

Contrasting Rural and Urban Fatal Crashes 1994 - 2003



U.S. Department
of Transportation
**National Highway
Traffic Safety
Administration**

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1.0 SUMMARY HIGHLIGHTS

This document is an update of the 1996 report, *Rural and Urban Crashes: A Comparative Analysis (DOT HS 808 450)*. Like the earlier report, it is a statistical abstract concerned with differences and similarities between rural and urban crashes rather than a paper, with a specific agenda. The purpose of this report is to provide a reference tool for those who wish to examine rural and urban fatal crashes, rather than support a particular policy. For this reason, highlights of the results are summarized, but there are no conclusions or recommendations. Furthermore, for brevity, the analysis has been purposely limited to examining a single variable at a time. In so doing, this work points to several areas for possible future investigation. An in-depth study of the rural crash problem examining the interaction of various factors may be warranted. There are, however, two results that are confirmed by virtually all of the measures of effectiveness used in this report: First, considerably more crashes occur in rural areas than urban areas, and second, rural crashes are more severe, cause greater injury, and pose a more difficult challenge to the highway safety community than do urban crashes.

Data from the Fatal Accident Reporting System (FARS) were used to examine the similarities and differences between rural and urban fatal crashes.

1.1 Highlights from the analysis of FARS data on rural versus urban fatal crashes are:

There are approximately 35 percent more crashes, vehicles involved, individuals involved, and deaths in rural areas than in urban areas (Figures 1, 2, 19, 25, 26, 40, 41, 44, and 45). However, there are fewer vehicle miles traveled, VMT, in rural areas, 11.6 trillion from 1990 to 2001, than in urban areas, 17.9 trillion (Figures 3 and 4). These combine to provide higher rural involvement rates per 100 million vehicle miles traveled, for all levels of the study (Figures 5, 6, 27, 28, 42, 43, 46, and 47).

Rural areas with 55 mph and urban areas with 35 mph speed limits have more fatal crashes on roadways than any other speed limit. Rural roadways with a 55 mph speed limit account for 50 percent of rural fatal crashes, the corresponding urban roadways with a 35 mph speed limit account for 19 percent of urban fatal crashes (Table 4 and Figure 14).

The time for emergency medical services to reach the scene of a fatal crash, once they have been notified, is usually longer in rural areas than in urban areas. The largest difference occurs for responses within ten minutes. However, the effect is measurable for all response times (Table 5 and Figure 15).

Rural fatal crashes result in multiple deaths 11 percent of the time, whereas urban fatal crashes result in multiple deaths 7 percent of the time (Table 10 and Figure 20).

Vehicle rollovers occur in 24 percent of rural fatal crashes, but only 10 percent of urban fatal crashes (Table 17 and Figure 31).

A larger portion of rural fatal crashes involve trucks, both light trucks and large trucks, 37 percent and 10 percent respectively, than urban fatal crashes with a light/large trucks involvement rate of 30 percent and 6 percent respectively. The results, for cars and motorcycles, are in the opposite direction (Table 19 and Figure 33).

A larger portion of vehicles in rural fatal crashes suffers severe vehicle damage, 79 percent, than urban fatal vehicles, 64 percent (Table 20 and Figure 34).

A larger portion of vehicles in rural fatal crashes are involved in head-on collisions, 25 percent, than in urban crashes, 14 percent (Table 14 and Figure 24).

A larger portion of individuals are ejected in rural fatal crashes, 17percent, than urban crashes, 8 percent (Table 25 and Figure 48).

Not all individuals involved in a fatal crash are killed. Of the individuals not killed in the crash, a larger portion of individuals in rural fatal crashes are injured than in urban fatal crashes (Table 27 and Figure 54).

Approximately 40 percent of individuals involved in fatal rural crashes are passengers compared to 33 percent in urban crashes. There is a corresponding reduction in the portion of pedestrian fatalities in rural crashes, 3 percent, as opposed to 9 percent for urban fatal crashes (Table 29 and Figures 52 and 53).

The pattern for death by age for rural and urban deaths is similar. Both curves have a steep rise at the ages of 18 and 21. The rural deaths obtain their maximum of 3.5 percent at 18 years, the urban deaths obtain their maximum at 21 years, 2.9 percent. The general pattern holds for all years of the study (Figure 55).

2.0 INTRODUCTION TO ANALYSIS OF DATA FROM FARS

2.1 Data

The objective of this section of the study is to provide a statistical abstract of the differences and similarities between rural and urban fatal crashes, as a function of crash, vehicle and individual characteristics. This study uses data from the Fatal Accident Reporting System (FARS). FARS consists of a census of all fatal crashes that occurred on a public roadway, and is therefore not a representative sample of all crashes. Fatalities that occurred within thirty days of the crash are included in FARS.

Data are collected and therefore reported in FARS on three different levels. FARS' accident level provides information that pertains to all vehicles and individuals involved in the crash, e.g., time of the crash. The vehicle or driver level contains information on each individual vehicle, e.g., type of vehicle, including its driver. The person level contains information about each individual in the crash, which includes each occupant of any vehicle involved in the crash and any injured non-occupant of any injury severity. From 1994 to 2003 there have been a total of 374,691 fatal crashes included in FARS. These crashes involved 569,014 vehicles 1,008,301 people, and resulted in 417,477 deaths that can be identified as either occurring in rural or urban locations.

This report makes extensive use of univariate and bivariate tables, which examine the effects of the data one or two variables at a time. These tables contain point estimates, as well as the lowest and highest yearly percent for each category. These tables often provide useful insight to understanding the differences and similarities between rural and urban crashes. Yet the possibility exists that the results may be confounded with one or more variables. This is a limitation of this type of analysis, which may be overlooked.

2.2 Definition of RURAL and URBAN Crashes in FARS

The fatal crash data are partitioned by rural and urban using information provided to FARS by the Federal Highway Administration. The FARS variable ROAD_FNC, from 1994, are used to partition the rural/urban data.

**FATAL
CRASH
ANALYSIS
-
CRASH
LEVEL**

3.0 FATAL CRASH ANALYSIS - CRASH LEVEL

3.1 Percent of Rural

Table 1 presents the percent of rural fatal crashes by jurisdiction from 1994 to 2003, which are the basic data, used throughout this report.

Table 1										
Fatal Crashes by State and Percent of Rural¹										
State	Year									
	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Alabama	68.9	66.0	67.9	62.4	63.6	69.9	69.6	70.0	73.8	66.6
Alaska	72.9	64.0	72.2	70.6	63.5	67.1	64.5	58.8	48.7	61.9
Arizona	52.7	46.3	49.7	48.7	51.5	50.6	51.0	48.3	50.1	53.8
Arkansas	80.9	80.7	80.7	79.1	76.0	77.8	78.4	78.1	76.3	75.7
California	39.8	40.8	37.9	39.7	40.4	40.0	36.6	37.7	40.1	38.0
Colorado	57.9	59.1	58.0	57.7	60.8	61.8	54.3	61.5	57.0	57.0
Connecticut	29.9	27.2	26.7	31.1	26.1	27.4	26.8	26.2	15.9	20.9
Delaware	61.0	51.8	50.5	57.5	53.8	50.5	57.8	50.4	63.2	51.9
Dist. Of Col.	0.0	0.0	0.0	0.0	0.0	- ²	- ²	- ²	0.0	- ²
Florida	44.4	44.4	43.3	44.2	44.8	45.5	46.8	46.3	44.0	48.5
Georgia	55.3	57.3	58.3	57.2	59.3	58.3	55.5	56.3	59.9	55.6
Hawaii	36.4	33.9	46.3	41.9	42.5	52.2	35.3	46.2	33.0	35.9
Idaho	84.0	83.7	82.5	88.2	90.6	85.7	85.1	83.1	80.0	83.5
Illinois	47.0	44.9	41.5	42.0	41.2	42.6	38.0	40.9	38.9	43.9
Indiana	58.9	58.6	59.2	68.0	68.1	70.2	58.8	78.5	79.8	66.6
Iowa	74.7	78.7	79.8	75.7	76.4	79.2	76.9	75.3	76.9	74.6
Kansas	75.9	72.8	76.7	72.1	71.1	72.0	77.8	73.6	75.1	72.9
Kentucky	82.5	80.5	75.3	79.8	77.7	80.0	75.6	75.3	75.7	77.3
Louisiana	75.6	72.0	69.3	64.1	67.3	69.5	70.7	67.8	66.8	65.7
Maine	77.1	79.4	83.4	81.4	81.8	81.5	82.2	85.3	90.9	94.1
Maryland	39.4	44.6	39.2	45.9	40.1	39.2	40.0	41.7	40.7	43.2
Massachusetts	21.0	19.1	22.7	19.5	25.5	26.2	20.0	19.5	19.6	20.0
Michigan	50.4	50.5	53.5	50.4	55.8	49.9	51.1	52.5	56.2	48.3
Minnesota	67.0	69.7	68.0	69.9	70.8	73.5	71.1	66.9	72.2	69.9

¹ Partitioning fatal crash data between rural and urban locations is dependent on the procedures used within each state or jurisdiction and can change over time. Occasionally as with all large data sets, some crashes may be miscoded. However, although one needs to be aware of possibility of miscoded data, these relatively rare crashes may reduce the perceived difference between rural and urban crashes but do not substantially change the results of this study.

² The percent of rural crashes is suppressed due to suspected miscoding of some crashes.

Table 1 (Continued)
Fatal Crashes by State and Percent of Rural

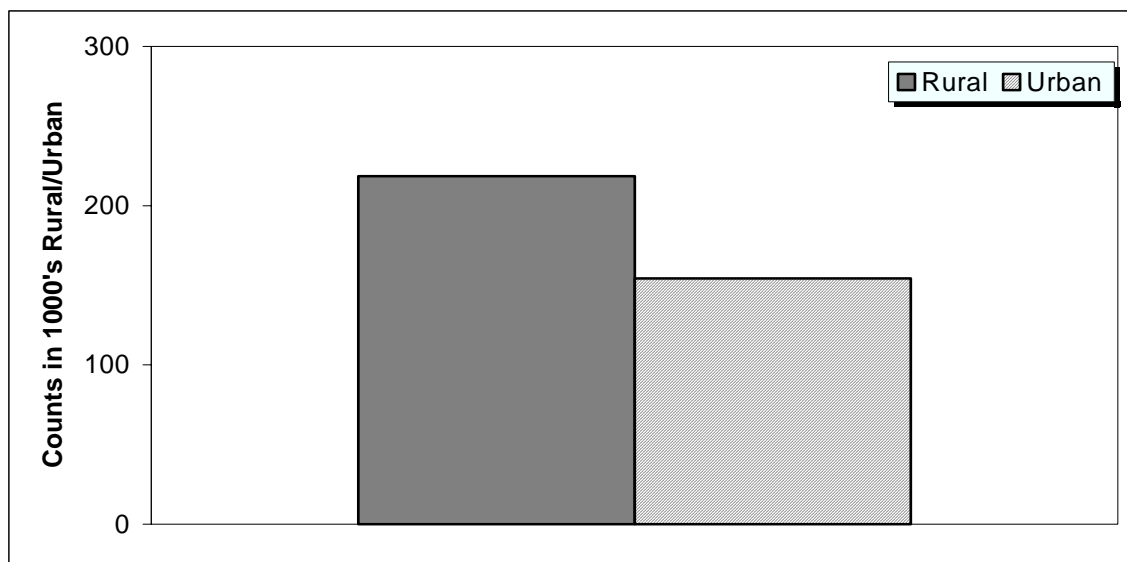
State	Year									
	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Mississippi	79.7	79.3	83.3	98.8	98.3	99.0	99.6	99.7	99.0	75.3
Missouri	69.2	68.5	68.0	67.9	69.3	71.4	69.4	64.6	70.4	70.1
Montana	95.6	90.9	89.9	93.3	88.9	90.7	93.1	95.5	92.2	95.4
Nebraska	76.9	82.7	77.9	80.8	81.5	83.1	83.9	72.1	81.3	79.0
Nevada	51.5	51.3	44.8	44.7	51.7	47.9	39.8	45.3	43.0	37.9
Nebraska	76.9	82.7	77.9	80.8	81.5	83.1	83.9	72.1	81.3	79.0
Nevada	51.5	51.3	44.8	44.7	51.7	47.9	39.8	45.3	43.0	37.9
New Hampshire	63.8	62.6	62.4	72.5	77.4	66.9	68.4	69.4	71.8	69.0
New Jersey	31.5	25.0	21.8	27.9	24.3	26.8	24.0	23.2	23.8	24.4
New Mexico	70.6	73.6	69.7	75.8	76.2	75.5	73.1	70.8	67.3	73.0
New York	35.5	33.3	40.7	48.1	59.2	55.9	55.9	57.4	43.6	38.0
North Carolina	70.4	70.2	69.8	68.3	63.9	60.4	63.2	67.6	72.0	73.2
North Dakota	81.6	87.7	88.8	89.9	87.3	89.1	81.3	95.8	86.9	81.1
Ohio	60.0	59.0	58.4	57.4	59.6	62.9	38.9	61.6	65.1	69.6
Oklahoma	71.1	72.7	70.1	71.3	71.7	70.8	73.2	71.6	71.7	72.6
Oregon	70.2	71.0	71.4	69.9	74.6	71.4	78.1	73.6	77.1	72.5
Pennsylvania	55.2	53.9	53.4	54.7	55.8	57.8	60.5	54.4	61.1	64.6
Rhode Island	21.0	15.6	18.5	18.2	17.1	15.3	15.1	14.1	19.8	17.7
South Carolina	84.1	87.6	91.2	89.3	84.4	85.4	87.1	89.1	89.1	89.6
South Dakota	89.4	84.3	85.9	90.6	89.9	86.0	92.0	89.0	89.9	91.9
Tennessee	57.3	63.3	60.8	57.6	62.7	63.6	65.3	63.9	62.5	58.6
Texas	53.5	52.2	54.9	54.9	54.7	56.1	54.9	53.9	53.9	57.3
Utah	62.3	61.8	74.3	80.6	77.9	96.2	94.7	74.0	70.8	74.8
Vermont	89.9	88.4	86.5	87.5	83.0	89.0	91.8	91.7	91.3	84.1
Virginia	62.9	65.6	61.9	65.3	61.8	63.0	59.8	61.9	60.6	63.5
Washington	59.7	58.5	59.4	59.3	53.1	60.1	56.1	59.0	64.8	62.7
West Virginia	82.4	81.8	86.3	86.3	82.4	82.2	84.5	85.1	85.8	82.3
Wisconsin	75.9	77.2	77.4	76.2	75.9	77.5	75.3	78.2	75.2	76.0
Wyoming	84.6	84.8	81.0	88.9	87.6	87.0	95.5	87.7	84.1	80.1
U.S. Total	57.0	56.9	57.1	58.4	59.4	60.0	58.1	58.6	59.1	58.5
Puerto Rico	37.8	39.2	37.7	37.1	39.1	38.4	41.5	39.4	49.4	47.3

Source: NCSA, NHTSA, FARS 1994-2003

3.2 Fatal Crashes

From 1994 to 2003 there were 218,539 rural fatal crashes and 154,199 urban fatal crashes for a total of 374,691 fatal crashes; see Figure 1. There are approximately 42 percent more rural crashes than urban crashes. To compare the effects of a factor on rural and urban crashes the proportion or percentage that have a particular characteristic are compared.

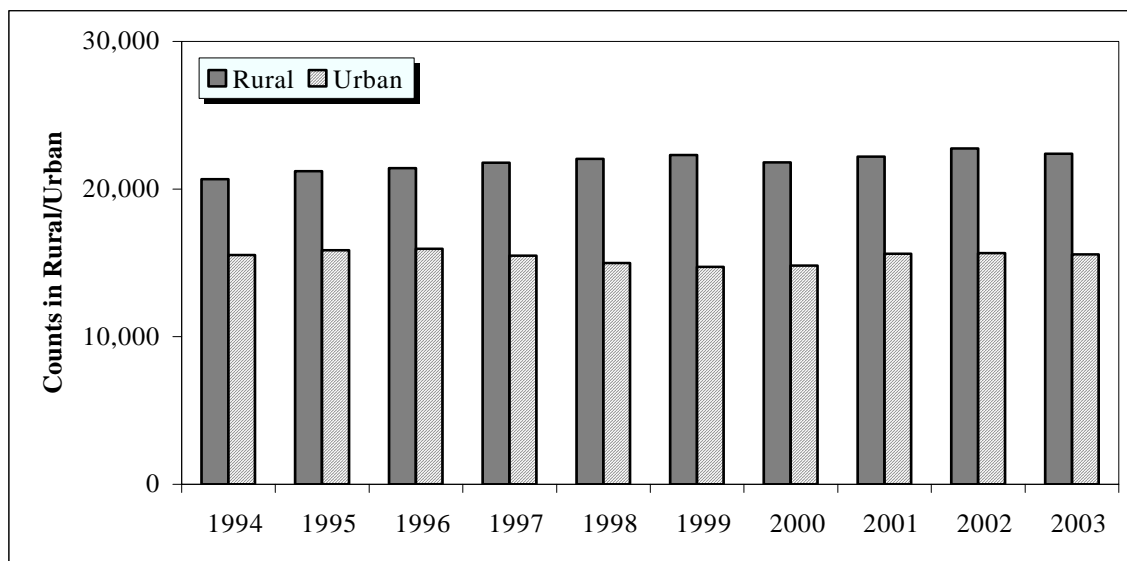
Figure 1
Fatal Crashes



Source: NCSA, NHTSA, FARS 1994-2003

It is interesting to examine these data on a yearly basis. The lowest number of rural fatal crashes, 20,671, occurred in 1994, the highest number of rural fatal crashes, 22,758, occurred in 2002. The average number of rural fatal crashes from 1994 to 2003 was 21,854, fatal crashes per year. The lowest number of urban fatal crashes, 14,740, occurred in 1999, the highest number of urban fatal crashes, 15,957, occurred in 1996. The average number of urban fatal crashes from 1994 to 2003 was 15,420, fatal crashes per year. Figure 2 shows the annual fatal crashes for rural and urban locations.

Figure 2
Fatal Crashes by Year

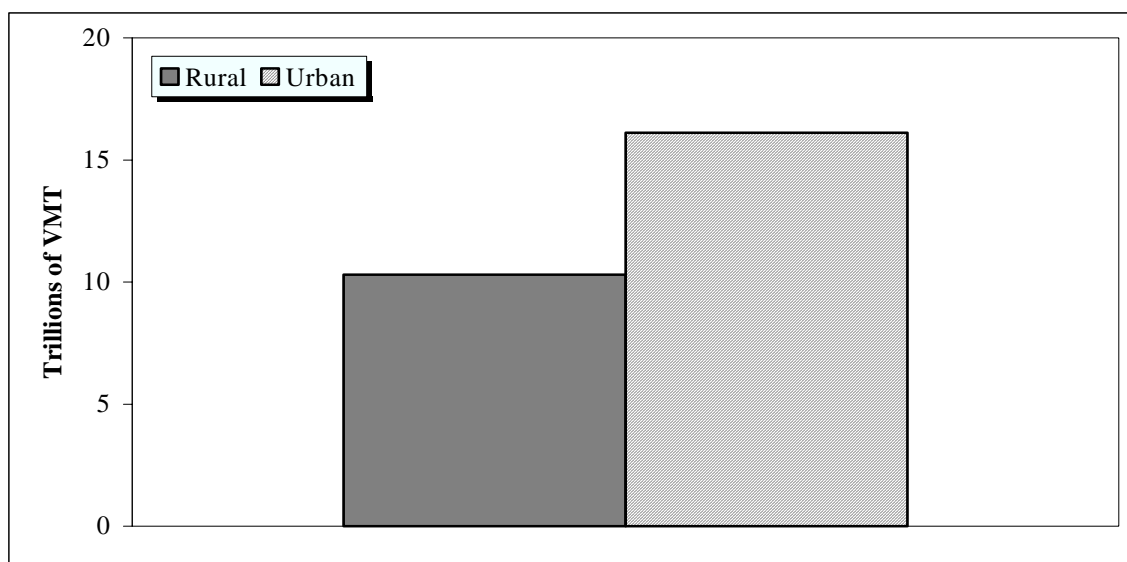


Source: NCSA, NHTSA, FARS 1994-2003

3.3 Vehicle Miles Traveled

Data from the Federal Highway Administration on rural and urban vehicle miles traveled (VMT) shows that from 1994 to 2003 10.3 trillion miles were driven on rural roads; during this same time period, 16.1 trillion miles were driven on urban roads. Note that although most of the fatal crashes occurred in rural areas, most of the vehicle miles traveled occurred in urban areas; see Figure 3.

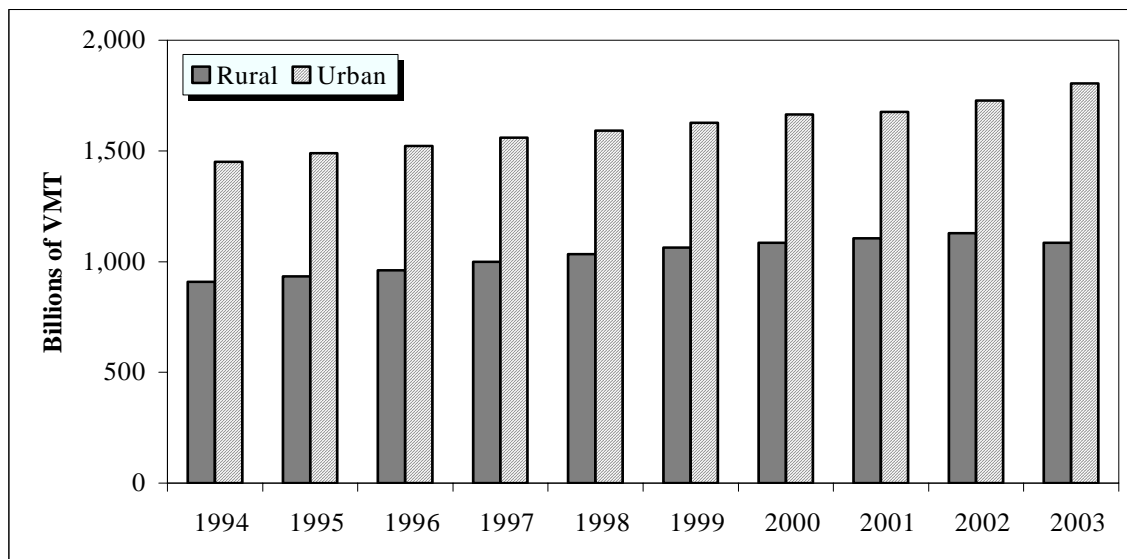
Figure 3
Trillions of VMT



Source: FHWA, VMT data 1994-2003

The pattern of VMT by year reveals an increasing trend over time. In particular, although both rural and urban VMT increase over time, the urban VMT has increased at a higher rate. As a result, the spread between rural and urban VMT has increased over the years; see Figure 4.

Figure 4
Billions of VMT by Year

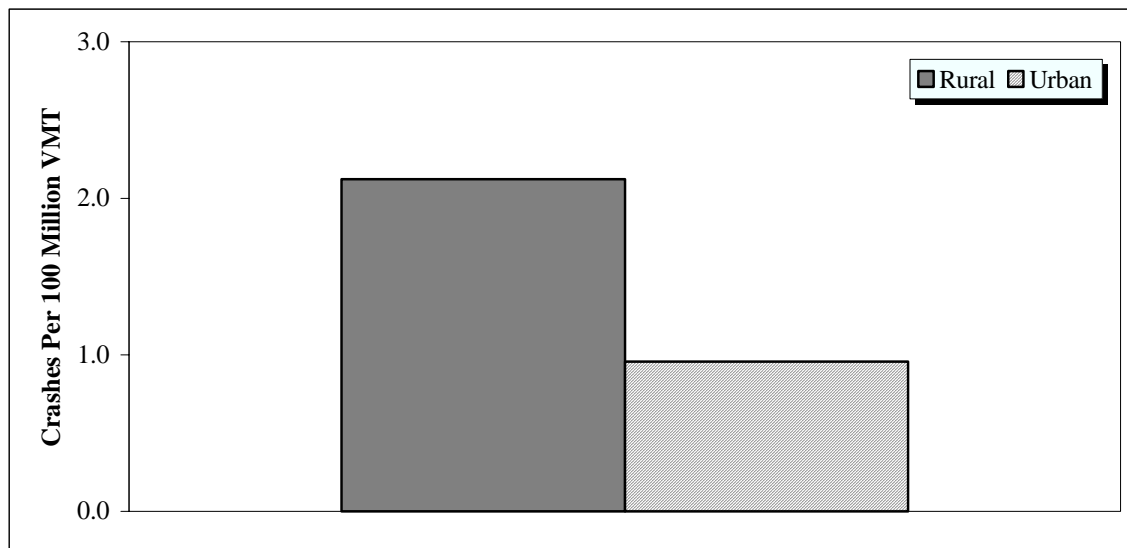


Source: FHWA, VMT data 1994-2003

3.4 Fatal Crash Rate

The fatal crash rate is calculated by dividing the number of fatal crashes by the VMT. The rural fatal crash rate from 1994 to 2003 is 2.1 crashes per 100 million vehicle miles traveled. The corresponding urban fatal crash rate is 1.0 crash per 100 million vehicle miles traveled. Note that the rural crash rate is more than twice the urban crash rate; see Figure 5.

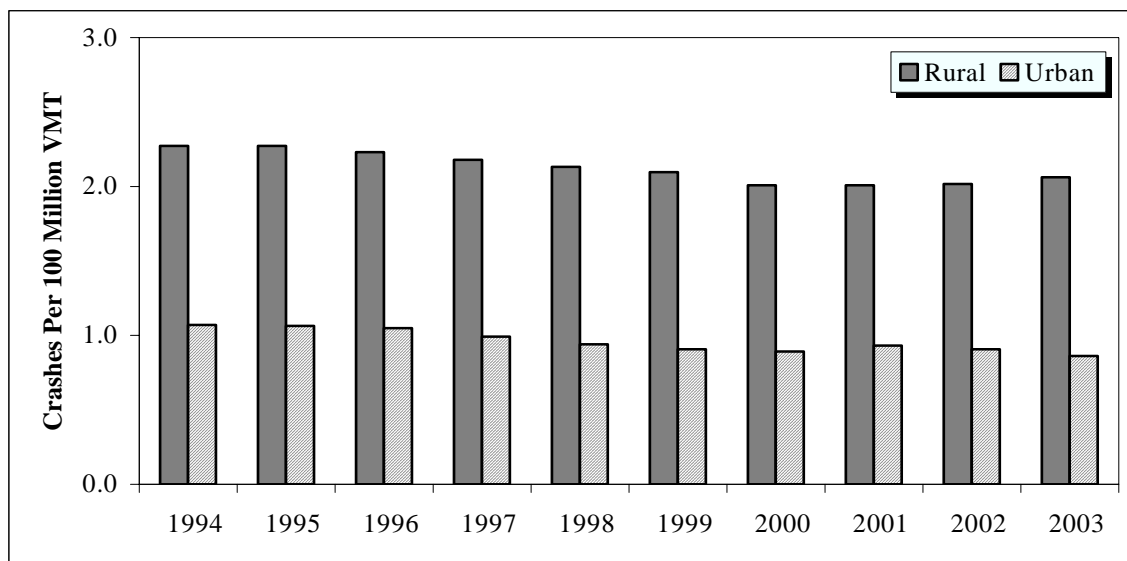
Figure 5
Fatal Crash Rate



Source: NCSA, NHTSA, FARS 1994-2003 and FHWA, VMT data 1994-2003

Figure 6 depicts the rural and urban fatal crash rate by year. Since 1994 both rural and urban crash rates have generally declined.

Figure 6
Fatal Crash Rate by Year

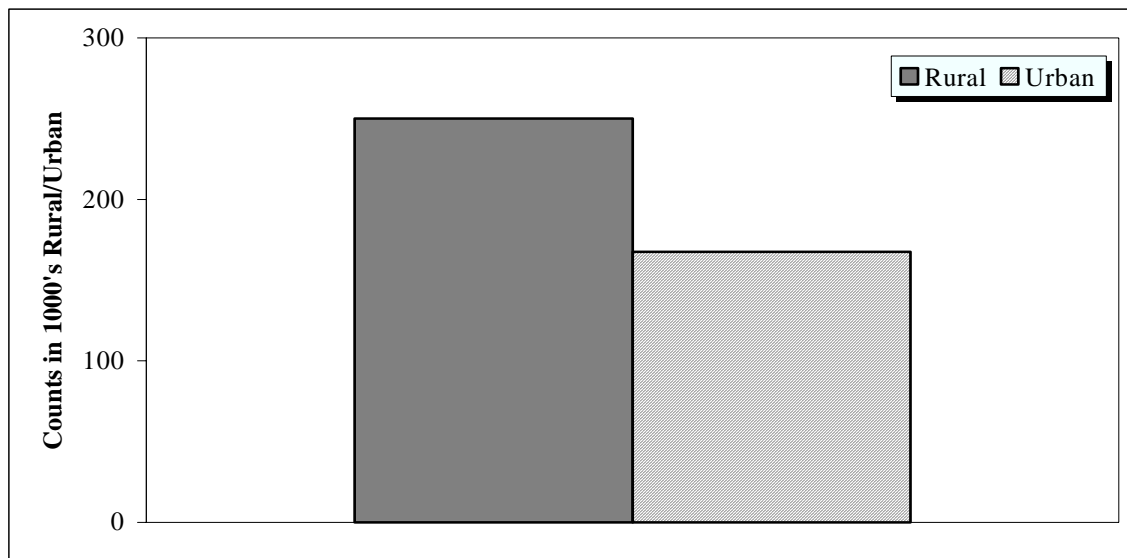


Source: NCSA, NHTSA, FARS 1994-2003 and FHWA, VMT data 1994-2003

3.5 Fatalities

From 1994 to 2003 there were 249,986 rural fatalities and 167,491 urban fatalities, for a total of 417,477 fatalities; see Figure 7. There were approximately 49 percent more rural fatalities than urban fatalities. To compare the effects of a factor on rural and urban fatalities the proportion or percentage that have a particular characteristic are compared.

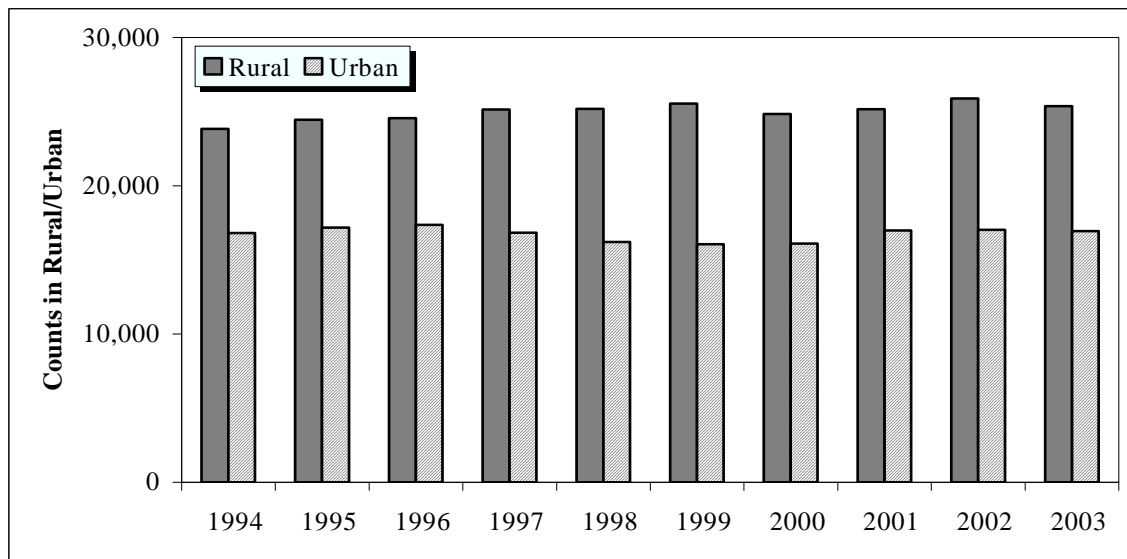
Figure 7
Fatalities



Source: NCSA, NHTSA, FARS 1994-2003

The lowest number of rural fatalities, 23,841, occurred in 1994, the highest number of rural fatalities, 25,896, occurred in 2002. The average number of rural fatalities from 1994 to 2003 was 24,999 fatalities per year. The lowest number of urban fatalities, 16,058, occurred in 1999, the highest number of urban fatalities, 17,368, occurred in 1996. The average number of urban fatalities from 1994 to 2003 was 16,749 fatalities per year. Figure 8 shows the annual fatalities for rural and urban locations. It appears that the number of rural fatalities is slowly increasing over time, whereas number of urban fatalities remains rather constant.

Figure 8
Fatalities by Year

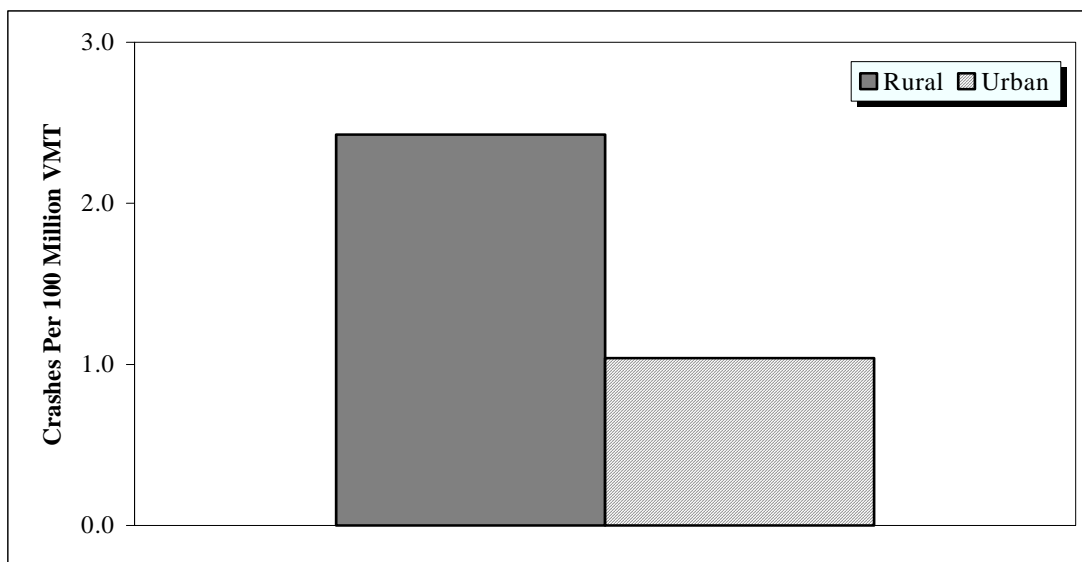


Source: NCSA, NHTSA, FARS 1994-2003

3.6 Fatality Rate

The fatality rate is calculated by dividing the number of fatalities by the vehicle miles traveled; see Figure 3. The rural fatalities rate from 1994 to 2003 is 2.4 fatalities per 100 million vehicle miles traveled. The corresponding urban fatalities rate is 1.0 fatalities per 100 million vehicle miles traveled. Note that the rural fatalities rate is more than twice the urban fatalities rate; see Figure 9.

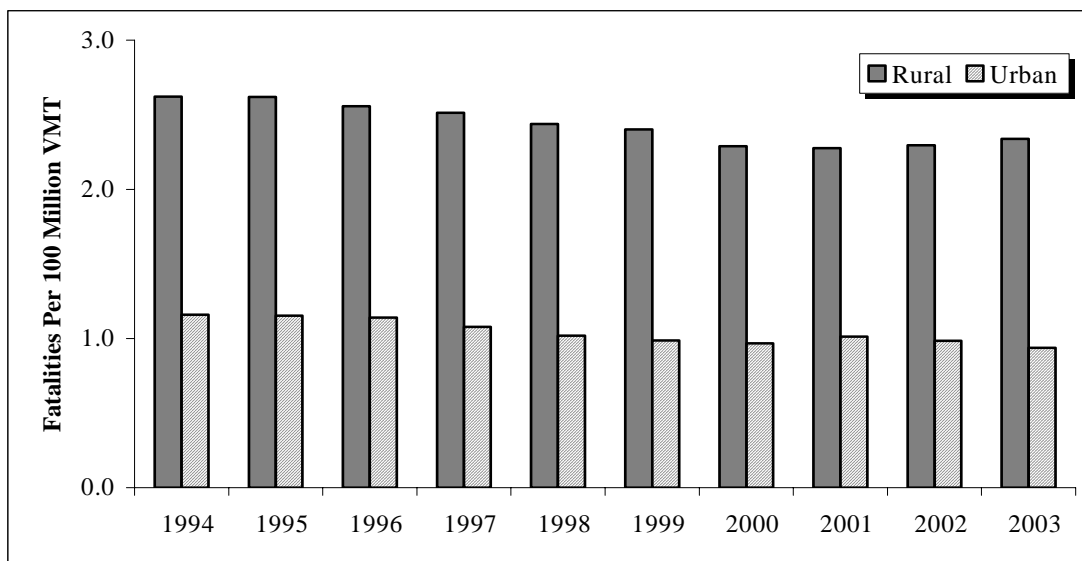
Figure 9
Fatality Rate



Source: NCSA, NHTSA, FARS 1994-2003 and FHWA, VMT data 1994-2003

Figure 10 shows the rural and urban fatalities rate by year. Since 1994 both rural and urban fatality rates have generally declined.

Figure 10
Fatalities Rate by Year



Source: NCSA, NHTSA, FARS 1994-2003 and FHWA, VMT data 1994-2003

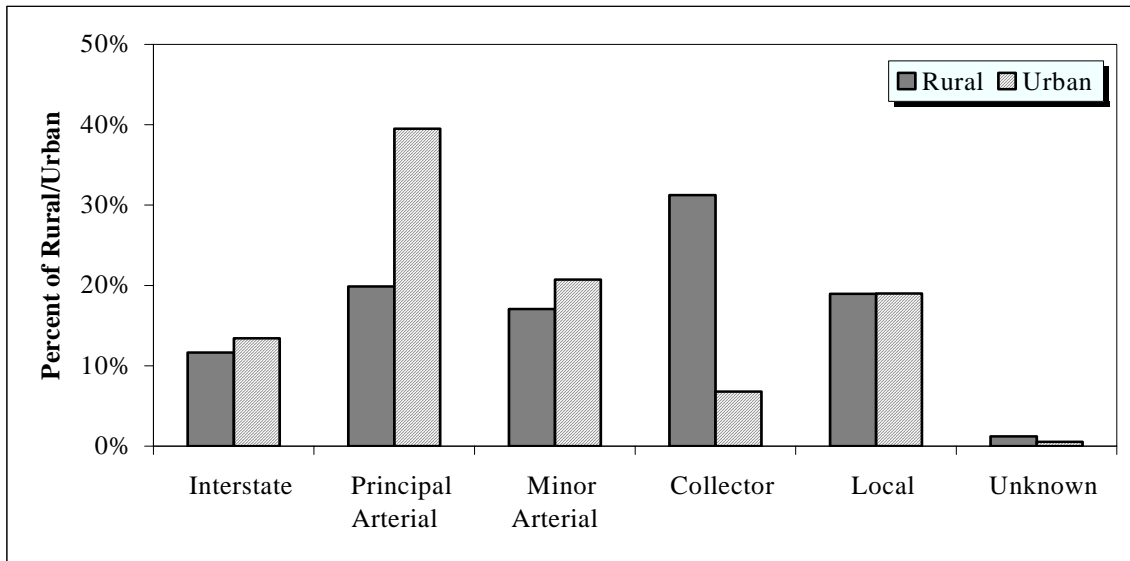
3.7 Road Type

There are significant differences between rural and urban localities when the types of roadways on which the crashes occurred are examined¹. Roadways types are partitioned into interstates, principal arterials, minor arterials, collectors, local roads, and unknown. The data are collected from 1994 to 2003. Table 2 and Figure 11 report that rural localities have a lower portion of fatal crashes on principal arterials, 20 percent, compared to urban localities, 39 percent. However, the rural collectors account for 31 percent of all rural fatal crashes, whereas the urban collectors account for only 7 percent of urban fatal crashes.

Road Type	Rural				Urban			
	Count	Lowest Yearly Percent	Mean Percent	Highest Yearly Percent	Count	Lowest Yearly Percent	Mean Percent	Highest Yearly Percent
Interstate	25,425	10.42 1995	11.63	12.59 2000	20,689	12.11 1995	13.42	14.46 2000
Principal Arterial	43,375	18.48 2002	19.85	20.63 1997	60,894	37.46 2003	39.49	40.62 1994
Minor Arterial	37,261	16.27 2000	17.05	18.53 2003	31,956	19.18 2002	20.72	22.07 1995
Collector	68,289	29.93 2000	31.25	33.09 1994	10,482	6.39 2000	6.80	7.18 1994
Local	41,471	18.37 1994	18.98	20.23 2002	29,323	17.87 1996	19.02	20.85 2002
Unknown	2,718	0.21 1995	1.24	3.55 2000	855	0.18 1995	0.55	1.63 2000
Total	218,539		100%		154,199		100%	

Source: NCSA, NHTSA, FARS 1994-2003

Figure 11
Fatal Crashes by Road Type



Source: NCSA, NHTSA, FARS 1994-2003

¹For Road Type Classification, see the Federal Highway Publication at:
<http://www.fhwa.dot.gov/environment/flex/ch03.htm> or
<http://ntl.bts.gov/lib/23000/23100/23121/09RoadFunction.pdf>

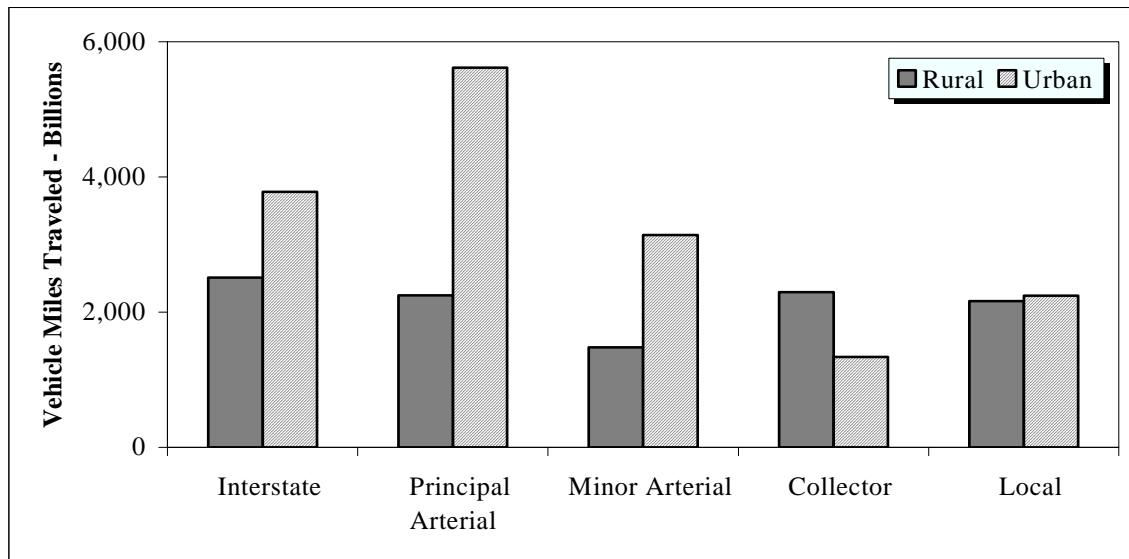
3.8 Vehicle Miles Traveled by Road Type

Data for the VMT by road type from 1994 to 2003 appear in Table 3 and Figure 12. The urban VMT exceed the rural VMT for all categories except collectors. Rural interstates contribute 23 percent of the rural VMT. The largest contributor to VMT for urban areas is principal arterials, which account for 35 percent of urban VMT.

Road Type	Rural		Urban	
	Billions VMT	Percent	Billions VMT	Percent
Interstate	2,510	23.45	3,778	23.44
Principal Arterial	2,249	21.02	5,617	34.85
Minor Arterial	1,480	13.83	3,143	19.50
Collector	2,298	21.47	1,337	8.30
Local	2,165	20.23	2,242	13.91
Total	10,702	100%	16,117	100%

Source: FHWA, VMT data 1994-2003

**Figure 12
VMT by Road Type**

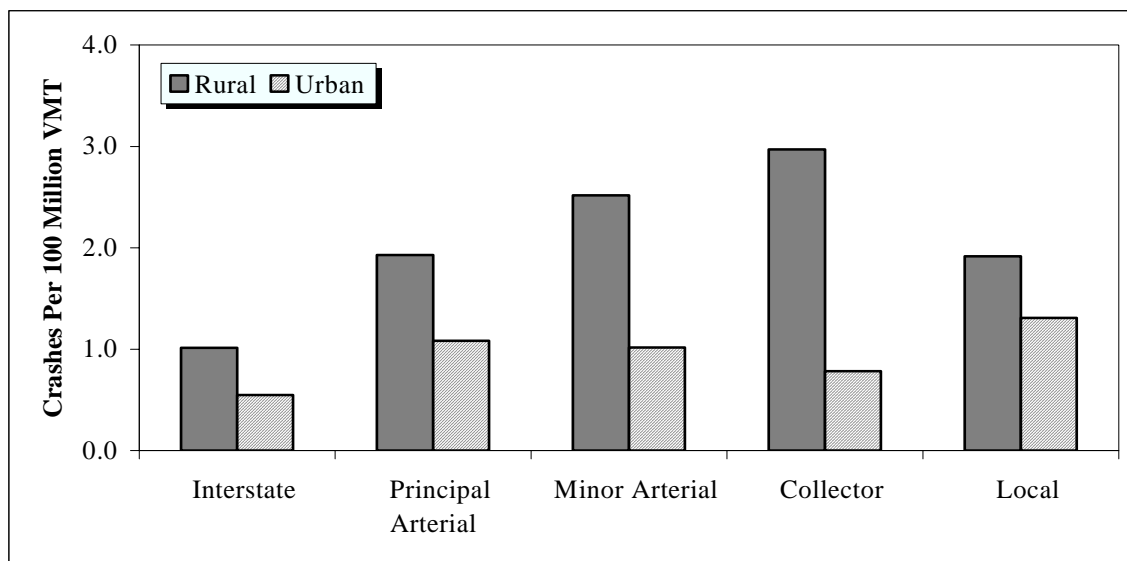


Source: FHWA, VMT data 1994-2003

3.9 Fatal Crash Rate by Road Type

The fatal crash rate is calculated by dividing the number of fatal crashes by the (VMT). The fatal crash rate by road type from 1994 to 2003 shows that as rural roads become “less complex” (that is, the change from interstate, to principle arterial, to minor arterial, to collector), the difference between rural and urban crash rates increases. Local roads do not follow this pattern; however, for all road types, the fatal crash rate on rural roads exceeds the fatal crash rate for the corresponding urban roads.

Figure 13
Fatal Crash Rate by Road Type



Source: NCSA, NHTSA, FARS 1994-2003 and FHWA, VMT data 1994-2003

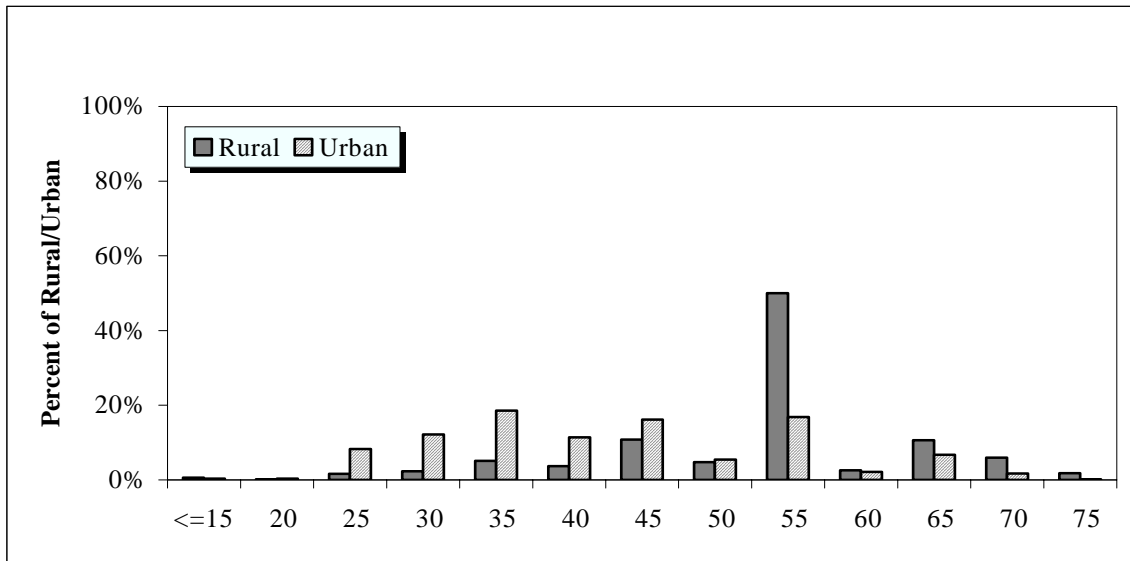
3.10 Speed Limit

There are noticeable differences in the distribution of rural and urban fatal crashes when partitioned by speed limit. Approximately 71 percent of rural fatal crashes occurred on roadways with speed limits of 55 mph or higher. In urban areas less than 27 percent of the fatal crashes occurred on roadways with speed limits of 55 mph or higher. Table 4 and Figure 14 cover years 1994 to 2003. Note that urban areas in some states have a speed limit up to 75 mph.

Speed Limit	Rural				Urban			
	Count	Lowest Yearly Percent	Mean Percent	Highest Yearly Percent	Count	Lowest Yearly Percent	Mean Percent	Highest Yearly Percent
<=15	1,355	0.40 1995	0.63	0.79 1998	569	0.33 2002	0.38	0.51 2003
20	449	0.18 2003	0.21	0.23 2001	479	0.26 2000	0.32	0.38 1995
25	3,518	1.47 1996	1.64	1.74 1999	12,300	7.55 2000	8.22	8.68 1994
30	4,979	2.06 2002	2.32	2.57 1999	18,159	10.52 2002	12.13	15.17 1994
35	11,057	4.68 1994	5.14	5.81 2001	27,716	18.18 2003	18.52	18.73 1994
40	7,848	3.36 1994	3.65	3.85 1999	17,061	10.89 1994	11.40	12.04 2003
45	23,238	9.56 1995	10.80	11.87 2002	24,150	15.10 1994	16.14	16.87 2003
50	10,168	4.43 2003	4.73	5.09 1994	8,168	5.27 2003	5.46	5.87 1995
55	107,457	44.53 2001	49.99	63.42 1994	25,194	13.64 2003	16.83	23.53 1994
60	5,485	0.05 1994	2.55	3.89 2003	3,134	0.02 1995	2.09	3.35 2003
65	22,827	9.36 1994	10.62	11.40 2003	10,041	1.75 1994	6.71	8.87 2001
70	12,766	0.00 1994	5.94	8.51 2000	2,492	0.00 1994	1.67	2.79 2000
75+	3,826	0.00 1994	1.78	2.50 2003	191	0.00 1994-95	0.13	0.29 2002
Total	214,973		100%		149,654		100%	

Source: NCSA, NHTSA, FARS 1994-2003
 Note: Excludes Speed Limit Unknown

Figure 14
Fatal Crashes by Speed Limit



Source: NCSA, NHTSA, FARS 1994-2003

Note: Excludes Speed Limit Unknown

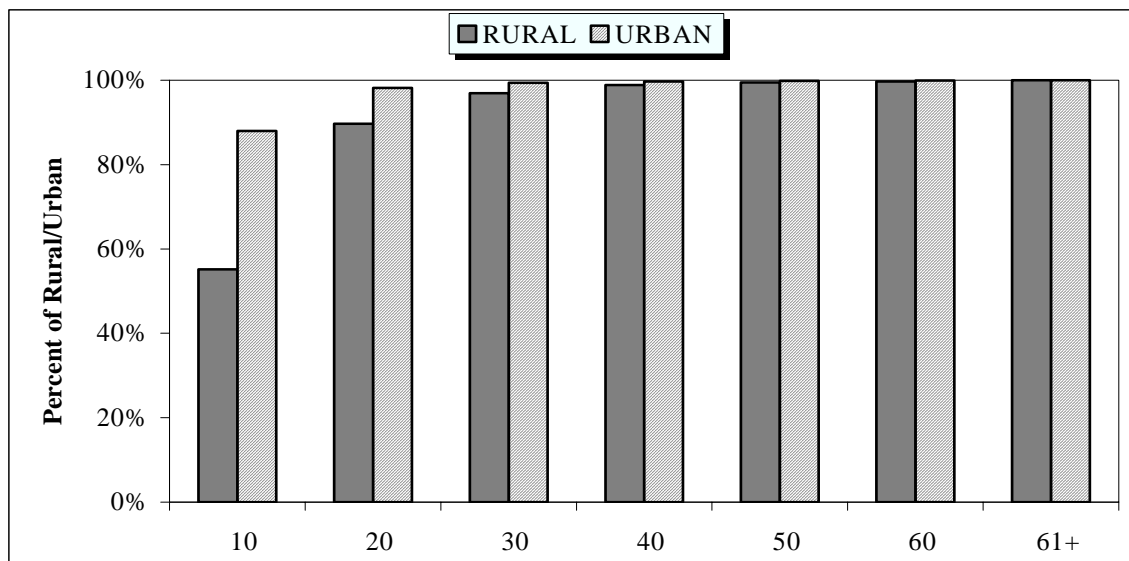
3.11 EMS Arrival Comparison

The cumulative distributions of the length of time from the notification of a fatal crash to the arrival of the emergency medical services (EMS) for both the rural and urban areas appear in Table 5 and Figure 15. The data represent fatal crashes for the period 1994 to 2003. The times required for EMS to respond, to rural fatal crashes tend to be somewhat longer than for urban fatal crashes. In approximately 55 percent of the rural fatal crashes the times for the emergency medical services to arrive, once they have been notified, is not more than 10 minutes. Likewise, for approximately 88 percent of the urban fatal crashes, the times for the emergency medical services to arrive, once they have been notified, is not more than 10 minutes. The largest difference between rural and urban areas in the arrival of EMS occurs for times of 10 minutes and less. As can be seen in Table 5, it takes approximately 10 minutes longer in rural areas to obtain the same response rate of urban areas.

Time Minutes	Rural		Urban	
	Count	Mean Percent	Count	Mean Percent
10	77,800	55.18	69,917	87.99
20	126,509	89.72	78,031	98.21
30	136,665	96.93	78,983	99.40
40	139,386	98.86	79,239	99.73
50	140,274	99.49	79,334	99.85
60	140,596	99.71	79,380	99.90
61+	141,000	100%	79,457	100%

Source: NCSA, NHTSA, FARS 1994-2003

**Figure 15
EMS Arrival Comparison**



Source: NCSA, NHTSA, FARS 1994-2003

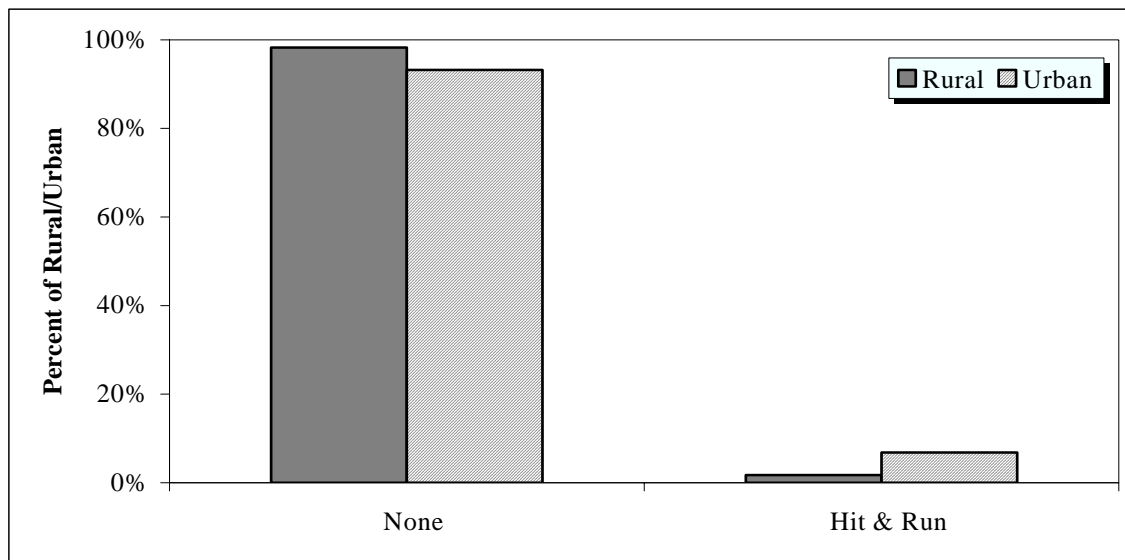
3.12 Hit and Run

Less than two percent of the fatal rural crashes from 1994 to 2003 are classified as hit and run, where-as 7 percent of the fatal urban crashes from 1994 to 2003 are classified as hit and run; see Table 6 and Figure 16.

Table 6 Hit and Run								
Hit and Run	Rural				Urban			
	Count	Lowest Yearly Percent	Mean Percent	Highest Yearly Percent	Count	Lowest Yearly Percent	Mean Percent	Highest Yearly Percent
None	214,786	98.22 2001	98.28	98.39 1996	143,732	92.92 1994	93.21	93.46 1998
Hit & Run	3,753	1.61 1996	1.72	1.78 2001	10,467	6.54 1998	6.79	7.08 1994
Total	218,539		100%		154,199		100%	

Source: NCSA, NHTSA, FARS 1994-2003

Figure 16
Fatal Crashes by Hit and Run



Source: NCSA, NHTSA, FARS 1994-2003

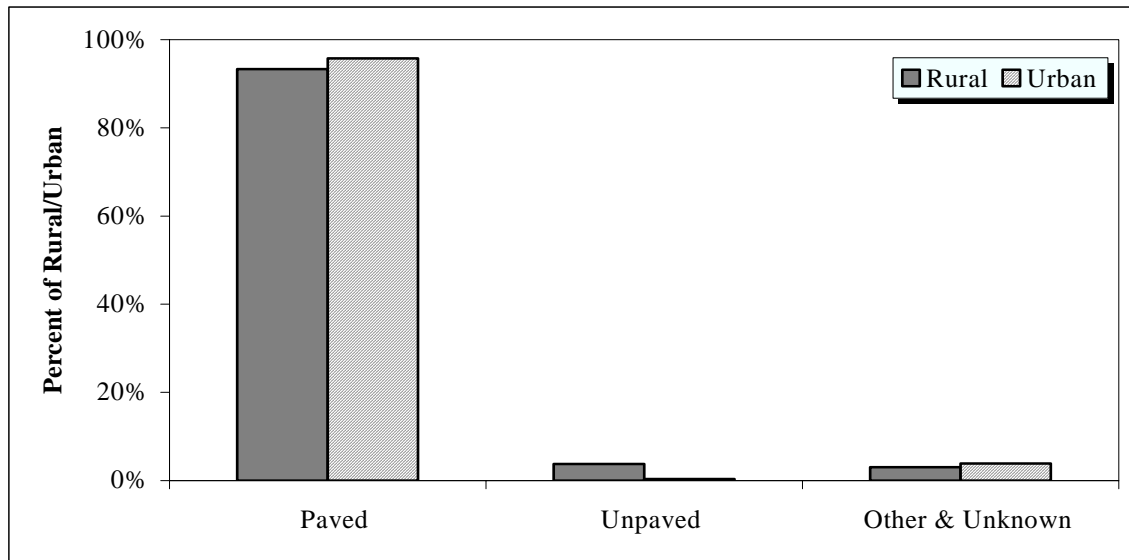
3.13 Paved Roads

Almost 4 percent of the fatal rural crashes from 1994 to 2003 occur on unpaved dirt and gravel roadways. Less than one half of a percent of the fatal urban crashes from 1994 to 2003 occurred on unpaved roads; see Table 7 and Figure 17.

Roadway Surface Type	Rural				Urban			
	Count	Lowest Yearly Percent	Mean Percent	Highest Yearly Percent	Count	Lowest Yearly Percent	Mean Percent	Highest Yearly Percent
Paved	203,892	91.48 2002	93.30	94.78 1999	147,625	93.23 2003	95.74	96.60 1999
Unpaved	8,111	3.32 2001	3.71	4.18 1994	544	0.24 2001	0.35	0.50 1994
Other & Unknown	6,536	1.53 1995	2.99	5.06 2002	6,030	3.05 1999	3.91	6.47 2003
Total	218,539		100%		154,199		100%	

Source: NCSA, NHTSA, FARS 1994-2003

**Figure 17
Fatal Crashes by Road Surface Type**



Source: NCSA, NHTSA, FARS 1994-2003

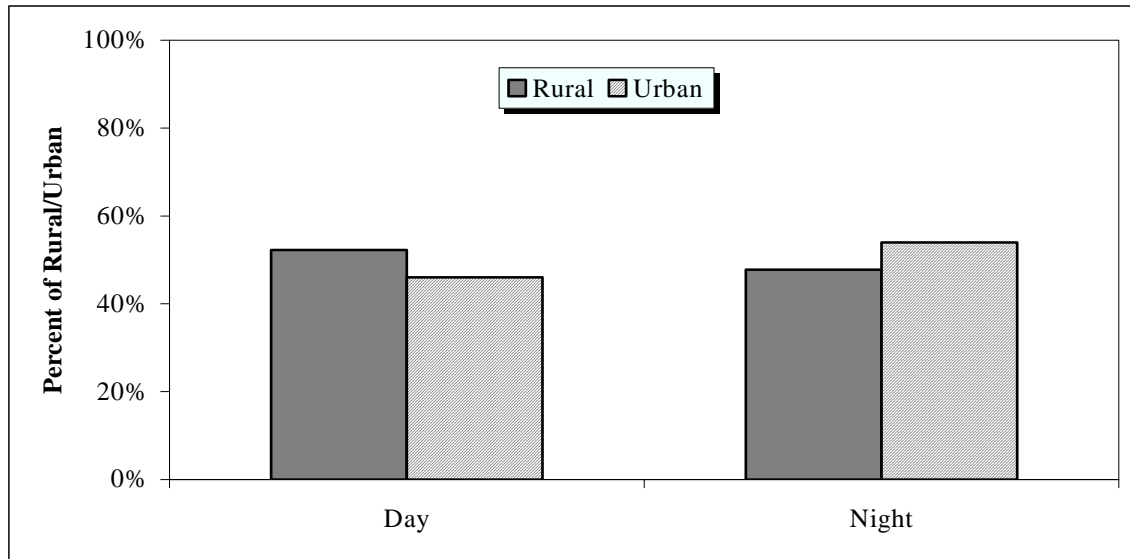
3.14 Time of Day

Approximately 52 percent of the rural fatal crashes from 1994 to 2003 occurred during the day. In this same time frame, just over 46 percent of the urban fatal crashes occurred during the day, see Table 8 and Figure 18. Note that Time of Day does not necessarily correspond to “daylight” conditions; see Section 3.18, Light Condition, Table 12 and Figure 22 later in this report.

Time of Day	Rural				Urban			
	Count	Lowest Yearly Percent	Mean Percent	Highest Yearly Percent	Count	Lowest Yearly Percent	Mean Percent	Highest Yearly Percent
Day	112,851	50.48 1995	52.27	53.05 2000	70,699	44.24 2002	46.04	47.41 1998
Night	103,039	46.95 2000	47.73	49.52 1995	82,861	52.59 1998	53.96	55.76 2002
Total	215,890		100%		153,560		100%	

Source: NCSA, NHTSA, FARS 1994-2003
 Note: Excludes Speed Limit Unknown (Rural - 2,649 and Urban - 639)
 Day - (6 a.m. – 5:59 p.m.) and Night - (6 p.m. – 5:59 a.m.)

**Figure 18
Fatal Crashes by Time of Day**



Source: NCSA, NHTSA, FARS 1994-2003
 Note: Exclude Time of Day Unknown (Rural - 2,649 and Urban - 639)
 Day - (6:00 am – 5:59 pm) and Night - (6:00 pm and 5:59 am)

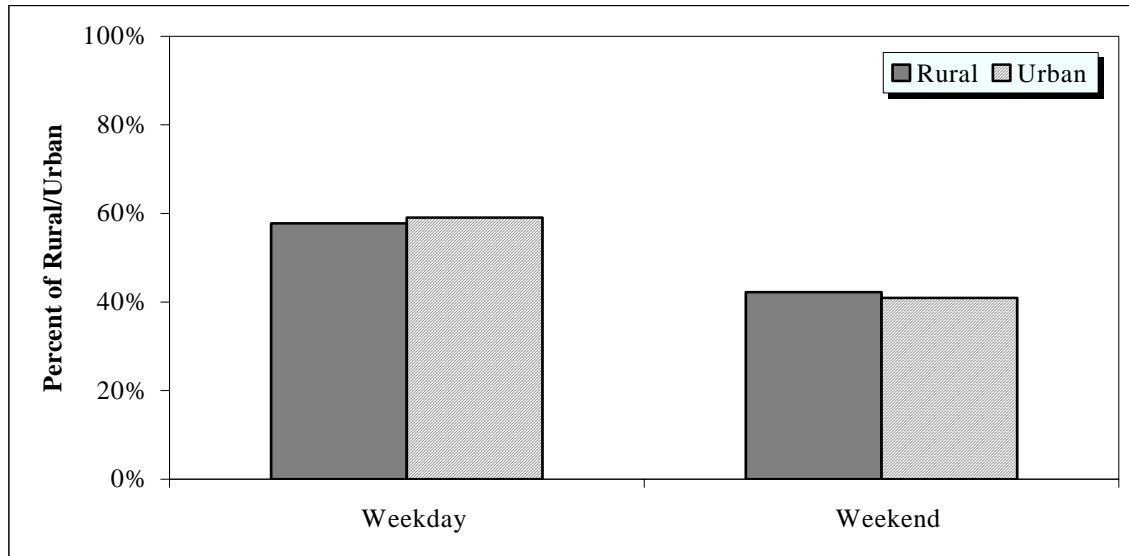
3.15 Weekday versus Weekend

Data on the Weekday versus Weekend for the occurrence of fatal crashes has been partitioned by weekday and weekend. The weekend begins at 6 p.m. on Friday and ends at 6:00 a.m. on Monday. There is a slightly higher portion of fatal crashes on the weekend in rural areas, 42 percent, than in urban areas, 41 percent. There is a complementary reduction in fatal rural weekday crashes, 58 percent, when compared to fatal urban weekday crashes 59 percent; see Table 9 and Figure 19.

Weekday or Weekend	Rural				Urban			
	Count	Lowest Yearly Percent	Mean Percent	Highest Yearly Percent	Count	Lowest Yearly Percent	Mean Percent	Highest Yearly Percent
Weekday	125,799	56.15 1994	57.76	58.43 1998	90,961	57.99 2003	59.06	59.90 1996
Weekend	91,994	41.57 1998	42.24	43.85 1994	63,065	40.10 1996	40.94	42.01 2003
Total	217,793		100%		154,026		100%	

Source: NCSA, NHTSA, FARS 1994-2003
 Note: Excludes Day of Week Unknown (Rural - 746 and Urban - 173)
 Weekday - (6 a.m. Monday thru 5:59 p.m. Friday) and Weekend - (6 p.m. Friday thru 5:59 a.m. Monday)

**Figure 19
Fatal Crashes by Day of Week**



Source: NCSA, NHTSA, FARS 1994-2003
 Note: Excludes Day of Week Unknown (Rural - 746 and Urban - 173)
 Weekday - (6 a.m. Monday thru 5:59 p.m. Friday) and Weekend - (6 p.m. Friday thru 5:59 a.m. Monday)

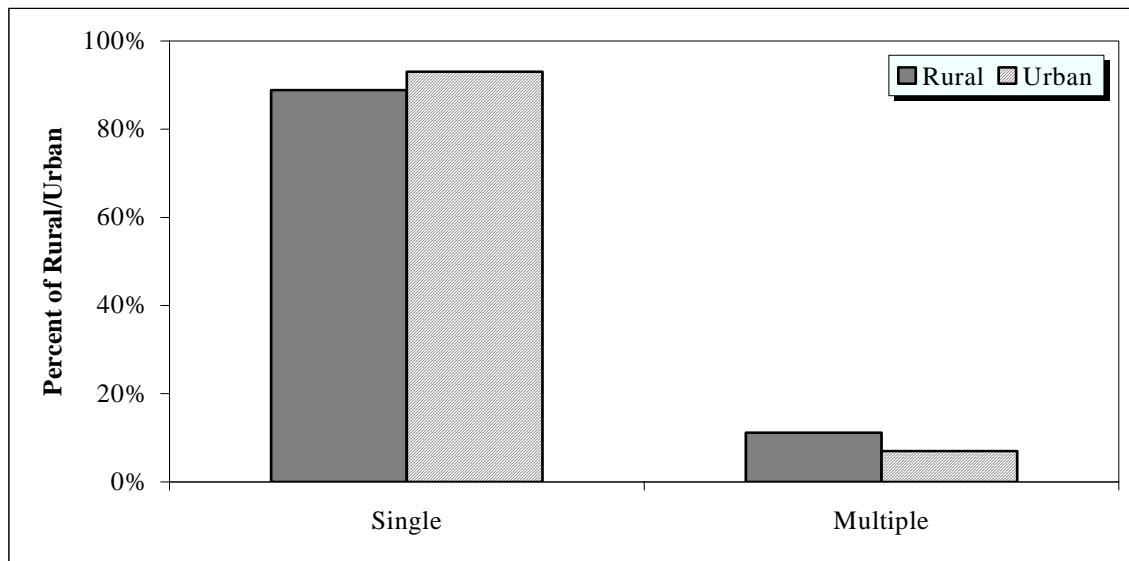
3.16 Fatalities Per Crash

There is a lower rate of rural fatal crashes involving a single fatality from 1994 to 2003 (89 %) than there were urban crashes involving a single fatality (93 %); see Table 10 and Figure 20.

Table 10 Fatalities Per Crash								
Fatalities	Rural				Urban			
	Count	Lowest Yearly Percent	Mean Percent	Highest Yearly Percent	Count	Lowest Yearly Percent	Mean Percent	Highest Yearly Percent
Single	194,171	88.25 1997	88.85	89.49 2001	143,429	92.81 1996	93.02	93.27 1995
Multiple	24,368	10.51 2001	11.15	11.75 1997	10,770	6.73 1995	6.98	7.19 1996
Total	218,539		100%		154,199		100%	

Source: NCSA, NHTSA, FARS 1994-2003

Figure 20
Fatalities Per Crash



Source: NCSA, NHTSA, FARS 1994-2003

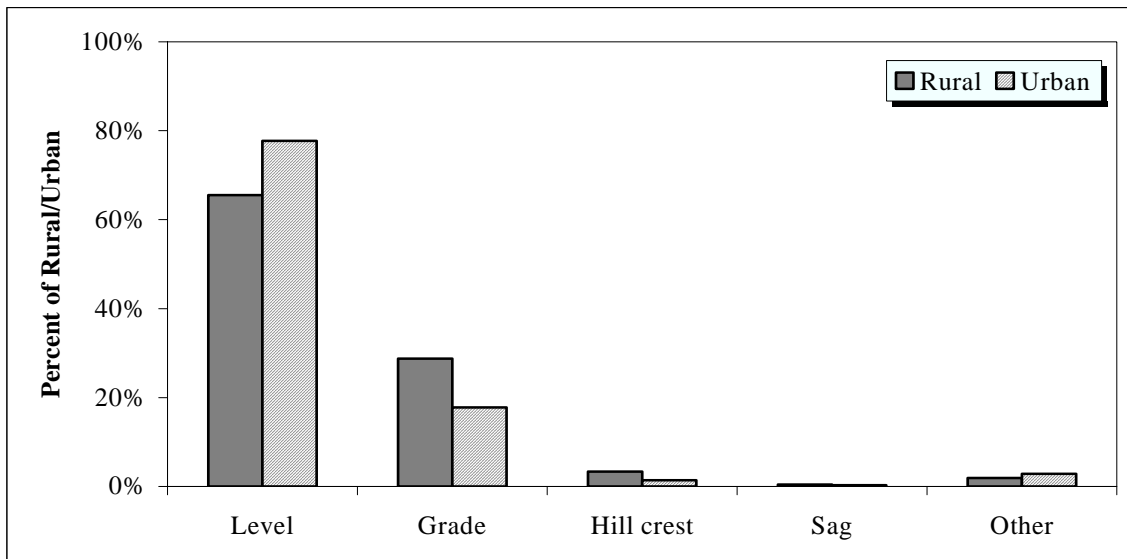
3.17 Roadway Profile

Approximately 3 out of 10 rural fatal crashes occur on a grade, 29 percent, from 1994 to 2003. For urban fatal crashes the rate is 18 percent. Rural fatal crashes occurring on level ground have a lower rate of occurrence, 65 percent, than similar urban fatal crashes, 78 percent, see Table 11 and Figure 21.

Road Type	Rural				Urban			
	Count	Lowest Yearly Percent	Mean Percent	Highest Yearly Percent	Count	Lowest Yearly Percent	Mean Percent	Highest Yearly Percent
Level	143,123	63.94 1995	65.49	67.03 2001	119,807	75.37 2003	77.70	78.88 2000
Grade	62,855	26.75 2002	28.76	30.21 1996	27,363	17.18 2000	17.75	18.58 1999
Hill Crest	7,317	3.09 2001	3.35	3.70 2002	2,244	1.24 2001	1.45	1.69 2002
Sag	959	0.30 2001	0.44	0.51 1994	391	0.19 1996	0.25	0.34 1994
Other	4,285	1.25 1999	1.96	2.94 2003	4,394	2.14 1996	2.85	5.74 2003
Total	218,539		100%		154,199		100%	

Source: NCSA, NHTSA, FARS 1994-2003

**Figure 21
Fatal Crashes by Roadway Profile**



Source: NCSA, NHTSA, FARS 1994-2003

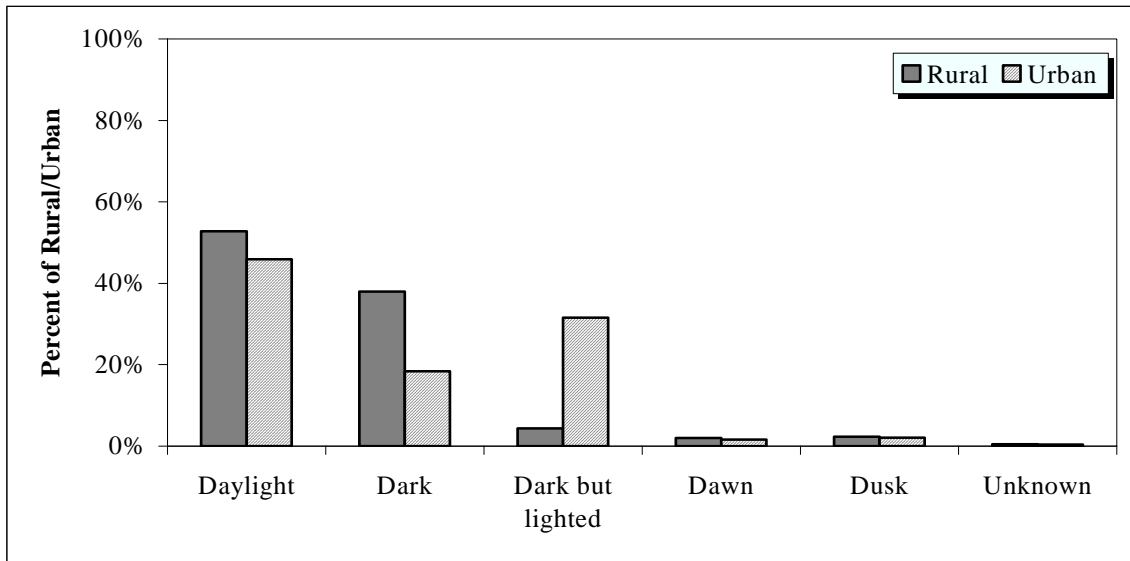
3.18 Light Condition

In rural areas, 53 percent of the crashes occur in daylight, while 42 percent are in the dark. In urban areas the situation is the opposite, with 46 percent of the crashes occurring in daylight and 50 percent of the crashes in the dark. Within crashes that occur in the dark, there is a large difference between crashes that occur in the dark but with lighted conditions (i.e. streetlamps). About 4 percent of the rural crashes occur in the dark but with lighted conditions; however almost 32 percent of the urban crashes occur in the dark but with lighted conditions; see Table 12 and Figure 22.

Light Condition	Rural				Urban			
	Count	Lowest Yearly Percent	Mean Percent	Highest Yearly Percent	Count	Lowest Yearly Percent	Mean Percent	Highest Yearly Percent
Daylight	115,353	51.05 1995	52.78	53.98 2001	70,759	44.42 2002	45.89	47.32 1998
Dark	82,935	36.77 2001	37.95	39.95 1995	28,422	18.06 2001	18.43	18.89 1996
Dark but Lighted	9,542	4.07 2003	4.37	4.73 2000	48,670	30.13 1998	31.56	33.27 2002
Dawn	4,490	1.83 1995	2.05	2.24 1994	2,526	1.51 2003	1.64	1.78 2000
Dusk	5,175	2.09 2003	2.37	2.55 1995	3,245	1.94 2000	2.10	2.36 1999
Unknown	1,044	0.34 1998	0.48	0.79 2003	577	0.16 1994	0.37	1.50 2003
Total	218,539		100%		154,199		100%	

Source: NCSA, NHTSA, FARS 1994-2003

Figure 22
Fatal Crashes by Light Condition



Source: NCSA, NHTSA, FARS 1994-2003

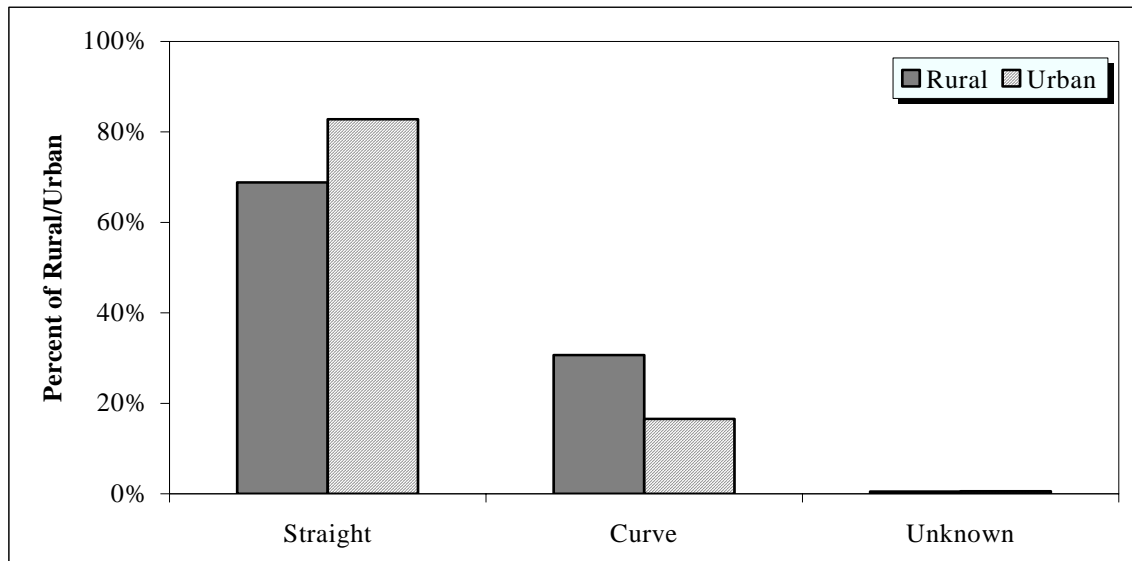
3.19 Roadway Alignment

From 1994 to 2003 approximately 69 percent of fatal rural crashes occurred on straight roads, where-as 83 percent of fatal urban crashes were on straight roads; see Table 13 and Figure 23.

Roadway Alignment	Rural				Urban			
	Count	Lowest Yearly Percent	Mean Percent	Highest Yearly Percent	Count	Lowest Yearly Percent	Mean Percent	Highest Yearly Percent
Straight	150,403	67.99 2002	68.82	69.52 1996	127,706	81.36 2003	82.82	83.63 1995
Curve	66,991	29.92 1996	30.66	31.43 2001	25,590	16.01 1995	16.59	17.12 2002
Unknown	1,145	0.39 1998	0.52	0.89 2003	903	0.31 1994	0.59	1.93 2003
Total	218,539		100%		154,199		100%	

Source: NCSA, NHTSA, FARS 1994-2003

**Figure 23
Fatal Crashes by Alignment**



Source: NCSA, NHTSA, FARS 1994-2003

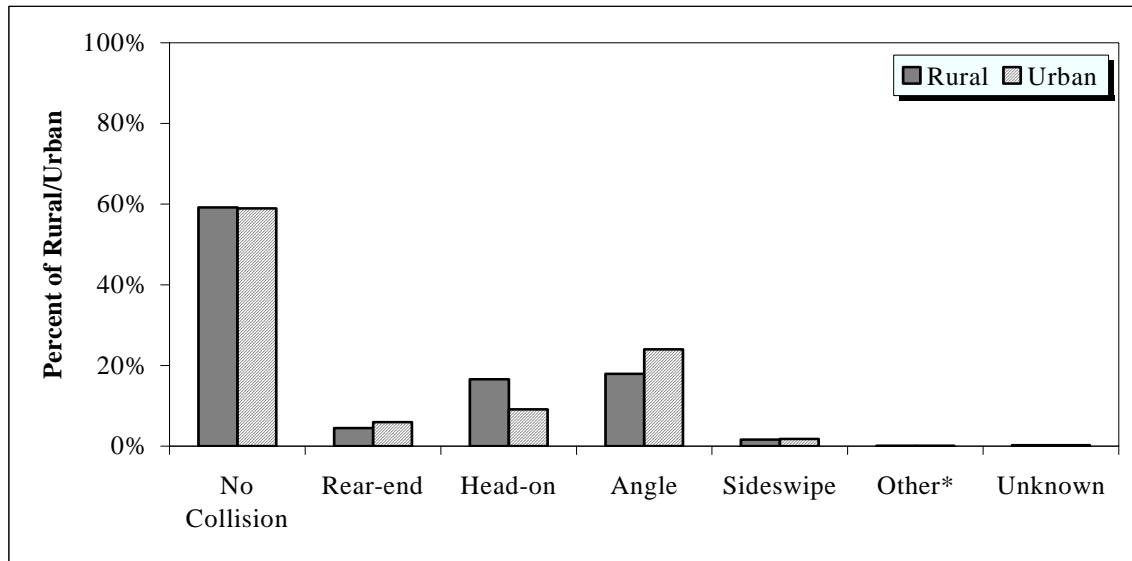
3.20 Manner of Collision

From 1994 to 2003 head-on crashes were more prevalent in rural areas, making up 17 percent of all rural fatal crashes. In urban areas, head-on crashes were responsible for 9 percent of all urban fatal crashes; see Table 14 and Figure 24. (Note: There were several years when no rear-to-rear crashes were reported.)

Table 14								
Fatal Crashes by Manner of Collision								
Manner of Collision	Rural				Urban			
	Count	Lowest Yearly Percent	Mean Percent	Highest Yearly Percent	Count	Lowest Yearly Percent	Mean Percent	Highest Yearly Percent
No Collision	129,246	57.69 1997	59.14	60.77 2002	90,837	58.14 2000	58.91	59.67 1995
Rear-End	9,810	3.93 1995	4.49	4.88 2003	9,160	5.22 1995	5.94	6.41 2000
Head-On	36,238	12.05 2002	16.58	18.93 1994	14,031	7.05 2003	9.10	10.04 1996
Angle	39,124	16.35 1994	17.90	20.05 2002	36,948	23.50 2001	23.96	24.84 2002
Sideswipe	3,557	1.31 1994	1.63	2.20 2002	2,732	1.41 1995	1.77	2.19 2002
Other *	102	0.00 1995 & 2000	0.05	0.22 2002	84	0.00 1996- 1999 & 2001	0.06	0.27 2002
Unknown	462	0.13 2001	0.21	0.38 2003	407	0.07 1998	0.26	1.33 2003
Total	218,539		100%		154,199		100%	

Source: NCSA, NHTSA, FARS 1994-2003
 Note: *Other = Rear-to-Rear, Rear-to-Side, End-Swipes, etc.

Figure 24
Fatal Crashes by Manner of Collision



Source: NCSA, NHTSA, FARS 1994-2003

Note: *Other = Rear-to-Rear, Rear-to-Side, End-Swipes, etc.

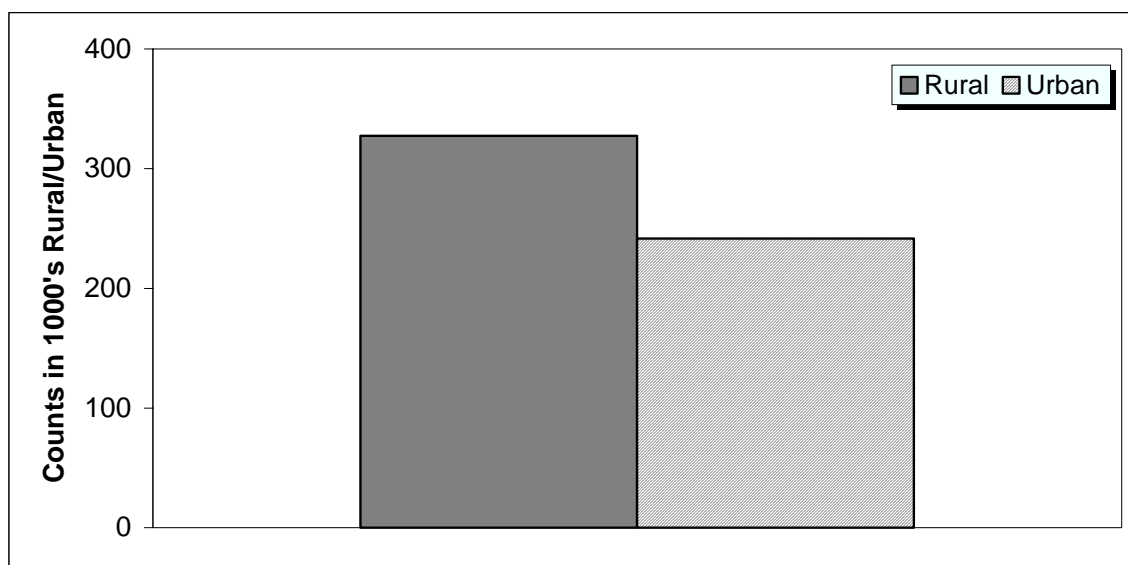
**FATAL
CRASH
ANALYSIS
-
VEHICLE
LEVEL**

4.0 FATAL CRASH ANALYSIS - VEHICLE LEVEL

4.1 Vehicles Involved in Fatal Crashes

From 1994 to 2003 in FARS, there were 327,445 vehicles involved in rural fatal crashes and 241,569 vehicles involved in urban fatal crashes; see Figure 25. There were approximately 36 percent more vehicles involved in fatal rural crashes than urban crashes. To compare the effects of a factor on vehicles involved in rural versus urban fatal crashes, the portion or percentage that have a particular characteristic are compared.

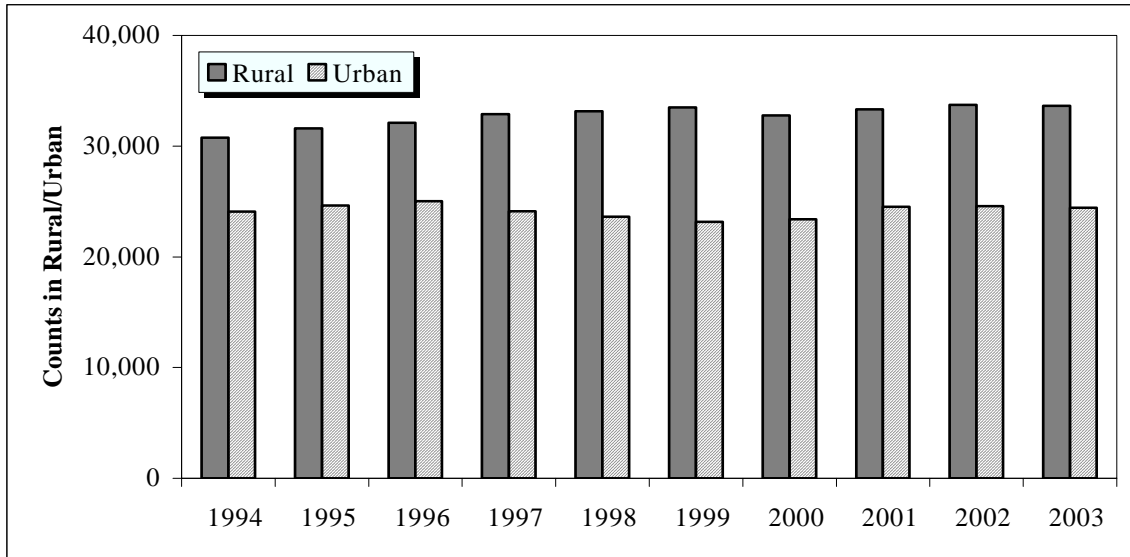
Figure 25
Vehicle Involved in Fatal Crashes



Source: NCSA, NHTSA, FARS 1994-2003

Displaying the vehicle data on a yearly basis provides a reference for longitudinal considerations. The lowest number of vehicles in rural fatal crashes, 30,756, occurred in 1994; the highest number of vehicles in rural fatal crashes, 33,729, occurred in 2002. The average number of vehicles in rural fatal crashes, from 1994 to 2003 was 32,745 vehicles per year. The lowest number of vehicles in urban fatal cases, 23,163, occurred in 1999, the highest number of vehicles in urban fatal cases, 25,031, occurred in 1996. The average number of vehicles in urban fatal crashes, from 1994 to 2003 was 24,157 vehicles per year; see Figure 26.

Figure 26
Vehicles involved in Fatal Crashes by Year

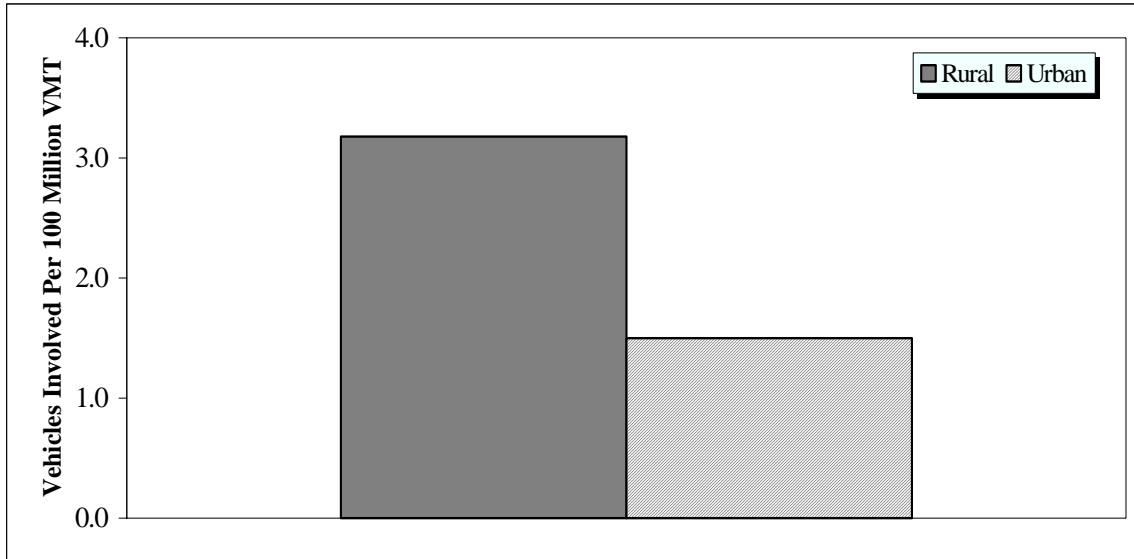


Source: NCSA, NHTSA, FARS 1994-2003

4.2 Vehicle Involvement Rate

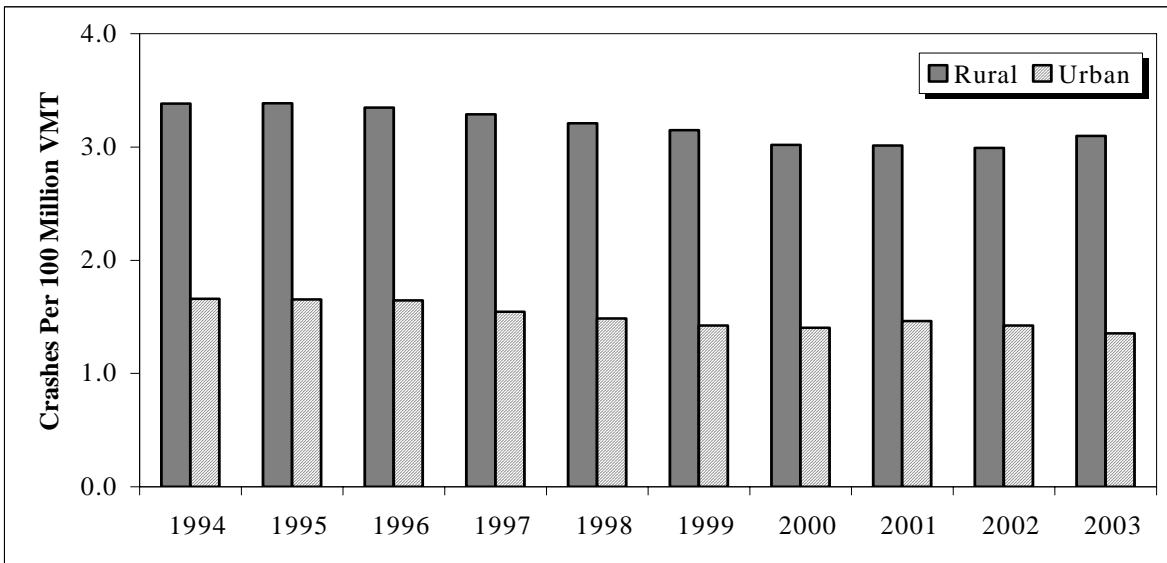
The vehicle involvement rate is the number of vehicles involved in fatal rural/urban crashes divided by the rural/urban vehicle miles traveled, for the given time period, see Figures 3 and 4 for VMT. From 1994 to 2003, the rural rate of vehicle involvement in fatal crashes was 3.2 vehicles per 100 million miles traveled. The urban vehicle involvement rate was 1.5 per 100 million miles traveled; see Figure 27. The vehicle involvement rate for fatal crashes has generally declined from 1994 to 2003 for both rural and urban crashes.

Figure 27
Vehicle Involvement Rate



Source: NCSA, NHTSA, FARS 1994-2003 and FHWA, VMT data 1994-2003

Figure 28
Vehicle Involvement Rate by Year



Source: NCSA, NHTSA, FARS 1994-2003, FHWA, VMT data 1994-2003

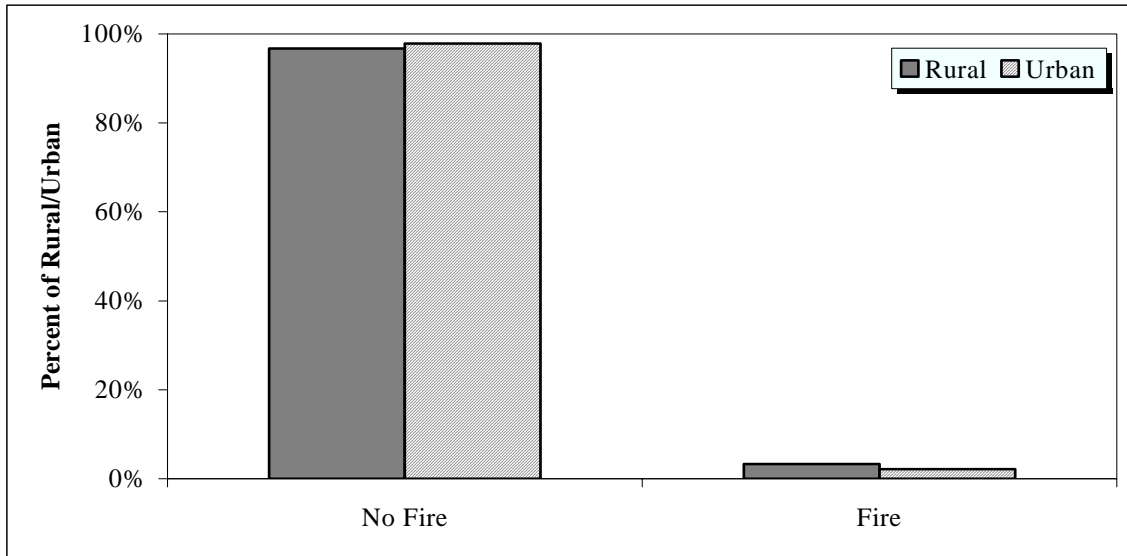
4.3 Fire Occurrence

The rate of fire occurrence in fatal crashes for vehicles in rural areas, 3 percent, is more than 50 percent higher than the rate of fire occurrence for vehicles in urban areas, 2 percent; see Table 15 and Figure 29. However, fire occurrence is a rare event in both rural and urban areas.

Fire Occurrence	Rural				Urban			
	Count	Lowest Yearly Percent	Mean Percent	Highest Yearly Percent	Count	Lowest Yearly Percent	Mean Percent	Highest Yearly Percent
No Fire	316,602	86.48 2002	96.69	96.94 1997	236,451	97.66 2001	97.88	98.12 1996
Fire	10,843	3.06 1997	3.31	3.52 2002	5,118	1.88 1996	2.12	2.34 2001
Total	327,445		100%		241,569		100%	

Source: NCSA, NHTSA, FARS 1990-2001

**Figure 29
Fire Occurrence**



Source: NCSA, NHTSA, FARS 1994-2003

4.4 Vehicle Role

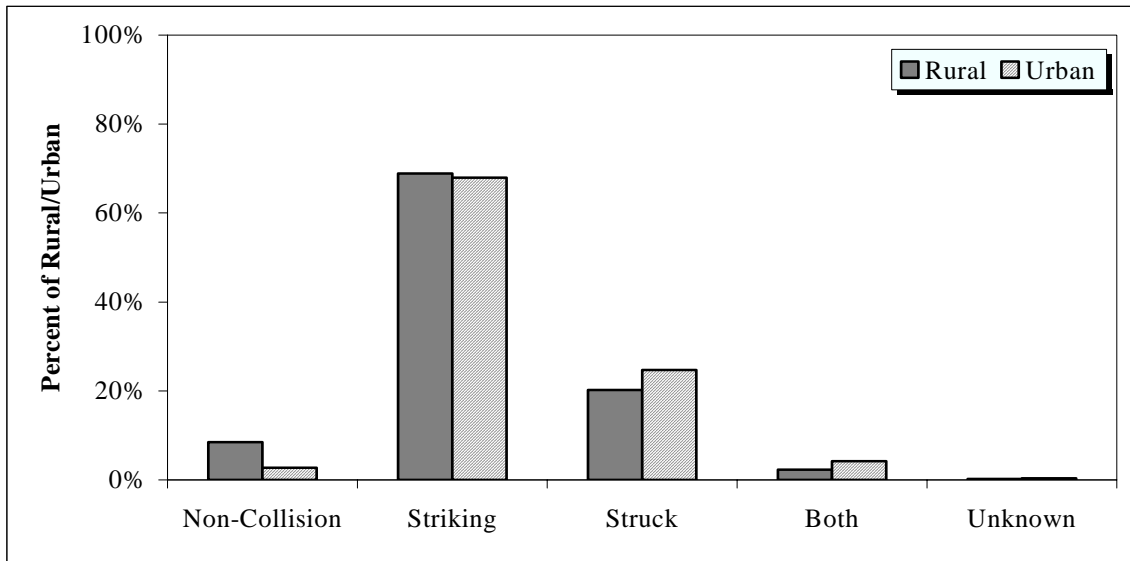
The vehicle role in fatal crashes from 1994 to 2003, has been partitioned into non-collision, striking, struck, both, and unknown in this study. In a multi-vehicle crash each vehicle is assigned a vehicle role. For example, with a chain reaction crash involving three vehicles traveling on the same roadway in the same direction, the first vehicle stops abruptly. The second vehicle strikes the first vehicle in the rear. The third vehicle then strikes the second vehicle in the rear. The vehicle role of the first vehicle is struck. The vehicle role of the second vehicle is both and the vehicle role of the third vehicle is striking.

Non-collision shows the greatest difference between rural and urban fatal crashes. Vehicles were coded non-collision 8 percent of the time for rural fatal crashes, but only 3 percent of the time for urban fatal crashes; see Table 16 and Figure 30.

Vehicle Role	Rural				Urban			
	Count	Lowest Yearly Percent	Mean Percent	Highest Yearly Percent	Count	Lowest Yearly Percent	Mean Percent	Highest Yearly Percent
Non-Collision	27,751	7.94 1998	8.47	9.01 2002	6,615	2.39 1998	2.74	3.09 2003
Striking	225,435	59.32 2003	68.85	72.55 1994	164,180	61.51 2003	67.96	70.39 1994
Struck	66,168	16.75 1994	20.21	28.76 2003	59,683	22.71 1995	24.71	29.72 2002
Both	7,395	1.76 1997	2.26	2.88 2003	10,245	3.53 1997	4.24	4.71 2003
Unknown	696	0.06 1994	0.21	0.40 2003	846	0.14 1995	0.35	1.40 2003
Total	327,445		100%		241,569		100%	

Source: NCSA, NHTSA, FARS 1994-2003

Figure 30
Vehicle Role



Source: NCSA, NHTSA, FARS Source: NCSA, NHTSA, FARS 1994-2003

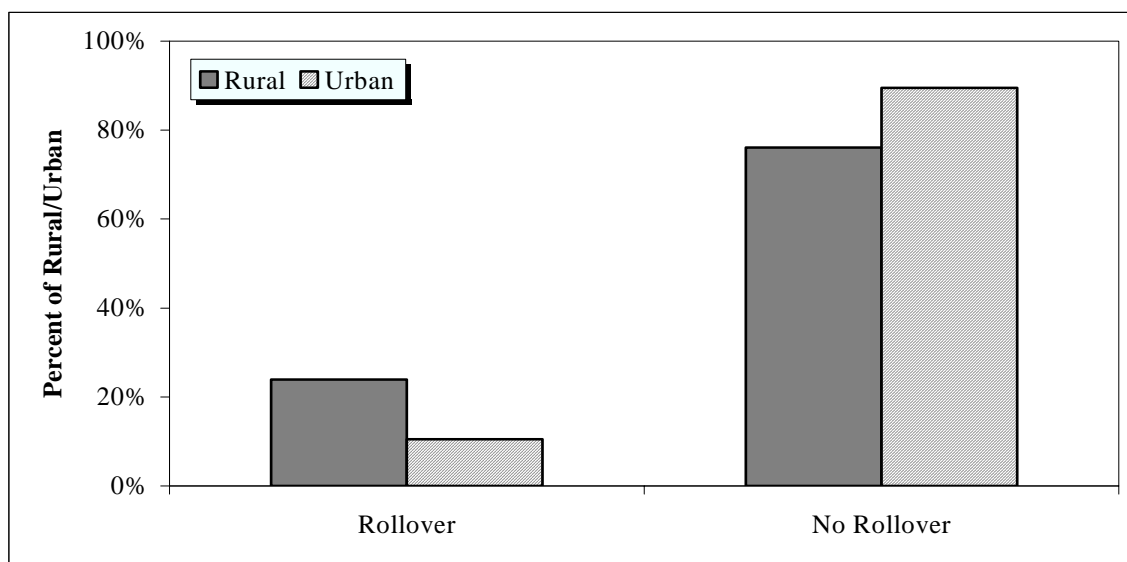
4.5 Rollover

Vehicles involved in fatal crashes in rural areas are more than twice as likely to rollover (24 %), than in urban fatal crashes, (10 %). These data are shown in Table 17 and Figure 31.

Table 17 Rollover								
Rollover	Rural				Urban			
	Count	Lowest Yearly Percent	Mean Percent	Highest Yearly Percent	Count	Lowest Yearly Percent	Mean Percent	Highest Yearly Percent
Rollover	78,258	23.14 1997	23.90	25.13 2002	25,268	9.57 1994	10.46	11.33 2002
No Rollover	249,187	74.87 2002	76.10	76.86 1997	216,301	88.67 2002	89.54	90.43 1994
Total	327,445		100%		241,569		100%	

Source: NCSA, NHTSA, FARS 1994-2003

Figure 31
Rollover



Source: NCSA, NHTSA, FARS 1994-2003

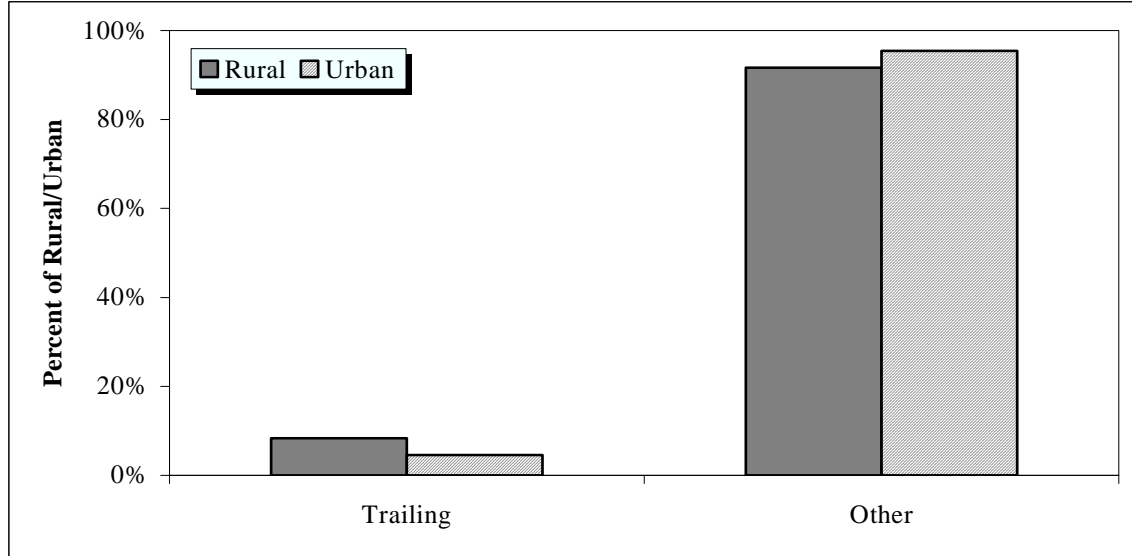
4.6 Trailing Vehicle

This variable applies not only to tractor trailers, but also to boats, cars, and rental-trailer-type vehicles, so long as the towed vehicle is attached by a trailer hitch. A vehicle pulled by a rope or chain is **not** counted as a towed vehicle. From 1994 to 2003, 8 percent of the vehicles involved in rural fatal crashes were towing a vehicle. In urban areas, 5 percent of the vehicles involved in urban fatal crashes were towing another vehicle; see Table 18 and Figure 32.

Trailing Vehicle	Rural				Urban			
	Count	Lowest Yearly Percent	Mean Percent	Highest Yearly Percent	Count	Lowest Yearly Percent	Mean Percent	Highest Yearly Percent
Trailing	27,231	7.79 1995	8.32	8.75 2000	11,092	4.26 2003	4.59	4.95 1999
Other	300,214	91.25 2000	91.68	92.21 1995	230,477	95.05 1999	95.41	95.74 2003
Total	327,445		100%		241,569		100%	

Source: NCSA, NHTSA, FARS 1994-2003

**Figure 32
Trailing Vehicle**



Source: NCSA, NHTSA, FARS 1994-2003

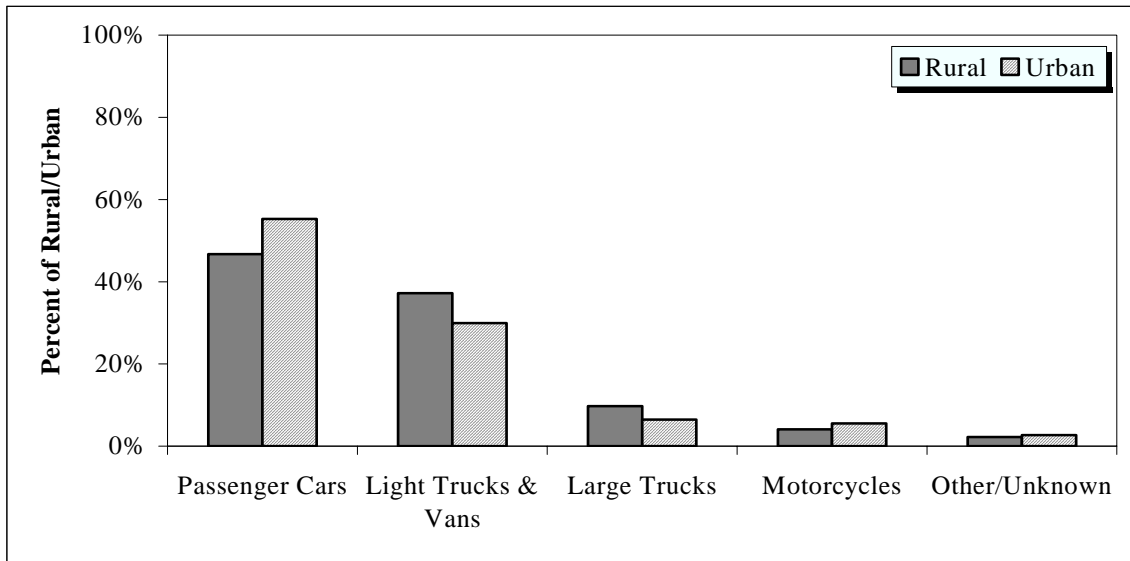
4.7 Vehicle Type

There are noticeable differences among the types of vehicles involved in fatal crashes between rural and urban areas. Both light trucks and large trucks were proportionately involved in more fatal crashes in rural areas, 37 percent and 10 percent respectively, than in urban areas, 30 percent and 6 percent respectively. Cars and motorcycles were proportionately involved in fewer rural fatal crashes, 47 percent and 4 percent respectively, than urban fatal crashes, 55 percent and 6 percent; see Table 19 and Figure33.

Table 19 Vehicle Type								
Vehicle Type	Rural				Urban			
	Count	Lowest Yearly Percent	Mean Percent	Highest Yearly Percent	Count	Lowest Yearly Percent	Mean Percent	Highest Yearly Percent
Passenger Car	152,880	41.56 2003	46.69	51.19 1994	133,585	49.06 2003	55.30	60.18 1994
Light Trucks & Vans	121,962	33.13 1994	37.25	40.75 2003	72,370	25.50 1994	29.96	33.78 2003
Large Trucks	31,754	8.99 1995	9.70	10.12 2000	15,670	5.88 2003	6.48	6.88 1998
Motorcycles	13,476	3.19 1996	4.11	5.70 2003	13,497	4.55 1997	5.59	7.36 2003
Other/Unknown	7,373	1.98 1995	2.25	2.59 2003	6,447	2.30 1998	2.67	3.93 2003
Total	327,445		100%		241,569		100%	

Source: NCSA, NHTSA, FARS 1994-2003

Figure 33
Vehicle Type



Source: NCSA, NHTSA, FARS 1994-2003

4.8 Vehicle Damage

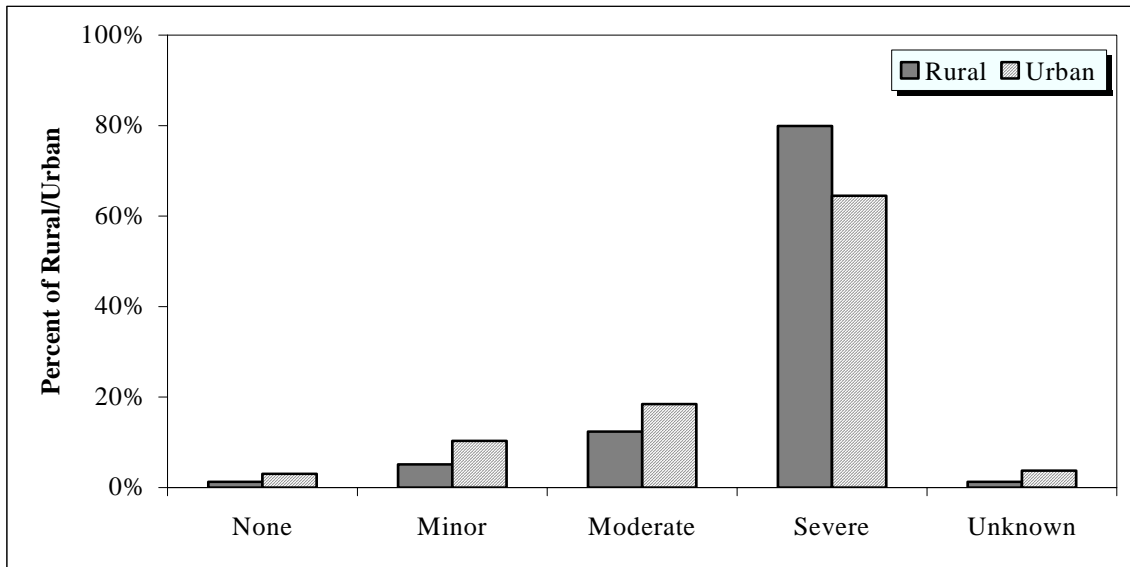
The damage to vehicles involved in fatal crashes is partitioned into five categories: none, minor, moderate, severe, and unknown. Vehicle damage is generally determined by the investigating police officer. It is not surprising that most of the vehicles involved in fatal crashes have severe vehicle damage. A larger portion of vehicles involved in rural fatal crashes was considered severely damaged, 80 percent as compared to severely damaged vehicles in urban fatal crashes, 64 percent. Vehicles involved in rural fatal crashes were classified with damage at levels of none, minor, or moderate of 1 percent, 5 percent, and 12 percent, compared to vehicles involved in urban fatal crashes classified with damage at the same levels at 3 percent, 10 percent, and 18 percent, respectively. These data suggest that rural fatal crashes were more serious, as characterized by vehicle damage, than urban fatal crashes; see Table 20 and Figure 34.

Table 20
Vehicle Damage

Vehicle Damage	Rural				Urban			
	Count	Lowest Yearly Percent	Mean Percent	Highest Yearly Percent	Count	Lowest Yearly Percent	Mean Percent	Highest Yearly Percent
None	4,231	1.16 1998	1.29	1.43 1994	7,263	2.67 2002	3.00	3.44 1994
Minor	16,826	4.77 1999	5.14	5.49 1996	24,974	9.87 2003	10.34	11.89 1994
Moderate	40,405	10.96 2002	12.34	13.34 1997	44,586	17.08 2003	18.46	19.29 1994
Severe	261,756	78.53 1996	79.94	81.69 2002	155,759	62.40 1994	64.48	66.26 2002
Unknown	4,227	1.16 2001	1.29	1.38 1994	8,987	3.29 2001	3.72	4.61 2003
Total	327,445		100%		241,569		100%	

Source: NCSA, NHTSA, FARS 1994-2003

Figure 34
Vehicle Damage

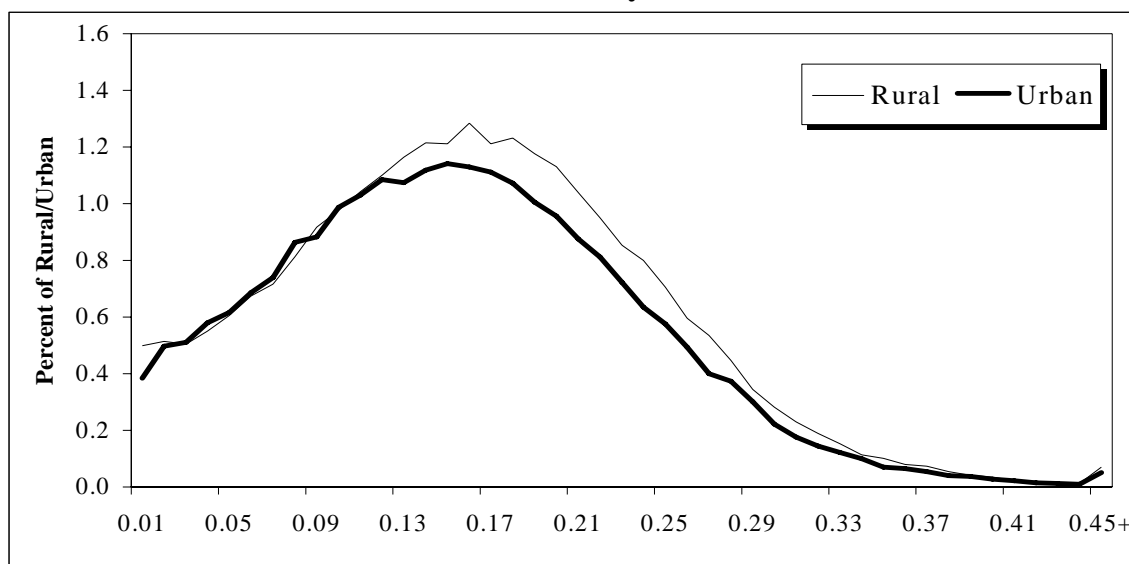


Source: NCSA, NHTSA, FARS 1994-2003

4.9 Alcohol-Involved Drivers

The blood alcohol concentration (BAC) of drivers involved in fatal crashes appears in Figure 35. The distribution was similar for both rural and urban drivers for BAC levels below .11, For virtually all levels of BAC above 0.11, the percent of rural drivers with a given BAC exceeded the percent of urban drivers with that same BAC level.

Figure 35
Distribution of Blood Alcohol Concentration of Drivers Involved
In Fatal Crashes by Location



Source: NCSA, NHTSA, FARS 1994-2003

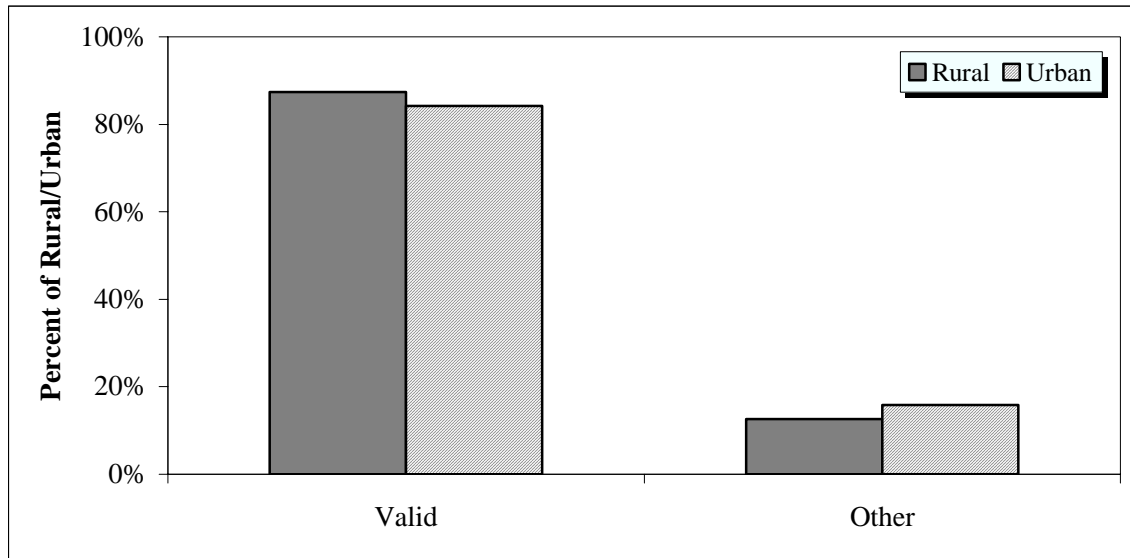
4.10 License Status

There is a slight difference in the portion of drivers who have a valid drivers license involved in fatal crashes in rural areas compared to those involved in fatal crashes in urban areas. Drivers in rural areas involved in fatal crashes from 1994 to 2003 had valid licenses 87 percent of the time. Drivers involved in fatal crashes in urban areas had valid licenses 84 percent of the time; see Table 21 and Figure 36.

License Status for Drivers Involved	Rural				Urban			
	Count	Lowest Yearly Percent	Mean Percent	Highest Yearly Percent	Count	Lowest Yearly Percent	Mean Percent	Highest Yearly Percent
Valid	286,151	86.58 1995	87.39	87.99 1997	203,309	82.83 2003	84.16	85.03 1998
Other	41,294	12.01 1997	12.61	13.42 1995	38,260	14.97 1998	15.84	17.17 2003
Total	327,445		100%		241,569		100%	

Source: NCSA, NHTSA, FARS 1994-2003

**Figure 36
License Status**



Source: NCSA, NHTSA, FARS 1994-2003

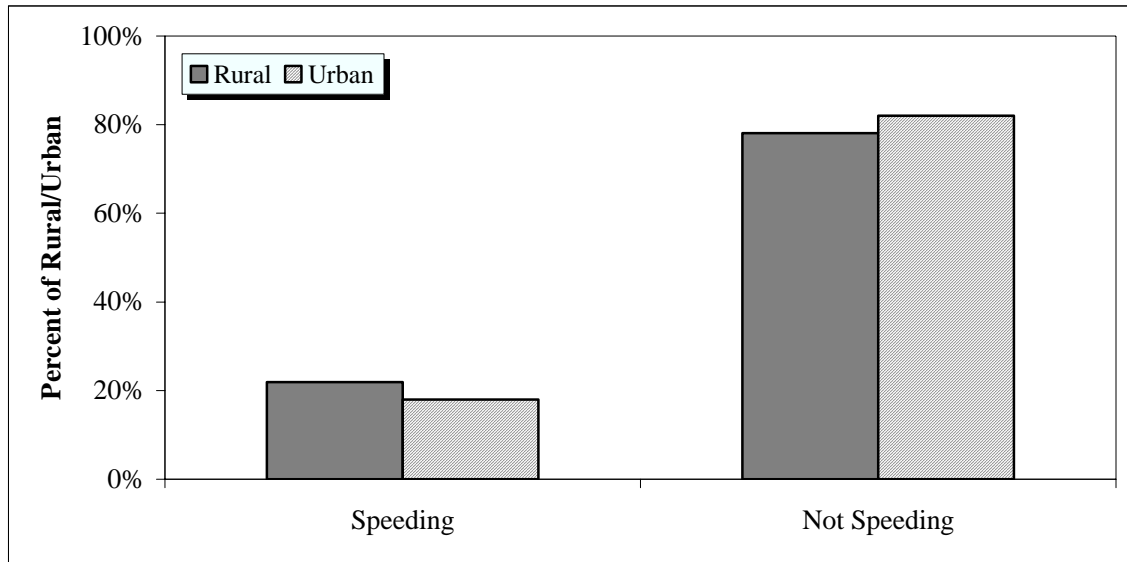
4.11 Vehicle Speeding

Fatal crash information on speeding is captured using the driver-related factors and violations charged. From 1994 to 2003, 22 percent of the vehicles involved in rural fatal crashes were identified as speeding. In this same time frame, 18 percent of the vehicles involved in urban fatal crashes were identified as speeding; see Table 22 and Figure 37.

Speeding	Rural				Urban			
	Count	Lowest Yearly Percent	Mean Percent	Highest Yearly Percent	Count	Lowest Yearly Percent	Mean Percent	Highest Yearly Percent
Speeding	71,786	20.73 2000	21.92	23.28 1995	43,520	17.16 1998	18.02	19.18 2002
No Speeding	255,659	76.72 1995	78.08	79.27 2000	198,049	80.82 2002	81.98	82.84 1998
Total	327,445		100%		241,569		100%	

Source: NCSA, NHTSA, FARS 1994-2003

**Figure 37
Vehicle Speeding**



Source: NCSA, NHTSA, FARS 1994-2003

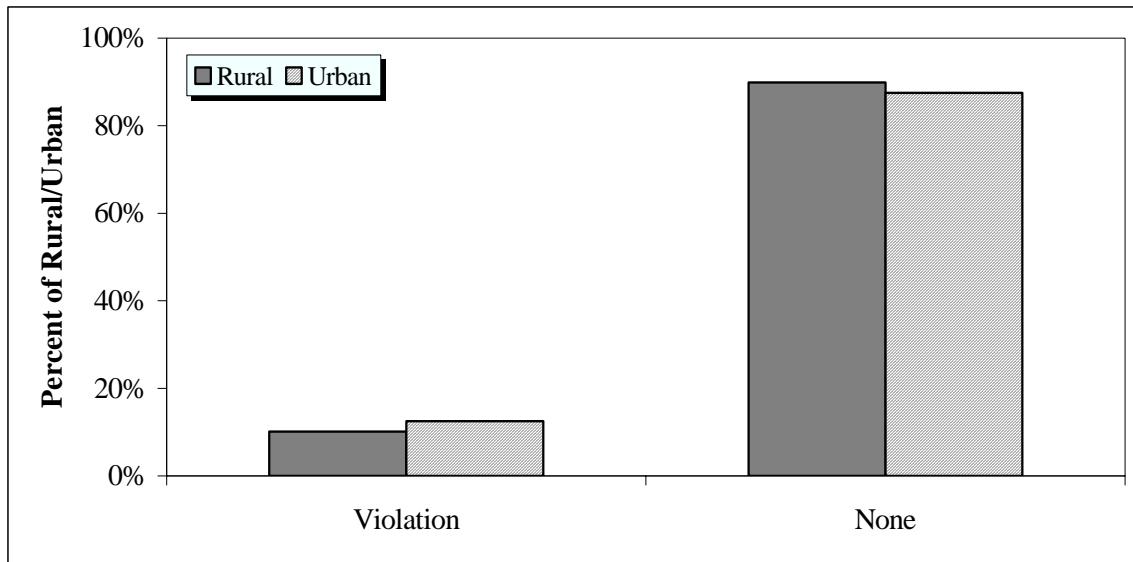
4.12 Driver Violation Charged

Violations that may be charged in conjunction with the fatal crash include, but are not limited to, alcohol, drugs, speeding, reckless driving, or driving without a valid drivers license. From 1994 to 2003, almost 10 percent of drivers in rural fatal crashes were charged with one or more violations, while for drivers involved in urban fatal crashes, the rate was approximately 13 percent; see Table 23 and Figure 38.

Violations Charged	Rural				Urban			
	Count	Lowest Yearly Percent	Mean Percent	Highest Yearly Percent	Count	Lowest Yearly Percent	Mean Percent	Highest Yearly Percent
Violation	33,191	8.80 2001	10.14	11.92 1994	30,211	11.06 2003	12.51	14.25 1994
None	294,254	88.08 1994	89.86	91.20 2001	211,358	85.75 1994	87.19	88.94 2003
Total	327,445		100%		241,569		100%	

Source: NCSA, NHTSA, FARS 1994-2003

**Figure 38
Driver Violation Charged**



Source: NCSA, NHTSA, FARS 1994-2003

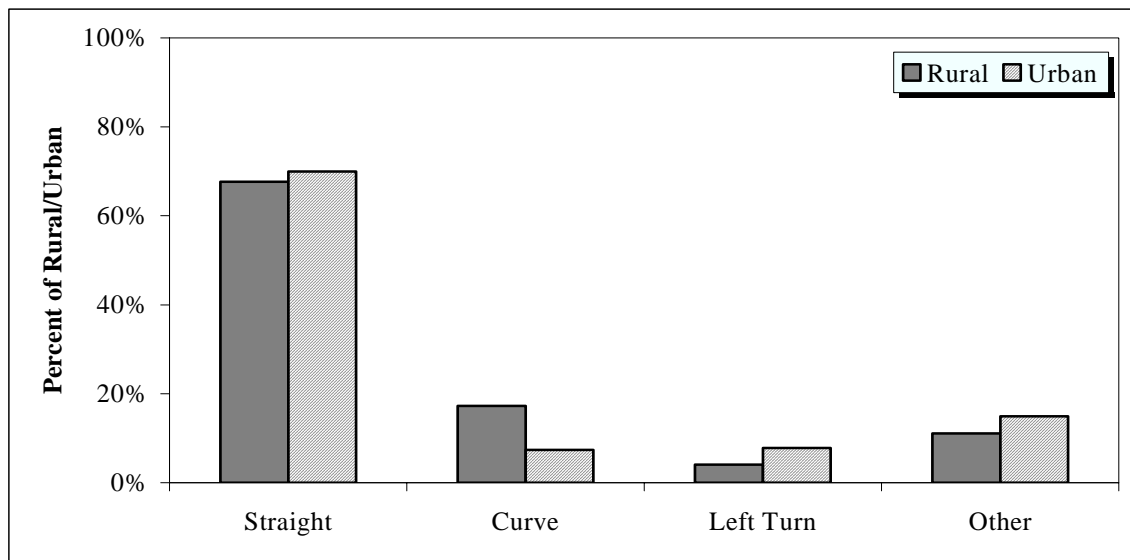
4.13 Vehicle Maneuver

The “Vehicle maneuver” refers to the action of the driver just prior to entering a crash situation. There are noticeable differences in reported vehicle maneuvers for rural versus urban fatal crashes. These differences were found for the maneuvers: going straight, negotiating a curve, and making a left turn. The largest difference was found for the maneuver “negotiating a curve.” Vehicles involved in rural fatal crashes were negotiating a curve 17 percent of the time just prior to entering a crash situation, while vehicles involved in urban fatal crashes were negotiating a curve about 7 percent of the time. These data are presented in Table 26 and Figure 40.

Vehicle Maneuver	Rural				Urban			
	Count	Lowest Yearly Percent	Mean Percent	Highest Yearly Percent	Count	Lowest Yearly Percent	Mean Percent	Highest Yearly Percent
Straight	221,616	66.77 1998	67.68	68.04 2003	168,959	68.97 2003	69.94	71.67 1995
Curve	56,489	16.21 2003	17.25	18.36 1994	17,833	6.65 2003	7.38	7.64 1998
Left Turn	13,207	3.86 1995	4.03	4.21 1998	18,775	7.32 1995	7.77	7.99 2000
Other	36,133	10.15 1994	11.04	11.67 1998	36,002	13.42 1995	14.91	16.51 2003
Total	327,445		100%		241,569		100%	

Source: NCSA, NHTSA, FA445RS 1994-2003

**Figure 39
Vehicle Maneuver**



Source: NCSA, NHTSA, FARS 1994-2003

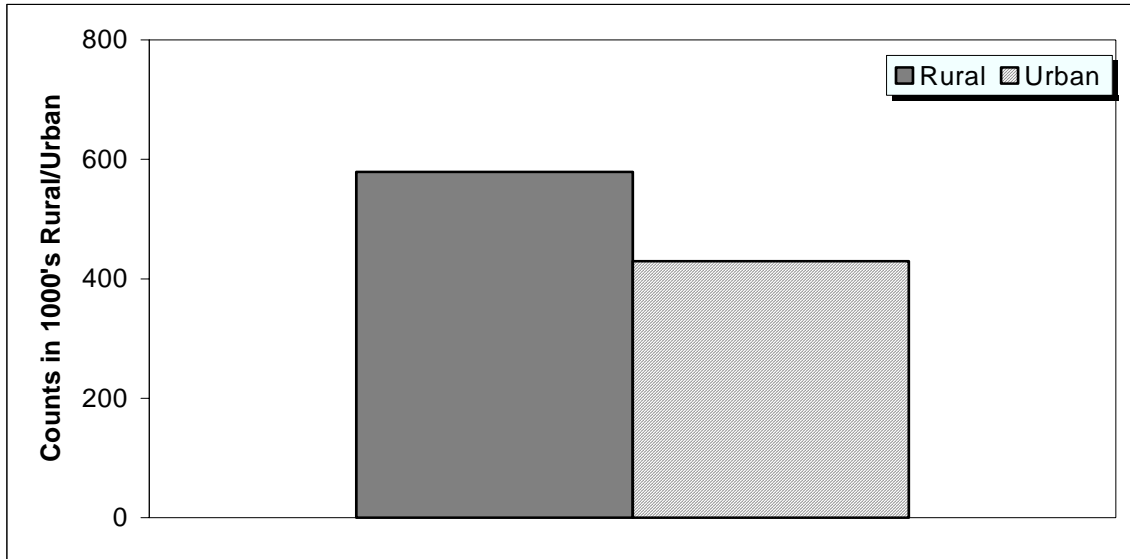
**FATAL
CRASH
ANALYSIS
-
PERSON
LEVEL**

5.0 FATAL CRASH ANALYSIS - PERSON LEVEL

5.1 Persons Involved in Fatal Crashes

From 1994 to 2003 there were 578,755 persons involved in rural fatal crashes and 429,546 persons in urban fatal crashes; see Figure 40. Persons involved in fatal crashes include but are not limited to occupants of vehicles involved in fatal crashes and injured pedestrians or cyclists. There were approximately 35 percent more persons involved in rural fatal crashes than urban fatal crashes. To examine the effects of variables involved in rural and urban fatal crashes, the portion or percentage that have a particular characteristic are compared.

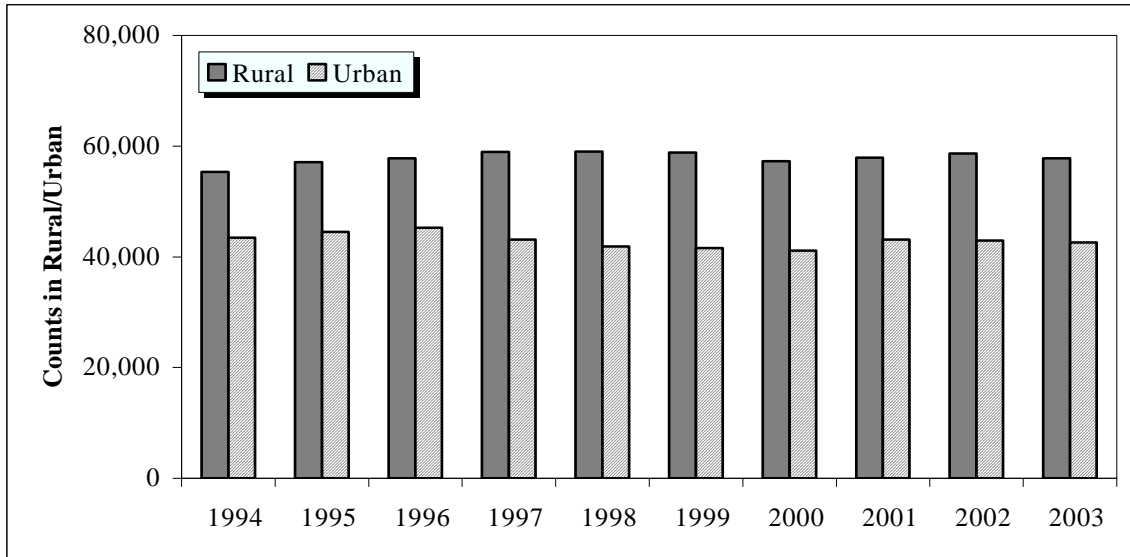
Figure 40
Persons involved in Fatal Crashes



Source: NCSA, NHTSA, FARS 1994-2003

Displaying the yearly data on persons involved in fatal crashes provides a reference for longitudinal considerations. The lowest number of persons involved in rural fatal crashes from 1994 to 2003, 55,364, occurred in 1994; the highest, 58,641, persons occurred in 2002. The average number of persons involved in rural crashes from 1994 to 2003 was 57,876 persons per year. The lowest number of persons involved in urban fatal crashes from 1994 to 2003, 41,567, occurred in 1999; the highest, 45,221, occurred in 1996. The average number of persons involved in urban fatal crashes from 1994 to 2003 was 42,955 individuals per year.

Figure 41
Persons involved in Fatal Crashes by Year

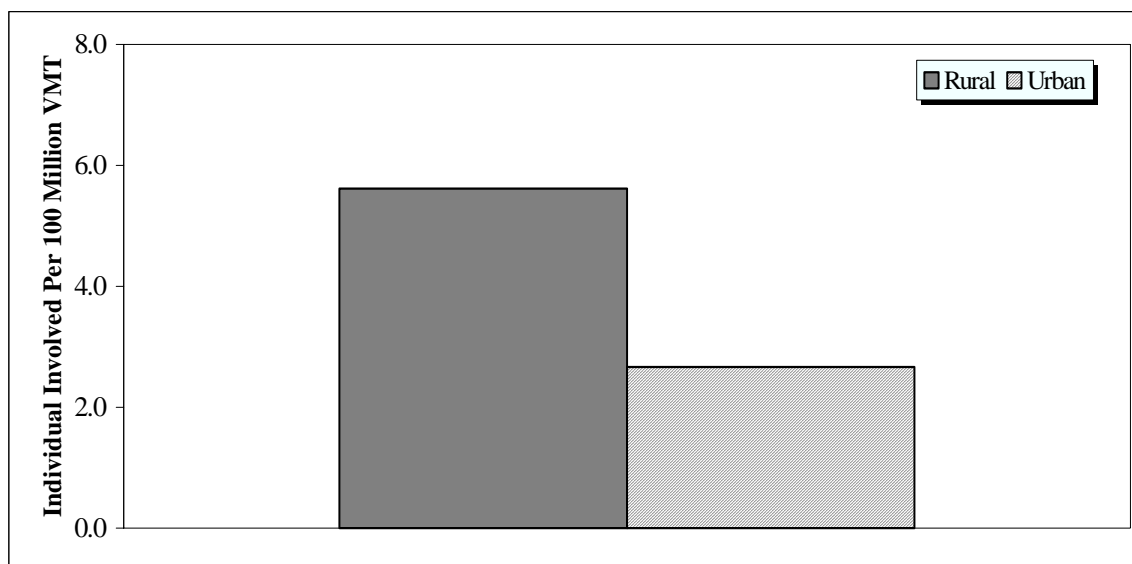


Source: NCSA, NHTSA, FARS 1994-2003

5.2 Person Involvement Rate

The person involvement rate is the number of people involved in rural versus urban fatal crashes divided by the rural/urban vehicle miles traveled for the given time period. The person involvement rate for rural fatal crashes from 1994 to 2003 was 5.6 persons per 100 million VMT. Over the same time period, the corresponding rate for urban fatal crashes was 2.7 individuals per 100 million VMT; see Figure 42.

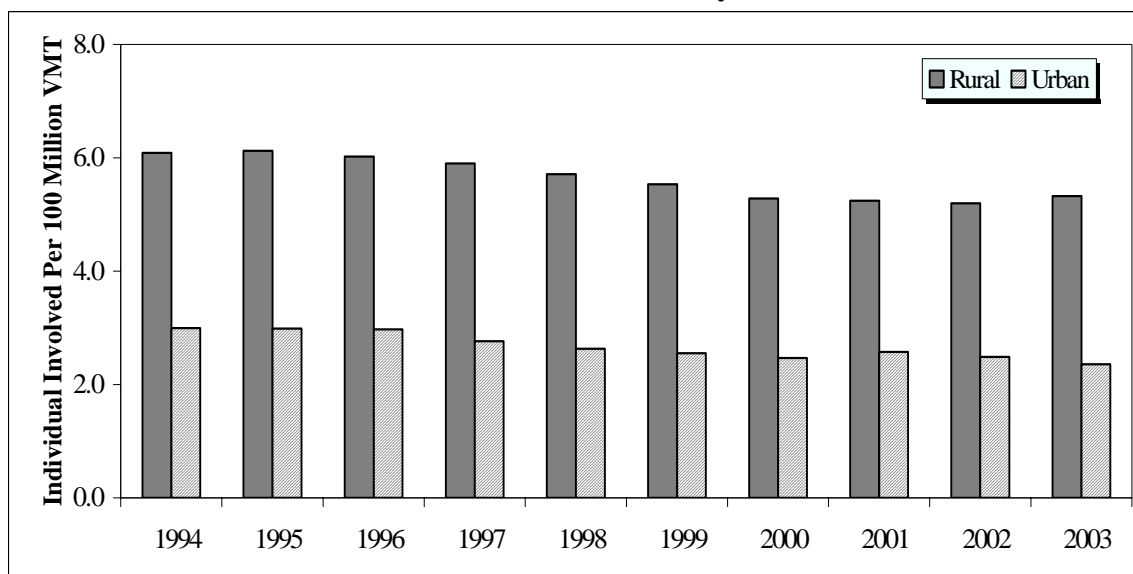
Figure 42
Person Involvement Rate



Source: NCSA, NHTSA, FARS 1994-2003, FHWA, VMT data 1994-2003

The person involvement rate, per 100 million miles driven, has generally declined over the time period of the study, 1994 to 2003, for both rural and urban areas; see Figure 43. For rural fatal crashes from 1994 to 2003, the lowest person involvement rate of 5.2 per 100 million miles driven, occurred in 2002, the highest, 6.1, occurred in 1995. For urban fatal crashes, the lowest individual involvement rate, 2.4 per 100 million miles driven, occurred in 2003, the highest, 3.0, occurred in 1994.

Figure 43
Person Involvement Rate by Year

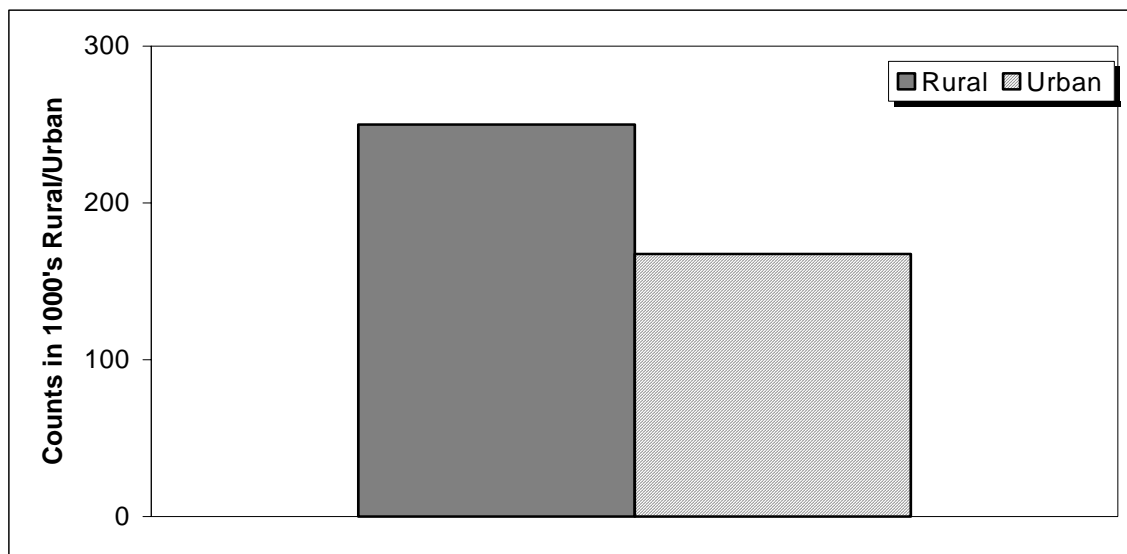


Source: NCSA, NHTSA, FARS 1994-2003, FHWA, VMT data 1994-2003

5.3 Deaths in Fatal Crashes

From 1994 to 2003 there were 249,986 deaths in rural fatal crashes and 167,491 deaths in urban fatal crashes; see Figure 44. There were approximately 49 percent more deaths in rural fatal crashes than urban fatal crashes.

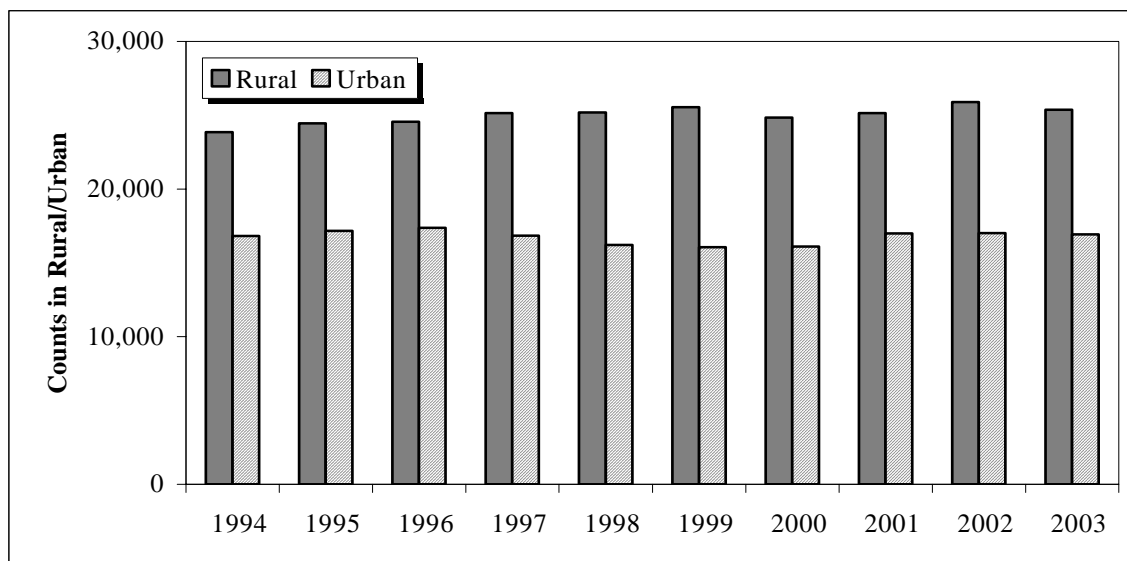
Figure 44
Deaths in Fatal Crashes



Source: NCSA, NHTSA, FARS 1994-2003

Displaying the yearly data on deaths in fatal crashes provides a reference for longitudinal considerations. The lowest number of deaths attributed to rural fatal crashes from 1994 to 2003, 23,841, occurred in 1994; the highest, 25,896, occurred in 2002. The average number of deaths attributed to rural fatal crashes from 1994 to 2003 was 24,999 deaths per year. The lowest number of deaths attributed to urban fatal crashes from 1994 to 2003, 16,058, occurred in 1999; the highest, 17,368, occurred in 1996. The average number of deaths attributed to urban fatal crashes from 1994 to 2003 was 16,749 deaths per year. See Figure 45.

Figure 45
Deaths in Fatal Crashes by Year

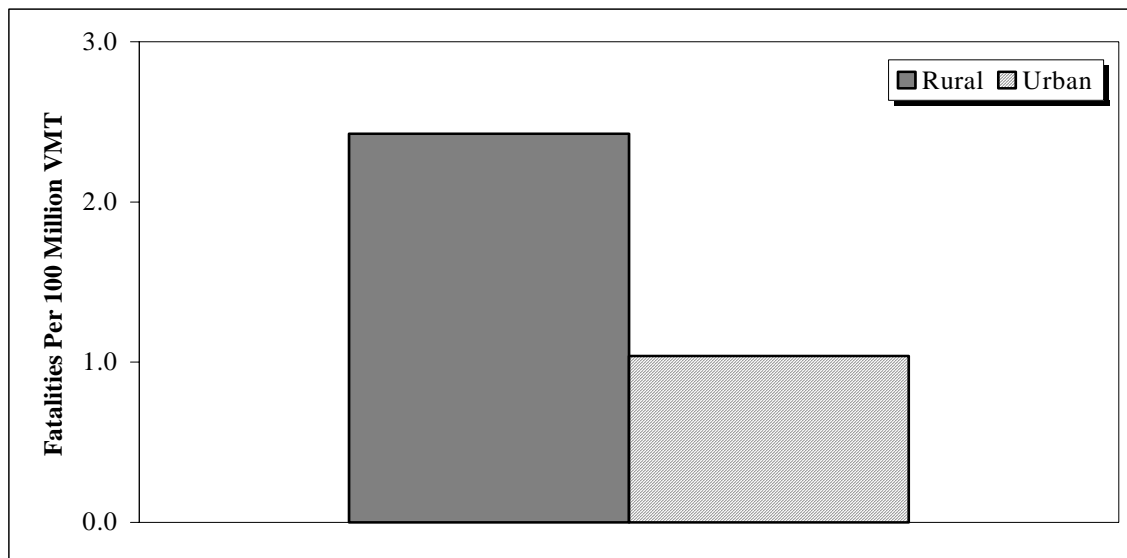


Source: NCSA, NHTSA, FARS 1994-2003

5.4 Fatality Rate

The fatality rate is the number of fatalities due to rural/urban fatal crashes divided by the rural/urban VMT for the given time period. From 1994 to 2003 the rural fatality rate was 2.4 fatalities per 100 million VMT. The corresponding urban fatality rate was 1.0 fatalities per 100 million VMT; see Figure 46.

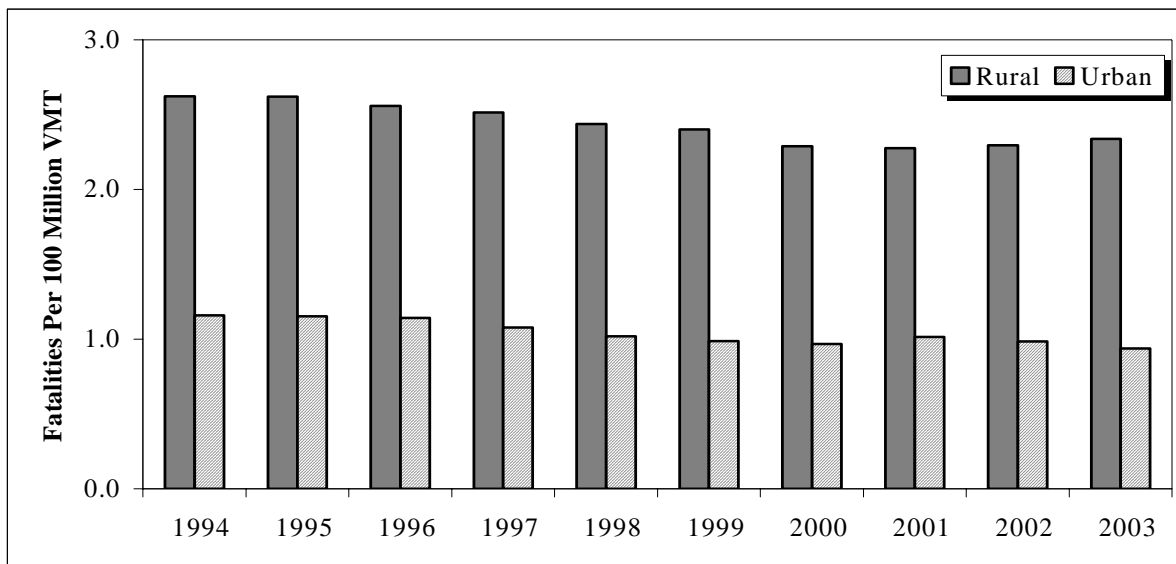
Figure 46
Fatality Rate



Source: NCSA, NHTSA, FARS 1994-2003, FHWA, VMT data 1994-2003

From 1994 to 2003 the Fatality rate generally declined for both rural and urban areas. The lowest fatality rate per 100 million miles vehicle driven in rural fatal crashes from 1994 to 2003, 2.3, occurred in 2001; the highest, 2.6, occurred in 1994. The lowest fatality rate per 100 million vehicle miles driven in urban fatal crashes from 1994 to 2003, 1.0, occurred in 2000; the highest, 1.2, occurred in 1994.

Figure 47
Fatality Rate by Year



Source: NCSA, NHTSA, FARS 1994-2003, FHWA, VMT data 1994-2003

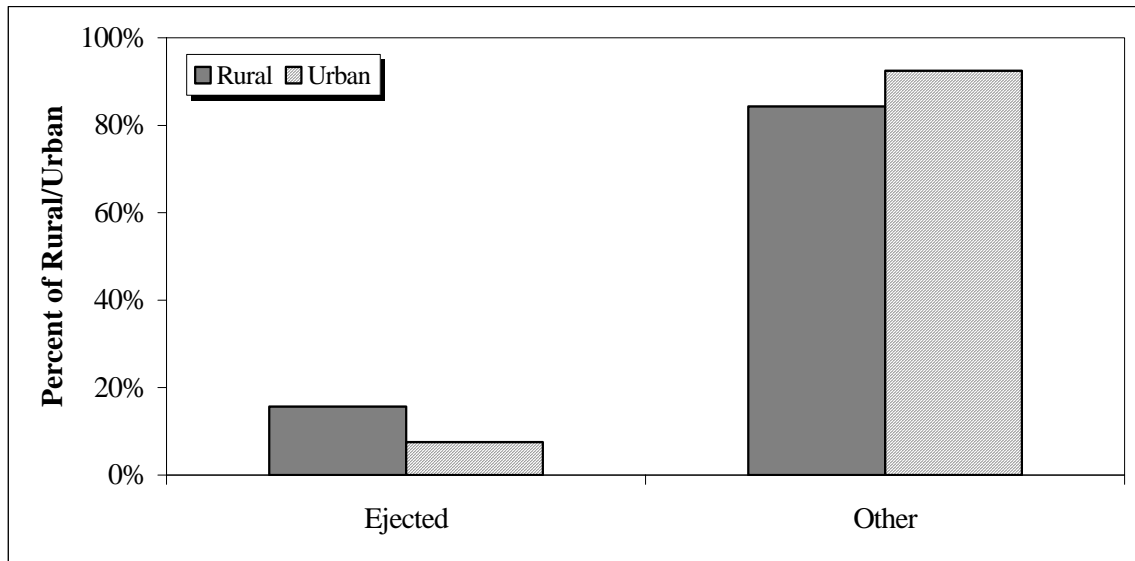
5.5 Ejection

Ejection is more prevalent in rural areas than in urban areas. Individuals involved in rural fatal crashes from 1994 to 2003 were ejected approximately 17 percent of the time. Individuals involved in urban fatal crashes from 1994 to 2003 were ejected approximately 8 percent of the time, i.e., the ejection rate for rural crashes is more than twice the ejection rate for urban crashes; see Table 25 and Figure 48. Five percent of the ejected individuals were belted in both rural and urban area.

Table 25 Ejection								
Ejection	Rural				Urban			
	Count	Lowest Yearly Percent	Mean Percent	Highest Yearly Percent	Count	Lowest Yearly Percent	Mean Percent	Highest Yearly Percent
Ejected	90,704	14.97 2003	16.67	16.07 1995	32,399	7.11 2003	7.54	7.96 2001
Other	488,051	83.93 1995	84.33	85.03 2003	397,147	92.04 2001	92.56	92.89
Total	578,755		100%		429,546		100%	2003

Source: NCSA, NHTSA, FARS 1994-2003

Figure 48
Ejection



Source: NCSA, NHTSA, FARS 1994-2003

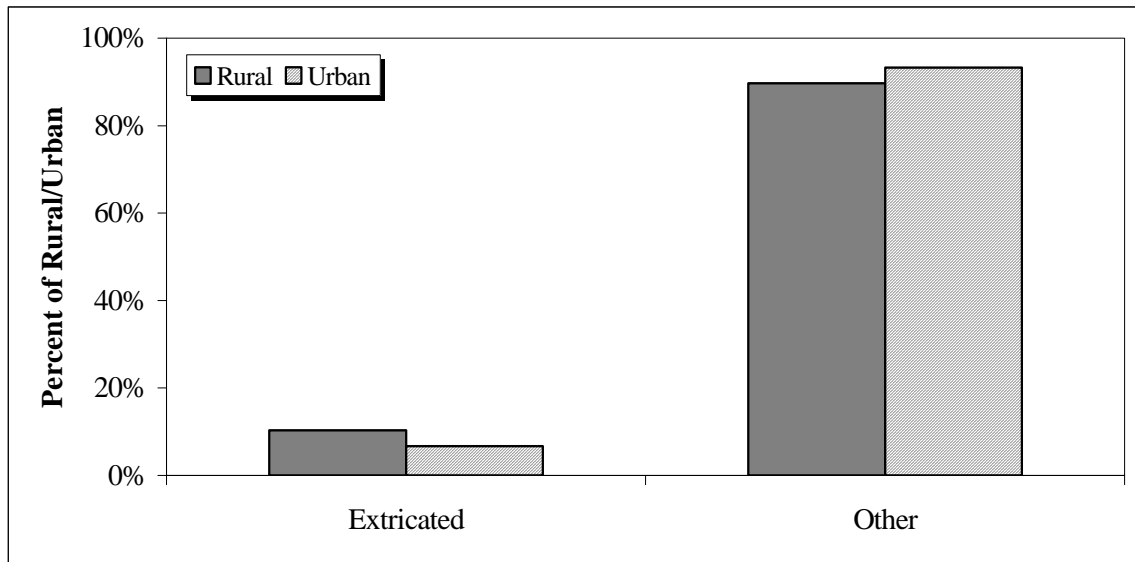
5.6 Extrication

Individuals in fatal crashes are recorded as extricated if equipment was used to remove them from the vehicle, i.e., mechanical means are used to remove the people. From 1994 to 2003, 10 percent of the individuals involved in rural fatal crashes were extricated. During this same time period approximately 7 percent of the individuals involved in urban fatal crashes were extricated; see Table 26 and Figure 49.

Table 26 Extricated								
Extrication	Rural				Urban			
	Count	Lowest Yearly Percent	Mean Percent	Highest Yearly Percent	Count	Lowest Yearly Percent	Mean Percent	Highest Yearly Percent
Extricated	59,631	7.88 1995	10.30	12.33 2002	28,806	5.39 1995	6.71	8.25 2003
Other	519,124	87.67 2002	89.70	92.12 1995	400,740	91.75 2003	93.29	94.61 1995
Total	578,755		100%		429,546		100%	

Source: NCSA, NHTSA, FARS 1994-2003

Figure 49
Extricated



Source: NCSA, NHTSA, FARS 1994-2003

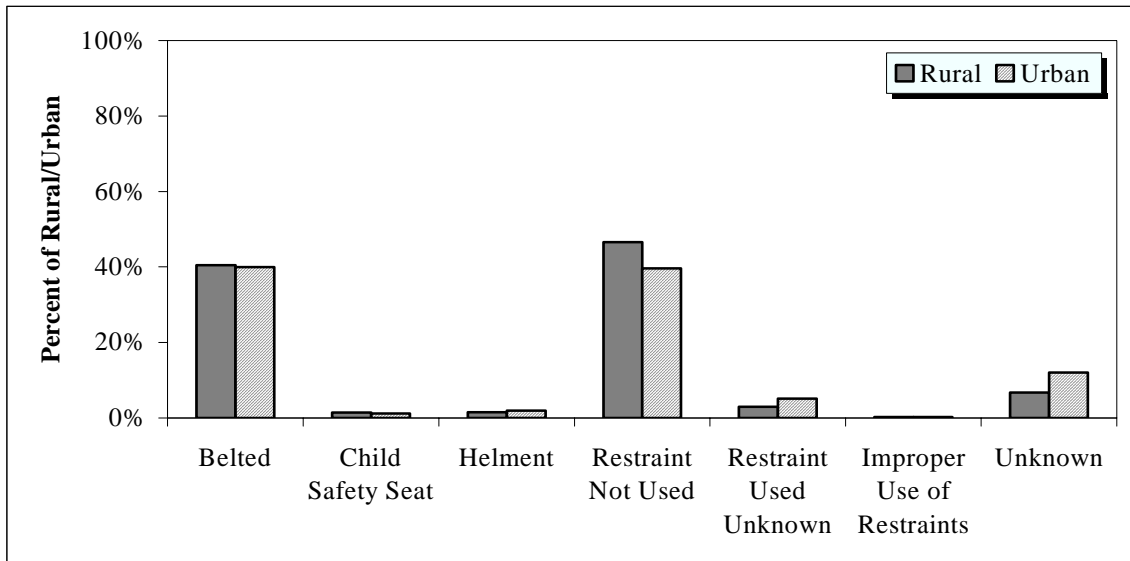
5.7 Restraint Use

Reported proper restraint use appears to be similar for all people involved in rural and urban fatal crashes. For the purposes of this study, restraint use was partitioned into seven levels: belted, child safety seat, helmet, restraint not used, restraint use unknown, improper use of restraints, and unknown. The average reported proper restraint use for fatal crashes for the period 1994 to 2003 is about 43 percent. Just under 47 percent of rural people involved in fatal crashes were not restrained, compared to about 40 percent in urban areas; see Table 27 and Figure 50.

Restraint Use	Rural				Urban			
	Count	Lowest Yearly Percent	Mean Percent	Highest Yearly Percent	Count	Lowest Yearly Percent	Mean Percent	Highest Yearly Percent
Belted	234,306	33.71 1994	40.48	46.88 2003	171,550	32.61 1994	39.94	45.59 2003
Child Safety Seat	8,438	1.16 1995	1.46	1.87 2003	5,166	0.93 1994	1.20	1.58 2003
Helmet	8,829	1.17 1996	1.53	2.16 2003	8,265	1.58 1998	1.92	2.49 2003
Restraint Not Used	269,497	40.82 2003	46.56	51.55 1994	170,198	35.26 2003	39.62	43.83 1994
Restraint Use Unknown	17,161	1.61 2003	2.96	5.32 1994	21,877	2.68 2003	5.09	8.01 1994
Improper Use of Restraints	1,428	0.19 1995	0.25	0.29 2003	968	0.14 1994	0.23	0.29 2001
Unknown	39,096	6.35 2002	6.76	7.21 1996	51,522	10.92 2002	12.00	12.66 1994
Total	578,755		100%		429,546		100%	

Source: NCSA, NHTSA, FARS 1994-2003

Figure 50
Restraint Use



Source: NCSA, NHTSA, FARS 1994-2003

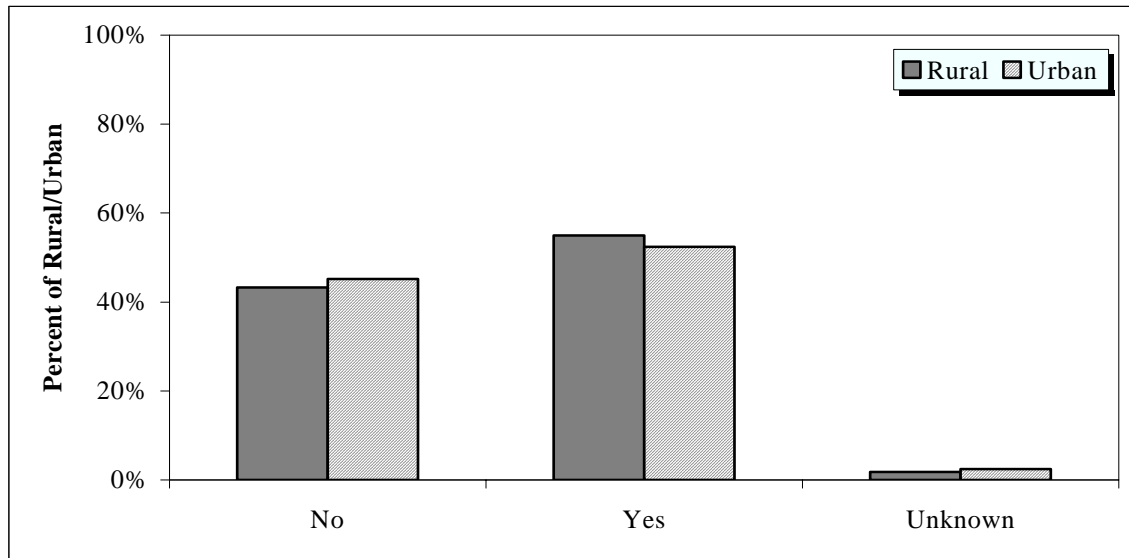
5.8 Hospital (Taken to)

A slightly larger portion of individuals involved in fatal crashes was taken to hospitals in rural areas, 55 percent, compared to urban areas, 52 percent. Almost twice the portion, 4 percent, of individuals involved in rural fatal crashes died at the scene compared to 2 percent who died at the scene in urban fatal crashes in 1999-2000; see Table 28 and Figure 51.

Hospital (Taken to)	Rural				Urban			
	Count	Lowest Yearly Percent	Mean Percent	Highest Yearly Percent	Count	Lowest Yearly Percent	Mean Percent	Highest Yearly Percent
No*	250,499	40.82 1994	43.28	46.98 2003	194,016	43.24 1995	45.17	48.56 2006
Yes*	318,051	51.65 2003	54.96	56.94 1995	225,148	49.38 2003	52.41	54.50 1997
Unknown	10,205	1.36 2003	1.76	2.75 1994	10,382	1.72 2001	2.42	3.85 1994
Total	578,755		100%		429,546		100%	

Source: NCSA, NHTSA, FARS 1994-2003
* No for 1999-2000 include Died at the Scene and Yes for 1999-2000 include Died En Route

**Figure 51
Hospital (Taken to)**



Source: NCSA, NHTSA, FARS 1994-2003
*1999-2000 only

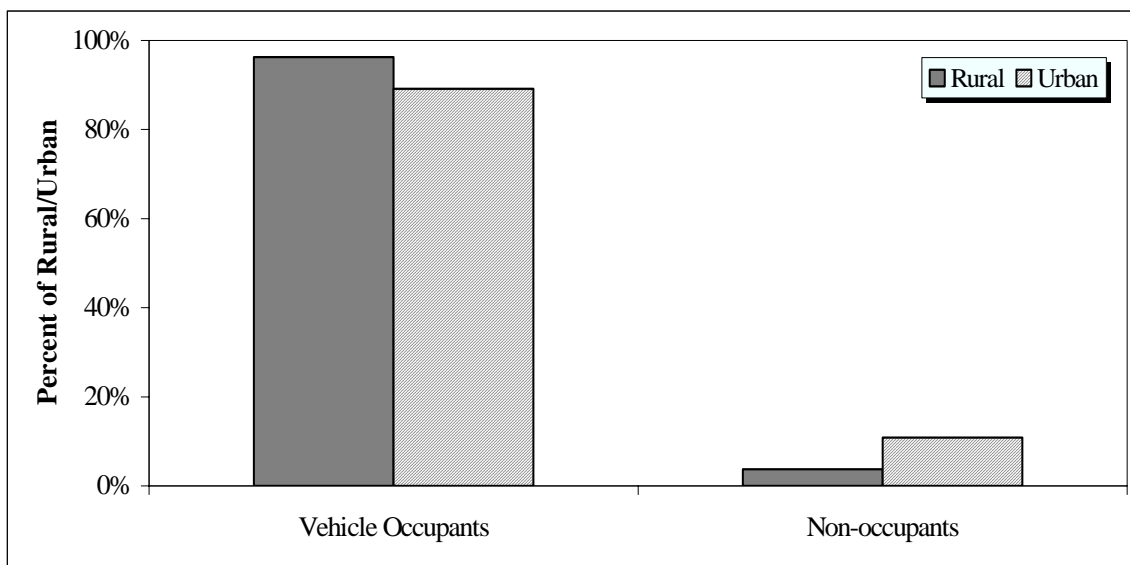
5.9 Individual Location and Person Type

From 1994 to 2003, less than 4 percent of the individuals involved in rural fatal crashes were non-occupants. During this same period, almost 11 percent of the individuals involved in urban fatal crashes were non-occupants. More than 40 percent of the individuals involved in rural fatal crashes were passengers. During this same period, over 33 percent of the individuals involved in urban fatal crashes were passengers. Almost 3 percent of the individuals involved in rural fatal crashes were pedestrians. The corresponding result for pedestrians in urban fatal crashes is slightly over 9 percent; see Table 29 and Figure 52 - 53.

Location	Rural				Urban			
	Count	Lowest Yearly Percent	Mean Percent	Highest Yearly Percent	Count	Lowest Yearly Percent	Mean Percent	Highest Yearly Percent
Vehicle Occupants								
Drivers	325,809	55.04 1995	56.29	57.86 2003	239,839	54.90 1995	55.84	56.92 2003
Passengers	231,560	40.85 1995	40.01	38.92 2003	143,160	34.21 1996	33.33	32.63 2003
Subtotal	557,369		96.30		382,999		89.17	
Non-occupants								
Pedestrian	16,582	2.56 2003	2.87	3.19 1995	39,148	8.69 2001	9.11	9.82 1994
Cyclist	2,743	0.36 2003	0.47	0.59 1994	4,988	1.03 2003	1.16	1.27 1995
Other	2,061	0.26 2002	0.36	0.345 1997	2,411	0.40 2001	0.56	0.81 1999
Subtotal	21,386		3.70		46,547		10.83	
Total	578,755		100%		429,546			

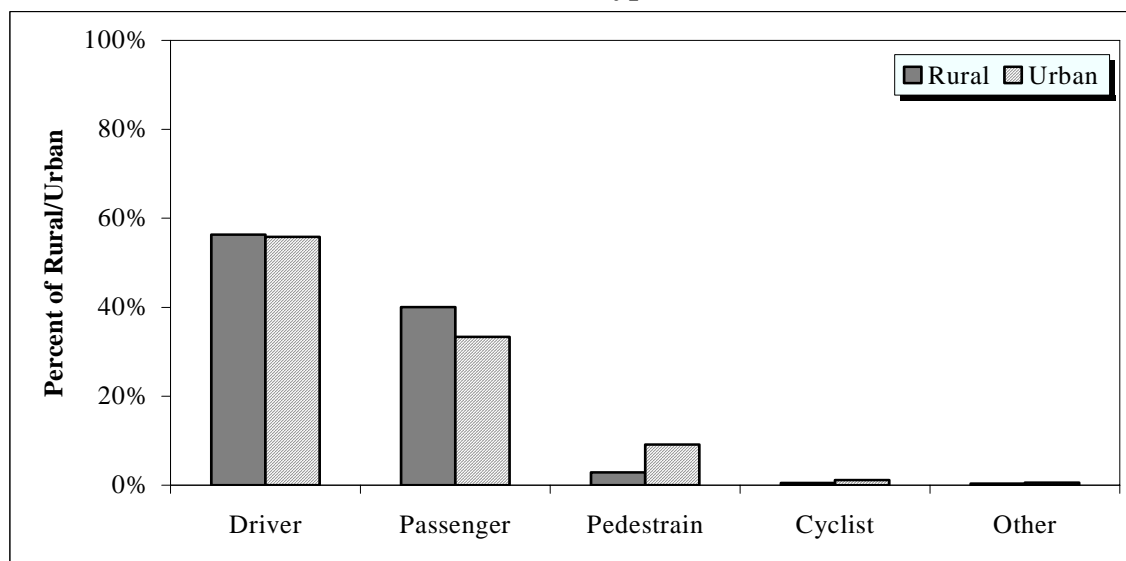
Source: NCSA, NHTSA, FARS 1994-2003

Figure 52
Individual Location



Source: NCSA, NHTSA, FARS 1994-2003

Figure 53
Person Type



Source: NCSA, NHTSA, FARS 1994-2003

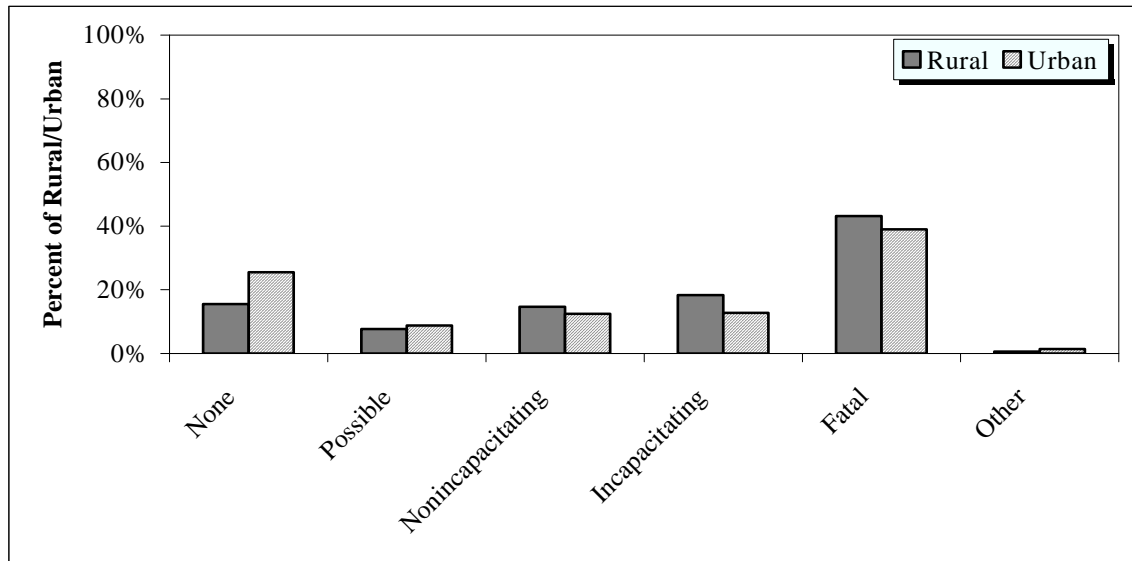
5.10 Injury Severity

To be included in the national census of fatal crashes, a crash must result in the death of at least one vehicle occupant or non-motorist within 30 days of the crash. As a result, data is captured for other vehicle occupants or non-motorists who were not fatally injured. From 1994 to 2003, less than half of all individuals involved in fatal crashes were fatally injured. More than 15 percent of the individuals involved in rural fatal crashes were not injured, compared to 25 percent of the individuals involved in urban fatal crashes. In general the injury severity level rate was higher in rural areas than in urban areas. In particular for non-incapacitating injuries, incapacitating injuries, and fatal injuries the rate was always higher for rural crashes than for urban crashes; see Table 30 and Figure 54.

Injury Severity	Rural				Urban			
	Count	Lowest Yearly Percent	Mean Percent	Highest Yearly Percent	Count	Lowest Yearly Percent	Mean Percent	Highest Yearly Percent
None	90,174	15.09 1995	15.58	16.01 2003	109,765	25.06 1997	25.55	26.21 2003
Possible	44,239	7.09 1995	7.65	8.44 2003	37,699	8.48 1994	8.78	9.09 2003
Non-incapacitating	84,738	13.97 1994	14.64	15.15 1999	53,559	12.22 1994	12.47	12.76 1999
Incapacitating	106,142	16.05 2003	18.34	20.02 1994	54,884	10.82 2003	12.78	13.93 1995
Fatal	249,986	42.47 1996	43.19	43.91 2003	167,491	38.41 1996	38.99	39.74 2003
Other	3,476	0.52 2002	0.60	0.67 1995	6,148	1.27 1997	1.43	1.66 2001
Total	578,755		100%		429,546		100%	

Source: NCSA, NHTSA, FARS 1994-2003

Figure 54
Injury Severity

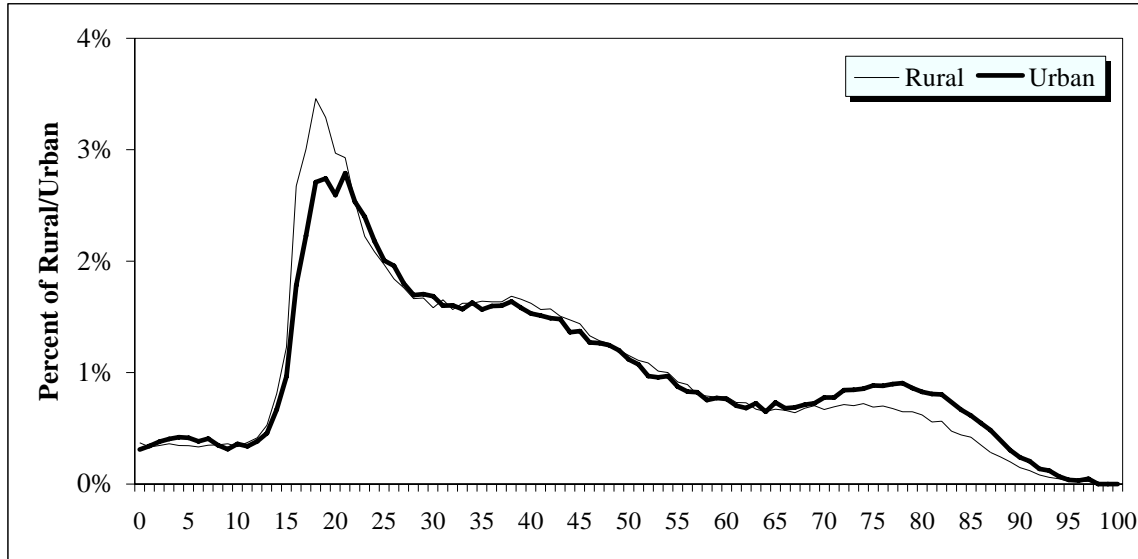


Source: NCSA, NHTSA, FARS 1994-2003

5.11 Age of Fatally Injured Persons and Survivors

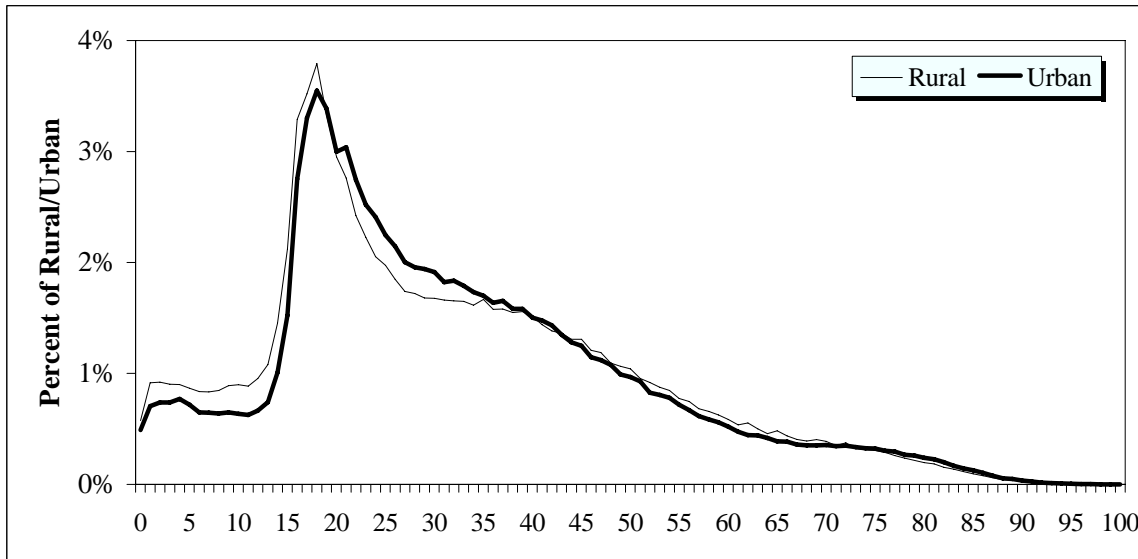
For both rural and urban fatal crashes, the distribution of the age of fatally injured persons including non-occupants appears to be similar. For fatalities in rural fatal crashes, the high of 3.46 percent occurs at age 18; for fatalities in urban fatal crashes, the high of 2.79 percent occurs at age 21. Figure 55 graphs the percentage of all crash fatalities by age, from 1994 to 2003. The general pattern holds for all years. The age distribution of survivors of a fatal crash is similar; see Figures 55 and 56.

Figure 55
Fatalities by Individual's Age



Source: NCSA, NHTSA, FARS 1994-2003

Figure 56
Survivors by Individual's Age



Source: NCSA, NHTSA, FARS 1994-2003

GLOSSARY

10.0 Glossary

Age: The age of an individual in crash as recorded.

Crash: An event that produces injury and/or property damage, involves a motor vehicle in transport, and occurs on a trafficway or while the vehicle is still in motion after running off the trafficway.

Crash Severity:

1. **Fatal Crash:** A police-reported crash involving a motor vehicle in transport on a trafficway in which at least one person dies within 30 days of the crash.
2. **Injury Crash:** A police-reported crash that involved a motor vehicle in transport on a trafficway in which no one died but at least one person was reported to have: (1) an incapacitating injury; (2) a visible but not incapacitating injury; (3) a possible, not visible injury; or (4) an injury of unknown severity.
3. **Property-Damage-Only Crash:** A police-reported crash involving a motor vehicle in transport on a trafficway in which no one involved in the crash suffered any injuries.

Day of Week: This variable is treated as a dichotomous variable.

1. **Weekday:** From 6 a.m. Monday to 5:59 p.m. Friday.
2. **Weekend:** From 6 p.m. Friday to 5:59 a.m. Monday.

Deaths in Fatal Crashes: The number of deaths that can be attributed to a qualifying crash that occurred within 30 days of the crash.

Death Rate: All qualifying deaths in fatal crashes in FARS for the given time period, divided by the corresponding number of vehicle miles traveled, VMT. This rate is reported as the number of deaths per 100 million vehicle miles traveled.

Drinking Driver: This variable is coded as drinking if there is evidence, within the police accident report, that the driver had been drinking.

Driver Violation Charged: This variable is coded if the driver is charged with a violation. Violations that may be charged include, but are not limited to, DWI, drugs, speeding, reckless driving, or driving without a valid drivers license.

Ejection: Ejection refers to individuals being completely or partially thrown from a compartment of a vehicle during the course of a crash. Ejection is not applicable to persons riding on the exterior of a vehicle, to motorcycle occupants, or to non-motorists. Exterior of vehicles includes running boards, roofs, fenders and bumpers, but not the bed of pickup trucks.

Extrication: Extrication refers to the use of equipment or other force to remove one or more persons from a vehicle, i.e., more than just lifting or carrying an individual out of the wreckage.

Fatal Crash Rate: The number of FARS crashes, for a given time period, divided by the corresponding vehicle miles traveled, VMT. This rate is reported as the number of crashes per 100 million vehicle miles traveled.

Fatalities per Crash: This variable is treated as a dichotomous variable, i.e., two levels. The levels of this variable are a single fatality and multiple fatalities.

Fire Occurrence: If a vehicle involved in the crash were also involved in a fire.

Hit and Run: A dichotomous variable, i.e., two levels, either the crash involved a case of hit and run or it did not.

Individual Location: This variable divides the population as inside a vehicle or not.

1. **Vehicle Occupants:** Any person who is in or upon a motor vehicle in transport. Includes the driver, passengers, and people riding on the exterior of a motor vehicle.
2. **Non-occupants:** Any person who is not an occupant of a motor vehicle in transport and includes the pedestrians, pedalcyclist, occupants of parked motor vehicles and others such as joggers, skateboard riders, people riding on animals, and people riding in animal-drawn conveyances.

Individuals Involved in Fatal Crashes: All individuals involved in fatal crashes recorded in FARS, including occupants of involved vehicles, pedestrians, and cyclists.

Individual Involvement Rate: The number of individuals involved in fatal crashes for the given time period, divided by the corresponding number of vehicle miles traveled, VMT. This rate is reported as the number of individuals involved per 100 million vehicle miles traveled.

Injury Severity: This variable is partitioned into six levels:

1. **None:** No injury indicates there is no reason to believe the person received bodily harm from the motor vehicle crash.
2. **Possible:** No visible signs of injury but complaint of pain or momentary unconsciousness.
3. **Nonincapacitating:** Any visible injuries such as bruises, abrasions, limping, etc.
4. **Incapacitating:** Any visible signs of injury from the crash and the person had to be carried from the scene.
5. **Fatal:** Any injury sustained in the motor vehicle crash that results in death within 30 days.
6. **Other:** Injured, Severity Unknown, Died Prior to Accident, and Unknown

License Status: This variable is coded valid if the driver of the vehicle had a valid driver license for the type of vehicle driven.

Manner of Collision:

1. **Angle:** Collisions which are not head-on, rear-end, rear-to-rear, or sideswipe.
2. **Head-on:** Refers to a collision where the front end of one vehicle collides with the front-end of another vehicle while the two vehicles are traveling in opposite directions
3. **Other:** Collisions which are rear-end, rear-to-rear, or sideswipe.

Person Type:

1. **Driver:** An occupant of a vehicle who is in physical control of a motor vehicle in transport, or for an out-of-control vehicle, an occupant who was in control until control was lost.
2. **Passenger:** Any occupant of a motor vehicle who is not a driver.
3. **Pedestrian:** Any person not in or upon a motor vehicle or other vehicle.
4. **Cyclist:** A person on a vehicle that is powered solely by pedals.
5. **Other:** Including occupant of a motor vehicle not in transport, occupant of a non motor vehicle transport device, unknown occupant type in a motor vehicle in transport, unknown type of non motorist and unknown.

Paved/Unpaved Roads: Roadway surface type partitions roadways into paved roads, which consist of concrete, blacktop, etc., or unpaved roads of gravel, stone, or dirt.

Probability of EMS arrival: The probability that the emergency medical services have arrived at the scene of the crash within the specified time. The time is calculated from the time of notification of the crash to the time of EMS arrival. This is a cumulative probability distribution and the results are reported as a percentage.

Restraint Use: The occupant's use of available vehicle restraints including lap belt, shoulder belt, or automatic belt.

1. **Belted:** Including shoulder belt, lap belt, and automatic belt.
2. **Child SS:** Child Safety Seat
3. **Helmet:** Including motorcycle helmet
4. **Other:** Type unknown or other including other helmet or unknown restraint used

Road type: The roadways are classified:

1. **Interstate:** Limited access divided facilities of at least four lanes designated by the Federal Highway Administration as part of the Interstate System.
2. **Principal Arterial:** All urban principal arterial with limited control of access not on the Interstate system. Major streets or highways, many with multi-lane or freeway design, serving high-volume traffic corridor movements that connect major generators of travel.
3. **Minor Arterial:** Streets and highways linking cities and larger towns in rural areas in distributing trips to small geographic areas in urban areas (not penetrating identifiable neighborhoods).
4. **Collector:** In rural areas, routes serving intra-county, rather than statewide travel. In urban areas, streets providing direct access to neighborhoods as well as direct access to arterials.
5. **Local:** Streets and roads whose primary purpose is feeding higher order systems, providing direct access with little or no through traffic.
6. **Unknown:**

Roadway Profile: This variable has five categories, level, grade, crest, sag, and other.

Rollover: Rollover is defined as any vehicle rotation of 90 degrees or more about any true longitudinal or lateral axis. Includes rollovers occurring as a first harmful event or subsequent event.

Speed limit: The posted speed limit in mph.

Time of Day:

1. **Day:** From 6 a.m. to 5:59 p.m.
2. **Night:** From 6 p.m. to 5:59 a.m.

Trailing Vehicle: This variable applies to vehicles that are being towed by a trailer hitch. It does not apply to vehicles that are pulled by a rope or chain.

Vehicle Damage: This variable, sometimes called extent of deformation, has been partitioned into five levels: none, minor, moderate, severe, and unknown. If the police accident report indicates that the vehicle was “totaled,” but the vehicle was driven away, then the damage is considered moderate. If the police accident report indicates that the vehicle was “totaled” and the vehicle was towed away, then damage is considered severe.

Vehicles Involved in Crashes: The number of vehicles involved in crashes as recorded in the database. The data are reported as totals by year.

Vehicle Involvement Rate: The number of vehicles involved in crashes for the given time period, divided by the corresponding number of vehicle miles traveled, VMT. This rate is reported as the number of vehicles involved in fatal crashes per 100 million vehicle miles traveled.

Vehicle Maneuver: This variable refers to the action of the driver just prior to entering the fatal crash situation. This is not a crash avoidance maneuver. The data have been partitioned into four levels, going straight, negotiating a curve, making a left turn, and other.

Vehicle Miles Traveled, VMT: The number of miles traveled by vehicles on public roadways. The Federal Highway Administration provides these data.

Vehicle Role: For the purpose of this study the “vehicle role” has been partitioned into five levels: no collision, striking, struck, both and unknown.

Vehicle Speeding: These codes are part of the driver related factors and violations charged. This variable is coded as driving too fast for conditions, in excess of posted speed limit, racing speeding (above the speed limit), speed greater than reasonable and prudent (Not necessarily over the limit), exceeding special speed limit (e.g., for trucks, buses, cycles, or on bridge, in school zone, etc.), energy speed (exceeding 55 mph, non-pointable), or speed related violations generally.

Vehicle Type: A series of motor vehicle body types that have been grouped together because of the design similarities. The principal vehicle types used in this report are passenger car, light truck including SUVs, large truck, motorcycle, and other vehicle.

Passenger Cars: Motor vehicles used primarily for carrying passengers, including convertibles, sedans, and station wagons.

Light Trucks and Vans: Trucks of 10,000 pounds gross vehicle weight rating or less, including pickups, SUVs, vans, truck-based station wagons, and utility vehicles.

Large Trucks: Trucks over 10,000 pounds gross vehicle weight rating, including single-unit trucks, combination trucks and tractors (cab only or with any number of trailing units; any weight).

Motorcycles: A two- or three-wheeled motor vehicle designed to transport one or two people, including motorscooters, minibikes, and mopeds.

Other/Unknown: Consists of the following types of vehicles:

1. Bus (large motor vehicles used to carry more than 10 passengers, including school buses, inter city buses, and transit buses)
2. Large limousine (more than four side doors or stretched chassis)
3. Three-wheel automobile or automobile derivative
4. Van-based motorhome
5. Light-truck-based motorhome (chassis-mounted)
6. Large-truck-based motorhome
7. ATV (all-terrain vehicle, including dune/swamp buggy) and ATC (all-terrain cycle)
8. Snowmobile
9. Farm equipment other than trucks
10. Construction equipment other than trucks (includes graders)
11. Other type vehicle (includes go-cart, fork lift, city streetsweeper)
12. Unknown.

Year: The calendar year in which the crash occurred.

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