

# Bicycle - Motor Vehicle Crashes in Chapel Hill

A Typology and Analysis of Police-Reported  
Crashes Spanning A Four-Year Period

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## Overview

Eighty six (21.5 per year) *police-reported* bicycle-motor vehicle crashes occurred in Chapel Hill during the four year period January 1996 through December 1999. This represents a 31% decrease from the 93 (31 per year) crashes that occurred during the three year period February 1993 through January 1996 which were examined in my previous report.

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.

Fifty-eight (67%) of the 86 crashes could be classified into the 4 crash types described in descending order of frequency on pages 3 through 6 in this report.

1. Drive Out (20 cases)
2. Ride Out (16 cases)
3. Left Cross (12 cases)
4. Right Hook (10 cases)

The remaining 28 crashes (33%) were classified into additional types as follows:

- Overtaking (5 cases). The bicyclist was struck from behind by a passing motorist.
- Trapped (3 cases). The bicyclist was struck when the signal for cross traffic changed from red to green.
- Bicyclist Failed to Yield Changing Lanes (2 cases).
- Bicyclist Lost Control (2 cases).
- Doored (2 cases). The bicyclist was struck by the door of a disembarking driver.
- Other miscellaneous crashes occurring one time each (8 cases)
- Unable to Specify (6 cases)

The NHTSA coding typology was recently 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 Chapel Hill. However, there are at least two major 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 Chapel Hill sample can be considered entirely urban. Thus, Chapel Hill would be expected to be overrepresented by those types of crashes that characteristically occur in urban areas. Second, in the nationwide sample, juveniles less than 15 years old comprised 45% of the crashes. In Chapel Hill, only 13 (15%) crashes involved bicyclists age 15 or less. Most of the crashes occurred to college age bicyclists. These two different age groups are typically involved in different type crashes, further making comparisons between the two samples problematic.

### **Crash factors.**

- C Light Condition: Daylight—82%; Darkness—13%; Dusk/Dawn—5%
- C Alcohol Use: Two bicyclists had been drinking.
- C Riding Facing Traffic: Four bicyclists were riding facing traffic while in the roadway; 2 of these were juveniles. Thirteen crashes (15%) involved bicyclists who were riding facing traffic while on the sidewalk.
- C Riding On Sidewalk: Nineteen crashes (22%) involved bicyclists who had been riding on a sidewalk either facing traffic or with traffic. Eight were sidewalk Bike Paths.
- C Five happened in a designated Bike Lane.
- C Thirteen bicyclists were age 15 or younger.
- C Six were motorist Hit & Run.
- C Ten occurred in the rain.

### **The Overtaking collisions.**

Since getting hit from behind is novice bicyclists' biggest fear, albeit an unwarranted one based on crash statistics, and public policy, infrastructure, and expenditure decisions are made in an attempt to alleviate this fear (the designation of on-street Bike Lanes and sidewalk Bike Paths for examples), a description of the individual cases is justified. Of these 5 crashes, 1 involved two riders on a single unlit bicycle at night, 1 occurred in the rain with a bicyclist making a left turn from the through lane rather than the available left-turn-only lane, 1 happened while both parties were making a low speed left turn at the dual left turn lanes from Cameron Ave. onto Pittsboro St., 1 was a low speed crash in a neighborhood involving an elderly driver, and 1 was a sideswipe and Hit & Run in which the bicyclist was grazed but did not fall.

### **Explanation for decrease in collisions.**

It is unclear why crashes have decreased by 31% between the report periods. Possibly there are less bicyclists. The UNC Commuting Study (Raimi & Distefano, 1997) reported 2093 bicyclists in a 12 hour count at Cameron Ave at Pittsboro St. on October, 1994, and 1606 in 1996, a decrease of 23%. Possibly there are many more bicyclists, and their greater number has led to increased motorist awareness, but there is no evidence that this is the case. It is possible greater police presence and enforcement of speed limits has resulted in more cautious driving. Maybe the increase in motor vehicle traffic has caused a heightened sense of caution among motorists, or resulted in greater congestion and slower speeds, thus reducing collisions.

### **Conclusions/Recommendations.**

- I. Due to the inherent conflicts at driveways and intersections, bicyclists should ride in the street and not on the sidewalk. Any riding on the sidewalk should be at a slow speed. Sidewalk Bike Paths should be decommissioned so as to not encourage sidewalk riding. Bicyclists could still use them though.
- II. Because of their small size, position near the edge of the road, and relative infrequency, bicyclists are not as readily noticeable to motorists as are motor vehicles. Bicyclists should Use More Lane to increase their visibility and to reduce the risk of Drive Out, Left Cross, and Right Hook collisions, the three most prevalent crashes for adult bicyclists.
- 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.

# Drive Out

**Description:** The motorist was pulling out at a stop sign or signal controlled intersection (11 cases), or an uncontrolled driveway or alley (9 cases). The bicyclist was crossing, on a sidewalk (13 cases), or in the street (7 cases).

**Discussion:** This was the most frequent crash in Chapel Hill, and occurs at about the same rate as in the nationwide sample.

Six of the 13 sidewalk incidents were on designated Bike Path sidewalks.

Of the 7 bicyclists in the street, 2 were riding the wrong way (1 was in a Bike Lane), and 3 were riding at night with no lights.

Eleven of the 13 sidewalk bicyclists were riding facing traffic. Thus, overall 13 of 20 bicyclists were riding facing traffic, a position that drivers do not expect.

**Recommendations:** Reduce the incidence of sidewalk riding by decommissioning the sidewalk Bike Paths and conducting an awareness campaign. Bicyclists should ride further into the lane and Use More Lane. Motorists should be informed of their duty to stop before crossing a sidewalk or crosswalk whether marked or unmarked.

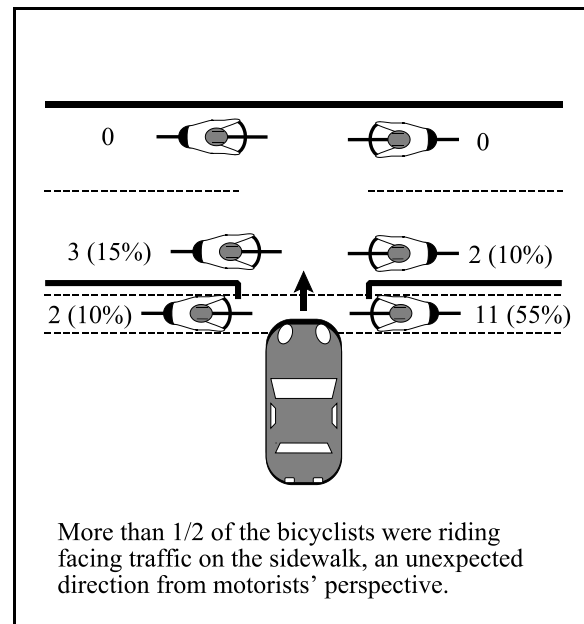
## Frequency

**Chapel Hill:** 20 cases; 23.2% 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 (6 cases) or red light (5 cases), or failed to yield from an uncontrolled driveway (4 cases) or in a PVA (private area) (1 case). The motorist was crossing.

**Discussion:** This is the second most frequent collision, and in comparison to the nationwide sample, this crash was somewhat less likely in Chapel Hill.

Nine of the 16 cases involved youth age 14 or younger. All of the driveway and PVA incidences were youth.

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

**Recommendations:** Youth bicyclist and general traffic safety education should be implemented.

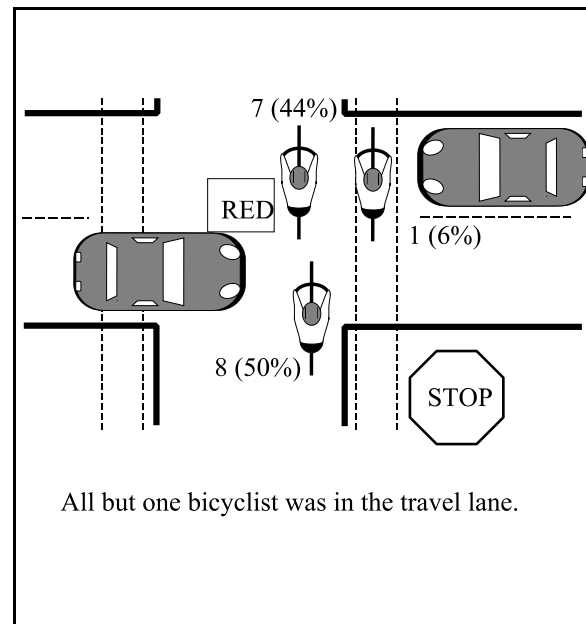
## Frequency

**Chapel Hill:** 16 cases; 18.6% 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 (8 cases) or driveway (4 cases) in front of the approaching bicyclist.

**Discussion:** This is the third most frequent crash in Chapel Hill and occurs 2.4 times the national average.

Ten of the 12 took place on multilane roads such as Airport Road or Franklin Street. 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.

Two occurred on sidewalks, 1 of which was a designated Bike Path. Two of the bicyclists were in an on-street Bike Lane.

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 Use More Lane and avoid being screened, and driver awareness to watch for bicyclists are the appropriate countermeasures.

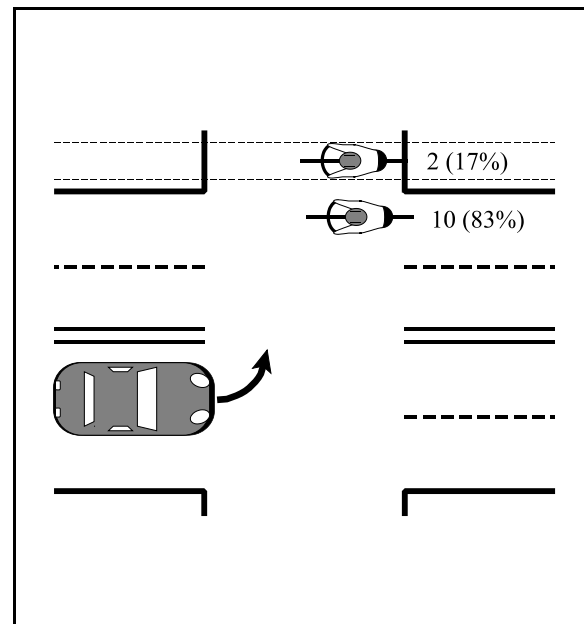
## Frequency

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**Chapel Hill:** 12 cases; 14.0% of all crashes  
**Rank:** 3

**Nationwide:** 5.9% of all crashes  
**Rank:** 6

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**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 (7 cases) or a driveway (3 cases).

**Discussion:** This is the fourth most prevalent crash in Chapel Hill, with an occurrence 2.5 times the nationwide figure.

The bicyclist may have 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 drivers purposefully cut off bicyclists in this fashion. It is difficult to always make judgement on culpability because of the unknown precise timing of the event.

Two were driver Hit & Run.

Four of the 10 bicyclists were judged to be passing on the right or possibly passing on the right.

Three were in a Bike Lane.

Four were at a signal controlled intersection, 1 at a stop sign, 3 onto driveways, and 2 at uncontrolled intersections.

## Frequency

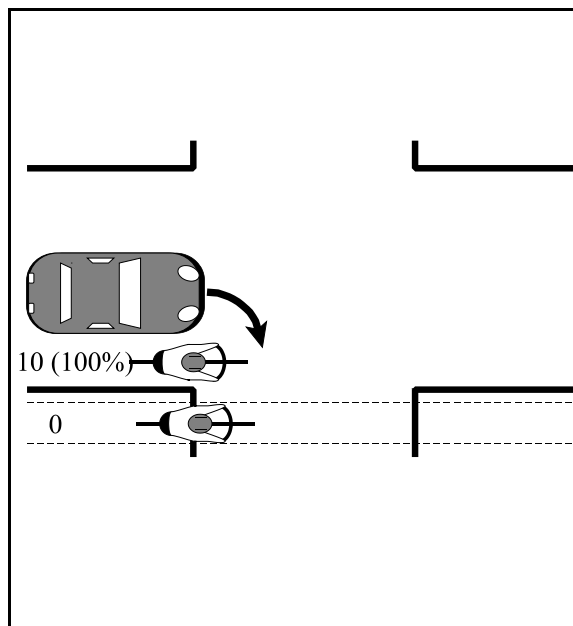
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**Chapel Hill:** 10 cases; 11.6% of all crashes  
**Rank:** 4

**Nationwide:** 4.7% of all crashes  
**Rank:** 7

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**Recommendations.** Bicyclists should Use More Lane, and avoid passing on the right. Drivers should be more conscientious of the presence of other road users.



**Figure 4.** Positions in “Right Hook.”