

Not In Traffic Surveillance Back Over Investigation / Vehicle v. Two Non-Motorists  
Dynamic Science, Inc. / Case Number: DS07045  
1996 Dodge Ram Pickup  
Colorado  
August 2007

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The crash investigation process is an inexact science which requires that physical evidence such as skid marks, vehicular damage measurements, and occupant contact points be coupled with the investigator's expert knowledge and experience of vehicle dynamics and occupant kinematics in order to determine the pre-crash, crash, and post-crash movements of involved vehicles and occupants.

Because each crash is a unique sequence of events, generalized conclusions cannot be made concerning the crashworthiness performance of the involved vehicle(s) or their safety systems.

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16. Abstract This single vehicle incident occurred in August 2007 at 1550 hours. The subject vehicle was a 1996 Dodge Ram pickup. The incident took place on an east/west two-lane residential roadway. The weather was clear and calm at the time of the incident. The Dodge Ram was being driven by a 15-year-old male. There was one additional occupant in the vehicle. The front right seat was occupied by a 15-year-old male. There were two female children, ages 8 and 9, who were playing in the westbound lane of the residential roadway. The 8-year-old child was on a Razor-type scooter and the 9-year-old was on a bicycle. The two children were cousins. Based on witness accounts, the driver of the Dodge Ram was showing off by spinning the vehicle tires in front of several girls in the area. At some point, the driver began driving backward in the westbound lane at what police termed "a high rate of speed". The Dodge Ram struck both children with its rear end. The 9-year-old child was run over. The 8-year-old was struck and pushed to the side. After backing over the children, the driver of the Dodge Ram began backing in a southern direction in order to turn around. The driver did turn the Dodge Ram around and fled from the scene by driving to the east. The 9-year-old child was fatally injured. She sustained blunt force injuries to the head, neck, thorax, and abdomen. The 8-year-old child sustained serious injuries. She was transported to a local trauma center where she was hospitalized. A witness was able to get the license number of the Dodge Ram. The driver was located at his home later that day.					
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**Dynamic Science, Inc.**  
**Crash Investigation**  
**Case Number: DS07045**

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## BACKGROUND

This single vehicle incident occurred in August 2007 at 1550 hours. The case vehicle was a 1996 Dodge Ram pickup (**Figure 1**). The incident took place on an east/west two-lane residential roadway. The weather was clear and calm at the time of the incident. The Dodge Ram was being driven by a 15-year-old male. There was one additional occupant in the vehicle. The front right seat was occupied by a 15-year-old male. There were two female children, ages 8 and 9, who were playing in the westbound lane of the residential roadway. The 8-year-old child was on a Razor-type scooter and the 9-year-old was on a bicycle. The two children were cousins. Based on witness accounts, the driver of the Dodge Ram was showing off by spinning the vehicle tires in front of several girls in the area. At some point, the driver began driving backward in the westbound lane at what police termed “a high rate of speed”. The Dodge Ram struck both children with its rear end. The 9-year-old child was run over. The 8-year-old was struck and pushed to the side. After backing over the children, the driver of the Dodge Ram began backing in a southern direction in order to turn around. The driver did turn the Dodge Ram around and fled from the scene by driving to the east. The 9-year-old child was fatally injured. She sustained blunt force injuries to the head, neck, thorax, and abdomen. The 8-year-old child sustained serious injuries. It has been reported that she sustained a liver laceration, in addition to multiple contusions and abrasions. She was transported to a local trauma center where she was hospitalized. A witness was able to get the license number of the Dodge Ram. The driver was located at his home later that day. The driver was arrested and the Dodge Ram was placed into police custody. He later pleaded guilty to vehicular homicide, vehicular assault, and hit-and-run involving death and was sentenced to prison.



**Figure 1.** 1996 Dodge Ram pickup (police photo).

This on site Not-In-Traffic Surveillance Back Over Investigation was initiated in response to an on-line article describing two children who were injured in a back over incident. DSI was notified of the incident on September 5, 2007. DSI contacted the investigating police agency and obtained the police report and on-scene photographs on October 23, 2007. The subject vehicle was placed on a police hold and was being held as evidence. The district attorney for Greeley County was contacted. Due to on-going legal activities, it was necessary to get the cooperation of the attorney representing the driver. Permission from the district attorney was given on November 27, 2007. DSI was assigned the case on November 27, 2007. DSI inspected the Dodge Ram pickup on December 5, 2007. The investigating police officer was present during the vehicle inspection.

## SUMMARY

### Incident Site

This single vehicle incident occurred in August 2007 at 1550 hours. The subject vehicle was a 1996 Dodge Ram pickup. The incident took place on a level east/west two-lane residential roadway. The weather was clear and calm at the time of the incident. The roadway was of asphalt construction and was dry at the time of the incident. The temperature at the nearest reporting station was 23 degrees C (73 degrees F). The speed limit was 48 km/h (30 mph).

### Pre-Crash

The Dodge Ram was being driven by an unlicensed 15-year-old male. There was one additional occupant in the vehicle. The front right seat was occupied by a 15-year-old male. There were two female children, ages 8 and 9, who were initially on the sidewalk north of the roadway. At some point, they began playing in the westbound lane of the residential roadway. The 8-year-old child was on a Razor-type scooter and the 9-year-old was on a pink bicycle (20" girls Next Slumber Party). The two children were cousins. The 9-year-old child was wearing a red short-sleeve t-shirt and blue jeans.

Based on witness accounts, the driver of the Dodge Ram was showing off by spinning the vehicle tires in front of several girls in the area. At some point, the driver began driving backward in the westbound lane at what police termed "a high rate of speed" (**Figure 2**). The children would have been visible to the driver when he initially began backing. He began backing at a point west of the intersecting roadway, approximately 27 m (88.6 ft) from the area of impact.



**Figure 2.** Path of Dodge Ram, backing east



**Figure 3.** Area of impact



**Figure 4.** Final rest for Non-motorists 1 and 2 (looking west)

## Crash

Just prior to the incident, the children began crossing the roadway going from north to south. The Dodge Ram struck both children with its rear end (**Figure 3**). The 8-year-old (Non-motorist 1) was struck and pushed to the side. She came to rest 66 m (215ft) west of the north/south intersecting roadway. The 9-year-old child (Non-motorist 2) was run over and trapped beneath the vehicle. She remained trapped under the vehicle as it continued backing. At some point during the backing, the right rear tire rolled over her head and torso. She came to rest 56 m (184 ft) west of the north/south intersecting roadway (**Figure 4**). The scooter came to rest near the area of impact (**Figure 5**).

## Post-Crash

After backing over the children, the driver of the Dodge Ram began backing in a southern direction in order to turn around. The driver did turn the Dodge Ram around and fled from the scene by driving to the east. The bicycle remained trapped under the Dodge Ram until the vehicle reached the north/south roadway and began traveling north (**Figure 6**).

The 8-year-old child sustained serious injuries. It has been reported that she sustained a liver laceration, in addition to multiple contusions and abrasions. She was transported to a local hospital and then was airlifted to an area trauma center where she was hospitalized.

The 9-year-old child was fatally injured. She sustained a complex skull fracture, subarachnoid hemorrhage, lacerations/contusions of the frontal and temporal lobes, liver lacerations, pulmonary contusions, and multiple contusions and abrasions all over her body. The cause of death was listed as massive head trauma.

A witness was able to get the license number of the Dodge Ram. The driver and the Dodge were located at the driver's residence later that day (**Figure 7**). The vehicle plates had been removed from the vehicle and the vehicle parked in the garage. The driver was arrested and the Dodge Ram was placed into police custody. In March 2008, the driver pled guilty to vehicular homicide,



**Figure 5.** Damaged scooter



**Figure 6.** Damaged bicycle



**Figure 7.** Police photo showing 1996 Dodge Ram pickup at driver's residence

vehicular assault, and hit-and-run involving death and was sentenced to prison.

### VEHICLE DATA - 2006 Dodge Ram

The 1996 Dodge Ram pickup was identified by the Vehicle Identification Number (VIN): 1B7HC16Y4TSxxxxxx. The vehicle belonged to the father of the driver. There were 139,032 kilometers (86,393 miles) on the odometer at the time of inspection. The Dodge Ram regular cab pickup was equipped with a 5.2 liter, eight cylinder engine, automatic transmission, rear-wheel drive, and disc/rear drum brakes with ABS. The Dodge Ram was configured with after-market tires and rims. The Ram was using Hankook Ventus P295/50R15 tires with a tire diameter of 60.4 cm (23.8 in). The tires extended 11.0 cm (4.3 in) laterally from the wheel well (**Figure 8**). The measured track width was 191.0 cm (75.1 in). The vehicle manufacturer's recommended cold tire pressure was 283 kPa (41 psi). The tire manufacturer's maximum tire pressure was 303 kPa (44 psi). The standard tire size for this vehicle is P225/75R16 with a tire diameter of 74.4 cm (29.3 in). The specific tire information is as follows:

Position	Measured Pressure	Measured Tread Depth	Restricted	Damage
LF	228 kPa (33 psi)	6 mm (7/32 in)	No	None
LR	Flat	5 mm (6/32 in)	No	None
RR	214 kPa (31 psi)	4 mm (5/32 in)	No	None
RF	193 kPa (28 psi)	6 mm (7/32 in)	No	None

The seating in the Dodge Ram was configured with a cloth cover front bench seat with seating for three. The seat had been adjusted to the forward most track position in order to accommodate an after-market stereo/amplifier system (**Figures 9-10**). The outboard seat positions were configured with integral head restraints.



**Figure 8.** Right rear tire





**Figure 9.** Driver's seated position



**Figure 10.** Stereo/amplifier positioned behind front seat

## Vehicle Dimensions

Dimensions obtained from Canadian vehicle specifications and the inspected case vehicle. Eye height was estimated using the anthropometric measurements for a 50<sup>th</sup> percentile male and the seat height the inspected vehicle.

Ground to bottom of back light:	125 cm (49.2 in)
Ground to top of trunk/tailgate:	121 cm (47.6 in)
Ground to top of rear bumper:	60 cm (23.6 in)
Ground to bottom of rear bumper:	38 cm (14.9 in)
Ground to differential:	16 cm (6.3 in)
Ground to axle:	28 cm (11.0 in)
Driver's seated eye height:	161.5 cm (63.5 in)
Overall vehicle height:	183 cm (72.0 in)
Overall vehicle width:	202 cm (79.5 in)
Overall vehicle length:	506 cm (199.2 )
Rear overhang:	106 cm (41.7 in)
Track width:	191 cm (75.1 in)
Longitudinal distance between the center of the rear bumper and the center of the base of the backlight:	207 cm (81.4in)

## Parking Aids/Sensors

The case vehicle was not equipped with any parking aids or backing up sensor/video technology.

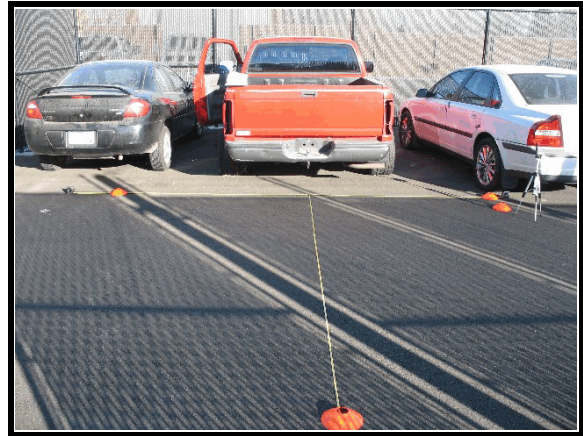
## Vehicle Sight Distances

A visibility study was conducted during the inspection of the Dodge Ram pickup in order to determine the nominal blind zone behind the Dodge as well as the nominal blind zone of both side view mirrors. The standard 71 cm (28 in) high target was used for the observations. The investigating officer assisted the SCI investigator in making the visibility observations. The observations were conducted on the case vehicle inside the police impound lot.

The driver's eye height was estimated to be 161.5 cm (63.5 in) above the ground and was based on a 50<sup>th</sup> percentile male seated eye height. Observations were taken at this height. The initial set of measurements were made as if the driver were looking over his right shoulder out the backlight. The target was moved rearward from the back bumper along the Dodge's centerline until it came into view. The target had to be moved rearward from the back bumper 4.1 m (13.5 ft) before the top of the target came into view (**Figure 11**). The target was then moved 8.5 m (27.8 ft) to the right of the centerline where it became obstructed by the right B-pillar (**Figure 12**).

The left and right side view mirrors had been moved prior to this investigator's on-site inspection. The mirrors were re-positioned to a position that provided a clear view down the side of the vehicle for a driver with the estimated 161.5 cm (63.5 in) seated eye height. The target was moved from the centerline at the rear bumper laterally to the right until the target became visible through the right side view mirror. This occurred as the target moved outboard of the side of the vehicle. The target was then moved laterally to the right until the target was no longer visible. This process was repeated on the left side of the vehicle.

There were no indications that the driver looked in the direction of the children or looked in any of his mirrors before backing.



**Figure 11.** Overview of rear blind zone



**Figure 12.** View through backlight to area obstructed by B-pillar

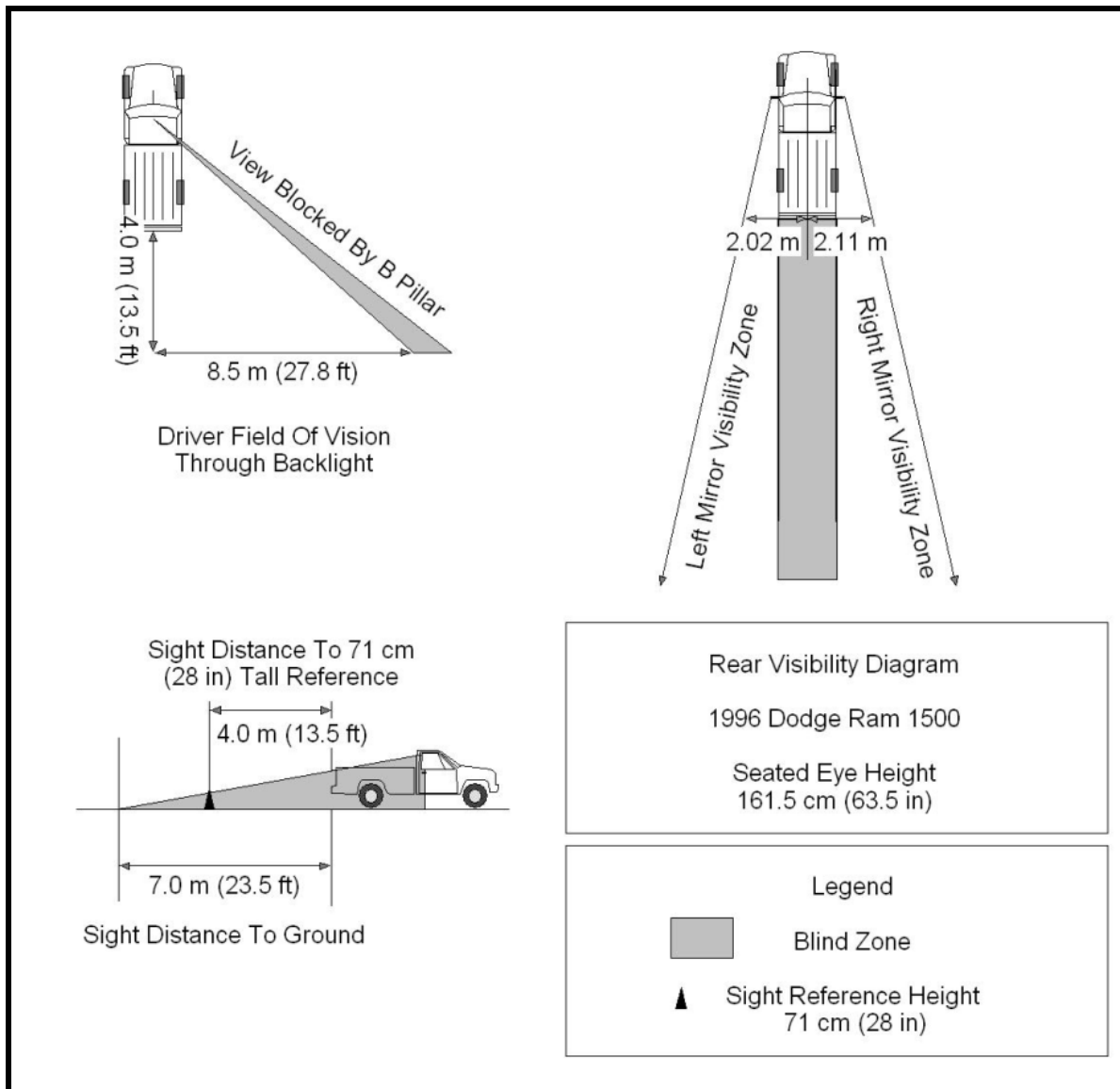


Figure 13. Nominal Visibility Diagram

## VEHICLE DAMAGE

### Exterior Damage - 2006 Dodge Ram pickup

The 1996 Dodge Ram sustained minor scuffing and scratching damage as a result of contacting the two children, the Razor-type scooter, and the bicycle. There were no indications of direct contact to the rear bumper (**Figure 14**). There was contact damage to the tail pipe, the muffler, the rear axle and the differential (**Figures 15-16**). Contact between the two events could not be separated. A combined Collision Deformation Classification (CDC) of 06BZLU1 was assigned to the second event.

The right mirror was cracked, but there were no indications that the damage was related to this incident.



**Figure 14.** View of Dodge's back bumper (no indications of contact)



**Figure 15.** Undercarriage contacts (rear view)



**Figure 16.** Undercarriage contacts (side view)

### Interior Damage - 2006 Dodge Ram pickup

There was no interior damage.

**OCCUPANT DEMOGRAPHICS - 2006 Dodge Ram**

	Driver	Right Front Passenger
Age/Sex:	15/Male	15/Male
Seated Position:	Front left	Front right
Seat Type:	Bench	Bench
Height:	170 cm (57 in)	Unknown
Weight:	54 kg (120 lbs)	Unknown
Occupation:	None	None
Pre-existing Medical Condition:	None noted	None noted
Alcohol/Drug Involvement:	None	N/A
Driving Experience:	Unknown	N/A
Body Posture:	Unknown	Unknown
Hand Position:	Unknown	Unknown
Foot Position:	Right foot on accelerator at impact.	Unknown
Restraint Usage:	Lap and shoulder belt available, unknown if used.	Lap and shoulder belt available, unknown if used.
Air bag:	Steering wheel mounted air bag available, did not deploy.	None

**NON-MOTORIST DEMOGRAPHICS**

	Non-Motorist 1	Non-Motorist 2
Age/Sex:	8/Female	9/Female
Height:	Unknown	127 cm (50 in)
Weight:	Unknown	33 kg (72 lbs)
Pre-existing Medical Condition:	None noted	None noted
Alcohol/Drug Involvement:	None	None

**INJURIES - 2006 Dodge Ram**Driver: Not injured.Front right passenger: Not injured.Non-Motorist 1 (8-year-old): Injuries obtained from police.

<u>Injury</u>	<u>OIC Code</u>	<u>Injury Mechanism</u>	<u>Confidence Level</u>
Liver laceration	541820.2,1	Unknown	Unknown
Multiple contusions and abrasions	990200.1,0 990400.1,0	Ground	Probable

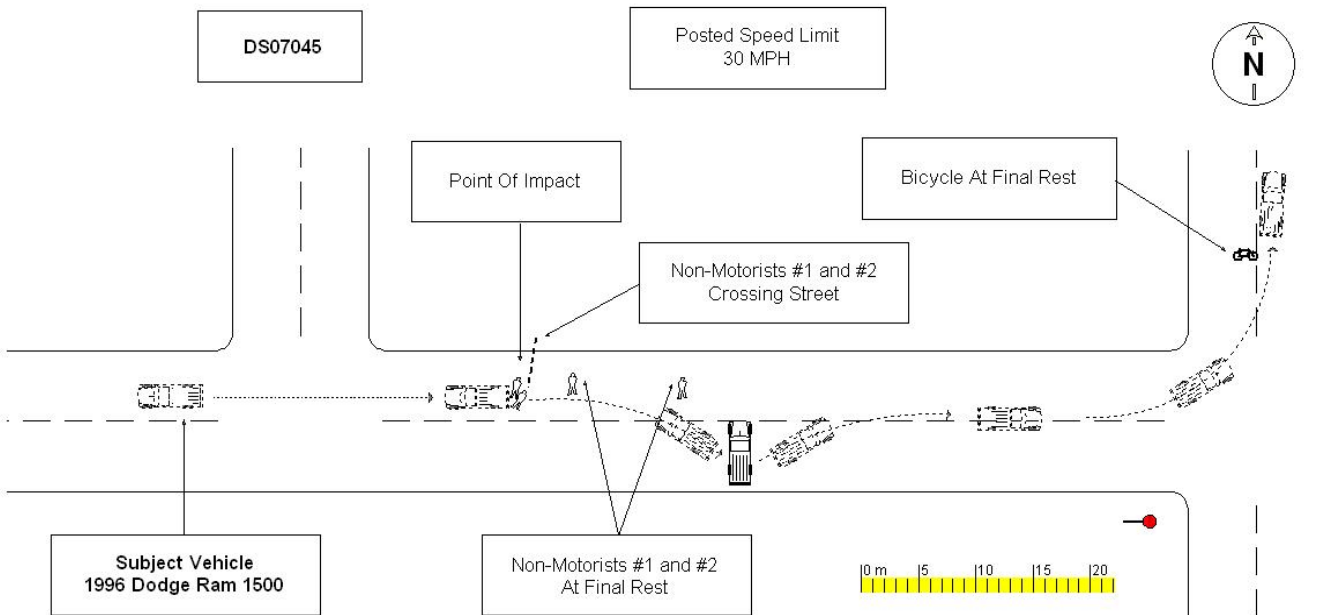
Non-Motorist 2 (9-year-old): Injuries obtained from autopsy report.

<u>Injury</u>	<u>OIC Code</u>	<u>Injury Mechanism</u>	<u>Confidence Level</u>
Complex skull fracture involving base of skull.	150206.4,8	Tire	Probable
Lacerations, inferior aspects of frontal and temporal lobes	140688.4,9	Tire	Probable
Contusions, inferior aspects of frontal and temporal lobes	140602.3,9	Tire	Probable
Subarachnoid hemorrhage cerebral hemispheres, brainstem and cerebellum	140466.3,6 140684.3,9	Tire	Probable
Multiple facial abrasions	290202.1,0	Ground	Probable
Abrasions, neck upper chest, upper right abdomen, and right flank	490202.1,1 590202.1,1	Tire	Probable
Abrasions, left flank	590202.1,2	Ground	Probable
Abrasion, left buttock	890202.1,2	Ground	Probable
Abrasion, left posterior thigh	890202.1,2	Ground	Probable
Abrasion, left upper arm	790202.1,2	Ground	Probable
Abrasion, left wrist	790202.1,2	Ground	Probable
Abrasion, right elbow	790202.1,1	Ground	Probable
Abrasion, right forearm	790202.1,1	Ground	Probable
Abrasion, right medial thigh	890202.1,1	Ground	Probable

Abrasion, right knee cap	890202.1,1	Ground	Probable
Abrasions, right foot	890202.1,1	Ground	Probable
Abrasion, left knee cap	890202.1,2	Ground	Probable

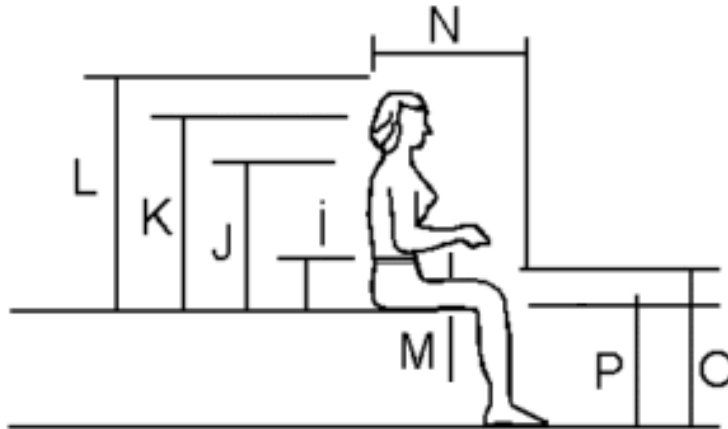


**Attachment 1. Scene Diagram**



**Attachment 2. Satellite View of Incident Scene**



Attachment 3. Anthropometric Measurements<sup>1</sup>

		Men in (cm)			Women in (cm)		
		5th	50th	95th	5th	50th	95th
I	Elbow Rest Height	7.7 (19.6)	9.4 (23.9)	11.2 (28.4)	7.4 (18.8)	9.4 (23.9)	10.6 (26.9)
J	Shoulder Height	21.6 (54.9)	23.8 (60.5)	25.9 (65.8)	20.3 (51.6)	22.4 (56.9)	24.6 (62.5)
K	Eye Height	29.3 (74.4)	31.7 (80.5)	38.0 (96.5)	27.2 (69.1)	29.4 (74.7)	31.5 (80.0)
L	Sitting Height	33.7 (85.6)	36.0 (91.4)	38.3 (97.3)	31.3 (79.5)	33.6 (85.3)	35.9 (91.2)
M	Thigh Clearance	5.0 (12.7)	6.0 (15.2)	7.0 (17.8)	4.1 (10.4)	5.5 (14.0)	6.9 (17.5)
N	Buttock-Knee Length	21.6 (54.9)	23.5 (59.7)	25.4 (64.5)	20.7 (52.6)	22.7 (57.7)	24.7 (62.7)
O	Knee Height	19.7 (50.0)	21.5 (54.6)	23.3 (59.2)	18.9 (48.0)	19.8 (50.3)	21.4 (54.4)
P	Stool Height (Popliteal Height)	14.6 (37.1)	16.3 (41.4)	18.1 (46.0)	13.4 (34.0)	15.0 (38.1)	16.7 (42.4)

<sup>1</sup>[http://www.cdc.gov/niosh/pot\\_anth.html](http://www.cdc.gov/niosh/pot_anth.html)

**Attachment 4. Field Data Forms**



1. Case Number

\_\_\_\_\_

## IDENTIFICATION

2. Date of Crash \_\_\_\_ / \_\_\_\_ / \_\_\_\_

3. Time of Crash \_\_\_\_\_

Code reported military time of crash.

NOTE: Midnight = 2400  
Unknown = 9999

## AMBIENT CONDITIONS

4. Light Conditions

- Daylight
- Dark
- Dark but lighted
- Dawn
- Dusk
- Unknown

5. Atmospheric Conditions  
(Select all that apply)

- Clear-No adverse conditions
- Cloudy
- Rain
- Snow
- Fog, Smog, Smoke
- Sleet, Hail (freezing rain or drizzle)
- Blowing Snow
- Severe Crosswinds
- Blowing Sand, Soil, Dirt
- Other (specify):
- Unknown

6. Temperature

- Below 0 degrees Celsius (Below 32 F)
- 1-10 degrees Celsius (33-50 F)
- >10-24 degrees Celsius (51-75 F)
- Over 24 degrees Celsius (Over 75 F)
- Unknown

## SCENE INFORMATION

7. Type of area in which crash occurred  
(Select all that apply)

- Single family residential
- Row houses/townhouses
- Multi family housing
- Commercial
- Industrial
- Rural
- Unknown

8. Driver exterior sightline obstructions  
(Select all that apply)

- None
- Other vehicles
- Building
- Trees
- Shrubby
- Other (specify) \_\_\_\_\_
- Utility poles
- Signs
- Glare
- Unknown
- No driver present

9. Crash location

- Driveway
- Parking Lot
- Sidewalk
- Alley
- Intersection of driveway and sidewalk
- Road / street
- Roadside / shoulder
- Other (specify) \_\_\_\_\_
- Unknown

10. Non motorist sightline obstructions  
(Select all that apply)

- None
- Other vehicles
- Building
- Trees
- Shrubby
- Utility poles
- Signs
- Glare
- Other (specify) \_\_\_\_\_
- Unknown

11. Grade at parked position \_\_\_\_\_ +/- \_\_\_\_\_ %

12. Estimated distance from parked position to impact

\_\_\_\_\_ m

13. Estimated speed at impact \_\_\_\_\_ +/- \_\_\_\_\_ kmph

14. Grade at impact \_\_\_\_\_ +/- \_\_\_\_\_ %

15. Estimated distance from impact to vehicle final rest

\_\_\_\_\_ m

Unknown = 999 Reference Items 11,12, 13, 14, 15



1. Case Number \_\_\_\_\_

## VEHICLE IDENTIFICATION

2. VIN \_\_\_\_\_

3. Model Year \_\_\_\_\_

4. Vehicle Make (specify): \_\_\_\_\_

5. Vehicle Model (specify): \_\_\_\_\_

## GLAZING

Location	Presence (check)	Status (select)	Clarity (select)	Tint (check)	Glazing Obstructions (specify if present)
Windshield		Fixed / Closed / Open / Partially Open / Unknown	Clear / Hazy / Very Dirty / Unknown		
LF		Fixed / Closed / Open / Partially Open / Unknown	Clear / Hazy / Very Dirty / Unknown		
RF		Fixed / Closed / Open / Partially Open / Unknown	Clear / Hazy / Very Dirty / Unknown		
2 <sup>nd</sup> Left		Fixed / Closed / Open / Partially Open / Unknown	Clear / Hazy / Very Dirty / Unknown		
2 <sup>nd</sup> Right		Fixed / Closed / Open / Partially Open / Unknown	Clear / Hazy / Very Dirty / Unknown		
3 <sup>rd</sup> Left		Fixed / Closed / Open / Partially Open / Unknown	Clear / Hazy / Very Dirty / Unknown		
3 <sup>rd</sup> Right		Fixed / Closed / Open / Partially Open / Unknown	Clear / Hazy / Very Dirty / Unknown		
Backlight		Fixed / Closed / Open / Partially Open / Unknown	Clear / Hazy / Very Dirty / Unknown		
Left Backlight		Fixed / Closed / Open / Partially Open / Unknown	Clear / Hazy / Very Dirty / Unknown		
Right Backlight		Fixed / Closed / Open / Partially Open / Unknown	Clear / Hazy / Very Dirty / Unknown		
Roof		Fixed / Closed / Open / Partially Open / Unknown	Clear / Hazy / Very Dirty / Unknown		
Other (specify)		Fixed / Closed / Open / Partially Open / Unknown	Clear / Hazy / Very Dirty / Unknown		

## TIRE DATA

6. Vehicle Manufacturer Recommended Tire Size \_\_\_\_\_

7. LF Tire Size \_\_\_\_\_

9. RF Tire Size \_\_\_\_\_

8. LR Tire Size \_\_\_\_\_

10. RR Tire Size \_\_\_\_\_

**Seats / Head Restraint Data**

Seat Position	Seat Type (Select from below )	Head Restraint (Check if available)	Head Restraint Adjustment (select)	NOTES:
Front Left			Full Down / Mid / Full Up	
Front Middle			Full Down / Mid / Full Up	
Front Right			Full Down / Mid / Full Up	
2 <sup>nd</sup> Left			Full Down / Mid / Full Up	
2 <sup>nd</sup> Middle			Full Down / Mid / Full Up	
2 <sup>nd</sup> Right			Full Down / Mid / Full Up	
3 <sup>rd</sup> Left			Full Down / Mid / Full Up	
3 <sup>rd</sup> Middle			Full Down / Mid / Full Up	
3 <sup>rd</sup> Right			Full Down / Mid / Full Up	

**Seat Type codes:**

- |   |                                      |
|---|--------------------------------------|
| 0 = No seat or seat folded down           | 8 = Pedestal (i.e. column supported) |
| 1 = Bucket                                | 9 = Box mounted (i.e. van type)      |
| 2 = Bucket w/ folding back                | 10= Other seat type (specify)        |
| 3 = Bench                                 | 99= Unknown seat type                |
| 4 = Bench with folding back cushions      |                                      |
| 5 = Bench w/ folding back                 |                                      |
| 6 = Split bench w/ separate back cushions |                                      |
| 7 = Split bench w/ separate folding back  |                                      |

**VEHICLE MEASUREMENTS**

Clearance Heights	Measurements (all from ground, and in centimeters)	NOTES
Beltline		
Top of trunk/tailgate		
Bottom of bumper		
Trailer hitch (if applicable)		
Undercarriage		
Sway bar		
Axle		
Differential		
Other (specify):		
Sensor Height (if equipped)		
Camera Height (if equipped)		



1. Case Number

\_\_\_\_\_

### PARKING AID PRESENCE

2. Type of backing/parking aid present

- OEM camera
- OEM ultrasonic/radar sensor
- OEM combination camera-ultrasonic/radar sensor
- OEM Fresnel lens
- OEM interior mirrors
- Aftermarket camera
- Aftermarket ultrasonic/radar sensor
- Aftermarket combination camera-ultrasonic radar sensor
- Aftermarket Fresnel lens
- Aftermarket interior mirrors
- Other (specify): \_\_\_\_\_

### CAMERA INFORMATION

*Specify field of view measurements on diagram*

3. System make/model

\_\_\_\_\_

4. Video monitor type

- None present
- LCD (color)
- CRT (black & white)
- Unknown

5. Video display size \_\_\_\_\_ cm  
(Diagonal)

6. Camera location

- None present
- Bumper
- License plate
- Tailgate/Hatch/Trunk
- Other (specify): \_\_\_\_\_

7. Video image quality under scene lighting conditions

- None present
- Good
- Average
- Poor (specify): \_\_\_\_\_
- Unknown

8. Was the camera functioning properly

- None present
- Yes
- No, poor image quality due to glare
- No, poor image quality due to atmospheric conditions
- No, camera turned off
- No, camera inoperable
- Unknown

### ULTRASONIC/RADAR SENSOR

*Specify object detection range on diagram*

9. System make/model

\_\_\_\_\_

10. Auditory warning illumination

- No sensor present
- Yes
- No
- Unknown

11. Number of sensors \_\_\_\_\_

12. Sensor locations  
(Select all that apply)

- No sensor present
- Left bumper
- Center bumper
- Right bumper
- License plate area
- Tailgate/Hatch/Trunk

13. Was warning system functioning properly

- No sensor present
- Yes, system alerted driver
- No, system did not alert driver
- No, system turned off
- No, system inoperable
- Unknown



14. Did driver react to warning

- No sensor present
- Yes
- No
- Unknown

15. Did driver report common false warnings

- No sensor present
- Yes
- No
- Unknown



# DRIVER FORM

1. Case Number  
\_\_\_\_\_

## DRIVER PROFILE

2. Driver's Age \_\_\_\_\_  
99 = Unknown

3. Driver's Sex  Male  
 Female  
 Unknown

4. Driver's Height \_\_\_\_\_ cm  
999 = Unknown

5. Driver's Weight \_\_\_\_\_ kg  
999 = Unknown

6. Driver eyewear worn  
(Select all that apply)  
 None  
 Eyeglasses  
 Sunglasses  
 Contacts  
 Unknown

7. Driver vision deficiency condition  
(Select all that apply)  
 None  
 Near sighted  
 Far sighted  
 Astigmatism  
 Other (specify): \_\_\_\_\_  
 Unknown

8. Non motorist's relationship to driver  
 No relationship  
 Child  
 Grandchild  
 Sibling  
 Neighbor  
 Friend  
 Other (specify): \_\_\_\_\_  
 Unknown

## DRIVER ACTIONS

9. Driver approach to vehicle for entry  
From left front  
 From left  
 From left rear  
 From right rear  
 From right front  
 Circled vehicle  
 Return trip (backing into driveway/lot)  
 Other (specify): \_\_\_\_\_  
 N/A  
 Unknown

10. Driver entry interruption  
(Select all that apply)  
 Direct trip from building to vehicle  
 Loaded items into vehicle  
 Spoke with family  
 Spoke with neighbors  
 Spoke with contacted nonmotorist  
 Return trip (backing into driveway/lot)  
 Other (specify): \_\_\_\_\_  
 N/A  
Unknown

11. Purpose of backing  
 Leaving parking space in parking lot  
 Backing onto roadway from driveway  
 Entering parking space in parking lot  
 Backing into driveway from roadway  
 Other (specify): \_\_\_\_\_  
 N/A  
Unknown

12. Where was driver going  
Description:  
\_\_\_\_\_  
\_\_\_\_\_

13. Driver in a hurry  
 Yes N/A  
 No Unknown  
 Unknown

14. How did driver check behind (rear area of vehicle)  
after vehicle entry  
(Select all that apply)  
 Did not look  
 Checked mirrors  
 Turned right and looked back  
 Turned left and looked back  
 Viewed Camera  
 Listened for auditory/visual warning from system  
 Other (specify): \_\_\_\_\_  
N/A Unknown

15. Estimated time between vehicle entry and start  
of backing  
 0-10 Seconds  Over 60 Seconds  
 11-30 Seconds  N/A  
 31-60 Seconds  Unknown

16. What direction was the driver looking during backing maneuver  
(Select all that apply)
- Straight ahead
  - Right
  - Left
  - Rearward
  - At object inside the car
  - At mirrors
  - Other (specify): \_\_\_\_\_
  - N/A
  - Unknown
17. Was the driver distracted during back up maneuver  
(Select all that apply)
- No non-driving activities
  - External**
  - Looking at other vehicles
  - Looking at other non motorist
  - Looking at intended turn destination
  - External focus, not specified
  - Other external focus (specify): \_\_\_\_\_
  - Internal**
  - Looking at other occupant
  - Talking to passenger
  - Dialing phone
  - Talking on phone
  - Listening to radio/cd/portable playback device
  - Adjusting radio/cd player
  - Adjusting climate controls
  - Using a device/controls integral to vehicle (specify): \_\_\_\_\_
  - Reading/adjusting navigation system
  - Eating or drinking
  - Smoking related
  - Retrieving fallen object (specify): \_\_\_\_\_
  - Internal focus, not specified
  - Focused on other internal object (specify): \_\_\_\_\_
  - N/A
  - Unknown
18. Driver avoidance actions prior to impact  
(Select all that apply)
- None
  - Braking
  - Steering left
  - Steering right
  - Accelerating
  - Other (specify): \_\_\_\_\_
  - N/A
  - Unknown
19. Did driver see struck non motorist prior to impact  
(Select all that apply)
- No, never saw non motorist
  - Saw non motorist prior to entering vehicle
  - Saw non motorist after entering vehicle
  - Other (specify): \_\_\_\_\_
  - N/A
  - Unknown
20. Est time between start of backing and impact
- <2 or = 1 second
  - 2-5 seconds
  - 6-10 seconds
  - > 10 seconds
  - N/A
  - Unknown
21. Driver interior sightline obstructions  
(Select all that apply)
- Pillar
  - Headrest
  - Cargo
  - Other occupant
  - Other (specify) \_\_\_\_\_
  - Unknown
  - None
22. Recent experience driving this vehicle
- More than 10 times the last three months
  - 6-10 times the last three months
  - 2-5 times the last three months
  - Less than 2 times the last three months
  - First time driving this vehicle
  - N/A
  - Unknown
23. Frequency of driving in this parking lot/driveway
- Daily
  - Weekly
  - Several times a month
  - Monthly
  - Rarely
  - First time in lot/driveway
  - N/A
  - Unknown
24. Driver Impairment  
(Select all that apply)
- No drugs or alcohol present
  - Alcohol present (specify BAC): \_\_\_\_\_
  - Drugs present (specify): \_\_\_\_\_
  - Unknown
25. Source of alcohol/drug results
- Police reported
  - Medical record
  - Other (specify) \_\_\_\_\_
  - Not Tested
  - Unknown if tested



# Non Motorist Form

1. Case Number  
\_\_\_\_\_

## NON-MOTORIST PROFILE

2. Non-motorist's Age \_\_\_\_\_ Months  
\_\_\_\_\_ Years  
99 = Unknown

3. Non-motorist's Sex  
 Male  
 Female  
 Unknown

4. Non-motorist's Height \_\_\_\_\_ cm  
999 = Unknown

5. Non-motorist's Weight \_\_\_\_\_ kg  
999 = Unknown

6. Medical outcome  
 Not injured  
 ER only  
 Hospitalized 1-4 days  
 Hospitalized 5 days or more  
 Treatment later  
 Fatal  
 Unknown

7. Source of most severe injury  
 Bumper  
 Tire  
 Undercarriage  
 Other Specify: \_\_\_\_\_  
 Ground  
 N/A  
 Unknown

8. Non-motorist impairment  
*(Select all that apply)*  
 No drugs or alcohol present  
 Positive for alcohol (specify BAC): \_\_\_\_\_  
 Positive for drugs (specify): \_\_\_\_\_  
 Unknown

9. Source of alcohol/drug results  
 Police reported  
 Medical Report  
 Other (specify) \_\_\_\_\_  
 Not Tested  
 Unknown if tested

## NON-MOTORIST ACTIONS

10. Non-motorist attitude  
 Standing  
 Bending at waist  
 Sitting  
 Crouching  
 Kneeling  
 On skates/skateboard  
 On bike/scooter  
 Other (specify) \_\_\_\_\_  
 Unknown

11. Non-motorist motion  
 Not moving  
 Walking slowly  
 Walking rapidly  
 Running or jogging  
 Skipping/Hopping/Jumping  
 Falling/Stumbling/Rising  
 On skates/skateboard  
 On bike/scooter  
 Other (specify): \_\_\_\_\_  
 Unknown

12. Non-motorist approach relative to rear of vehicle  
 Stationary  
 From left  
 From right  
 From behind  
 Other (specify): \_\_\_\_\_  
 Unknown

13. Non-motorist first avoidance action  
 No avoidance actions  
 Stopped  
 Accelerated pace  
 Ran away (along vehicle path)  
 Jumped  
 Turned away from vehicle  
 Turned toward vehicle and braced  
 Dove or fell away from vehicle  
 Other (specify): \_\_\_\_\_  
 Unknown

14. Non-motorist primary focus of attention  
 Striking vehicle  
 Play object  
 Person  
 Surrounding traffic  
 Animal  
 Handheld electronic (phone, MP3 player, etc.)  
 Other Object (specify) \_\_\_\_\_  
 Unknown

15. Were any other Non-motorists present?  
*(Select all that apply)*  
 Alone  
 One adult present  
 One other child present  
 Multiple adults present  
 Multiple children present  
 Unknown

**NON MOTORIST CLOTHING**

**NOTES:**

- Specify Color, Fabric and Texture/Weight for outermost layer only
- Indicate "NONE" if applicable
- Available codes:

	<u><b>Colors</b></u>		<u><b>Fabrics</b></u>		<u><b>Textures</b></u>		<u><b>Weights</b></u>
Black	Charcoal gray		Natural		Soft		Heavy
Lt gray/silver	Brown		Synthetic		Slick		Medium
Gold/tan	Purple		Blend		Coarse		Light
Dark blue	Light blue						
Dark green	Light green						
Maroon	Red						
Orange	Yellow						
White	Other (specify)						

	<b>Clothing</b>	<b>Color</b>	<b>Fabric</b>	<b>Texture</b>	<b>Weight</b>
<b>H E A D W E A R</b>	Hat				
	Helmet				
	Hood				
	Other (specify): _____				
<b>U P P E R  B O D Y</b>	Short Sleeve				
	Long Sleeve				
	Light Jacket				
	Heavy Jacket				
	Other (Specify): _____				
<b>L O W E R  B O D Y</b>	Shorts				
	Pants				
	Shoes				
	Other (specify): _____				

**Non-Motorist  
Form****Reset Values**

## 1. Case Number

  D     S     0     7     0     4     5  **NON-MOTORIST PROFILE**

## 2. Non-motorist's Age

99 = Unknown

  0     9    Months Years

## 3. Non-motorist's Sex

 Male  
 Female  
 Unknown

## 4. Non-motorist's Height

999 = Unknown

  1     2     7   cm

## 5. Non-motorist's Weight

999 = Unknown

  0     3     3   kg

## 6. Medical outcome

- 
- Not injured
- 
- 
- ER only
- 
- 
- Hospitalized 1-4 days
- 
- 
- Hospitalized 5 days or more
- 
- 
- Treatment later
- 
- 
- Fatal
- 
- 
- Unknown

## 7. Source of most severe injury

- 
- Bumper
- 
- 
- Tire
- 
- 
- Undercarriage
- 
- 
- Other Specify: \_\_\_\_\_
- 
- 
- Ground
- 
- 
- N/A
- 
- 
- Unknown

## 8. Non-motorist impairment

(Select all that apply)

- 
- No drugs or alcohol present
- 
- 
- Positive for alcohol (specify BAC): \_\_\_\_\_
- 
- 
- Positive for drugs (specify): \_\_\_\_\_
- 
- 
- Unknown

## 9. Source of alcohol/drug results

- 
- Police reported
- 
- 
- Medical Report
- 
- 
- Other (specify) \_\_\_\_\_
- 
- 
- Not Tested
- 
- 
- Unknown if tested

**NON-MOTORIST ACTIONS**

## 10. Non-motorist attitude

- 
- Standing
- 
- 
- Bending at waist
- 
- 
- Sitting
- 
- 
- Crouching
- 
- 
- Kneeling
- 
- 
- On skates/skateboard
- 
- 
- On bike/scooter
- 
- 
- Other (specify) \_\_\_\_\_
- 
- 
- Unknown

## 11. Non-motorist motion

- 
- Not moving
- 
- 
- Walking slowly
- 
- 
- Walking rapidly
- 
- 
- Running or jogging
- 
- 
- Skipping/Hopping/Jumping
- 
- 
- Falling/Stumbling/Rising
- 
- 
- On skates/skateboard
- 
- 
- On bike/scooter
- 
- 
- Other (specify): \_\_\_\_\_
- 
- 
- Unknown

## 12. Non-motorist approach relative to rear of vehicle

- 
- Stationary
- 
- 
- From left
- 
- 
- From right
- 
- 
- From behind
- 
- 
- Other (specify): \_\_\_\_\_
- 
- 
- Unknown

## 13. Non-motorist first avoidance action

- 
- No avoidance actions
- 
- 
- Stopped
- 
- 
- Accelerated pace
- 
- 
- Ran away (along vehicle path)
- 
- 
- Jumped
- 
- 
- Turned away from vehicle
- 
- 
- Turned toward vehicle and braced
- 
- 
- Dove or fell away from vehicle
- 
- 
- Other (specify): \_\_\_\_\_
- 
- 
- Unknown

## 14. Non-motorist primary focus of attention

- 
- Striking vehicle
- 
- 
- Play object
- 
- 
- Person
- 
- 
- Surrounding traffic
- 
- 
- Animal
- 
- 
- Handheld electronic (phone, MP3 player, etc.)
- 
- 
- Other Object (specify) \_\_\_\_\_
- 
- 
- Unknown

## 15. Were any other Non-motorists present?

(Select all that apply)

- 
- Alone
- 
- 
- One adult present
- 
- 
- One other child present
- 
- 
- Multiple adults present
- 
- 
- Multiple children present
- 
- 
- Unknown

**NON MOTORIST CLOTHING**

**NOTES:**

- Specify Color, Fabric and Texture/Weight for outermost layer only
- Indicate "NONE" if applicable
- Available codes:

	<u>Colors</u>		<u>Fabrics</u>		<u>Textures</u>		<u>Weights</u>
Black	Charcoal gray		Natural		Soft		Heavy
Lt gray/silver	Brown		Synthetic		Slick		Medium
Gold/tan	Purple		Blend		Coarse		Light
Dark blue	Light blue						
Dark green	Light green						
Maroon	Red						
Orange	Yellow						
White	Other (specify)						
Pink							

	Clothing	Color	Fabric	Texture	Weight
HEADWEAR	Hat	NONE			
	Helmet	NONE			
	Hood	NONE			
	Other (specify): _____				
	_____				
UPPER BODY	Short Sleeve	Red	Unknown	Soft	Light
	Long Sleeve				
	Light Jacket				
	Heavy Jacket				
	Other (Specify): _____				
LOWER BODY	Shorts				
	Pants	Light blue	Natural	Soft	Medium
	Shoes	Unknown			
	Other (specify): _____				
	_____				