

# Huntsville Bicycle Motor Vehicle Crash Statistics Analysis 2005-2013



Huntsville Bicycle Advisory & Safety Committee  
(BASC) Research Project

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# BASC Research Team



- Marjorie Holderer, LCI #3100, BASC Co-Chair
- Jo Somers, PE, City of Huntsville Traffic Engineering, BASC Member
- Officer Kim Roach, Huntsville Police Dept, BASC Member
- Chris Terry, City of Huntsville GIS Dept



# 3 Purposes

- Assessing Huntsville Bicycling Safety
  - Who is responsible?
  - Risks for whom?
  - Actions that cause crashes?
- Provide Risk Analysis for Policy Makers
- Support Engineering, Education, Enforcement, Encouragement and Evaluation Efforts

# Who I am

- Materials Engineer in aviation safety and risk assessment
- Cyclist for 15 years
- Community Affairs Advisor for [Spring City Cycling Club](#) for 2 years
- Founding member of the Alabama Bicycle Coalition ([AlaBike](#)) in 2003
- Near-fatal collision with a motorist driving the wrong way
- League Cycling Instructor since 2004
- Researched bicycle safety for 15 years



# Data Content



- Study covers 9 years, 2005 to 2013
- Only includes Huntsville, not Redstone Arsenal, Madison, or Madison county.
- 183 cyclists were involved in crashes with motor vehicles
  - Does not cover solo bike crashes or crashes with other bicycles, pedestrians or animals

# Assumptions



- Crash definitions & database construction to compare with FHWA report [FHWA-RD-96-104](#)
- Subjective interpretation required
  - Reports
  - Crash Types
  - Unseen cyclists
  - Experienced cyclists
- Limited to crash reports, including facts, officer narrative and witness statements
- Identifying experienced road cyclists is a challenge
- Cyclist were assumed partially at fault if:
  - Violated traffic laws
  - Cycling on sidewalk
  - Cycling at night without lights
  - Cycling against traffic
  - Were intoxicated

# Demographic Methodology



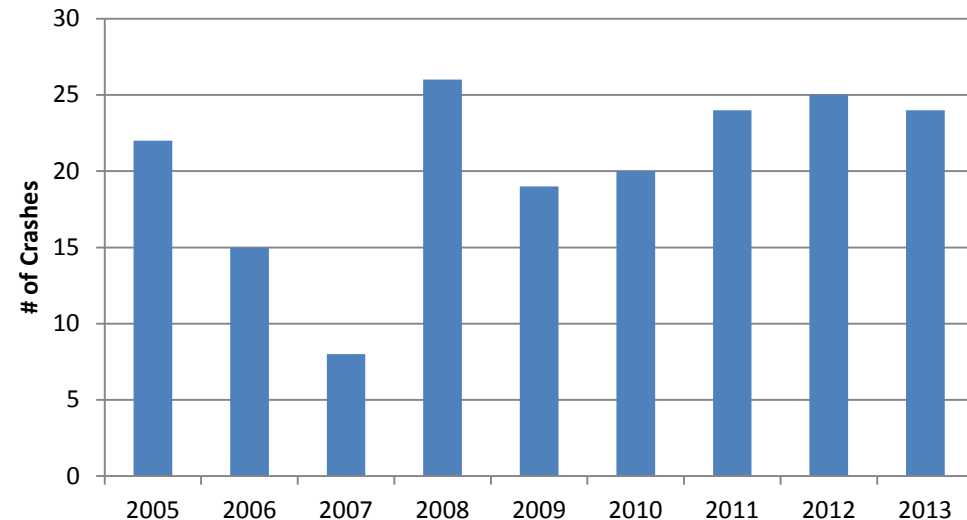
- Reports showed significant demographic trends
- Not only sex and age, but also race, zip code and employment status
- Unemployed adults do not count students or retirees
- Zip codes link crashes to census data
- Who, how and where are equally important
- Can be used for future educational, encouragement and enforcement campaigns



# Crash Database

## What

- Averaged 20.3 crashes per year
- 3 fatalities in 9 years
  - 2 crashes – cyclist lost control
  - 1 crash - distracted motorist
- 86.9% did not involve getting hit from behind by overtaking traffic







# Relative Fatality Risk

- In Huntsville in [2012](#)
  - 7440 motor vehicle crashes
  - 24 motor vehicle fatalities
- In Alabama
  - In 2012, 9 cyclists died
  - In 2010-2011, [14 hunters](#) fell out of tree stands killing 4
- Nationally in 2012 ([NTSB](#) & [NHTSA](#) statistics)
  - 726 - bicycling
  - 651 - recreational boating incidents
  - 509 - trespassing on RR tracks
  - 432 - general aviation crashes
  - 4,743 - pedestrians

# How & Why



- 24% of cyclists were driving against traffic
- 13% of crashes were hit and run
  - 42% the cyclist was also partially at fault
  - 33% were at night
- 38% were “unseen” cyclists
  - 66% were partially at fault
  - 34% were at night
  - 26% were on sidewalks
  - 31% were driving against traffic
- 12% of adult cyclists were intoxicated. One report with both cyclist and motorist intoxicated.
- 1.6% were identifiable “distracted” motorists



# Who

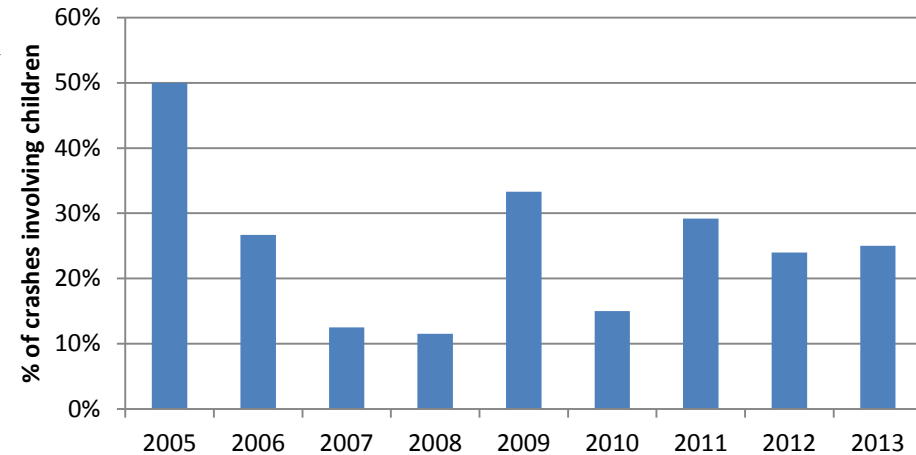
- 26% are children (<18 years old)
- 86% were male
- 68% of cyclists were at least partially at fault
- 35% of adult cyclists were unemployed\*
- Numerous crashes occurred with cyclists from inner city zip codes
- Identifiable experienced road cyclists account for 16% of adult crashes

\*7.2% of Huntsville is unemployed, US Census 2013 American Community Survey 1-Year Estimates



# Children

- 26% of crashes involved children (47 crashes)<sup>†</sup>
- 87% were boys
- 85% were at least partially at fault
- 45% were Caucasian, 53% were African American<sup>\*</sup>
- >50% of children 10-15 years old
- Top 3 crash types involving children (% of children crashes)
  - Ride Out at Stop Sign (23.4%)
  - Ride Out at Residential Driveway (12.8%)
  - Ride Out at Midblock (8.5%)
  - Ride Out at Intersection (Cyclist Failed to Yield) (8.5%)



<sup>†</sup> Huntsville is 21% children (US Census 2013 American Community Survey 1-Year Estimates)

<sup>\*</sup> African American children comprise 37% of Huntsville children (City of Huntsville demographics)



# Adults

- 74% of crashes involved adult cyclists
- 62% of adults were at least partially at fault
- 69% were Caucasian, 24% were African American<sup>†</sup>
- Top 3 crash types involving adults (% of adult crashes)
  - Motorist Overtaking Failure to Detect (17.6%)
  - Drive Out At Stop Sign (12.2%)
  - Ride Out at Intersection (Cyclist Failed to Yield) (9.2%)

<sup>†</sup>Huntsville is 62.8% Caucasian, 31.5% African American  
(US Census 2013 American Community Survey 1-Year  
Estimates)



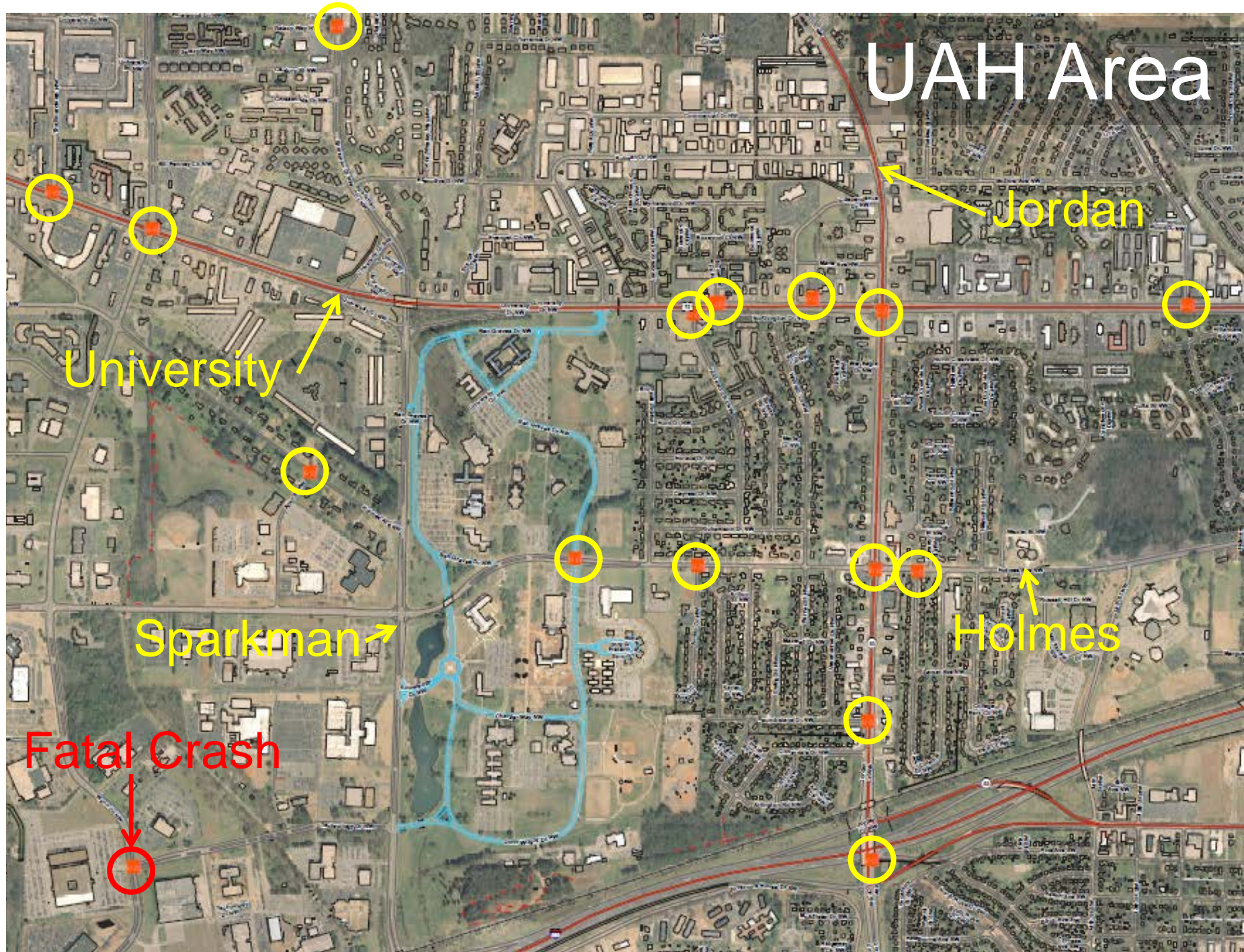
# Where

- 52% of crashes were at intersections
- 19% of cyclists were on sidewalks
- Very few crashes on popular road cycling routes in the database
- 96% were on roads  $\leq 45$  mph
- 32% were on 2 lane roads



- City Map of crash locations







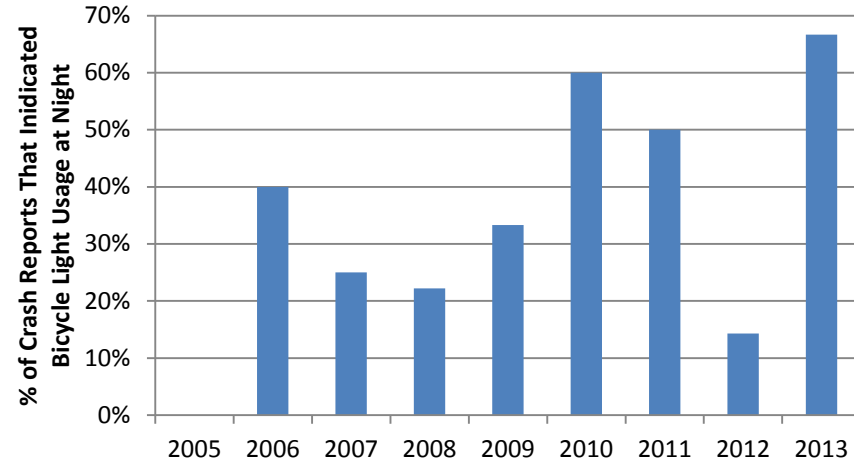
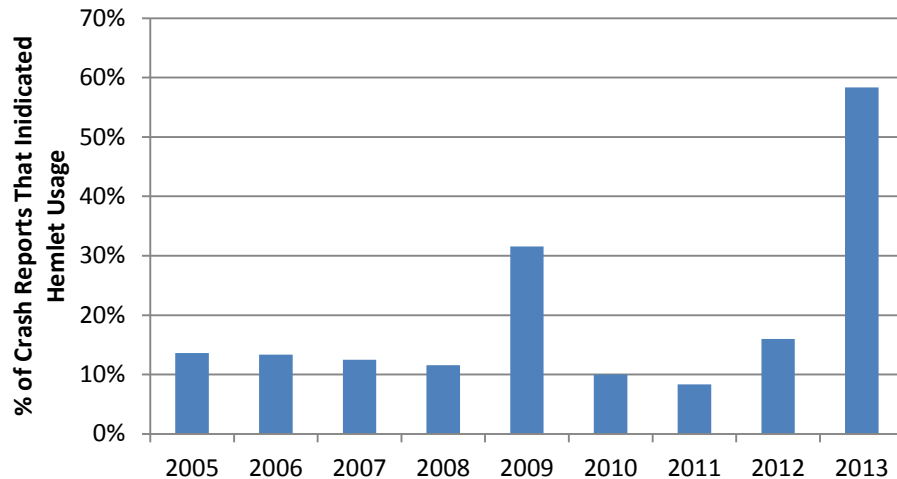
# When

- 27% of crashes were at night, including dusk & dawn
- 12.2% of adult crashes occurred between 9 pm & 6 am
- 70.2% of children's crashes occurred between noon – 6 pm
- Saturdays
  - No significant increase in crashes during daylight due to adult road cycling
  - 23.4% of crashes involving children occur on Saturday
- Sundays - 61.5% of crashes on Sundays occur Sunday night
- Adults crash most often in August (16.0% of adult crashes) and June, September & December (10.7% each)
  - Least often in January & February (3.1% each)
- Children crash more in warm school months
  - May & June (17% each), April (12.8%), March & October (10.6%)
  - January, July & September (6.4%), February & December, 4.3%, August & November (2.1%),
- 50% of crashes in December and February are at night



# Report Quality

- 34% of crashes at night reported light usage
  - 2013 – 67% included this
- 20% of reports included helmet usage
  - 2013 – 58% of reports included this
- Better electronic report formats & officer training improves report quality





# Analyzed Crash Types Summary

- Motorist Overtaking Failure to Detect 13.1% (24 crashes, 16.7% cyclist partially at fault)
- Drive Out at Stop Sign 10.4% (19, 89.5%)
- Ride Out at Intersection (Cyclist Failure to Yield) 9.3% (17, 100%)
- Ride Out from Midblock 6.6% (12, 91.7%)
- Ride Out at Stop Sign 6.6% (12, 91.7%)
- Ride Out at Commercial Driveway 6.0% (11, 90.9%)
- Motorist Left Turn Facing Bicyclist (a.k.a Left Cross) 6% (11, 9.1%)
- Backing 3.8% (7, 57.1%)
- Motorist Overtaking Misjudge Passing Space 3.8% (7, 0%)
- Ride Out at Residential Driveway 3.3% (6, 100%)
- Drive Out at Midblock 3.3% (6, 66.7%)
- Motorist Left Turn in Front of Bicyclist 3.3% (6, 100%)
- Bicyclist Left Turn in Front of Traffic 2.7% (5, 100%)
- Bicyclist Lost Control 2.7% (5, 100%)
- Right on Red 2.2% (4, 100%)
- Wrong Way Bicyclist 2.2% (4, 100%)
- Weird 1.6% (3, 33%)
- Unknown 1.6% (3, 66.7%)

# Crash Types with <3 crashes in database



With few crashes to analyze, conclusions cannot be made at this time.

- [Ride Out From Sidewalk \(1\)](#)
- [Multiple Threat \(obstructed vision\) \(1\)](#)
- [Trapped \(nonobstructed vision\) \(1\)](#)
- [Drive Through \(motorist ran signal\) \(1\)](#)
- [Motorist Lost Control \(1\)](#)
- [Bicyclist Left Turn - Facing Traffic \(2\)](#)
- [Bicyclist Right Turn \(facing traffic\) \(1\)](#)
- [Motorist Right Turn \(a.k.a Right Hook\) \(1\)](#)
  - Narrow lanes and few bike lanes reduce the risk of this crash type
- [Bicyclist Overtaking \(1\)](#)
- [Non-Roadway \(parking lot\) \(1\)](#)
- [Controlled Intersection \(1\)](#)
- [Motorist Overtaking – Other \(2\)](#)
- [Bicycle Strikes Parked Vehicle \(2\)](#)
  - None of this crash type involved “doorings.” Little on-street parallel parking limits this risk.
- [Drive Out At Intersection - Other \(driver failed to yield\) \(2\)](#)

# Crash types with no crashes in database to date



- Motorist Overtaking, Counteractive evasive actions
- Motorist Overtaking, Bicyclist Path Obstructed
- Uncontrolled intersection – other
- Wrong Way Motorist
- Drive Out From On-Street Parking
  - Little on-street parallel parking reduces this risk
- Play vehicle

# Crash Database Conclusions



- Bicycle safety is more complex than widely assumed
  - Bikes do not crash that often
    - Crash rates have decreased. # of crashes per year remains constant while more people are cycling
  - All roads have risks
    - 2 lane, 25 mph neighborhood streets just have different risks than 5 lane, 40 mph ones
  - Different cycling populations have different risks and threats
    - What is a “cyclist” vs. a “bike rider?”
    - Is everybody riding a bicycle a “cyclist?”
  - Road cyclists have fewer crashes but those crashes predominately are motorist overtaking failure to detect
  - Cyclists still fare best when they ACT and are TREATED as drivers of vehicles
    - 2/3rds of cyclists were partially at fault
    - Experienced cyclists following vehicular cycling principles only had 2.3 crashes per year despite thousands of cyclists riding thousands of miles each year.

# Crash Database Conclusions



- Disadvantaged populations are most at risk for a bicycle crash
  - Homeless, transients, unemployed
    - How can they afford a \$65 Cycling Essentials course?
  - Different solutions required for different populations
    - While websites, Twitter feeds and FaceBook pages are good methods to reach road cyclists, they are less effective for homeless transients with no internet access.
  - Children, especially African American
    - Further investigation is needed why African American children are over represented in the reports.

# Crash Database Conclusions



- Uneducated cyclists are at risk regardless of where they ride
- Nighttime cycling is significantly more dangerous
  - Relatively few trips occur at night but result in a considerable number of crashes
- A lack of bicycle facilities and narrow lanes reduces one of the most common types of crashes
  - Only 1 Motorist Right Turn (a.k.a Right Hook) compared with 4.7% of crashes in FHWA report
- Sidewalks are a significant contributor for certain crash types



# Crash Database Conclusions



- Bike facilities, including protected bike lanes, unlikely to prevent most the crashes in the database
  - Bike facilities address the fear of getting hit from behind
    - >83% of crashes do not involve overtaking motorists
    - 52% of crashes are at intersections
    - 58.3% of motorist overtaking failure to detect were at night with 71.4% of those with no or unknown lights
  - Bike facilities move cyclists from where motorists are looking for traffic
    - 19% of cyclists were on sidewalks
    - 38% were “unseen” cyclists at night, on sidewalks and/or driving against traffic
  - Bike facilities require additional education to use safely
    - 68% of crashes were partially caused by cyclist
    - Will not address risks involving intoxicated motorists and cyclists
    - Road cycling has 5 basic principles, [greenways](#) have 9 additional considerations
  - Bike facilities are needed for children to ride safely
    - 85% were partially caused by child
    - 54.7% on 25 mph roads
    - 63.9% are on 1-2 lane roads
  - Bike facilities may increase certain types of crash types
    - Using motor vehicles as a barrier reduces visibility and increases risk of “doorings”
    - Putting through bicycle traffic on the right of right turning motorists will increase risks of “right hooks”
- Bike facilities improve safety by increasing numbers of cyclists that will lead to small improvements if crash causes do not change.
  - Bike facilities make cycling more popular, increasing the population of cyclists not represented in the crash database

# Recommendations

- Education is vital to improving bicycle safety
  - 7 volunteer instructors are available to teach
    - Need resources & structure to reach all populations
    - Dedicated, full time instructors are needed
  - Children still need better education
    - Teach their parents to teach them how to cycle safely
    - Teach parents how to cycle safely to set the example
    - School age kids, especially in middle school, need courses in their school curriculum
- Hit & Runs need to be addressed
- Target enforcement of bicycle lights
  - Nighttime cycling is significant issue
  - Start effort in October, not May
  - Hand out lights and information, not tickets
- Expand existing police training

# Future Work

- Add 2014 & 2000-2004
  - More data can fill holes when only 1 or 2 crashes occurred
- Database is structured for future crash trends
  - Bike lanes, paths, greenways and shoulders are included. Little data to date.
- Multivariate analysis with statistical analysis software once additional years are entered
  - Allows greater visibility of statistically significant crash combinations

# Additional Details



# Report Parameters Recorded



- Report #

- Date
- Time
- Location

## Crash parameters

- Severity
- First or Second Half of roadway
- Cyclist Fault
- Alcohol/drug usage by cyclist & motorist

- Crash Type

## Road design

- Number of lanes
- Road feature (intersection/midblock)
- Speed Limit
- Traffic Control (lights, signs)
- Sidewalk, Greenway, Bike Lane, Shoulder

## Bike Equipment

- Bike lights
- Helmet

## Cyclist

- Employment
- Zip Code
- Age
- Race
- Sex

## Cyclists actions

- Cycling with or against traffic
- Overtaking on left/right?
- Unseen Cyclist/Distracted Driver/Experienced Cyclist

## Motorists actions

- Hit & Run
- Dooring

## Environmental conditions

- Weather
- Road Surface (i.e. wet)
- Light Condition (dusk, dawn, etc)

# Sources of Bias

- Cannot reinvestigate crash & must rely on report content
- Bias may exist in officer's & witnesses statements
- Officers & witnesses may not understand cycling enough to know why a cyclist did what they did. For example evading road debris.
- Did not use report codes for determining crash type
- Attempted to judge cyclists potential actions against report to correct for any bias
- Cyclists statements in many reports confirm officers & witnesses statements on poor cycling behavior

# Crash Database

## What

- Averaged 20.3 crashes per year (compared to 7440 motor vehicle crashes)
  - High 26 in 2008, low 8 in 2007, Median - 22
- Motorist Overtaking Failure to detect was the most common crash type, 13%.

## 3 fatalities

- 2 crashes were caused by loss of control by the cyclist
  - One cyclist did not make a right hand turn after a fast descent and hit the side of a nearly stopped vehicle at the stop sign.
  - Second cyclist lost control on a rain slicked sidewalk and rode into traffic.
- 1 crash caused by a distracted motorist
  - The report notes that the cyclist's helmet was found 30 ft away from where the cyclist came to rest. The cyclist died of a traumatic brain injury. Helmet fit and proper usage may be a contributing factor to the fatality.





# How/Why

- 13% of crashes were hit and run
  - 2011-2013 averaged 19%
  - Max 25% in 2007 (2 crashes), Min 0% in 2006
- 38% were “unseen” cyclists
  - 20% involved children
- 36% were in “bad” weather or cloudy conditions, 13% with wet roads
- 12% of adult cyclists were intoxicated.
  - Addition 15% were “unknown” intoxication
  - Only one report with both cyclist and motorist intoxicated.
  - Hit & runs may be the reason intoxicated motorists are under reported.
- 1.6% were “distracted” motorists
  - Both crashes were motorist overtaking failure to detect



# Who

- Average Cyclist Age – 34.8 (Median – 35)
- Oldest Cyclist – 81
- Youngest Cyclist – 4
- 87% were male (Max 100% in 2007, Min 77% in 2008)
- 68% of cyclists were at least partially at fault (Max 82%, Min 50%)
- 26% are children (<18 years old)
  - Low 12% in 2007, high 50% in 2005

# Who

## By Race

- 61% were Caucasian (Max 80%, Min 40%)
- 32% African American (Max 50%, Min 6%)
- Huntsville is 62.8% Caucasian, 31.5% African American (US Census 2013 American Community Survey 1-Year Estimates)
- Cyclist Zip Code
  - 35805 – 20%
  - 35810 – 12%
  - 35803 – 12%
  - 35801 – 10%
  - 35802 – 8%
- Severity
  - No injuries – 20%
  - Minor Injuries – 23%
  - Severe Injuries – 4%
  - EMS to Hospital, Severity Unknown – 50%
  - Fatal 1.65%



# Children

- 19% of children in crashes were on sidewalks
- Crashes per year
  - Pre & post Safety City closing
- By age group
  - <5 – 0.5%
  - 5-10 – 7.7%
  - 10-15 – 13.7%
  - 16-17 – 4.9%

# Adults

- 19% of adults were on sidewalks
- Identifiable experienced road cyclists account for 16% of adult crashes
  - Identified by personal knowledge & by how & where they were cycling
  - 47.6% were Motorist Overtaking Failure To Detect.
  - 19% were “Left Cross”
  - 14.3% were Motorist Overtaking Misjudged Passing Space
  - 9% were Drive Out at Stop Sign
  - 90% were Caucasian, 10% were Asian
  - 0% were unemployed
- Unknown experience adults – 24%
  - 28.1% were Motorist Overtaking Failure To Detect.
  - 15.6% were “Left Cross”
  - 9.4% were Motorist Overtaking Misjudged Passing Space
  - 6.3% were Drive Out at Midblock & Backing each
- Unemployed Adults
  - 64% - Caucasian
  - 31% - African American

# Sidewalks

- 19% of cyclists were on sidewalks
  - [Lewiston & Wachtel](#) study showed 2-4 times increase in crash risk
  - Top # adult crashes involving sidewalks ( $\geq 3$  crashes)
    - Right on Red (75%)
    - Motorist Left Turn in Front of Bicyclist (75%)
    - Drive Out at Stop Sign (62.5%)
    - Ride Out at Controlled Intersection (41.7%)
  - Top children crashes involving sidewalks ( $\geq 3$  crashes)
    - Ride Out at Sidewalk (100%)
    - Drive Out At Stop Sign (100%)
    - Weird (100%)
  - Top zip codes for adult involved in sidewalk crashes
    - 35805 (32%), 35801 & 35816 (16%), 35802 & 35803 (12%), 35810 & 35811 (4%)
  - Top zip codes for children involved in sidewalk crashes
    - 35803 (44%), 35805 (22%), 35810 & 35811 (12%) 35801 & 35816 (16%), 35802 &
  - 18% of sidewalk crashes involved someone 45-54 or 55-64 years old each
  - Sidewalks are a protected bike facility



# Where

- Speed limit
  - 30% -  $\leq 25$  mph
  - 16% - 25 to 35 mph
  - 48% - 35 to 45 mph
  - 3% -  $> 45$  mph
- # of lanes
  - 6.6% on 1 lane roads
  - 31.9% on 2 lane roads
  - 4.4% on 3 lane roads
  - 22.0% on 4 lanes roads
  - 19.2% on 5 lane roads
  - 12.6% on 6+ lane roads



- City Map of crash locations



# When

- 27% of crashes were at night including dusk & dawn
  - Median 28%
  - Max 50% (2009)
  - Min 8% (2011)
- Time of Day
  - 3-6 pm – 30.8% (17.9% in darkness)
  - Noon – 3 pm – 18.7%
  - 9 am – noon – 15.4%
  - 6-9 pm – 14.8% (70.4% in darkness)
  - 6-9 am – 9.3% (17.6% in darkness)
  - 9 pm – midnight – 7.1% (100% in darkness)
  - 3-6 am – 1.6% (100% in darkness)
  - Midnight – 3 am – 1.1% (100% in darkness)
  - 70.2% of children's crashes occurred between noon – 6 pm



# When

- 12.3% of adult crashes occurred between 9 pm & 6 am
  - 9 pm – midnight – 8.5%
  - Midnight – 3 am – 1.5%
  - 3-6 am – 2.3%
- Day of the Week
  - Monday – 14.3% (7.7% at night)
  - Tuesday – 15.9% (31% at night)
  - Wednesday – 9.3% (29.4% at night)
  - Thursday – 18.1% (30.3% at night)
  - Friday – 15.9% (17.2% at night)
  - Saturday – 18.1% (30.3% at night)
  - Sunday – 7.1% (69.2% at night)
    - 61.5% occurred Sunday night
    - Unknown causes for why Sunday has such a large percentage of night crashes



# When (cont)

- Month of the Year
  - January– 3.8% (14.3% at night)
  - February– 3.3% (50.0% at night)
  - March– 6.6% (33.3% at night)
  - April– 8.2% (20.0% at night)
  - May– 9.9% (22.2% at night)
  - June– 12.6% (21.7% at night)
  - July– 7.7% (28.6% at night)
  - August – 12.1% (22.7% at night)
  - September – 9.3% (17.6% at night)
  - October – 10.4% (26.3% at night)
  - November – 7.1% (38.5% at night)
  - December – 8.8% (50.0% at night)

# Crash Type Summaries



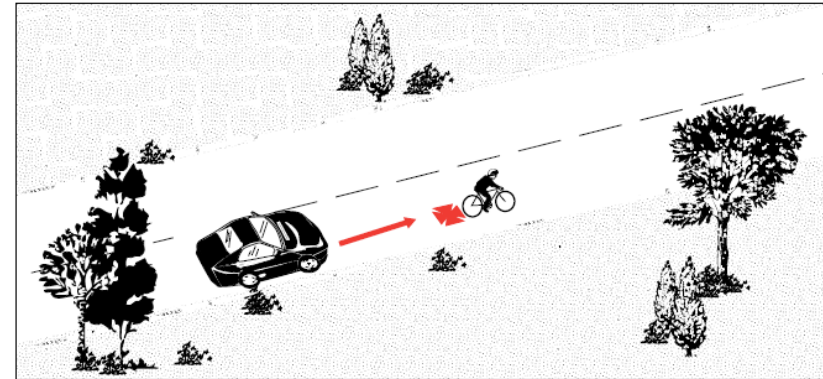
- Document significant observations from each crash type
- Crashes with few crashes,  $\leq 7$ , have few findings to list & show them as numbers, not percentages

# Motorist Overtaking Failure to Detect



The motorist was overtaking and failed to detect the bicyclist.

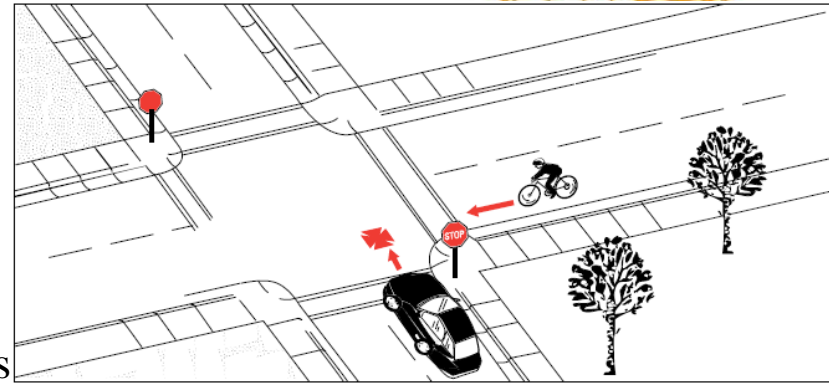
- 13.1% of crashes (24 crashes)
- 16.7% the cyclists were partially at fault
- 58.3% were at night
  - 16.7% were hit between 9am to noon, 3-6 pm (50% in darkness), 6-9 pm (100% in darkness) & 9 pm to midnight each. 8.3% were hit 3-6 am, 6-9 am (50% in darkness), & noon- 3 pm each. 4.2% were midnight – 3 am
  - 14.3% had no lights, 57.1% had unknown lights
- 29.2% were hit & run
  - 14.3% of hit & runs the cyclist was also at fault
  - 71.4% of hit & runs occurred at night (100% unknown lights)
- 58.3% were unseen
  - 71.4% of unseen cyclists were at night
    - 60% of unseen cyclists at night either without or unknown lights
- # of lanes
  - 37.5% were on 4 lane roads, 25% were on 2 lane roads
- Speed limit
  - 70.8% were on roads with speed limits between 35-45 mph
  - 0% on roads with speed limits of 55 mph
- When?
  - Adults primarily hit on Tuesday (21.7%) & Wednesday & Thursday (17.4% each)
- Sex, age, race & zip code
  - 95.8% were adults
  - 33.3% of cyclists were 45-54 years old, 20.8% were 35-44 years old
  - 86.9% of adults were men
  - 73.9% of adults were Caucasian, 13% were Asian, 8.3% were African American
  - 25% were from 35801 zip code, 16.7% from 35805
- 1 fatality, 54% were taken to the hospital by ambulance, 25% were minor injuries



# Drive Out at Stop Sign

The crash occurred at an intersection at which the motorist was facing a stop sign.

- 10.4% of crashes (19)
- 89.5% of crashes caused by cyclist
  - 15.8% of this crash type cause by children
  - 84.2% from cycling against traffic
  - 63.2% from cycling against traffic on sidewalks
  - 68.4% from cycling on sidewalks
  - 73.7% were unseen
- Only 5.3% at night
- 84.2% were in the first half (just entered) of the roadway
- 36.3% were between 3-6 pm.
- 26.3% were from 35803 zip code, 21.1% from 35816 & 35805 each
  - 60% of cyclists from 35803 were children, 0% from 35816 or 35805
- 31.6% did not result in injuries, 52.6% were taken by EMS to the hospital

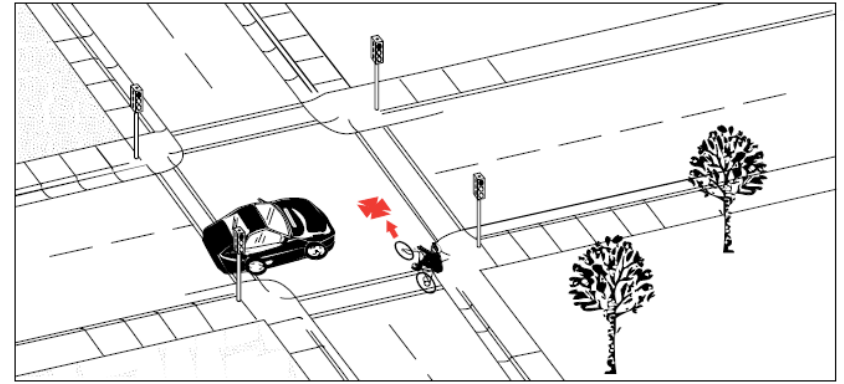




# Ride Out At Intersection (cyclist failed to yield)

The crash occurred at an intersection, signalized or uncontrolled, at which the bicyclist failed to yield.

- 9.3% of all crashes (17)
- Cyclist was always partially at fault
  - 1 crash was hit & run
- 41.2% were at night
- 23.5% involved children
- 35.3% were on sidewalks
- 23.5% were cycling against traffic
- 29.4% were “unseen” cyclists
  - 60% were at night, no cyclist used lights
- 23.5% were between 6-9 am. Also between noon and 3 pm.
- 23.5% were in the month of April, 17.6% in August & October each
- 29.4% were between 45-54 years old, 23.5% were between 16-20 years old
- 23.5% were from the 35805 zip code, 17.6% were from 35803 and 35810 each.
  - 50% of crashes from 35805 were children, 33.3% from 35803 & 35810 each
- 41.2% reported no injuries, 29.4% were taken to the hospital by ambulance
- No evidence of identifiable experienced cyclists running red lights that resulted in crashes**



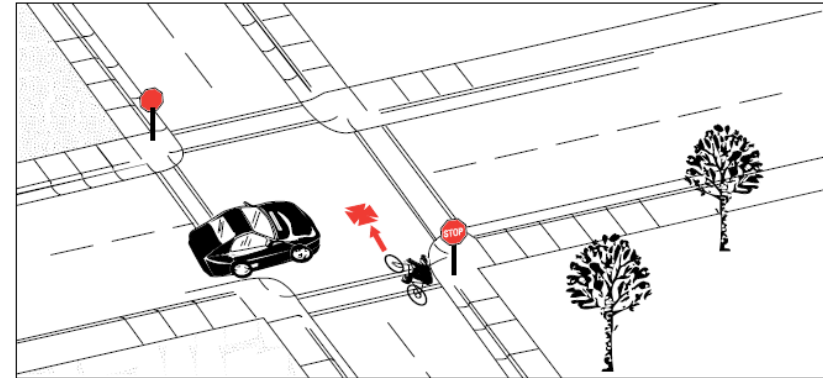


# Ride Out At Stop Sign



The crash occurred at an intersection at which the bicyclist was facing a stop sign or flashing red light.

- 6.6% of crashes (12)
- 91.7% were partially caused by cyclist
  - 1 crash was hit and run, unknown cyclist fault
- 91.7% involved children
- 8.3% were at night
- 16.7% were cycling against traffic
- 41.7% were between 3-6 pm, 33.3% were between noon-3 pm
- 41.7% were on 25 mph roads, 33.3% on 35 mph roads
- 50% were on 2 lane roads, 16.7% on 4 lane and 25% on 5 lane
- 50% were between 10-15 years old, 25% between 5-9, and 16.7% between 16-20.
- 1 fatality, 50% were taken to the hospital by ambulance, 25% were minor injuries.
- 1 was on the Eastern Bypass greenway with the cyclist facing a yield sign

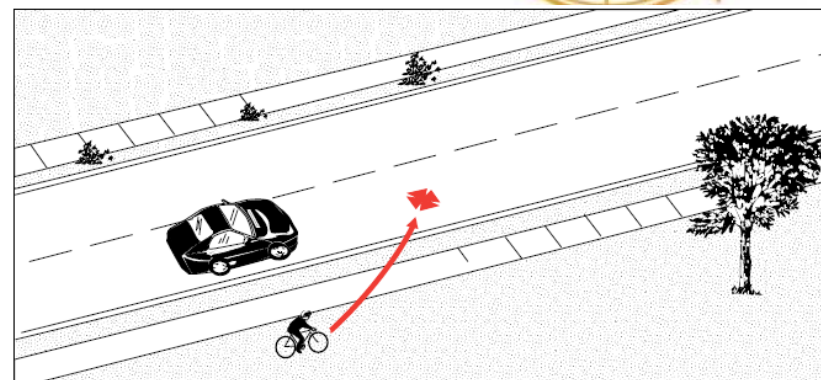


# Ride Out From Midblock



The bicyclist entered the roadway at a shoulder or curb midblock location.

- 6.6% of crashes (12)
  - 1 was unknown, 1 was hit & run
  - Potential bias?
- 25% occurred at night
  - All with no or unknown lights
- 33.3% involved children
  - 75% were African American
- 1 Hit & Run, cyclist was also partially at fault
- 85.7% of adults were unemployed
- 33.3% were “unseen”, 33.3% were between 6-9 pm
- 33.3% were on 25 mph roads, 33.3% were on 40 mph roads
- 25% were cyclists from 35805, 35810, & 35816 zip codes each
- 25% had no injuries, 25% had minor injuries, 33.3% were taken to the hospital.

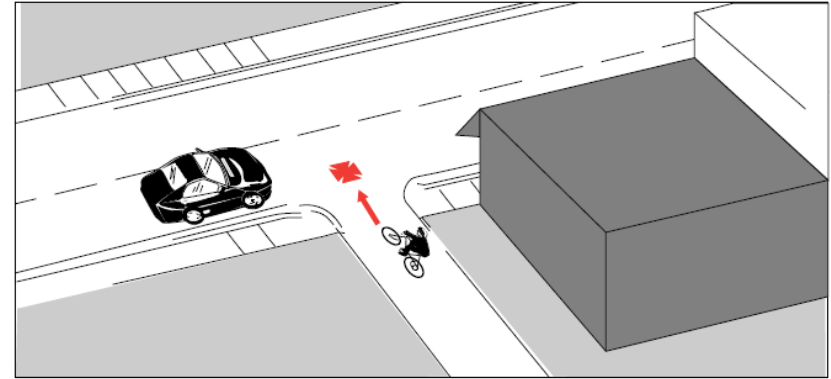


# Ride Out At Commercial Driveway



The bicyclist entered the roadway from a commercial driveway.

- 6.0% of crashes (11)
- 91% cyclist partially at fault
- 36.4% occurred at night
  - 1 cyclist had headlights and taillights
- 27.3% involved children, all African American 10-15 years old
- 62.5% of adults were unemployed
- 36.4% were “unseen,” 75% of these were at night
- 36.4% occurred between 3-6 pm, 27.3% were 6-9 pm, all in darkness
- 54.5% were on 40 mph roads, 36.4% were on 45 mph roads
- 54.5% were on 4 lane roads, 27.3% on 6+ lane roads
- 27.3% were from 35811 zip code, 18.2% from 35805
- 81.8% were taken to the hospital by EMS, 18.2% had no injuries

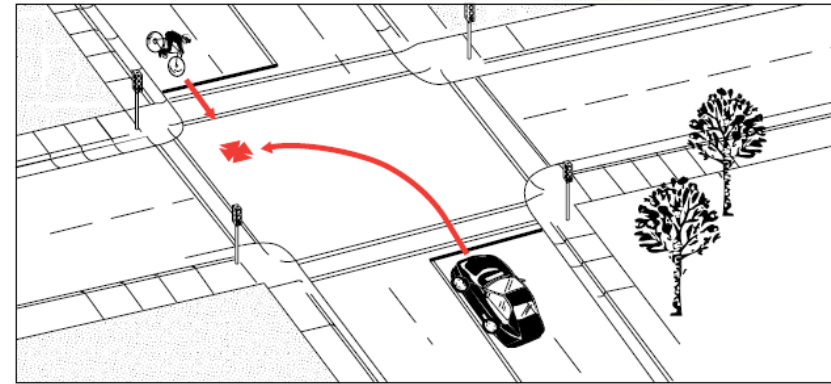


# Motorist Left Turn Facing Bicyclist (Left Cross)



The motorist made a left turn while facing the approaching bicyclist

- 6% of crashes (11)
- By default, motorists are at fault
  - 1 “unseen” cyclist was also at fault in nighttime crash with unknown lights
- 1 hit & run
- 4 identifiable experienced cyclists hit
- 45.5% “unseen”
  - 1 crash unseen at night with unknown lights
- All adults, 1 woman & 10 men
  - 36.4% were 25-34, 27.3% were 55-64 years old
- 72.4% on 40 mph roads
- 45.5% on 5 lane roads
- 36.4% were noon-3 pm, 18.2% were 6 am – 9 am, 9am – noon and 3 pm -6 pm each
- 54.5% were taken to the hospital, 27.3% with minor injuries, 9.1% with no injuries

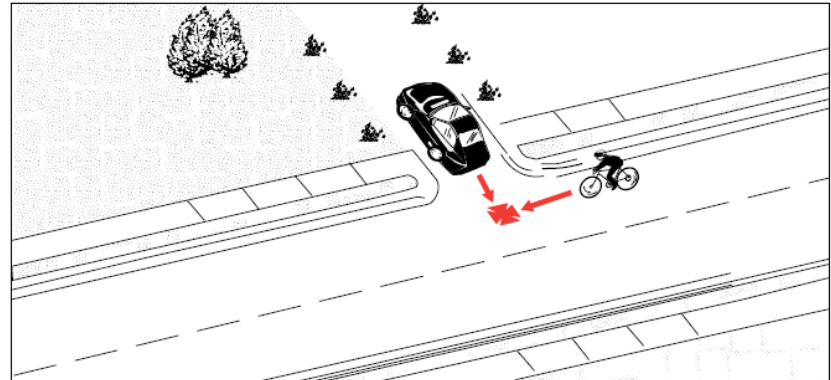




# Backing

The crash involved a motor vehicle which was backing.

- 3.8% of crashes (7)
- 4 partially caused by cyclist
- 3 occurred at night
  - 2 with unknown lights
- 5 were “unseen,” 3 were children
- 4 involved children
  - 3 were 5-9 years old
- 3 were on 25 mph roads, 1 was 40 mph, 3 were other
- 3 were from 35803, 2 from 35805
- 1 child was on a sidewalk
- 1 crash was a distracted driver (talking to neighbor caused the distraction)
- 1 cyclist was an identifiable experienced cyclist at night on a recumbent when the motorist backed up the street
- All adults & 75% of children were Caucasian
- 4 occurred between 3-6 pm
- 5 were taken to the hospital, 1 with minor injuries, 1 with no injuries

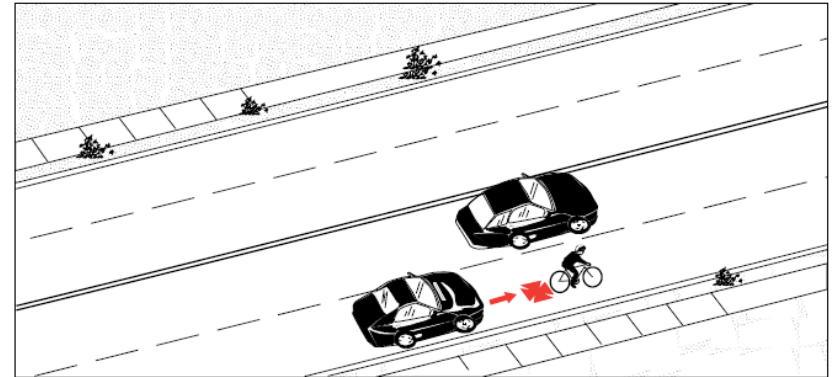


# Motorist Overtaking, Misjudge Passing Space



The motorist was overtaking and misjudged the width or length required to pass the bicyclist.

- 3.8% of crashes (7)
- Only crash type where a typical 3 ft law is applicable.
- All caused by motorist during daylight hours
- By default all cyclists were “seen”
- 6 Caucasian, 1 African American
- 5 men, 1 woman, 1 young boy
- 2 adults were unemployed
- 2 were hit & run
- 3 identifiable experienced cyclists were hit
- 5 were between 9 am and 3 pm
- 4 were on Friday
- 2 were on 25 mph streets, 2 were on 55 mph roads
- 2 each were on 2, 4 and 5 lane roads
- 3 had minor injuries, 3 had no injuries



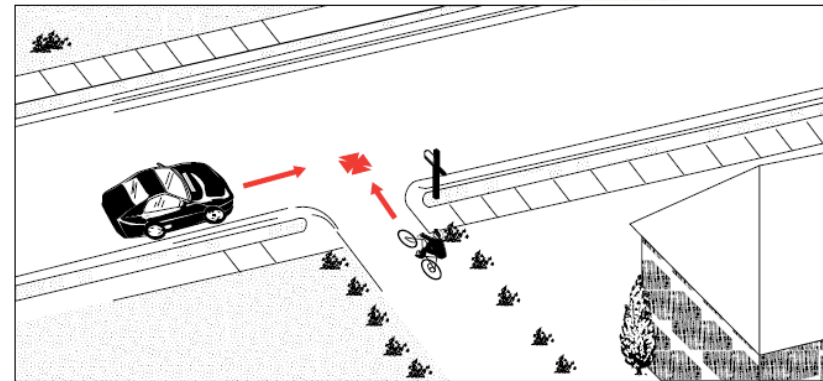




# Ride Out At Residential Driveway

The bicyclist entered the roadway from a residential driveway or alley.

- 3.3% of crashes (6)
- All involved children
  - 4 were 5-9 years old, 1 was 10-15 and 1 was 16-17 years old
- No crashes at night
- 5 were boys
- 5 were African American
- By zip code
  - 2 - 35816
  - 1 - 35801, 35810, 35811, & 35803 each
- 3 were “unseen”
- 3 were between 3-6 pm, 2 were noon-3 pm
- 3 were on Saturday
- 2 were in April, 1 each in March, June & August
- 100% on 25 mph residential roads, 1-2 lanes
- 3 were taken to the hospital, 3 had minor injuries



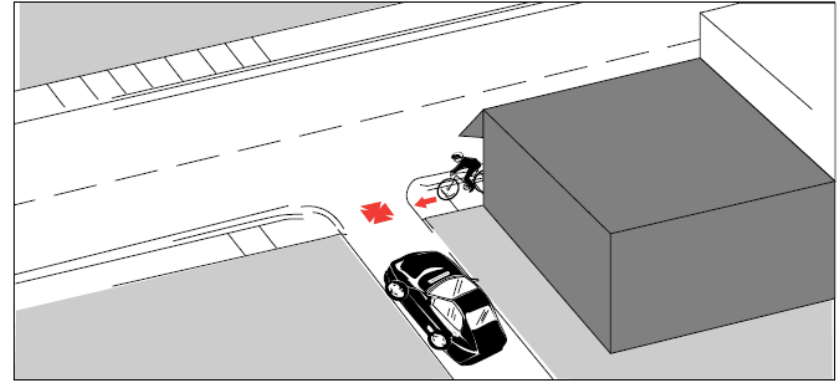


# Drive Out At Midblock



The motorist was entering the roadway from a driveway or alley.

- 3.3% of crashes (6)
- 4 caused by cyclists
- All adult men during daylight hours
- 3 were unemployed
- No intoxicated cyclists or motorists
- 3 crashes were between 3-6 pm
- 3 crashes were unemployed cyclists
- 2 were on sidewalks
- 3 were against traffic, 2 on a sidewalk
- 3 were on 40 mph roads, 2 on 45 mph
- 4 were on 5 lane roads
- 4 were “unseen”
- 1 hit & run, cyclist also at fault
- 5 went to the hospital, 1 had no injuries

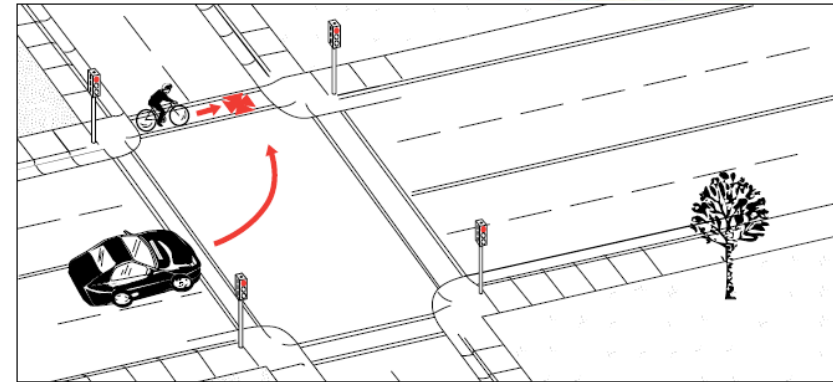


# Motorist Left Turn in Front Of Bicyclist



Both parties were traveling in the same direction and the motorist turned left in front of the bicyclist.

- 3.3% of crashes (6)
- All caused by cyclist
  - By definition, cyclist driving against traffic
  - 3 on sidewalks
  - 1 at night, no lights, cyclist “unseen”
- Only 1 crash involving a child, 10-15 years old
- 1 hit & run
- 4 happened between 3-6 pm
- 3 adults were unemployed
- 3 occurred on roads with a speed limit of 40 mph, 2 on 35 mph roads
- 3 had no injuries, 1 minor injuries, 2 were taken to the hospital by EMS,



# Bicyclist Left Turn in Front Of Traffic



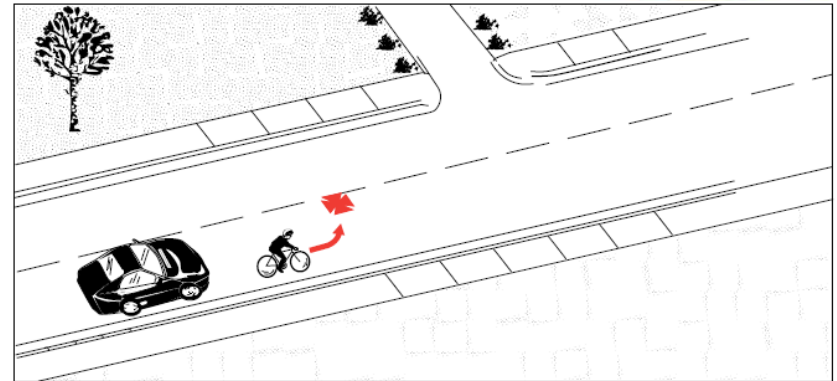
The bicyclist made a left turn in front of traffic traveling in the same direction.

2.7% of crashes (5)

By default always cyclist's fault

Subject to bias & misinterpretation

—Was cyclist turning in front of car or avoiding road debris?



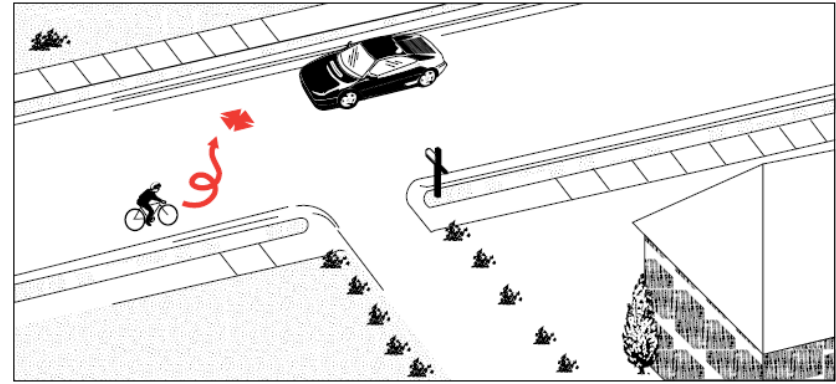
- 4 adults, 1 tween/teen, all Caucasian male
- 2 unemployed
- 1 nighttime with unknown lights
- 1 hit & run
- 2 on 40 mph roads, 2 on 45 mph roads, 1 other
- 2 on 2 lane roads, 2 on 5 lane, 1 6+ lanes
- 3 went to hospital, 1 minor, 1 no injuries.

# Bicyclist Lost Control



The bicyclist lost control and inadvertently swerved into the path of the motorist.

- 2.7% of crashes (5)
- 1 fatality, second fatality classified differently but also resulted from loss of control.
- By default all caused by cyclist
- 2 nighttime, both with unknown lights
- All adults, 2 unemployed, 1 woman
- 4 were at intersections
- 3 were on 40 mph roads, 1 at 35, 1 is other
- 3 on 4 lane roads, 2 on 2 lane roads
- 1 was taken to hospital, 1 reported as serious, 1 as minor, 1 had no injuries
- 1 failed to make turn at speed & hit an essentially stopped vehicle
- 1 cyclist intoxicated, fell off bike & then was hit
- 1 cyclist had brake failure
- 1 could not stop on wet pavement
- 1 using cell phone & hit stopped motor vehicle

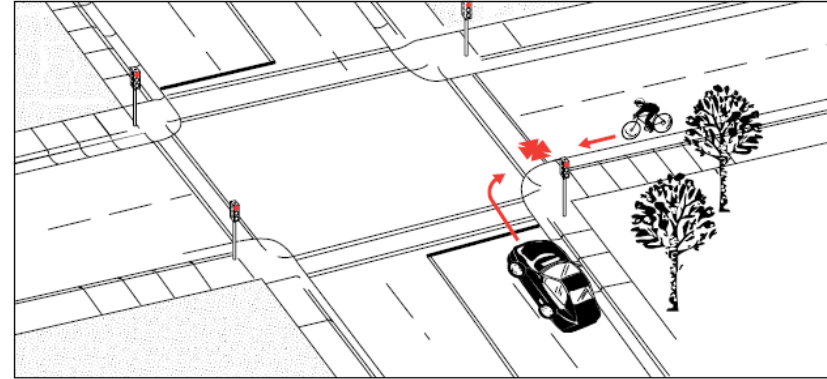


# Right on Red



At an intersection controlled by a signal, the motorist struck the bicyclist while making a right turn on red.

- 2.2% of crashes (4)
- 100% caused by cyclist
- All daytime
- All adults, 2 men, 2 women
- 2 were “unseen”
- 3 of 4 on sidewalks, other was driving against traffic on Parkway
- 2 of 4 against traffic on sidewalks
- 3 between 3-6 pm, 1 6-9 am
- 2 on 45 mph roads, 1 on 35 mph, 1 on 25 mph
- 2 on 6+ lane roads, 1 on 5 lane, 1 on 4 lane
- All taken to hospital
- 1 cyclist stopped for a water break then decided to proceed

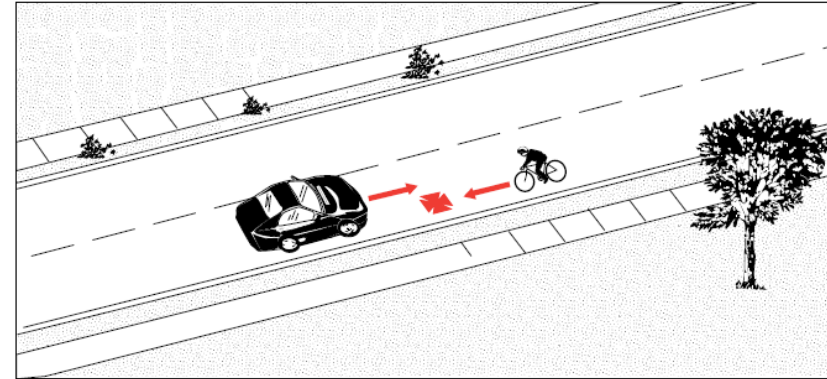


# Wrong Way Bicyclist



The bicyclist was on a parallel path with the motorist and was riding in the roadway against traffic.

- 2.2% of crashes (4)
- By default, all caused by cyclist
- 2 involved children, 11 & 13 years old
- 3 were at night, all with unknown or no lights, 2 “unseen”
- All male, both adults were intoxicated
- 2 were 6-9 pm, 2 were 9 pm – midnight
- 2 were 25 mph roads, 2 were 40 mph roads
- 2 were 2 lane roads, 2 were 4 lane roads
- 2 taken to hospital, 2 with minor injuries



# Weird



The crash was weird because:

- The motorist intentionally caused the crash.
- The bicyclist was struck by falling cargo, extended cargo, construction equipment, etc.
- Of other unusual circumstances.

1.6% of crashes (3)

- 1 cyclist caught wheel in bridge joint. Unknown if motor vehicle was involved
- Cyclist entered roadway & motorist then intentionally ran the cyclist over & left the scene. Stories suspect
- Motorist in argument with neighbor, droved into front yard to run neighbor down & hit neighbor's daughter on her bicycle on the way back to the street



## Unknown

Insufficient information was available to specify a crash type.

- 1.6% of crashes (3)