

Sharing the Road with Bicyclists



City Employee Briefing

This briefing was originally developed upon request by the cities of Cary and Morrisville, NC

Why learn about driving among bicyclists?

- Reduce stress when encountering bicyclists
- Prevent collisions
- Promote good community relations



Why learn about driving among bicyclists?

Not knowing what to expect or what to do when encountering bicyclists can increase driver stress. Having better information and being prepared makes road sharing easier.

We want to prevent collisions by following the law ourselves and by taking precautions against errors that are sometimes made by bicyclists.

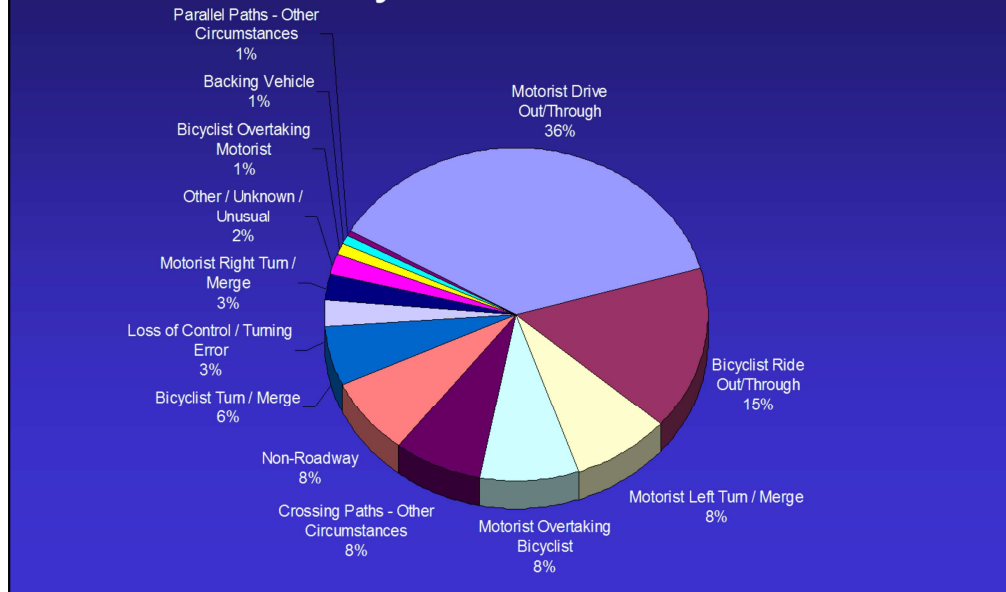
Safe driving around the bicycling public promotes good community relations and sets a good example for other drivers.

What we'll talk about

- Common collision types
- Applicable traffic laws
- Recommended practices



Common Types of Bicycle Collisions in Cary/Morrisville Area



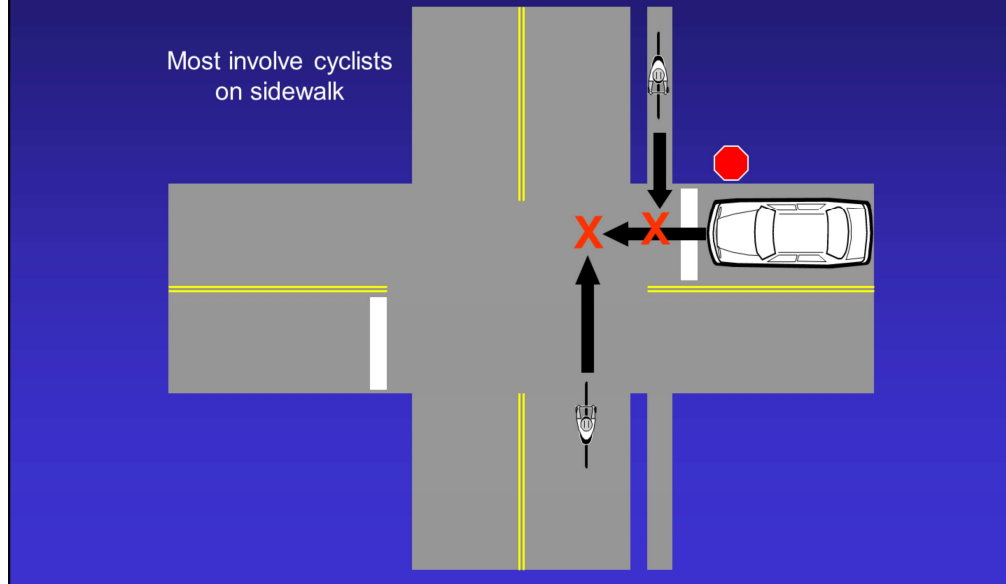
[Note that bicycling on public roads is not a particularly dangerous activity; per hour of activity it has an injury rate lower than soccer and a fatality rate lower than swimming. This presentation focuses on traffic collisions, but most bicycling accidents involve falls or collisions with other cyclists, pedestrians, animals, or fixed objects]

The vast majority of car-bike collisions involve intersection and crossing movements

Only 8% of collisions involve faster motor vehicles overtaking slower bicycles

If we really want to reduce injuries to cyclists, we need to address intersection crashes

Most common car-bike crash type: “Motorist Drive-Out/Through”



This is the most common type of car-bike collision in the Triangle.

The bicyclist has right of way but the motorist fails to yield at a stop sign, red light or driveway

Most of these collisions actually involve sidewalk cyclists.

The single most common type of car-bike collision in Cary involves a bicyclist riding contra-flow on the sidewalk struck by driver pulling out from stop sign, red light or driveway

How to avoid drive-out crashes as a motor vehicle driver

- Come to a full stop before the crosswalk as required by law
- Look **both ways** up the sidewalk and roadway before proceeding
- Don't encourage sidewalk bicycling
- Respect lawful roadway bicycling



Come to a full stop before the crosswalk as required by law

Look **both ways** up the sidewalk and roadway before proceeding

Don't encourage sidewalk bicycling

Respect lawful roadway bicycling

Bicyclists are Drivers of Vehicles

- § 20-4.01(49) *Vehicle.* – ...for the purposes of this Chapter **bicycles shall be deemed vehicles** and every rider of a bicycle upon a highway shall be subject to the provisions of this Chapter applicable to the **driver of a vehicle** except those which by their nature can have no application.

State law defines bicycles as vehicles and assigns bicyclists the rights and duties of drivers of vehicles.

Bicyclists are allowed to travel on all roadways except freeways

Vehicles and Motor Vehicles

- § 20-4.01(23) **Motor Vehicle**. – *Every vehicle which is **self-propelled***
- Most rules of the road apply to drivers of **all** vehicles. Some special restrictions apply only to **motor** vehicles.
- Bicycling on sidewalks is not prohibited our town, but
- Roadway bicycling is considerably safer

Most traffic rules apply to all vehicles

A few special restrictions apply only to motor vehicles

State law is very consistent about this distinction

Bicyclists operating on roadways have fewer car-bike collisions and far fewer fall related injuries per mile of travel than do bicyclists who ride on sidewalks or who otherwise attempt to follow pedestrian rules

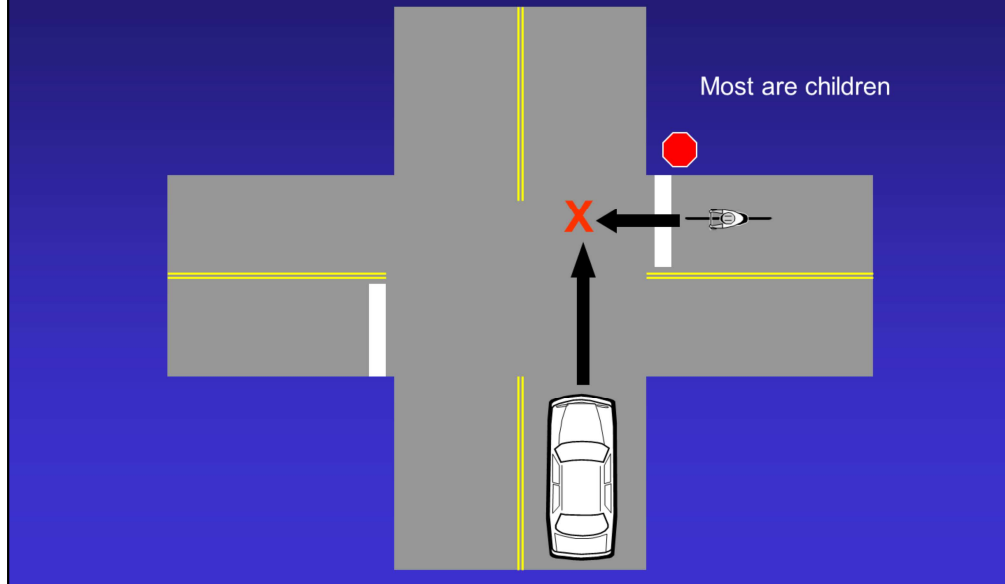
Why not bike on left facing traffic?

- Where is right-turning motorist looking?



Riding with traffic on the right half of the road is much safer than riding on the left side against traffic [crash data proves this; wrong-side cycling is associated with about 40% of car-bike crashes in our area]

2nd most common crash type: “Bicyclist Ride-Out/Through”



The second most common crash type in the Triangle is the bicyclist ride out/through type.

Here the motorist has right of way but the bicyclist fails to yield at a stop sign, red light or driveway

Most of these are kids, who have limited experience with traffic negotiation.

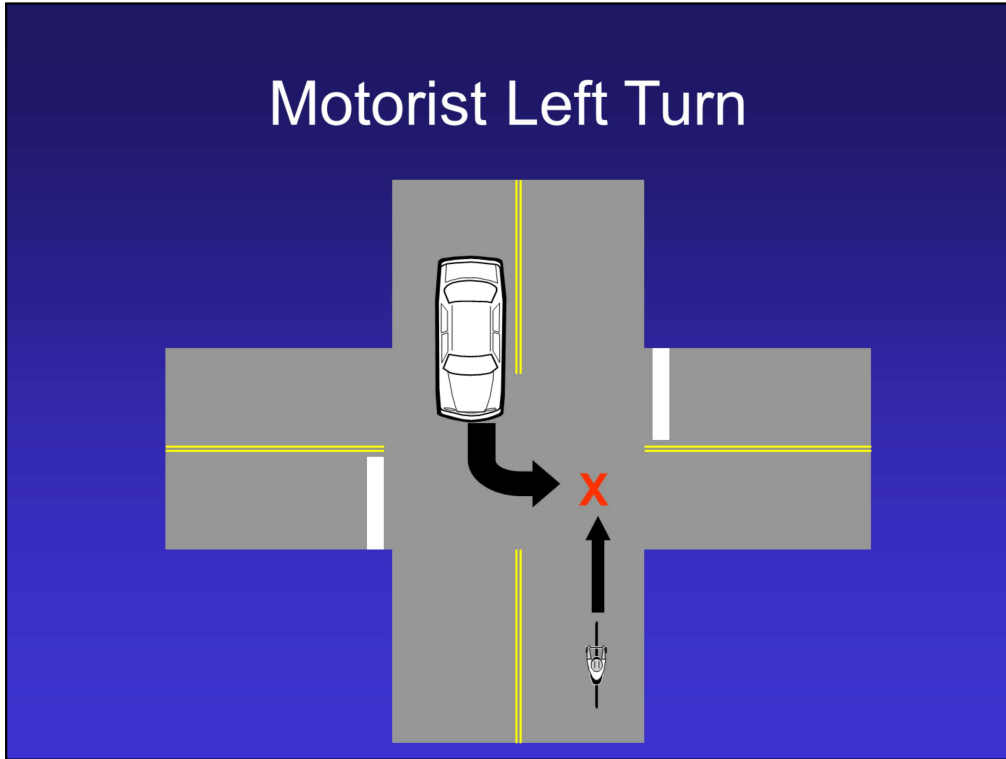
Many adults unlawfully run stop signs but their experience means they are less likely to do so in front of other traffic

How to avoid ride-out crashes as a motor vehicle driver

- Be cautious on residential streets and near parked cars
- Be prepared to stop for children as well as adults making errors at intersections
- Set a good example by obeying stop signs and red lights



Motorist Left Turn



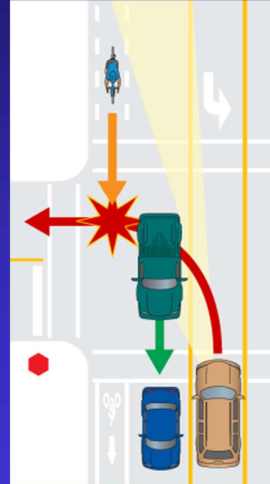
The motorist-left-cross collision is a common crash type for both bicyclists and motorcyclists.

The thru cyclist has right of way, but the oncoming motorist turns left across cyclist's path

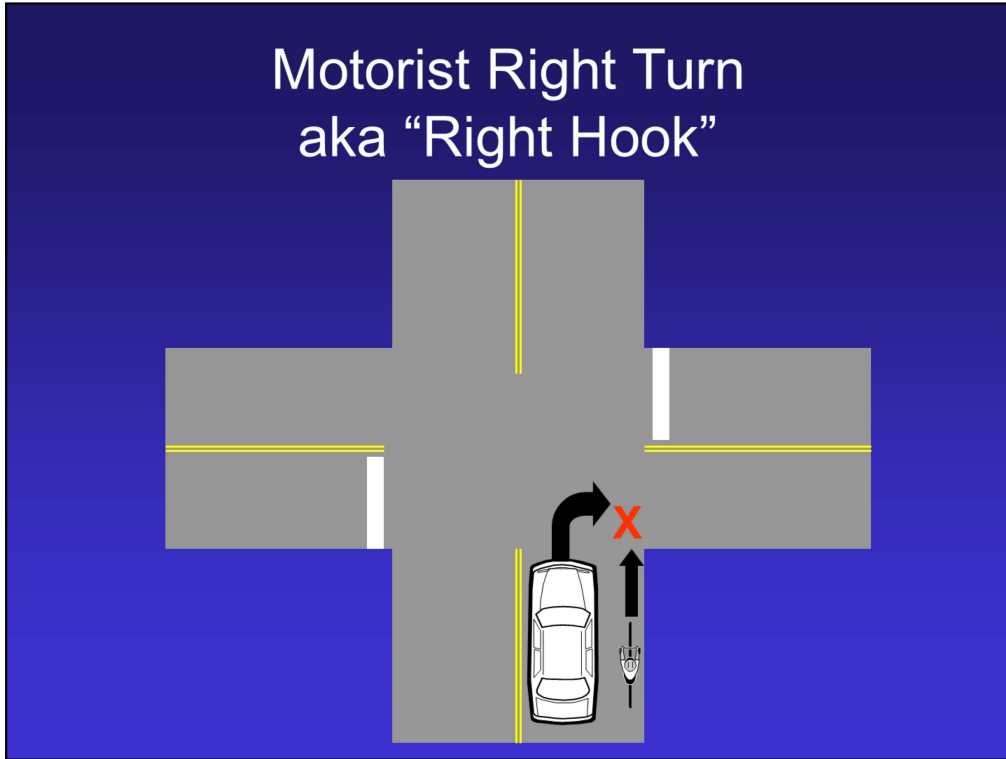
The motorist may overlook the narrow bike or misjudge the cyclist's distance or speed.

How to avoid left turn crashes as a motor vehicle driver

- Look twice for oncoming traffic before turning
- Scan roadway, shoulder and/or crosswalk
- Look out for bicyclists screened by other oncoming vehicles
- Be aware that bicycles may be traveling faster than you expect



Motorist Right Turn aka “Right Hook”

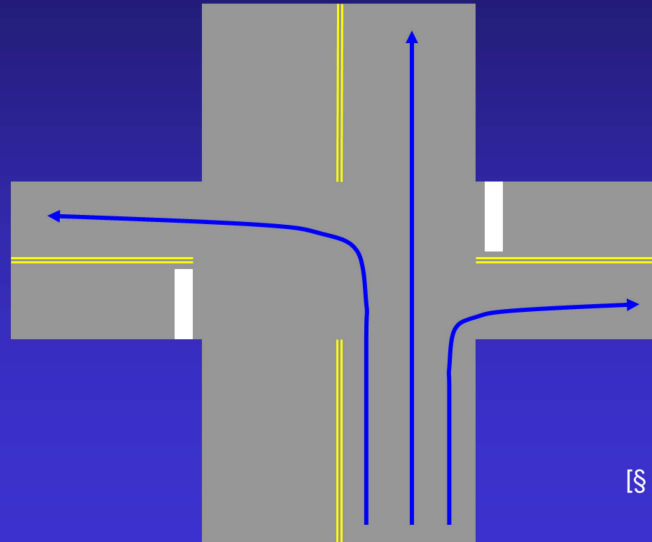


The motorist right hook collision happens when a motorist executes a right turn from a position to the left of a bicyclist traveling straight.

This crash type is especially dangerous when the motor vehicle is a truck or bus; the rear wheels track to the inside of the curve and crush the bicyclist.

It can happen when a bicyclist overtakes a motorist on the right or when a motorist overtakes a bicyclist just before turning right.

Correct Destination Positioning at Intersections

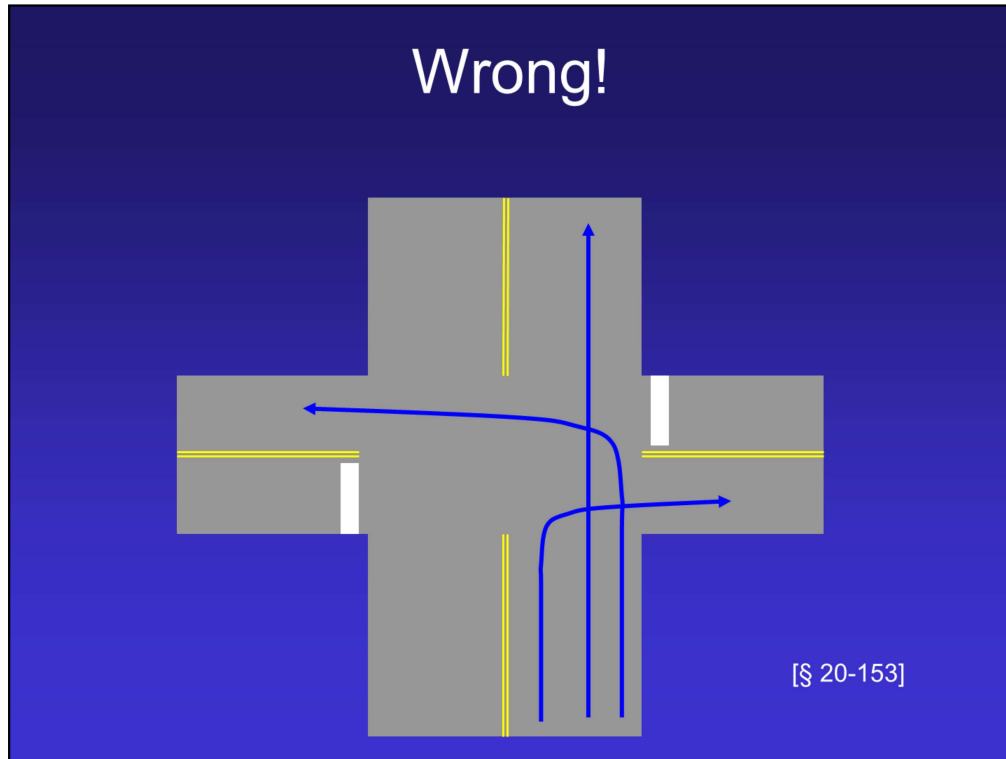


[§ 20-153]

The rules of the road prescribe destination positioning to prevent these collisions.

Drivers must approach an intersection in a position corresponding to their destination: right edge of road before turning right, center of highway before turning left, between these positions when traveling straight.

Separate lanes are often marked for these destinations, but drivers must often treat wide pavement as though it will perform as multiple lanes.



If drivers don't use destination positioning, crossing conflicts occur. This is a common error where motorists and bicyclists are operating together. Examples: Cyclist turning left from right edge of road, or right turning driver right-hooking cyclist traveling straight at right edge of road.

Bicyclists Passing on Right

- Some bicyclists pass on right, surprising right-turning drivers
- This violates state law
- Cyclists shall not pass on right unless separate lane [§ 20-150.1]
- Thru cyclists who get in line with traffic help deter right hook collisions



When bicyclists attempt to pass other traffic on the right, they surprise other drivers and can set themselves up for right hook collisions.

Passing on the right is illegal without a separate marked lane, and right turns must be made from the rightmost lane.

Bicyclists who get in line with other traffic at intersections avoid right hook conflicts.

Right Hook Crashes Continued

- Curbside bike lanes at intersections discourage proper destination positioning by motorists and bicyclists
- Bicyclists are more likely to pass on right in a bike lane



Curbside bike lanes can create complications for motorists and bicyclists at intersections.

The markings make it seem that right turning motorists should stay to the left of thru-traveling bicyclists and that bicyclists should pass stopped traffic on the right.

How to avoid right hook crashes as a motor vehicle driver

- **Signal** well in advance of turn
- Don't try to pass bicyclists just before an upcoming turn
- **Merge** as far right as practicable when approaching turn (and merge into bike lane if present)



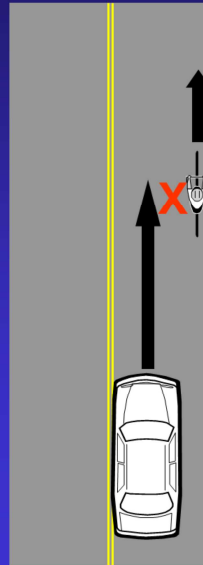
Right hook crashes can be prevented by patience and proper destination positioning.

Always signal well in advance of a turn.

Don't try to pass bicyclists just before a right turn.

On approach to the right turn, merge as far right as practicable. If there is a bike lane on the right, merge into the bike lane. This includes blocking the bike lane when traffic conditions require you to stop before turning.

Motorist Overtaking (<10% of crashes)



Most are overtaking too closely

Most involve a bicyclist on the right edge of a narrow lane

Many involve wide vehicles

A motorist overtaking a slower bicyclist accounts for less than 10% of car-bike crashes in our area.

Most of these involve motorists attempting to pass within the bicyclists' lane and passing too closely, sideswiping the cyclist

Most of the cyclists are at rightmost edge of pavement

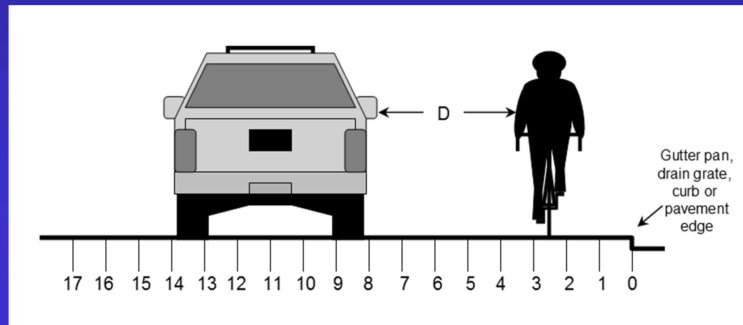
Most occur on narrow lanes

Most involve 35 or 45 mph maximum speed limits

It appears that in most of these collisions that happen in daylight, the motorist sees the bicyclist well in advance but misjudges the space needed to pass safely.

Space Required for Safe Passing

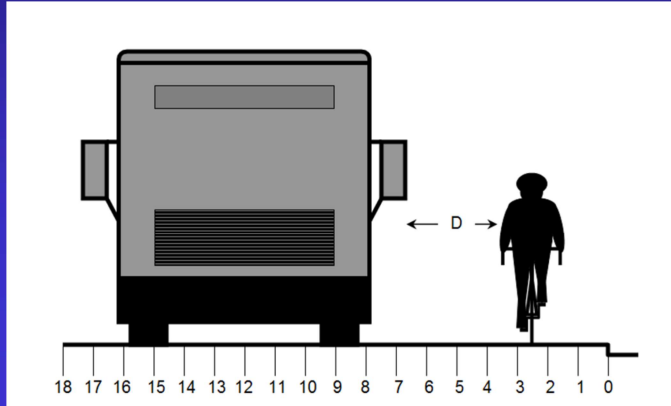
- Bicycle and motorcycle drivers need maneuvering space for balance and to avoid pavement hazards
- Safe passing at $>3'$ requires at least 14' pavement
- Motorists usually must move into next lane



Although state law requires a minimum of 2' passing distance when passing any vehicle, two-wheeled vehicles require greater distance for safety. 3' is the minimum safe passing distance when passing a bicyclist; more is required at higher speeds. This requires at least 14' of pavement for an SUV driver to safely pass a cyclist riding a safe distance from the pavement edge. But most travel lanes in the area are only 11-12 feet wide. This means drivers must move into the next lane, at least partially, to pass safely.

Space Required for Safe Passing

- Bus and truck drivers should not pass within the same lane as a bicyclist



Buses and trucks require much more pavement space to pass. Bus and truck drivers should not attempt to pass within the same lane as a bicyclist.

How to Pass a Bicyclist

1. Slow Down
2. Look and Wait for Other Traffic
3. Change Lanes to Pass

1. Slow Down



1. Slow Down

Your first responsibility as a driver is to not hit other people who are already in front of you. This means always being prepared to match their speed or stop as required. Slowing down ensures that you'll have the time you need to fully assess the road and traffic conditions prior to executing a safe pass. Lower speed also gives you more time to react should conditions change, and greatly reduces the danger you pose to the bicyclist should a collision occur.

If you're traveling too fast to slow down in time, that means you're violating the basic speed law. You must always limit your speed so that you can stop within the distance that you can see ahead. This principle is known as assured clear distance ahead. Always choose a safe speed for conditions, and keep your eyes on the road.

2. Look and Wait for Other Traffic



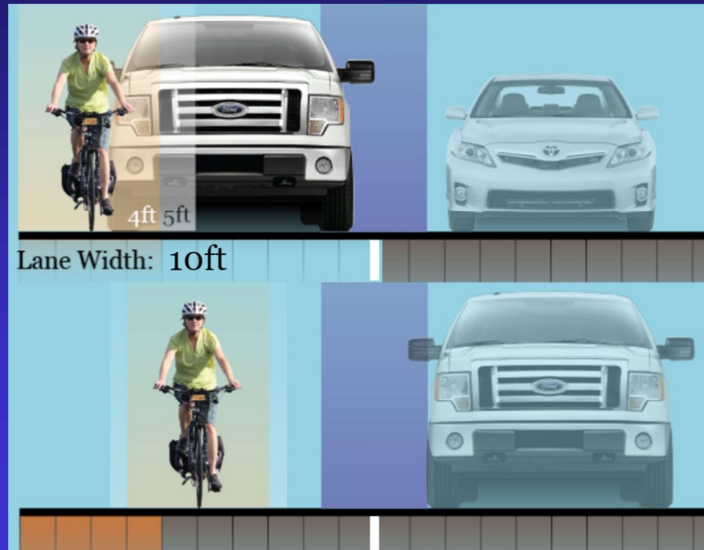
Wait for safe sight distance

2. Look and Wait for Other Traffic

Don't try to squeeze between a bicyclist and other traffic in the adjacent lane. On the vast majority of roads, travel lanes aren't wide enough for this to be safe. Attempting to squeeze past a bicyclist in the same lane is the most common cause of car-overtaking-bicycle collisions. You'll need space in the next lane in order to pass, so look for a safe gap in that traffic and wait as required. If the adjacent lane is for opposite-direction traffic, wait until you have sufficient sight distance to ensure that no traffic will arrive before you can complete the pass.

Some bicyclists will hug the right edge of a narrow travel lane in an effort to stay as far away from other traffic as they can manage. Don't misinterpret this as an invitation to pass within the same narrow lane; these bicyclists report lots of unsafe same-lane passing of the type that most often results in collisions. Knowledgeable bicyclists will often ride near the center of a narrow lane, or ride two abreast, in order to deter motorists from making the mistake of trying to squeeze by. These cyclists aren't being rude; they are just driving defensively.

3. Change Lanes to Pass



3. Change Lanes to Pass

Once you have an adequate gap in traffic in the next lane, move completely into that lane. This will give the bicyclist a safe buffer and the room they need to maneuver for maintaining balance and avoiding surface hazards.

You may ask: "What if I start to pass and I realize that I've misjudged oncoming traffic?" Simple: Press your brake pedal, and slip back behind the bicyclist(s). No harm, no foul. Worst case: Stop completely, and let everybody sort it out. Stopped vehicles don't hurt people.

Lane Control = Defensive Cycling

- Motorists often misjudge space when:
 - Lane is narrow and
 - Cyclist is at right edge of lane
- Bicyclists who ride near center of narrow lanes reduce unsafe passing, sideswipes



Some motorists misjudge the space required to pass safely when a bicyclist is riding at the right edge of a narrow lane.

This can result in unsafe close passes and sideswipe collisions.

Many experienced cyclists will ride in the center of the lane when the lane is narrow or hazards on the right edge narrow its usable width. [Example: door zone of parked cars]

This makes it clear to approaching motorists that there isn't room to pass in the same lane, causing them to slow down sooner and change lanes sooner, at a farther distance away, that there isn't room to pass within the same lane.

This improves safety and comfort for the cyclist and reduces sudden maneuvers by motorists.

Bicyclists May Use Full Lane

“Bicyclists usually ride on the right side of the lane, but are **entitled to use the full lane**.... Drivers wishing to pass a bicyclist may do so only when there is **abundant clearance** and no oncoming traffic is in the opposing lane. When passing a bicyclist, always remember **the bicyclist is entitled to use of the full lane.**”

- North Carolina Driver's Handbook, p.95.

<http://www.ncdot.gov/dmv/driver/>



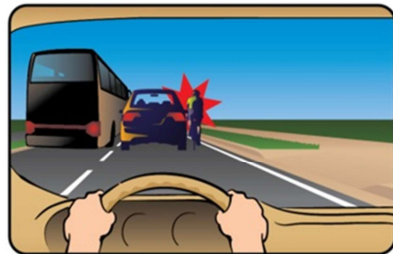
Some states have laws limiting where within a marked lane a bicyclist may operate under certain conditions. North Carolina does not.

It is at the bicyclist's discretion where to ride within a marked travel lane.

If a bicyclist elects to ride on the right side of the lane, another driver may legally pass within the bicyclist's lane only if it can be done safely.



How wide he thinks his car is



How wide it really is



Where Savvy Cyclists ride to discourage that mistake.



Most lanes are too narrow for a car to pass a bicyclist safely within the lane. Savvy Cyclists make that clear by leaving less space to their left. This is defensive driving. And it is legal in all 50 states. Regardless of where a bicyclist is, please don't risk a mistake. Change lanes to pass.

i am traffic.org  /iamtrafficorg

Graphic: i am traffic - iamtraffic.org

What about Solid Centerlines?

- Most motorists will cross a solid centerline when safe (good sight distance & no oncoming traffic) to pass a bicyclist safely.
- However, crossing a solid centerline to pass a bicyclist is not explicitly legal under current NC law (March 2016).
- Several states have explicitly legalized it for passing bicyclists when safe. NCDOT has endorsed changing the law in this way.

Most motorists will cross a solid centerline when safe (good sight distance & no oncoming traffic) to pass a bicyclist safely.

However, crossing a solid centerline to pass a bicyclist is not explicitly legal under current NC law (March 2016).

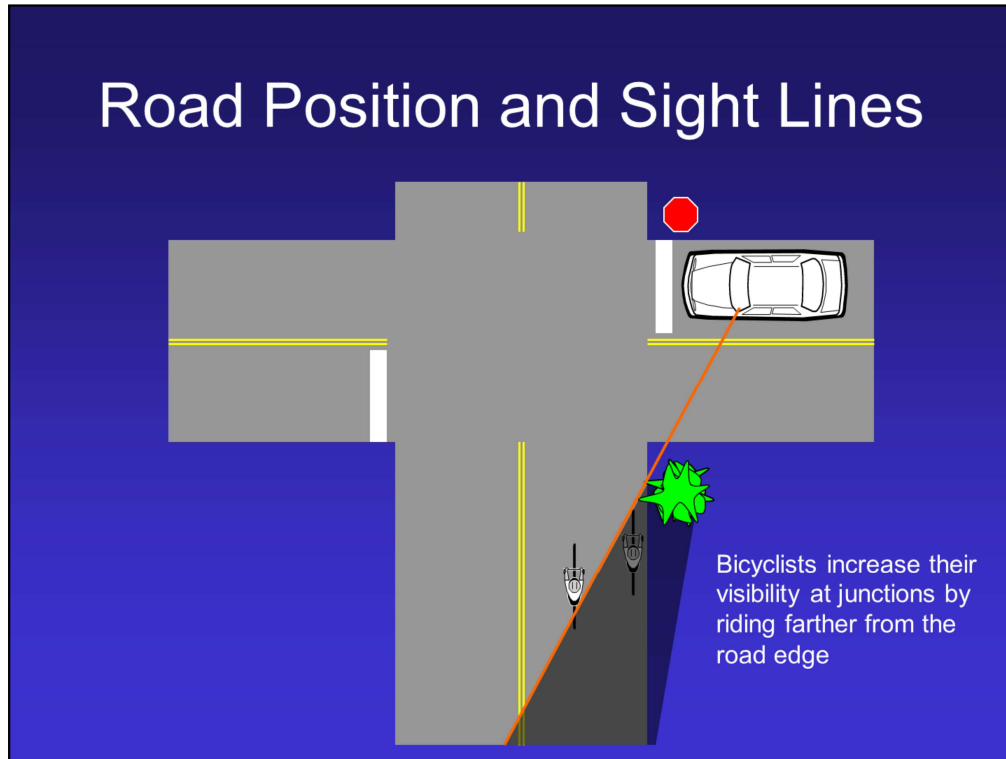
Several states have explicitly legalized it for passing bicyclists when safe. NCDOT has endorsed changing the law in this way.

What about Solid Centerlines?

- N.C. Highway Patrol 1st Sgt. Brian Gilreath:
“As long as you don’t affect the movement of oncoming traffic — that’s where common sense comes in — you’re allowed to go left of center to avoid hazards and obstructions in the roadways [...] An officer would have a hard time convincing a judge that you’re supposed to ride behind a bicyclist for 10-15 miles....” [Citizen Times, 8/19/2014]

Most police officers will not enforce the solid centerline passing prohibition when a motorist waits until it is safe to pass a bicyclist by crossing the centerline. N.C. Highway Patrol 1st Sgt. Brian Gilreath provided the following explanation quoted in the 8/19/2014 Citizen-Times:

Road Position and Sight Lines



Another reason why experienced cyclists may ride farther from the right edge of the road is to improve visibility at junctions.

The cyclist operating farther left is seen from farther away and is less likely to be lost in roadside clutter.

Riding Side-by-Side

- Bicyclists may legally ride two abreast
- This improves conspicuity/visibility and reduces unsafe passing



Bicyclists may legally ride two abreast in a single lane.

Bicyclists who ride side by side increase their conspicuity to other drivers, discourage unsafe passing in narrow lanes, and make the group more compact in length. Experienced bicyclists have found that this can increase safety under conditions where same-lane passing is not recommended.

Bicyclists Cannot Be Cited for Impeding Traffic

- § 20-141. (h) No person shall operate a **motor** vehicle on the highway at such a slow speed as to impede the normal and reasonable movement of traffic except when reduced speed is necessary for safe operation or in compliance with law; provided, this provision shall not apply to farm tractors and other motor vehicles operating at reasonable speeds for the type and nature of such vehicles.



The impeding traffic law is a speed law. It is clearly written to only apply to vehicles that are capable of going faster. It exempts non-motorized vehicles entirely, and makes an explicit exception for motor vehicles that are slow by design.

How to avoid overtaking crashes as a motor vehicle driver

- Be prepared to **slow down**
- Yield to traffic in next lane and **change lanes** to pass
- Don't pass if oncoming traffic, limited sight distance, crest of a hill, or intersection
- Do not pass within same lane unless width allows at least 3' passing (unusually wide lane)



Overtaking crashes are easy to avoid.

First, always be prepared to slow down for slower traffic on the road.

Look for and yield to traffic in the next lane before passing, and change lanes to pass.

Don't pass when there is oncoming traffic, or limited sight distance due to a curve or crest of a hill, or at an intersection.

Don't pass within the same lane unless the pavement is unusually wide and allows for at least 3' of passing distance.



You've probably seen some strange markings and signs on local streets. This next section will help clear up some confusion about them.

All roads are bicycle facilities

- All roads except freeways (I-40, 540, etc.) are allowed for roadway bicycling
- Bicycle-specific markings are used as enhancements on some routes favored by bicyclists

Shared Lane Markings (Sharrows)

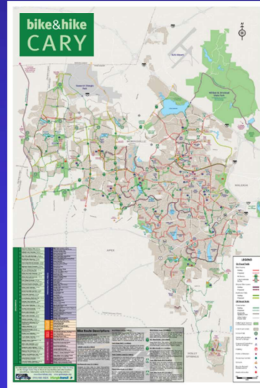
- Remind motorists to expect cyclists in the travel lanes
- Have no legal meaning



Shared lane markings, aka sharrows, have been stenciled on a number of Cary streets, including Kildaire Farm Road and Maynard Road. Sharrows are intended to remind motorists to expect cyclists in the travel lanes and to encourage cycling on the roadway rather than on sidewalks. They have no legal meaning; they don't affect the legal right of way of motorists or cyclists, or define where on the roadway a cyclist is required to operate. Sharrows were originally invented to encourage cyclists to ride farther out into the travel lane than they might normally operate, in order to encourage them to ride outside of the reach of parked car doors.

Signed Bike Routes

- Identify pleasant routes for cycling
- Have no legal meaning



Signed bike routes identify pleasant routes for cycling.

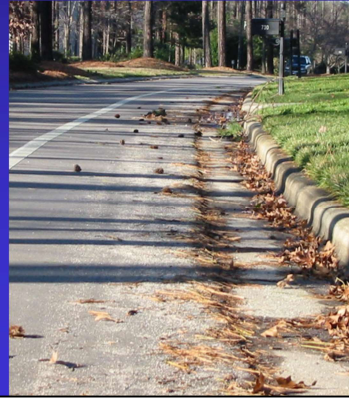
Cary produces a map of these routes which is popular with cyclists who are new to the area or are new to roadway cycling.

Signed bike routes have no legal meaning; bike route designation does not affect the legitimacy of cycling on one road or another, nor does it affect the rules of the road.

The back of the map has a lot of useful information about safe cycling techniques, and can be obtained from Parks and Rec.

Paved Shoulders

- Legally optional for bicyclists to use
- May feature safety hazards including
 - Poor surface conditions
 - Obstructions
 - Inadequate usable width
 - Inadequate sight lines
 - Increased junction conflicts



Paved shoulders are legally optional for bicyclists to use. They are not legally part of the roadway but bicyclists often like to use them to facilitate passing on busy roads. Many feature safety hazards that may lead cyclists to avoid using them.

Striped Bike Lanes



- Legally optional for cyclists
- Similar safety hazards as paved shoulders
- Some feature dooring hazards
- Motorists may merge into them (and stop in them) when preparing to turn right



Striped bike lanes look and perform much like paved shoulders, and are also legally optional for cyclists to use. Bike lanes are not defined under NC law; it is not clear when they should be treated as travel lanes versus when they should be treated as shoulders. They often feature similar safety hazards as paved shoulders. When bike lanes are striped curbside up to intersections, they may encourage right hook collisions by encouraging right turning motorists to execute their turns from a position to the left of thru cyclists.

Conclusion: Defensive Driving

- Lawful driving avoids creating dangers for other lawful road users
- Defensive driving mitigates dangers posed by others' mistakes



Thank You

- The practices we've discussed apply to safer road sharing with all road users, not just bicyclists
- Thank you for driving safely and courteously

