# Crash Data Overview

*Introduction to Crash Data Relating to Cyclists and Pedestrians*

*July 20th 2016*
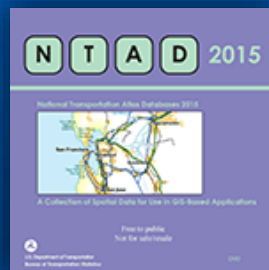
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# Two Data Sets

- **Fatality Analysis Reporting System (FARS)**

  - **Fatal** Crashes in the U.S.A.

  - Calendar Year 2013

  - *Mature* dataset. Dates back to 1975

    - Data accompanied by 500 page manual that defines the data elements and decodes the attributes.

- **Maryland State Police Vehicle Crashes (MSP)**

  - **All** Crashes in Maryland recorded by the State Police.

  - Calendar Year 2015

  - *Newly Available* data set. In its first year.

    - Data accompanied by excel spreadsheet that decodes attributes.

# FARS Manual- Data elements are defined at the top of each page.

– **Person Type** (PER_TYP)
   ○ Describes the role of the person involved in crash.

– **Injury Severity** (INJ_SEV)
   ○ Describes the severity of the injury to each person in the crash.

**2011-Later**

| Code | Description |
|------|-------------|
| 01 | Driver of a Motor Vehicle In-Transport |
| 02 | Passenger of a Motor Vehicle In-Transport |
| 03 | Occupant of a Motor Vehicle Not In-Transport |
| 04 | Occupant of a Non-Motor Vehicle Transport Device |
| 05 | Pedestrian |
| 06 | Bicyclist |
| 07 | Other Cyclist |
| -- | Other Pedestrian *(Includes Persons on Personal Conveyances, 1994-2006)* |
| 08 | Person on Personal Conveyances *(Since 2007)* |
| 09 | Unknown Occupant Type in a Motor Vehicle In-Transport |
| 10 | Persons In/On Buildings *(Since 2007)* |
| 19 | Unknown Type of Non-Motorist |
| -- | Not Reported |
| -- | Unknown |

**SAS Name: INJ_SEV**

**Attribute Codes**

| 1975-2012 | 2013-Later | Description |
|-----------|------------|-------------|
| 0 | -- | No Injury *(O)* |
| -- | 0 | No Apparent Injury *(O)* |
| 1 | 1 | Possible Injury *(C)* |
| 2 | -- | Non-Incapacitating Evident Injury *(B)* |
| -- | 2 | Suspected Minor Injury *(B)* |
| 3 | -- | Incapacitating Injury *(A)* |
| -- | 3 | Suspected Serious Injury *(A)* |
| 4 | 4 | Fatal Injury *(K)* |
| 5 | 5 | Injured, Severity Unknown *(U) (Since 1978)* |
| 6 | 6 | Died Prior to Crash |
| 8 | 8 | Not Reported *(2010 Only)* |
| 9 | 9 | Unknown |

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# MSP Crash Data

The **data dictionary**, and all data is provided by the Maryland State Police in excel format.

- I built a **relational geodatabase** from these files using the unique crash ID attribute.

- The CRASH file contains the x, y data.



**MMUCC**
Model Minimum
Uniform Crash Criteria

| | | | Count | Total People |
|---|---|---|---|---|
| 83 PED_TYPE_CODE | | | | |
| 84 | 00 | Not Applicable (NULL) | 233,244 | 238,045 |
| 85 | 01 | Pedestrian (On Foot) | 3,355 | |
| 86 | 02 | Bicyclist | 880 | |
| 87 | 03 | Other Pedalcyclist | 20 | |
| 88 | 04 | Rider of Animal | 0 | |
| 89 | 05 | In Animal-Drawn Vehicle | 4 | |
| 90 | 06 | Machine Operator/Rider | 26 | |
| 91 | 07 | Other Conveyance | 52 | |
| 92 | 88 | Other | 454 | |
| 93 | 99 | Unknown | 10 | |

MOVEMENT_CODE   (Non-motorist Action Prior to Crash)

| | | |
|---|---|---|
| 95 | 00 | Not Applicable |
| 96 | 51 | Cross/Enter at Intersection |
| 97 | 52 | Cross/Enter Not at Intersection |
| 98 | 53 | Walking/Riding with Traffic |
| 99 | 54 | Walking/Riding Against Traffic |
| 100 | 55 | Playing |
| 101 | 56 | Standing |
| 102 | 57 | Getting Off/On Vehicle |
| 103 | 58 | Push/Work on Vehicle |
| 104 | 59 | Other Working |
| 105 | 60 | Hitchhiking |
| 106 | 61 | Approaching/Leaving School Bus |
| 107 | 62.88 | Walking To/From School |
| 108 | 63.88 | Walking/Cycling on Sidewalk |
| 109 | 88 | Other |
| 110 | 99 | Unknown |

| | | | Count | Total People |
|---|---|---|---|---|
| 111 PERSON_TYPE | | | | |
| 112 | D | Driver | 177,589 | 238,045 |
| 113 | O | Occupant | 55,655 | |
| 114 | P | Pedestrian (All persons outside of vehicles) | 4,801 | |

ACCIDENT  PERSON  VEHICLE  EMS  CIRCUM_PERSON  CIRCUM_VEHICLE  CIRCUM_ROAD  CIRCUM_WEATHER

# Relationships are Bi-Directional

- ## Search for a Single Crash
  - Find Many Cars and People

## One-to-Many Relationship

Or Search in the Opposite Direction

## Many-to-One Relationship

- ## Search People
  - Find Certain Crashes

    Ex.) Find Pedestrians where
    they were killed in crashes.

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# Maryland State Police Vehicle Crashes

## Longitude/Latitude Coordinates

- Exact location on roadway where first harmful event of crash occurred.
- WGS 84

## Road Name

- Maintained by the State Highway Administration

## Counties in which Pedestrian Crashes are most Frequent

1. Baltimore City
2. Montgomery County
3. Baltimore County
4. Anne Arundel County
5. Harford County

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# Share of Total Crashes in the Baltimore Metropolitan Organization Area Involving Pedestrians in 2015

| Total Crashes | Crashes Involving Cyclists | Crashes Involving Pedestrians on Foot | Crashes Involving All Persons Outside Vehicles |
|---|---|---|---|
| 61,970 | 499 | 2,006 | 2,861 |
| | 0.8% | 3.2% | 4.6% |

*Source: MD State Police Crash data*

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# What We can Find out about Pedestrians Involved in MSP Crashes

## Level of Injury

1. No Injury
2. Non-Incapacitating Injury
3. Possible Incapacitating Injury
4. Incapacitating/Disabled Injury
5. Fatal Injury



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# Location of Pedestrian at Time of Crash

- Shoulder
- Curb
- Sidewalk
- Outside Right of Way
- On Road at Crosswalk
- On Road Not at Crosswalk
- School Bus Zone
- Bikeway
- At Intersection Marked Crosswalk
- At Intersection but No Crosswalk
- Driveway Access

- Median
- Island
- Shared Use Path/Trails
- Inside Building
- Midblock Marked Crosswalk
- Other
- Unknown



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# Movement of Pedestrian Prior to Crash

- Cross/Entering at Intersection
- Cross/Entering Not at Intersection
- Walking/Riding with Traffic
- Walking/Riding Against Traffic
- Playing
- Standing
- Hitchhiking

- Approaching/Leaving School Bus
- Walking To/From School
- Walking/Cycling on Sidewalk
- Getting Off/On Vehicle
- Push/Work on Vehicle
- Other Working

# VISIBILITY AND SAFETY EQUIPMENT

- Helmet
- Eye Protection Only
- Protective Pads
- Lighting
- Head Light
- Head Light and Reflectors
- Rear Reflector

- Reflective Material
- Reflective Clothing
- Light Clothing
- Mixed Clothing
- Dark Clothing
- None





As Judged by law Enforcement

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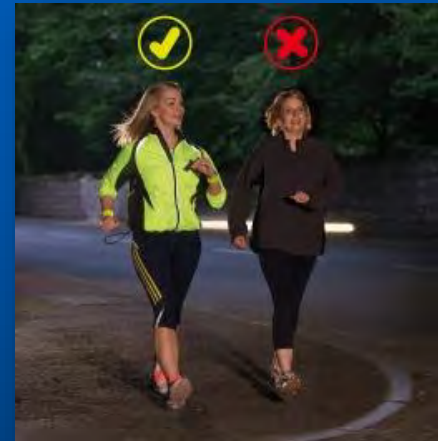
# Alcohol/Drugs –
## Testing at the discretion of law enforcement

## Test Attributes

- N/A
- Test Refused
- Positive Preliminary Test
- Evidence Test Given
- Other
- Unknown

## Result Attributes

### Blood Alcohol Content

- Numeric Result

### Drug Test Result

- N/A
- Positive
- Negative
- Unknown
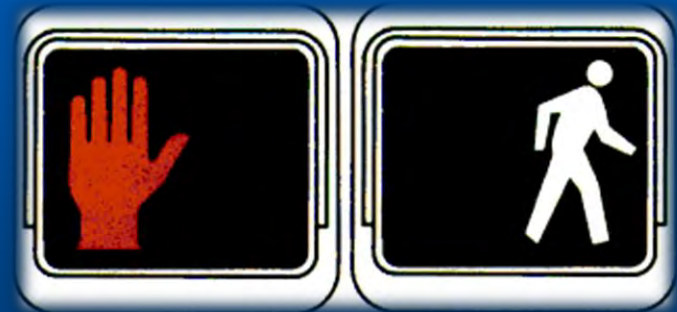
# Pedestrian Crash Attributes

## Sex

- Male/Female

## Date of Birth

- Day-Month-Year

## Obey Signal

As Judged by Law Enforcement

- No Pedestrian Signal
- Obeyed Pedestrian Signal
- Disobeyed Pedestrian Signal
- Pedestrian Signal Malfunction

# Attributes at Crash Level

- <u>First Harmful Event</u> - First injury or damage producing event that characterizes the crash type.
  - Pedestrian
  - Cycle
  - Other Vehicle



- <u>Lane Code</u> - Position of first harmful event.
  - Right Turn Lane
  - Left Turn Lane
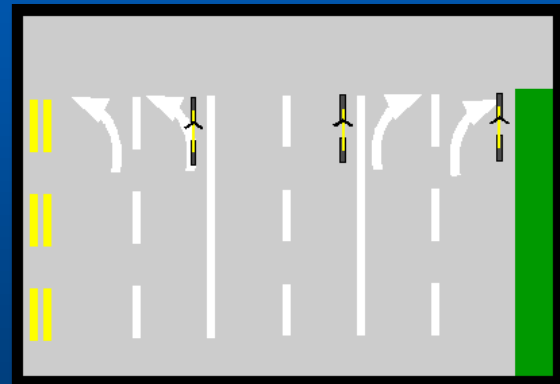
# Intersection- Location of the first harmful event in relation to an Intersection.

- **Mitigate intersections** where pedestrian crashes are frequent.

- Marked Crosswalks
- Traffic Lights
- Reduce Speeds
- Stop Signs
- Pedestrian Crossing Signs



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# Road Condition

- May have contributed to the crash.
- No defects
- Ruts, holes etc.



# Surface Condition

- Without regard to whether or not conditions contributed to cause of the crash.
- Dry
- Wet
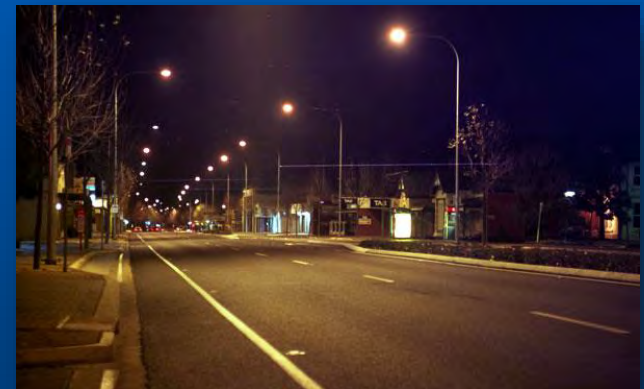
# Crash Level Attributes

## Weather

- Without regard to whether or not conditions contributed to causing the  crash
- Clear

## Light

- Type/Level of light that existed at the time of the crash
- Daylight
- Dark- Lights On
- Dark- No Lights On
- Dusk

## Date/Time of Crash

THU 26 JUN
12:47

# For More Information

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## Data Sources

**Maryland Open data Portal**
- data.maryland.gov

**Model Minimum Uniform Crash Criteria**
- http://www.mmucc.us/data-elements

**National Transportation Atlas Database**
- http://tinyurl.com/zsoysdd

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