) at the time of collision affect severity? 4. What was the impact of reduced traffic during COVID-19 on collision frequency? 5. What policy priorities do the observed patterns suggest? By analyzing 242,131 collision records spanning 2004–2022, this study provides empirical, city-specific evidence to help prioritize traffic-safety investments in Seattle, and potentially in other cities with similar characteristics.

METHODS AND MATERIALS

Data Source

This study analyzed the "SDOT Collisions – All Years" dataset from the Seattle Open Data Portal (6), maintained by the Seattle Department of Transportation and Seattle Police Department. It is a continuously updated dataset with no formal version number; the copy analyzed was downloaded in May 2023 and contained 242,131 records. The data span 2004–2022 plus a small number of incomplete boundary records (one from 2003 and 2,033 from early 2023); these two partial years were excluded from the year-over-year and month-of-year trends (Figures 1 and 2) but retained elsewhere.

Sample and Data Integrity

Each record has a unique incident key (INCKEY); no duplicate collisions were found and none were removed during cleaning, so the original and final sample sizes were identical (242,131). The unit of analysis was the collision rather than the individual road user, so a single collision may involve multiple people, pedestrians, or cyclists.

Variables Analyzed

The dataset contains 46 fields; the key variables used in this analysis are listed in Table 1.

Table 1. *Key variables from the SDOT Collisions – All Years dataset used in this study.*

Variable	Description
SEVERITYDESC	Collision severity classification
COLLISIONTYPE	Type of collision (e.g., Pedestrian, Rear Ended)
INCDTTM	Incident date and time
WEATHER	Weather conditions at the time of collision
ROADCOND	Road surface conditions
LIGHTCOND	Lighting conditions
SPEEDING	Whether speeding was a factor
UNDERINFL	Whether the driver was under the influence

Severity Classification and Missing Data

Collisions were classified by severity into five categories: Property Damage Only (149,578, 61.8%), Injury (64,172, 26.5%), Unknown (24,280; 10.0%), Serious Injury (3,665, 1.5%), and Fatality (436, 0.2%). For every variable, records with a missing or unknown value were excluded from analyses of that variable but kept in overall collision counts.

Unknown severity (10.0%) is the most consequential case. To calculate injury rates, the Injury, Serious Injury, and Fatality categories were combined into a single "any injury" outcome. The 24,280 Unknown records were excluded from injury-rate denominators rather than counted as non-injury. In a sensitivity analysis that instead treated these records as non-injury, injury percentages were unchanged for collision type, speeding, impairment, weather, and road condition (unknown-severity records rarely carry these fields; only 2 of 24,280 have a collision-type code) and were lower only for location type (mid-block 22.2% versus 25.0%; intersection 41.2% versus 43.9%). The unknown-severity handling therefore affects only the location-based rates (Table 5) and does not change ranking or conclusion.

Variable Recoding

Three contributing factors were each recorded as yes or no. In the under-the-influence field (UNDERINFL), both "Y" and "1" meant yes and "N", "0" and blank values meant no; counting these together gave 9,735 under-the-influence collisions. The speeding (SPEEDING) and inattention (INATTENTIONIND) fields were marked only when the factor was present ("Y"), so blank entries were counted as "no," giving 10,944 speeding and 30,615 inattention collisions. Location type was taken as-is from the ADDRTYPE field (Block, Intersection, or Alley); 3,897 records (1.6%) had no address type and were left out of the location analysis only.

Rate and Percentage Formulas

Each rate was computed within a category (for example, a collision type, a location type, a weather condition, or a contributing factor). The injury rate for a category was its injury, serious-injury, and fatality collisions divided by the category's collisions with a recorded severity. The share of fatalities, for a category, was its fatal collisions divided by the 436 total fatalities. A category's collision contribution was its collision count divided by all 242,131 collisions. Year, month, day, and hour were taken from the incident date-time field (INCDTTM). Morning rush hour was defined as the 7:00–10:00 AM window and evening rush hour as the 4:00–7:00 PM window (each three hours); these were chosen in advance, and the comparison between them is exploratory.

Geographic Analysis

Each collision includes map coordinates and a standardized street label in the SDOT-provided LOCATION field, populated for 98.0% of records; the location and corridor analyses used this text label as provided, without manual cleaning or additional geocoding. ADDRTYPE indicates whether the collision is at an intersection ("street A and street B") or a mid-block segment ("street between two cross-streets"). The LOCATION text label records this as "street A and street B" (intersection) or "street between two cross-streets" (mid-block). Corridor totals include both mid-block segments and intersections along the named street (e.g., Rainier Avenue S: 7,667 mid-block and 3,114 intersection collisions).

The 15 high-collision locations in Figure 7 are the distinct labels with the most collisions. For the corridor analysis (Table 4), collisions were aggregated by street: every collision whose label referenced a given street (for example, "Rainier Ave S") was counted toward that corridor, and the two corridors reported are the major arterials with the highest fatality counts. Because a corridor sums all segments and intersections along an entire street, corridor totals are larger than any single location in Figure 7.

Multivariable Analysis

To estimate each factor's association with injury while accounting for confounding, a binary logistic regression was fitted with any injury (versus property-damage-only) as the outcome; unknown-severity collisions were excluded. Predictors were collision type, speeding, driver impairment, location type, lighting, weather, road condition, time of day and year. Records missing a predictor were kept via a "missing" category, so all 216,250 known-severity collisions were analyzed. Results are reported as adjusted odds ratios (aOR) with 95% confidence intervals.

Analysis

Statistical analysis was performed using Python 3.12.6 with the pandas (3.0.0), numpy (2.4.1), matplotlib (3.10.8) and statsmodels (0.14.6) libraries. The analysis consisted of four components: frequency by time period (hour, day of week, month, year); injury rates by collision type and environmental condition; a 2019 vs. 2020 comparison to assess the impact of COVID-19 and cross-tabulation of severity by contributing factors.

This study used a publicly available, de-identified secondary dataset and did not involve human subjects, animal subjects, or the collection of any personally identifiable information; institutional review board (IRB) approval was therefore not applicable.

RESULTS

This analysis took several perspectives. First, collisions were grouped by year, month, time of day to identify any temporal patterns. Second, collision types and injury rates were reviewed to identify the collision types with the highest injury and fatality rates. Third, other contributing factors such as human behavior (e.g. speeding), environmental conditions (e.g. rain), and road conditions were analyzed to understand their impact on collisions. These results and takeaways are shown below.

Yearly Trends

Annual collision counts ranged from 16,016 (2005) to 7,250 (2020) (Figure 1).

Monthly Trends

October had the highest recorded number of collisions (22,166), while February had the lowest (17,438) (Figure 2). Adjusting for the number of days per month, October still had the most collisions per day (37.6) and February the fewest (32.5), a difference of 15.9%.

Hourly Patterns

The hourly distribution peaks at 5:00 PM (17:00) with 14,339 collisions (Figure 3).

Collision Type and Injury Rate

The relationship between collision type and injury rate helps determine where to improve safety most. The collisions with the highest injury rate were cyclist and pedestrian collisions (Figure 4). Rear-end collisions had both a moderately high count and a tendency to cause injury.

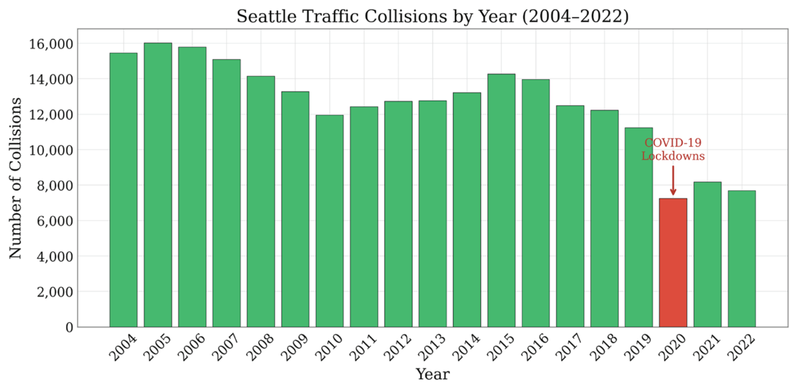

Figure 1. *The 2020 data show a 35.5% decrease from 2019 (11,235 to 7,250), coinciding with reduced traffic during COVID-19 lockdowns. Before the pandemic, collisions declined from 2015 (14,259) to 2019 (11,235), a 21.2% reduction over five years.*

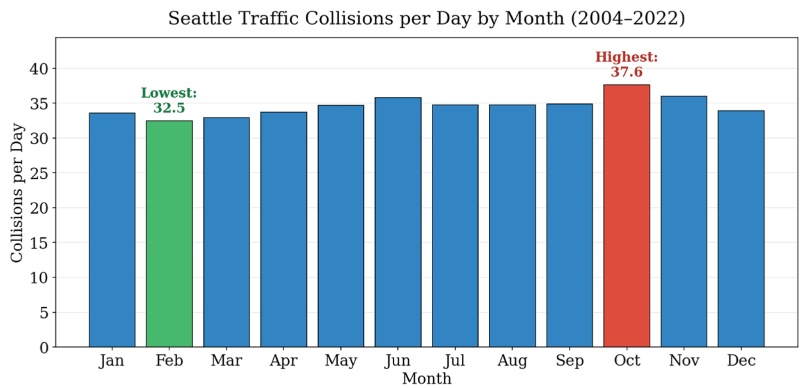

Figure 2. *Average collisions per calendar day by month, 2004–2022. October was highest (37.6 per day) and February lowest (32.5 per day).*

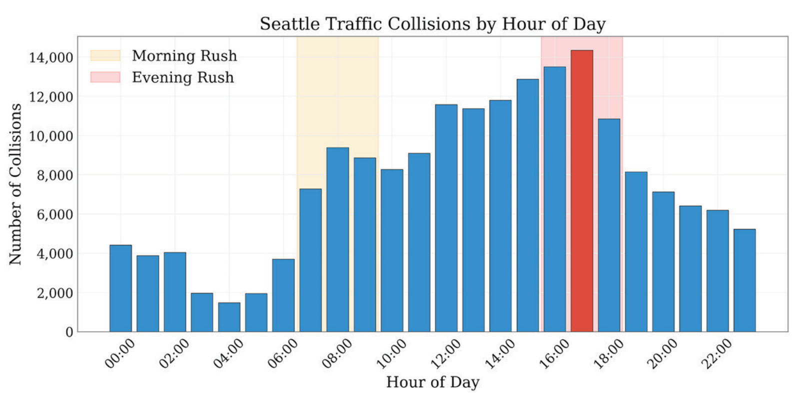

Figure 3. *Distribution of collisions by hour of day, 2004–2022, with the morning (7:00–10:00 AM) and evening (4:00–7:00 PM) rush-hour windows shaded. The evening window had 51.6% more collisions than the morning window (38,683 vs 25,515).*

Collision Type and Fatality

Pedestrian collisions had the highest fatality rate (2.1% of pedestrian collisions were fatal); head-on collisions (~0.8%) were next highest. Pedestrian and cyclist collisions, despite representing only 6.2% of all collisions (15,010 of 242,131), account for 47.7% of fatalities (208 of 436) (Figure 5; Table 2).

Contributing Factors: Human Behavior

Speeding was involved in only 4.5% of collisions but contributed to 23.2% of fatalities, indicating that speeding is strongly associated with lethal outcomes (Table 3).

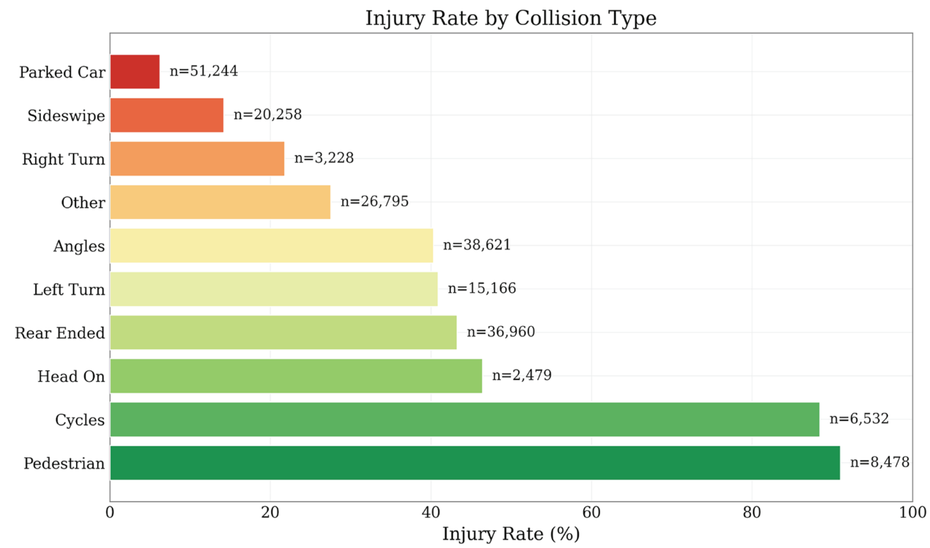

Figure 4. *Percentage of collisions of each type that resulted in any injury (injury, serious-injury, or fatality collision), Seattle 2004–2022. Pedestrian (91.0%) and cyclist (88.4%) collisions had the highest injury rates. Labels show the number of collisions (n) of each type.*

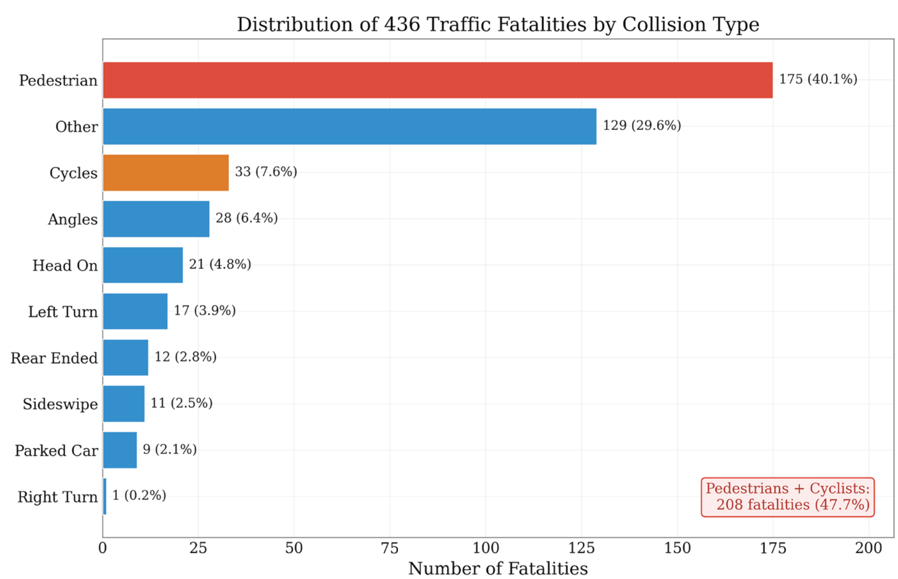

Figure 5. *Distribution of the 436 fatal collisions by collision type, 2004–2022 (count and percentage). Pedestrian and cyclist collisions together account for 208 (47.7%).*

Table 2. *Collisions, injuries, injury rate, and fatalities by collision type, 2004–2022 (all 242,131 collisions). Injury rate = injured ÷ collisions.*

Collision Type	Collisions (n)	Injured (n)	Injury Rate	Fatalities
Pedestrian	8,478	7,714	91.0%	175
Cycles	6,532	5,775	88.4%	33
Head On	2,479	1,150	46.4%	21
Rear Ended	36,960	15,977	43.2%	12
Left Turn	15,166	6,200	40.9%	17
Angles	38,621	15,552	40.3%	28
Parked Car	51,244	3,182	6.2%	9

Table 3. *Human-behavior contributing factors, 2004–2022: collisions, injury rate, fatalities, and share of all 436 fatalities for speeding, driver impairment, and inattention.*

Factor	Incidents	Injury Rate	Fatalities	% of Total Fatalities
Speeding	10,944	40.8%	101	23.2%
Under Influence	9,735	42.1%	94	21.6%
Inattention	30,615	-	-	-

Contributing Factors: Environment

Weather conditions showed relatively small variation in injury rates (Figure 6). Snow showed lower counts and rates. Lighting conditions showed little variation in injury rate but a difference in how often collisions were fatal: collisions occurring in darkness were more than twice as likely to be fatal as those in daylight (0.34% versus 0.15%).

Contributing Factors: High-Collision Streets

Geographic analysis was done at two levels. Figure 7 shows the 15 individual locations with the most collisions, several on Aurora Avenue N and Rainier Avenue S. Aggregating instead by whole arterial, Rainier Avenue S and Aurora Avenue N had the most fatalities of any corridor and are summarized in Table 4. These totals sum every segment along the street and are much larger than the individual locations in Figure 7.

Aurora Avenue North (SR-99) has the highest fatality count (43) despite fewer total collisions than Rainier Avenue. Research indicates that 17% of drivers exceed 55 mph on this corridor, and long stretches lack sidewalks or safe crossings (8, 9). Because higher speeds make a crash far more likely to be fatal (4), these conditions are especially dangerous for people walking, which points to speed reduction and pedestrian infrastructure as priorities.

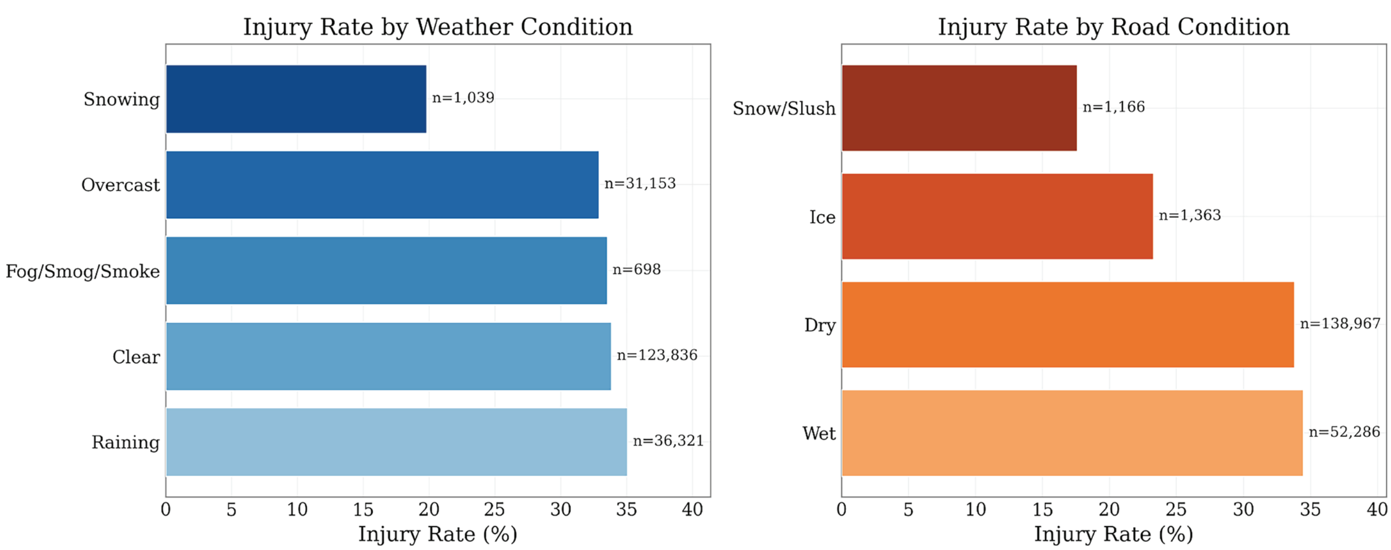

Figure 6. *Percentage of collisions resulting in any injury by weather condition (left) and road-surface condition (right), 2004–2022; n = collisions in each category.*

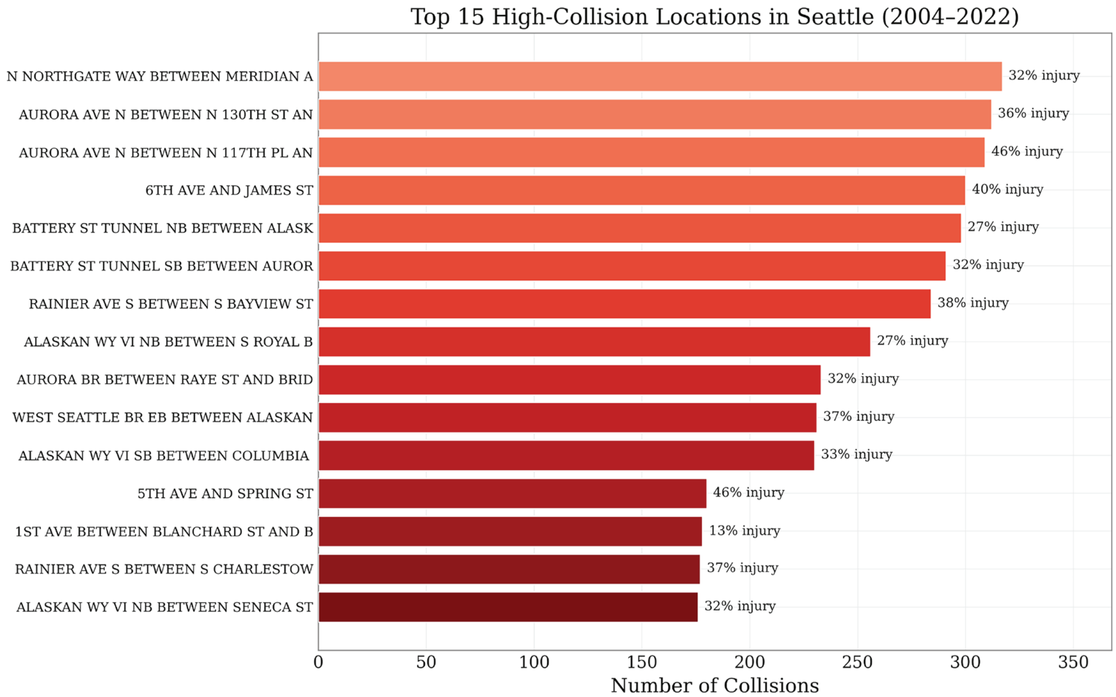

Figure 7. The 15 individual locations (intersections or segments, from the SDOT LOCATION field) with the most collisions, 2004–2022. Bars show collision counts; labels show each location's injury rate.

Table 4. *The two corridors with the highest fatality counts, 2004–2022, with total collisions, fatalities, and roadway characteristics.*

Corridor	Collisions	Fatalities	Key Reasons
Rainier Ave S	10,781	30	8-mile arterial, historically 4 lanes, high pedestrian activity (7)
Aurora Ave N	8,815	43	State Route 99, 4-6 lanes, 40 mph limit, inconsistent sidewalks

Collisions by Location Type

Contrary to the hypothesis, highway and ramp locations accounted for under 0.2% of collisions. Most collisions occurred mid-block along city streets (157,105; 64.9%), and about one-third occurred at intersections (80,202; 33.1%). However, intersection collisions had nearly double the injury rate of mid-block collisions (43.9% versus 25.0%), indicating that although intersections are not where most collisions occur, they are where collisions are most likely to cause injury (Table 5).

Table 5. *Collisions, share of all collisions, injury rate, and fatalities by location type, 2004–2022. Collision share uses all 242,131 collisions; injury rates exclude the 10.0% with unknown severity. Address type was not recorded for 3,897 collisions (1.6%).*

Location Type	Collisions	Collision Contribution	Injury Rate	Fatalities
Block (mid-block)	157,105	64.9%	25.0%	244
Intersection	80,202	33.1%	43.9%	192
Alley	927	0.4%	12.6%	0

Adjusted Analysis of Injury

The descriptive patterns above could reflect overlap between factors, so a logistic regression estimated each factor's association with injury while holding the others constant (Table 6). Effects are reported as adjusted odds ratios (aOR); a value above 1 means higher odds of injury than the reference group, after accounting for the other factors.

After adjustment, collision type remained the strongest predictor of injury. Pedestrian and cyclist collisions had far higher odds of injury than property-damage-only (parked-car) collisions (aOR 124.8 and 93.6). Speeding raised the odds of injury (aOR 1.63, 95% CI 1.56 - 1.70), as did driver impairment (aOR 1.89, 95% CI 1.80 -1.99). Intersection collisions had modestly higher odds than mid-block collisions (aOR 1.18, 95% CI 1.14 -1.21). Time of day had little effect on injury severity after adjustment: evening-rush collisions were only slightly more likely to injure than midday collisions (aOR 1.05, 95% CI 1.02 -1.08). This is consistent with time of day affecting collision frequency more than severity. These adjusted estimates confirm that the associations seen in the analysis persist after accounting for confounding.

Table 6. *Adjusted odds of any injury (logistic regression, N = 216,250); adjusted odds ratios with 95% CIs. Reference: parked-car collision; mid-block location. Also adjusted for lighting, weather, road condition, and year.*

Predictor	Adjusted Odds Ratio	95% CI
Pedestrian collision	124.8	114.6–136.0
Cyclist collision	93.6	85.9–102.0
Head-on collision	10.4	9.5–11.3
Rear-end collision	9.8	9.4–10.3
Impaired driver	1.89	1.80–1.99
Speeding involved	1.63	1.56–1.70
Intersection (vs mid-block)	1.18	1.14–1.21
Evening rush, 4–7 PM (vs midday)	1.05	1.02–1.08
Morning rush, 7–10 AM (vs midday)	0.94	0.91–0.97
Night, 12–6 AM (vs midday)	1.09	1.06–1.12

COVID-19 Impact

Annual collisions fell 35.5%, from 11,235 in 2019 to 7,250 in 2020. This whole-year figure averages months with very different impacts: January and February 2020 were near 2019 levels (−2.5% and +11.0%), whereas the peak-lockdown months showed the largest declines: March - 35.5% (866 to 559), April - 57.6% (937 to 397), and May - 55.7% (1,021 to 452) (Figure 8). The annual average is therefore smaller than the deepest monthly drops.

DISCUSSION

Interpretation of Results

The most significant finding is the vulnerability of pedestrians and cyclists, who account for nearly half of all traffic fatalities despite representing only 6.2% of collisions. This aligns with national trends showing that vulnerable road users face a higher risk per trip mile (2). The evening rush hour's 51.6% higher collision count compared to the morning rush hour may reflect higher

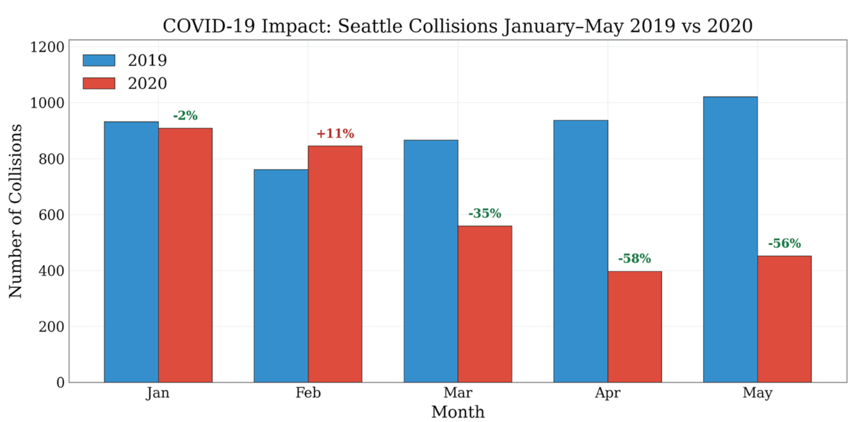

Figure 8. *Monthly collision counts for January–May in 2019 (pre-pandemic) versus 2020, with percentage change labeled. Declines were largest in April (−57.6%) and May (−55.7%).*

traffic volumes, driver fatigue, and more diverse trip purposes during evening hours.

Speeding's role in 23.2% of fatalities despite involvement in only 4.5% of collisions provides strong evidence for continued speed enforcement and traffic-calming solutions such as speed bumps. Higher speed reduces reaction time and increases crash energy, which is associated with greater injury severity.

The COVID-19 results are consistent with reduced vehicle travel being associated with fewer collisions, which may support policies that reduce vehicle trips through public transportation. External data support this association: vehicle miles traveled on Seattle-area freeways fell by roughly 64% in late March 2020 relative to February, comparable to the collision declines observed here (10).

The October collision peak may reflect the return to school, earlier sunsets producing darker evening commutes, and increased autumn rainfall. The lower counts and injury rates in snow likely reflect reduced and more cautious driving during Seattle's infrequent snow events, when schools and workplaces often close.

Several alternative explanations should be considered. Because collision counts are not adjusted for exposure, the high-collision corridors and the evening and October peaks may partly reflect greater traffic volume, roadway length, or pedestrian activity rather than higher risk per trip. The contributing factors also overlap - speeding, impairment, darkness, and collision type can co-occur - so simple cross-tabulations may attribute to one factor an effect partly due to another. These are partly addressed by the multivariable analysis but cannot be fully ruled out with observational data.

Limitations

The study has several limitations regarding data quality and measurement. The analysis used administrative collision records, and these may contain missing, unknown, or inconsistently recorded information. Approximately 10% of records had an unknown severity, and factors such as speeding, impairment, and inattention may have also been underreported or misclassified because they depend on a police investigation and the available evidence. Minor collisions that were not reported to police are also absent from the dataset. In addition, reporting systems, data collection practices, and definitions may have changed between 2004 and 2022, and possible duplicate or repeated event records cannot be ruled out entirely. Changes in roadway design, speed limits, bicycle infrastructure, enforcement, and transportation patterns during the study period may have also influenced the trends seen.

The analyses focused on observed counts and percentages and did not include exposure measures such as traffic volume, vehicle miles traveled or pedestrian and cyclist counts. Therefore, the findings describe collision frequency instead of whether an individual road user was more likely to be involved in a collision. The study also cannot show causation; although the multivariable analysis adjusts for the measured factors, unmeasured factors may still have influenced the results. Temporal comparisons may be influenced by seasonal patterns, long-term trends, and correlation between adjacent months or years (temporal autocorrelation). In particular, the decline seen during the COVID-19 period may reflect reduced travel, reporting changes, or other pandemic-related factors and should not be interpreted as proof of a direct causal effect. Multiple exploratory comparisons were run, so some findings may have occurred by chance. Finally, Seattle's road system, weather, travel patterns, and reporting practices may limit how generalizable the results are to other cities.

Comparison with Other Studies

The results are consistent with other research. The Vision Zero Network reports that pedestrians and cyclists represent a disproportionate share of traffic fatalities in U.S. cities (3). NHTSA data show that speeding was a factor in about 29% of U.S. traffic fatalities in 2022, comparable to the 23.2% found in this study (1). Multiple studies documented 40–60% collision reductions during COVID-19 lockdowns (11).

The link between speed and crash outcomes is well established. A peer-reviewed evaluation of Seattle's 2016 speed-limit reductions found a 17.2% reduction in the odds of a death-or-injury crash in downtown Seattle and a 19.9% reduction on downtown arterials, with smaller, non-significant effects elsewhere (12). The World Health Organization further estimates that a 5% reduction in average speed can cut fatal crashes by roughly 30%, and that every 1 km/h increase in mean speed raises the risk of a fatal crash by 4-5% (4). Together, these findings support speed-limit reductions and traffic calming on high-fatality corridors such as Aurora Avenue N.

Comparison with National and International Data

Seattle's results were also compared with national US data from the Kaggle US Accidents dataset (13) and Australian data from the AAMI Crash Index (14). In US data, the morning (7–10 AM) and evening (4–7 PM) peaks are roughly comparable, but in Seattle the evening peak has 51.6% more collisions than the morning peak. This may reflect the region's work concentration and schedules.

Several findings matched across the data: Friday was the highest-collision day and Sunday the lowest in Seattle, matching the national US pattern and AAMI's finding that Friday is Australia's worst crash day; pedestrian collisions were similarly severe; and speeding accounted for roughly a quarter of fatalities both locally (23.2%) and nationally (~29%) (1, 14).

Seattle's own monitoring shows the safety problem is not improving: since Vision Zero began in 2015, fatal and serious-injury collisions have trended upward, and Aurora Avenue N continues to appear among the city's fatal-crash locations (15).

Recommendations

The following are evidence-informed priorities rather than predicted effects. This study's Seattle data identify where and when severe collisions concentrate; evidence that specific countermeasures reduce collisions is drawn from external evaluations cited below, not established by this dataset.

First, given the 91% and 88% injury rates for pedestrian and cyclist collisions (Table 2), investment in pedestrian and cyclist infrastructure should be prioritized such as separated bike lanes and improved crosswalks. Second, traffic management should focus on the evening rush hour (4–7 PM), when the most collisions occur. Third, because speeding results in a disproportionate number of fatalities, speed-reduction measures such as speed bumps and raised crosswalks, together with stricter enforcement (which peer-reviewed evaluations link to fewer injury crashes; 4, 12) should target the riskiest corridors. This aligns with current regional practice, as the nearby city of Bellevue, WA recently approved "Safe Speeds Bellevue" in 2026, lowering limits on 84% of streets posted at 30 mph or higher (16, 17), noting that its higher-speed arterials carry only about 25% of road mileage but roughly 90% of fatal and serious-injury crashes. Fourth, the high-collision streets identified here should be prioritized for safety improvements. A 2015 road-diet redesign of Rainier Avenue S was associated with about 30% fewer injury collisions and about 40% fewer pedestrian and cyclist collisions (7), which supports focusing on these corridors. Finally, the COVID-19 period showed fewer collisions when travel fell. This is consistent with the idea that reducing vehicle trips through public transportation could support safety goals, although the present data cannot confirm a causal effect.

CONCLUSION

Analysis of 242,131 Seattle traffic collisions from 2004–2022 reveals clear patterns: 1. Vulnerable road users should be prioritized. Pedestrians and cyclists account for nearly half of fatalities despite being only 6.2% of collisions. 2. Evening rush hour has the most collisions: 51.6% more than morning rush hour (38,683 vs 25,515). 3. Speeding is disproportionately fatal: only 4.5% of collisions but 23.2% of fatalities. 4. Collisions fell sharply during the COVID-19 lockdowns (an immediate 55–58% reduction in April–May), consistent with reduced traffic volume.

These findings support investment in pedestrian/cyclist infrastructure, evening-focused traffic management, speed-reduction measures, and policies that reduce vehicle miles. Future research should examine intersection-level data and evaluate the effectiveness of implemented safety measures. In particular, because Seattle reduced its speed limits in 2016, within this study's window, future work could directly evaluate that change's effect within the collision dataset analyzed here.

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CONFLICT OF INTEREST

The author declares that there are no conflicts of interest related to this work.

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