

Bicycle - Motor Vehicle Crashes in Cary

A Typology and Analysis of Police-Reported Collisions
Spanning A Six-Year Period

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Overview

Seventy five *police-reported* bicycle-motor vehicle crashes occurred in Cary during the almost 6 year period from March 7, 1997 through November 21, 2002, equating to approximately 13 collisions annually.

The crashes were classified according to a slight modification of a typology developed in the early 1980's by the National Highway Traffic Safety Administration (NHTSA) which categorized 45 possible crash types. The police reports were also examined for other pertinent variables.

Sixty six (88%) of the 75 crashes could be classified into the 5 crash types described in descending order of frequency on pages 3 through 7 in this report.

1. Drive Out (36 cases)
2. Ride Out (15 cases)
3. Left Cross (7 cases)
4. Right Hook (4 cases)
5. Overtaking (4 cases)

The remaining 9 crashes (12%) were classified as follows:

- Assault (2 cases). The motorist intentionally struck the bicyclist.
- Bicyclist Failed to Yield Changing Lanes (2 cases). 1 youth; 1 bicyclist alcohol consumption.
- Wrong Way Bicyclist (2 cases). (Note that many bicyclists were riding the “wrong way” in the other type collisions.)
- Trapped (1 case). The bicyclist was struck when the signal for cross traffic changed from red to green.
- Bicyclist Lost Control (1 case).
- Parking Lot (1 case).

The NHTSA coding typology was applied by the Federal Highway Administration to a nationwide sample of 2990 bicycle-motor vehicle crashes. The frequencies of the crashes described in this report are compared to this nationwide sample to provide scale to the magnitude of the problem in Cary. However, there are at least two reasons this comparison must be treated with caution.

First, the nationwide sample was intended to be representative of both urban and rural areas, whereas the Cary sample can be considered almost entirely urban. Thus, Cary would be expected to be overrepresented by those types of crashes that characteristically occur in urban areas where intersections, driveways, and turning movements are ubiquitous. Second, in the nationwide sample, juveniles less than 15 years old comprised 45% of the crashes. In Cary, 23 (31%) crashes involved bicyclists age 15 or less. This population is typically involved in collisions characteristic of youth, with a high percentage of bicyclist error.

No bicyclists were killed. Injuries ranged from A (incapacitating), B (non-incapacitating), C (no visible- but complaint of pain), to no injury at all.

Crash factors.

- Light Condition: Daylight—88%; Darkness—7%; Dusk/Dawn—5%
- Alcohol Use: Only one bicyclist had been drinking.
- Riding Facing Traffic: Eight bicyclists were riding facing traffic while in the roadway. Twenty eight crashes (37%) involved bicyclists who were riding facing traffic while on the sidewalk.
- Riding On Sidewalk: Thirty one crashes (41%) involved bicyclists who had been riding on a sidewalk, either facing traffic (28) or with traffic (3).
- Twenty three (31%) bicyclists were age 15 or younger.
- Nine were motorist Hit & Run. Two were Assaults; several of the others were possibly Assault.

The Assault events.

Two of the crashes were deemed motorist Assault. Both were Hit & Run during daylight. In one, the motorist turned onto the wrong way of a median divided road, struck a youth bicyclist, and fled. The other involved an Overtaking collision in which the motorist struck a bicyclist's rear tire prior to making a right turn and fleeing. Other collisions that were motorist Hit & Run could possibly also be Assaults.

Conclusions.

Bicycle-motor vehicle collisions in Cary are characterized by a high proportion of riding on the sidewalk facing the normal direction of traffic, and an appreciable amount of bicyclists disregarding traffic control devices or other rules of the road. Nine (12%) motorist Hit & Run events indicate a substantial amount of motorist aggression and disregard.

Recommendations.

- I. Due to the inherent conflicts at driveways and intersections, bicyclists should ride in the street and not on the sidewalk, especially not facing the normal direction of traffic. Any riding on the sidewalk should be at a slow speed, and bicyclists must be prepared to yield at all junctions, an onerous and unrealistic task.
- II. Because of their small size, position near the edge of the road, and possibility of being obscured, bicyclists are not as readily noticeable to motorists as are motor vehicles. Bicyclists should Use More Lane to increase their conspicuousness, create shy distance, and induce caution in overtaking motorists. This reduces the incidence of Drive Out, Left Cross, Right Hook and Overtaking collisions.
- III. Bicyclists are required to obey all traffic laws and rules of the road. This legal requirement reduces the risk of a Ride Out collision, or any other type collision.
- IV. By knowing the actual, rather than perceived, risks, and knowing what techniques are effective in mitigating the risks, bicyclists are better able to avoid collisions and enjoy cycling. Public policy, infrastructure, and expenditure should also reflect the actual risks.
- V. Where traffic intensity (volume and speed) warrants designing the roadway to make it easier for motorists to pass people on bicycles, wide outside through lanes (14-16ft), "bicycle facilities" that are consistent with standard roadway design, should be employed. The greater space afforded by wide lanes also makes bicycling more attractive, and provides increased leeway and sight triangles which improve both bicycle vehicle and motor vehicle operations and interactions.

Drive Out

Description: The motorist was pulling out at a stop sign (21 cases) or signal controlled intersection (11 cases), or an uncontrolled driveway or alley (6 cases). The bicyclist was crossing on a sidewalk (25 cases) or in the street (9 cases), and in 2 cases the exact location was undetermined.

Discussion: This was the most frequent crash in Cary, and occurs at more than twice the rate as in the nationwide sample.

Of the 9 bicyclists in the street 4 were riding the wrong way, one of which was riding at night with no lights.

All 25 sidewalk bicyclists were riding facing traffic, as well as the two whose exact position was undetermined. Thus, overall 31 of 36 bicyclists involved in this type collision were riding facing traffic, a direction and location that motorists do not expect.

Recommendations: Reduce the incidence of sidewalk riding by conducting an awareness campaign. Bicyclists should ride with traffic, and further into the lane (Use More Lane) to create improved sight triangles and greater shy distance. Motorists should be informed of their duty to stop before crossing a sidewalk or crosswalk, whether marked or unmarked.

Frequency

Cary: 36 cases; 48% of all crashes

Rank: 1

Nationwide: 21.8% of all crashes

Rank: 2

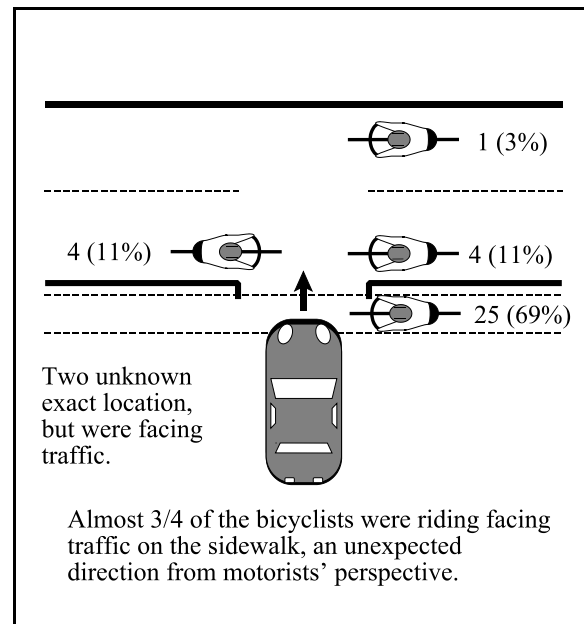


Figure 1. Positions in “Drive Out.”

Ride Out

Description: The crash occurred at an intersection at which the bicyclist ran a stop sign (4 cases) or red light (4 cases), or failed to yield from an uncontrolled driveway (4 cases) or midblock (3 cases). The bicyclist may have stopped and misjudged the clear space. The motorist was on a crossing trajectory.

Discussion: This is the second most frequent collision, and occurs at a slightly lower rate than in the nationwide sample.

Six of the 15 cases involved youth age 15 or younger.

Seven of bicyclists were struck in their first half of the roadway, and 8 in their second half.

Recommendations: Youth bicyclist and general traffic safety education should be implemented. Slower motor traffic reduces the likelihood and severity of collision.

Frequency

Cary: 15 cases; 20% of all crashes

Rank: 2

Nationwide: 26.3% of all crashes

Rank: 1

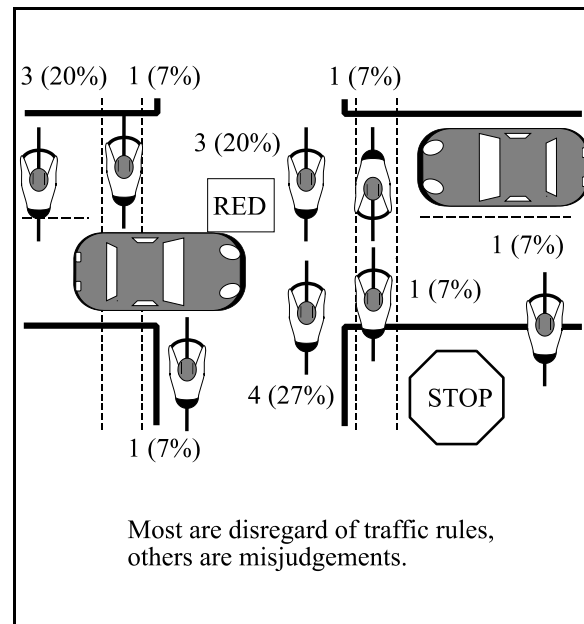


Figure 2. Positions in “Ride Out.”

Left Cross

Description: The motorist made a left turn at an intersection (4 cases), driveway (2 cases), or in a PVA (parking lot) (1 case) in front of the approaching bicyclist.

Discussion: This is the third most frequent crash in Cary and occurs more than 3 times the national average.

Two of the 7 took place on multilane roads. On such larger roads, motorists may be more distracted, and tend to search for other motor vehicles to the exclusion of bicyclists. In 2 cases, stopped motor vehicles were vision obstructions.

In general, bicyclists' narrow profile and curbside position, which places them out of motorists' main search area down the center of the lane, makes bicyclists less likely to be detected than other vehicles.

Recommendations: Bicyclist education to be more visible. Use More Lane and avoid being screened by motor vehicles. Motorist awareness to watch for bicyclists.

Frequency

Cary: 7 cases; 20.0% of all crashes

Rank: 3

Nationwide: 5.9% of all crashes

Rank: 6

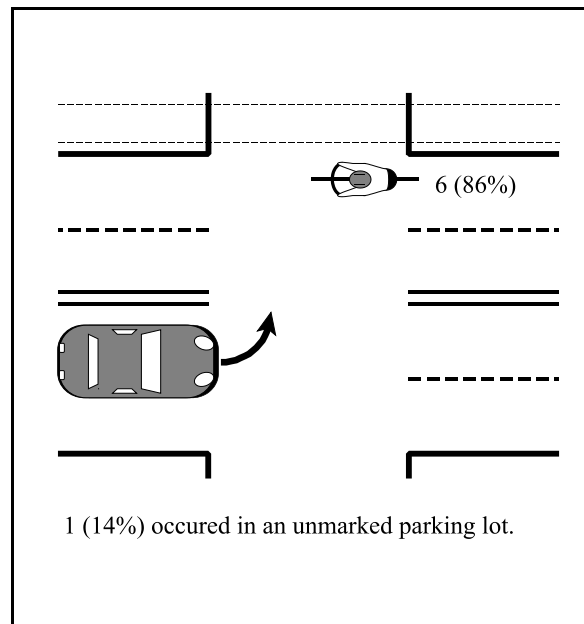


Figure 3. Positions in “Left Cross.”

Right Hook

Description: The motorist and bicyclist were traveling the same direction, and the motorist was making a right turn at an intersection (3 cases) or a driveway (1 case).

Discussion: This is tied for the fourth most prevalent crash in Cary, with an occurrence equal to the nationwide figure.

In one case the bicyclist attempted to overtake the motorist on the right. This typically occurs when the motorist is stopped in a queue at a signalized intersection.

The motorist may have overtaken the bicyclist and misjudged the space/time required to execute the turn. Sometimes motorists purposefully cut off bicyclists in this fashion. It is difficult to always make judgement on culpability because the precise timing of the event is unknown.

Three were at a signal controlled intersection, and 1 at a driveway.

Recommendations. Bicyclists should Use More Lane to deter motorists from making this mistake. Bicyclists should avoid passing on the right and riding on the sidewalk.

Frequency

Cary: 4 cases; 5.3% of all crashes

Rank: Tied 4

Nationwide: 4.7% of all crashes

Rank: 7

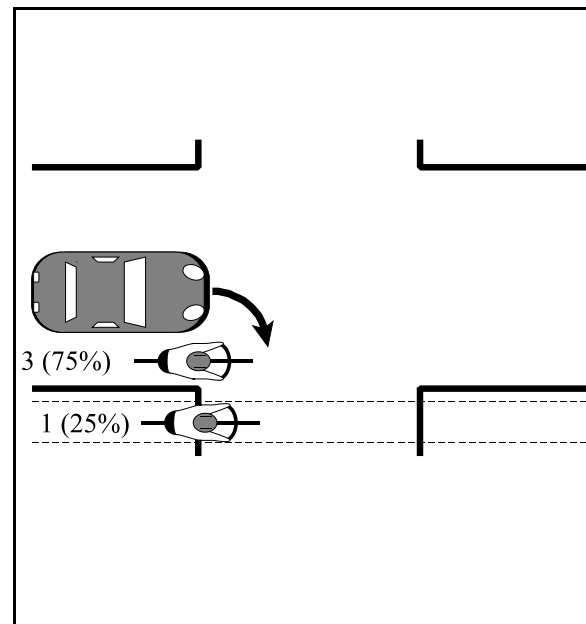


Figure 4. Positions in “Right Hook.”

Overtaking

Description: The motorist and bicyclist were in the roadway traveling the same direction, and the motorist struck the bicyclist.

Discussion: This is tied for the fourth most prevalent crash in Cary.

Two of the 4 were Hit & Run and are possible Assaults. All involve a measure of motorist aggression and carelessness.

The four collisions are described as follows:

- Two bicyclists were hit/grazed, one after the other, by a truck pulling a trailer on a curve with 10ft lane and 2ft shoulder. C injury. H&R. Possible Assault.
- A youth bicyclist was riding erratically and the motorist crossed into the opposing lane. B injury. School Zone.
- The bicyclist was squeezed off road into a drainage ditch, remounted the road and struck the vehicle's trailer. Raised concrete median with 10 ft lane and 6 inch shoulder. B injury.
- The bicyclist was struck by the mirror of the overtaking vehicle and fell off the bicycle. B injury. 11 ft lane. H&R. Possible Assault.

Recommendations. Bicycle drivers should Use More Lane to deter motorists from overtaking when unsafe and instill caution. Motorists should be informed that it is the bicyclist's lane, and to only overtake

Frequency

Cary: 4 cases; 5.3% of all crashes
Rank: Tied 4

Nationwide: 8.6% of all crashes
Rank: 3

providing plenty of clearance if they choose to pass within the bicyclist's lane. Road designers should avoid creating narrow lanes with narrow shoulders. These dupe users into poor behavior. A better configuration for the same pavement width would be a wide lane.

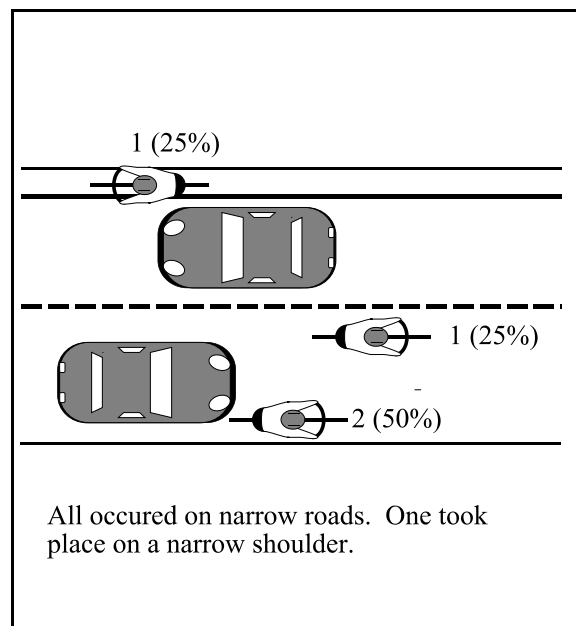


Figure 4. Positions in "Overtaking."