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Traffic Collisions in Washington State

Data
Summary and
Highway
Safety
Problem
Analysis

July 1994

WASHINGTON TRAFFIC SAFETY COMMISSION
1000 South Cherry Street
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Introduction

This Data Summary and Problem Analysis identifies and analyzes traffic safety problems, trends and issues in the State of Washington. Factors that contribute to the occurrence of traffic collisions and resultant fatalities, injuries and property damage are outlined. The analysis is intended to give traffic safety program specialists the information needed to design new countermeasures, monitor the effectiveness of ongoing countermeasure programs, and document successes or failures of program efforts.

Data are presented for significant traffic safety problem areas. These identified problem areas include safety-restraint use and segments of the population at risk for motor vehicle collisions, injuries and fatalities such as drinking drivers, youth, older drivers, pedestrians, pedalcyclists, motorcyclists and drivers of heavy trucks. Current year's data is compared to that of recent years for trend identification. Over/under-representation ratios are used to compare collision involvement of various groups relative to their percentage of the population.

Sources of data include traffic collision records (Washington State Patrol), the Fatal Accident Reporting System (Washington Traffic Safety Commission), driver's licensing records (Department of Licensing), vehicle registration records (Department of Licensing), highway/roadway information (Washington State Department of Transportation), and population data (Office of Financial Management).

The collision record system includes all collisions reported to the WSP. Collisions involving motor vehicles on public trafficways that result in death, injury, or property damage of $500 or more are required by law to be reported. The records include both citizen reports and law enforcement investigation reports. The data elements include information on vehicles, roadways, collision circumstances, and the drivers, passengers, pedestrians, and pedalcyclists involved in collisions. The analyses reported in this document use each of these factors as the unit of analysis at different times. For example, in examining the alcohol-related crash problem, some analyses use collisions, some drivers, and some use victims (killed or injured) as units of analysis.

The resources of the Traffic Record Data Center at the Washington Traffic Safety Commission have been used to analyze and summarize the data.

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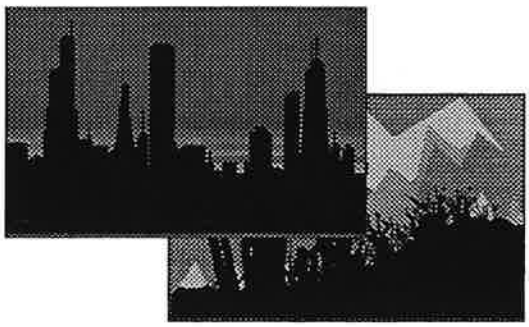
I. Overview



Six hundred and sixty one (661) persons were killed in 579 fatal traffic collisions in the state of Washington during 1993. This was an increase of 10 traffic deaths from the previous year, and a 10.1% decrease compared to the previous 4-year average (1989-1992). A total of 76,332 persons were injured in 1993, up 2.5% from the previous 4-year average. Serious injuries decreased, while possible injuries increased over the previous four-year average. The estimated economic loss for 1993 has been computed at $1.807 billion based on National Safety Council estimates of the cost of motor vehicle crashes. This estimate may be conservative; a NHTSA study of the economic cost of motor vehicle crashes gave an estimate of $2.733 billion for Washington State's 1990 collisions. There were 123,965 total reported collisions in 1993. The 1993 motor vehicle traffic death rate was 1.42 persons killed per 100 million vehicle miles traveled, a slight increase over 1992. The increase in the death rate from 1992 to 1993 was due to a change in the method for calculating miles traveled. The new method produced a lower estimate of travel than the previous method (Table 1-1).

Table 1-1: Overview of traffic crashes
Five-year comparison

	1993	1992	1991	1990	1989	prev 4-yr avg	'93 vs prev 4-yr avg
Total collisions	123,965	125,565	121,686	132,056	128,800	127,027	-2.4%
Fatal	579	593	603	726	694	654	-11.5%
Injury	51,500	51,186	49,048	51,713	50,747	50,674	1.6%
Property dmg only	71,886	73,786	72,035	79,617	77,359	75,699	-5.0%
Persons killed	661	651	683	825	781	735	-10.1%
Persons injured	76,332	75,803	72,004	76,064	73,992	74,466	2.5%
Serious injury	5,713	6,531	6,839	7,653	8,044	7,267	-21.4%
Evident injury	24,549	24,246	24,212	25,722	26,974	25,289	-2.9%
Possible injury	46,070	45,026	40,953	42,689	38,974	41,911	9.9%
Drivers involved	221,503	224,316	215,989	234,215	227,803	225,581	-1.8%
Vehicles involved	231,756	234,938	226,262	245,579	238,683	236,366	-2.0%
Motor veh. travel*	46,426	48,644	45,663	44,157	42,696	45,290	2.5%
Death rate**	1.42	1.34	1.50	1.87	1.83	1.63	-12.8%
Serious injury rate**	12.31	13.43	14.98	17.33	18.84	16.14	-23.8%
Economic loss +	$1,807	$1,827	$1,130	$1,146	$922	$1,256	43.8%

Source: WSP, WSDOT, Nat'l Safety Council

*In millions of miles.
*Method used by WSDOT for estimating miles traveled changed for 1993, resulting in lower mileage.
**Deaths/injuries per 100 million vehicle miles of travel.
+In $millions; based on National Safety Council estimates for fatal, injury, & ppty damage crashes.

Exposure

The method for calculating miles traveled was revised in 1993, resulting in a decrease from 1992. Motor vehicle travel typically has increased from 3% to 6% per year. Motor vehicle registrations were down slightly in 1993. The number of licensed drivers was up 2.6%, and the state's population was up 2.4% compared to 1992 (Table 1-2).

Table 1-2: Exposure - travel, vehicles, drivers and population
Five-year comparison

exposure	1993	1992	1991	1990	1989	% change '92 to '93	'93 vs prev 4-yr avg
Motor vehicle travel*	46,426	48,644	45,663	44,157	42,696	-4.6%	2.5%
Motor veh. registration	4,428,944	4,435,259	4,381,757	4,233,854	4,084,367	-0.1%	3.4%
Licensed drivers	3,784,430	3,689,741	3,572,038	3,366,146	3,350,324	2.6%	8.3%
State's population	5,240,900	5,116,685	5,000,400	4,866,692	4,660,700	2.4%	6.7%

*In millions of miles

Source: WSDOT, DOL, OFM

Age and status of persons killed and injured

The age group of 25-44 years accounted for 224 of Washington's 661 traffic fatalities and 30,234 of the state's 76,332 persons injured in 1993. The majority of persons killed or injured in traffic collisions in all age groups were motor vehicle occupants. Males were highest in all categories listed except for total injured and occupants injured (Table 1-3).

Table 1-3: Persons killed and injured
By status, age group and sex - 1993

	total*		occupants*		pedestrians		motorcyclists		pedalcyclists	
age	killed	injured	killed	injured	killed	injured	killed	injured	killed	injured
0 - 4	13	1,460	11	1,308	2	108	0	3	0	41
5 - 14	20	4,669	6	3,601	8	404	3	39	3	625
15 - 24	208	21,978	188	20,747	11	347	8	560	1	324
25 - 44	224	30,234	176	28,574	24	515	21	806	3	339
45 - 64	100	11,201	78	10,695	15	238	6	203	1	65
65/ovr	90	4,360	71	4,168	19	168	0	14	0	10
Age not stated	6	2,430	5	2,333	1	33	0	38	0	26
Males	456	37,377	362	33,727	53	1,038	34	1,446	7	1,166
Females	205	38,955	173	37,699	27	775	4	217	1	264
Total	661	76,332	535	71,426	80	1,813	38	1,663	8	1,430

* "Occupants" includes motor vehicle drivers and passengers - excludes motorcyclists.

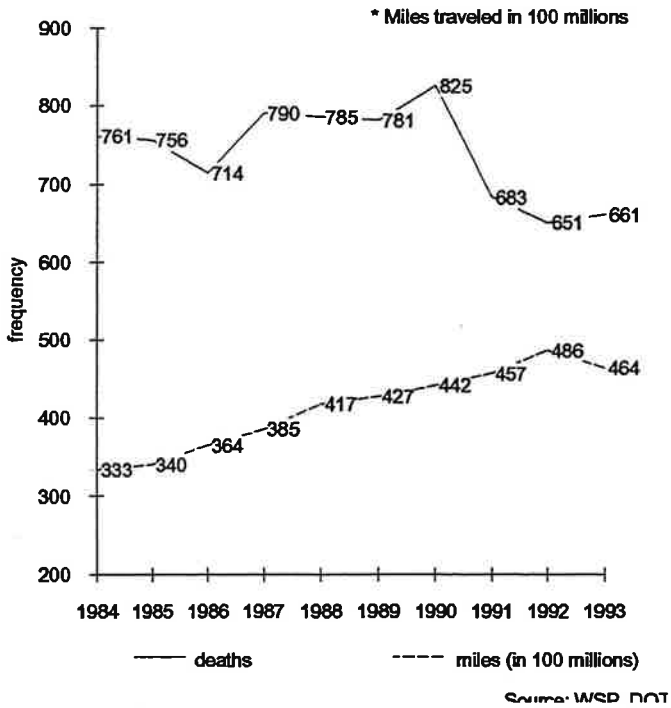
Source: WSP

Traffic deaths, injuries, and rates

Motor vehicle travel has increased steadily over the past decade, with the exception of 1993 (see explanation for Table 1-2). The number of deaths recorded in 1993 was the second lowest in a decade (Figure 1-1).

Figure 1-1:

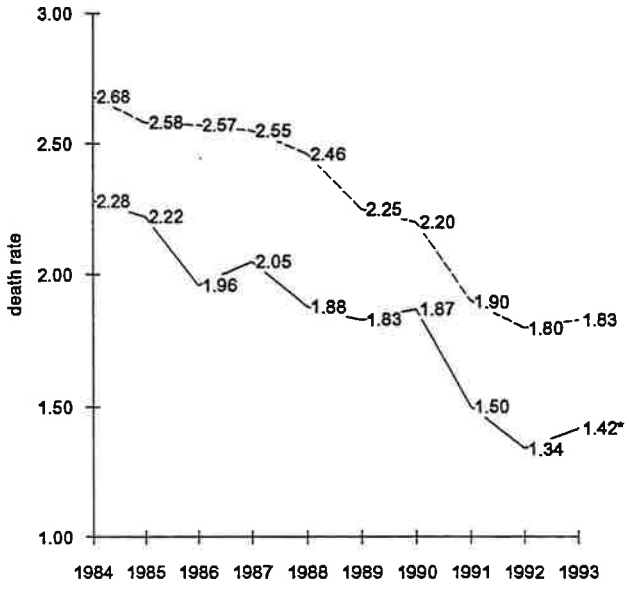
Traffic deaths & miles traveled*
Ten-year comparison



Source: WSP, DOT

Washington's 1993 death rate (per 100 million vehicle miles traveled) was 1.42, down 37.7% from the 2.28 rate recorded in 1984. Washington's rate has been consistently lower than the national rate (Figure 1-2).

Death rate (deaths per 100M miles)
Ten-year trend - Washington vs U.S.



* WSDOT method for determining miles traveled changed.

Source: WSP, Nat'l Safety Council

Traffic safety statistics: 1972 to 1993

Exposure statistics, including total licensed drivers, population, vehicle registration and travel, have generally increased annually (average increases have been 1% to 5%). Motor vehicle collisions and injuries peaked in 1990 with 132,056 collisions and 76,064 injuries. The annual traffic death total ranged from a low of 651 deaths recorded in 1992 to a high of 1,034 recorded in 1979. The fatality rate (deaths per 100 million miles of travel) has decreased over the years, from a high of 3.82 in 1972 to a low of 1.42 in 1992 (Table 1-4).

Table 1-4: Population, vehicle travel and collision summary
1972 - 1993

year	population	lic. drivers	reg. vehicles	travel*	collisions**	injuries	deaths +	death rate@
1972	3,418,800	2,011,893	2,315,310	22,363	101,002	55,454	855	3.82
1973	3,424,300	2,113,460	2,453,880	23,457	105,515	58,039	776	3.31
1974	3,448,100	2,122,131	2,545,975	22,585	106,242	57,716	761	3.37
1975	3,493,990	2,176,505	2,640,944	24,023	120,635	64,145	771	3.21
1976	3,571,591	2,324,697	2,785,500	25,932	120,864	66,309	825	3.18
1977	3,661,975	2,339,215	2,952,383	27,449	119,058	71,356	927	3.38
1978	3,774,300	2,485,248	3,042,265	29,378	116,923	64,669	1,006	3.42
1979	3,911,200	2,579,368	3,186,898	29,122	118,686	65,399	1,034	3.55
1980	4,132,353	2,662,659	3,293,065	28,696	113,751	61,532	985	3.43
1981	4,250,200	2,732,722	3,408,871	30,346	111,993	61,083	872	2.87
1982	4,264,000	2,774,212	3,313,348	30,353	100,644	54,789	757	2.49
1983	4,285,100	2,867,032	3,372,966	32,275	106,597	58,317	705	2.18
1984	4,328,100	2,973,468	3,459,772	33,344	111,655	61,366	761	2.28
1985	4,384,100	2,980,717	3,546,152	33,978	120,056	63,806	756	2.22
1986	4,419,700	3,029,375	3,651,102	36,416	122,918	66,707	714	1.96
1987	4,481,100	3,156,600	3,833,058	38,520	126,807	67,665	790	2.05
1988	4,565,000	3,264,065	3,896,828	41,698	125,920	72,449	785	1.88
1989	4,660,700	3,350,324	4,084,367	42,696	128,800	73,993	781	1.83
1990	4,866,692	3,366,146	4,233,853	44,157	132,056	76,064	825	1.87
1991	5,000,400	3,572,038	4,381,757	45,663	121,686	72,004	683	1.50
1992	5,116,685	3,689,741	4,435,259	48,664	125,565	75,803	651	1.34
1993	5,240,900	3,784,430	4,428,944	46,426	123,965	71,886	661	1.42

Source: WSP, OFM, DOL, WSDOT

* In millions of vehicle miles traveled.
Method used by WSDOT for estimating miles traveled changed for 1993, resulting in lower mileage.

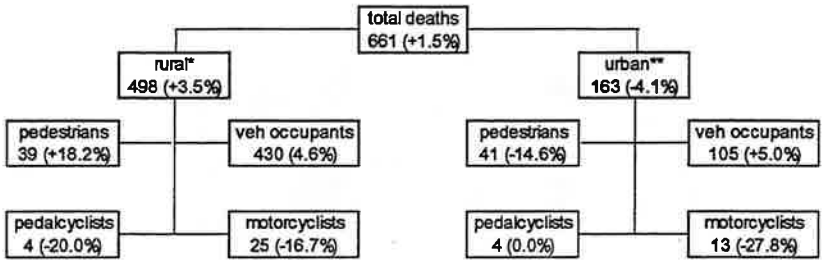
** Minimum damage for a reportable collision was increased from $100 to $300 to the property of one person on 7/1/77 and to $500 on 10/1/87.

+State adopted a 90-day fatal-reporting policy in 1980 and a 30-day fatal-reporting policy in 1989.

@ Traffic deaths per 100 million vehicle miles of travel.

Of the 661 traffic deaths in 1993, 498 occurred in rural areas of the state, while 163 occurred in urban areas (cities with a population of 2,500 or greater). Rural areas recorded an increase of 3.5% from the previous year, while the urban area experienced a decrease of 4.1% (Figure 1-3).

Figure 1-3: Urban vs rural traffic fatalities by type - 1993
Percent of change from previous year

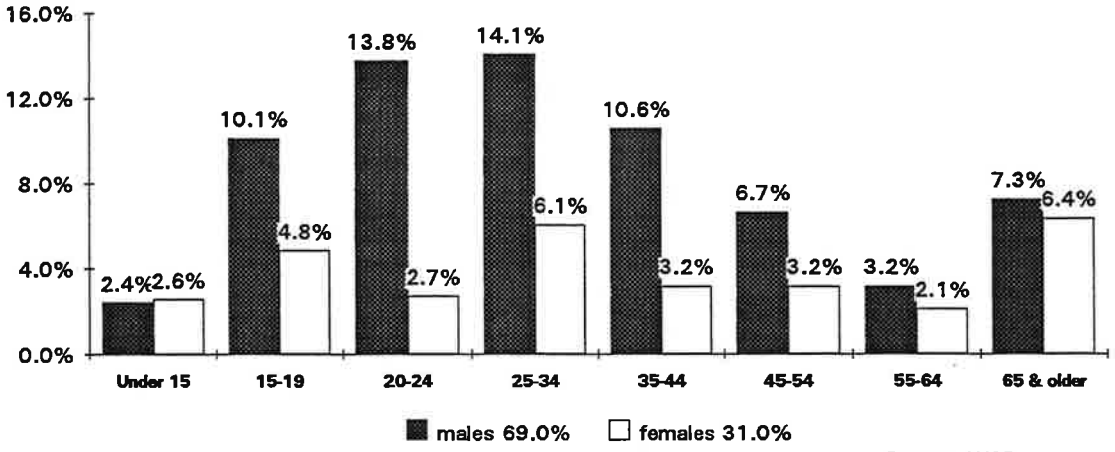


* Rural: Unincorporated areas plus incorporated areas with population less than 2,500. Source: WSP
Rural total includes two fatalities with status of "other".
** Urban: Cities with population 2,500 and greater.

Age and sex of persons killed

The majority of traffic fatalities were males (69.0%). For males, the age group with the most traffic fatalities was 25-34 with 14.1% of the total fatalities. For females, the age group with the most fatalities was the 65 and older, with 6.4% of the total (Figure 1-4)

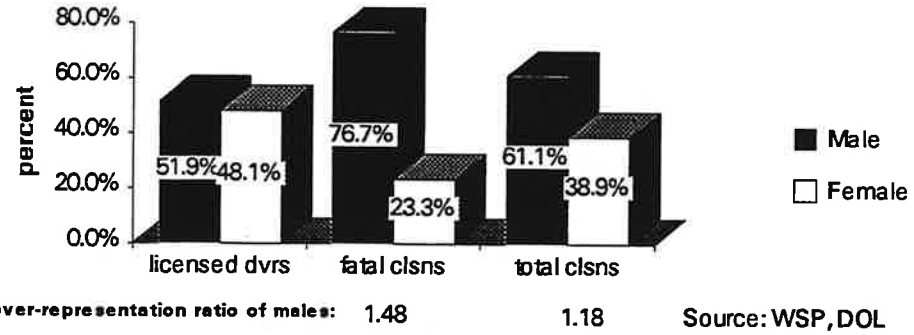
Figure 1-4:
Percentage of traffic fatalities
By age and sex - 1993



Source: WSP

Just over half, or 51.9%, of all licensed drivers in 1993 were males. However, males drivers were involved in 76.7% of fatal collisions, creating an over-representation ratio of 1.48. Males were involved in 61.1% of total collisions (Figure 1-5).

Figure 1-5:
Male and female drivers involved in collisions - 1993



over-representation ratio of males: 1.48 1.18 Source: WSP, DOL

Traffic death occurrences by month

During 1993, the months recording the greatest number of traffic deaths occurred during August, September and October. The months of March recorded the fewest fatalities (Table 1-5).

Table 1-5: Persons killed and injured in collisions
By month - 1993

	persons		collisions			
	killed	injured	fatal	injury	ppty dmg	total
January	47	6,003	41	4,215	7,353	11,609
February	43	4,931	38	3,356	5,031	8,425
March	36	5,460	33	3,780	5,256	9,069
April	54	6,290	48	4,252	5,845	10,145
May	52	6,370	48	4,322	5,529	9,899
June	49	6,216	42	4,172	5,500	9,714
July	59	6,760	51	4,484	5,945	10,480
August	77	6,856	68	4,501	5,534	10,103
September	71	6,535	58	4,365	5,484	9,907
October	72	7,354	66	4,875	6,526	11,467
November	56	6,665	44	4,471	6,691	11,206
December	45	6,892	42	4,707	7,192	11,941
Total	661	76,332	579	51,500	71,886	123,965

Source: WSP

Traffic collisions by day of week and hour of day

Nearly half of Washington's fatal collisions occurred on the days of Friday, Saturday and Sunday. The hours with the most fatalities were night-time hours on weekends, and afternoon and night-time hours on weekdays. Of total reported collisions, the majority occurred on weekdays (Table 1-6).

Table 1-6: Collisions by hour of day and day of week - 1993

	total week			Monday - Thursday			Friday - Sunday		
hour	total	injury	fatal	total	injury	fatal	total	injury	fatal
midnight	2,760	1,061	25	1,073	395	7	1,687	666	18
1:00 a.m.	2,441	1,003	28	840	343	15	1,601	660	13
2:00 a.m.	2,376	977	35	800	324	19	1,576	653	16
3:00 a.m.	1,211	472	23	411	162	9	800	310	14
4:00 a.m.	897	352	14	351	124	6	546	228	8
5:00 a.m.	1,313	528	16	780	291	10	533	237	6
6:00 a.m.	2,683	1,032	20	1,835	699	10	848	333	10
7:00 a.m.	5,576	2,227	11	4,102	1,654	4	1,474	573	7
8:00 a.m.	5,279	2,052	12	3,573	1,394	7	1,706	658	5
9:00 a.m.	4,490	1,752	13	2,693	1,040	6	1,797	712	7
10:00 a.m.	5,173	2,034	18	2,990	1,156	11	2,183	878	7
11:00 a.m.	6,425	2,532	16	3,696	1,431	10	2,729	1,101	6
noon	7,681	3,100	22	4,437	1,736	12	3,244	1,364	10
1:00 p.m.	7,884	3,245	20	4,529	1,819	10	3,355	1,426	10
2:00 p.m.	8,932	3,828	30	5,368	2,269	15	3,564	1,559	15
3:00 p.m.	10,044	4,259	25	6,259	2,659	15	3,785	1,600	10
4:00 p.m.	10,607	4,631	33	6,662	2,952	21	3,945	1,679	12
5:00 p.m.	10,673	4,654	34	6,746	2,955	21	3,927	1,699	13
6:00 p.m.	7,530	3,391	24	4,403	2,012	12	3,127	1,379	12
7:00 p.m.	5,322	2,291	25	2,839	1,231	12	2,483	1,060	13
8:00 p.m.	4,102	1,746	36	2,087	937	18	2,015	809	18
9:00 p.m.	4,047	1,670	33	2,079	838	13	1,968	832	20
10:00 p.m.	3,473	1,443	29	1,557	651	11	1,916	792	18
11:00 p.m.	3,046	1,220	37	1,325	542	18	1,721	678	19
Total	123,965	51,500	579	71,435	29,614	292	52,530	21,886	287

Source: WSP

Traffic collisions & deaths by type of roadway

During 1993, the interstate system recorded the lowest death rate per vehicle miles traveled with 0.60 deaths per 100 million miles. The highest death rate was on county roads with a death rate of 2.52. City streets had by far the greatest number of total collisions with 57,039, followed by state highways and county roads. The greatest amount of vehicle travel was on state highways with an estimated 13,533 millions of vehicle miles traveled (Table 1-7).

Table 1-7: Highways, travel and collisions
By type of highway - 1993

type of highway	highway miles	%	miles traveled +	%	collisions	fatalities	death rate *
County roads	41,445	52.2%	9,329	20.1%	24,003	235	2.52
State highways	6,256	7.9%	13,533	29.2%	28,521	233	1.72
City streets	12,067	15.2%	10,682	23.0%	57,039	106	0.99
Interstate system	764	1.0%	12,407	26.7%	13,484	74	0.60
Other traffic ways **	18,900	23.8%	474	1.0%	910	13	2.74
Total	79,432	100.0%	46,425	100.0%	123,957	661	1.42

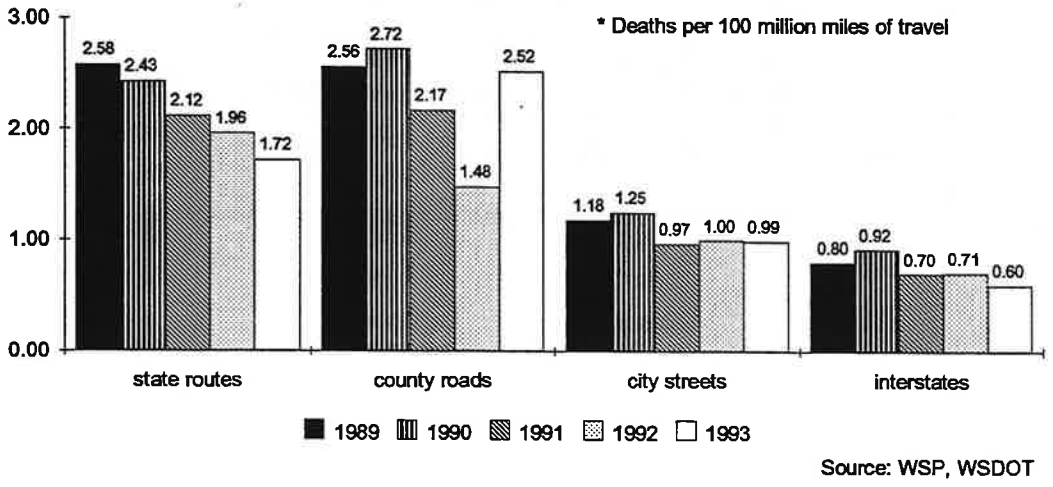
+WSDOT estimate in millions of vehicle miles traveled. Source: WSP, WSDOT, WTSC

*Fatalities per hundred million vehicle miles

** Includes parks/forest service roads. Does not include all-terrain-vehicle trails.

Figure 1-6 shows a five-year trend of death rates by highway types. In general, there has been a reduction in the death rate over the past five years. However, the death rate on county roads jumped significantly in 1993, mainly due to a revision in the method used to estimate miles traveled in the state. The new method produced a lower figure for miles traveled on county roads.

Figure 1-6: Death rate* by type of highway
Five-year comparison

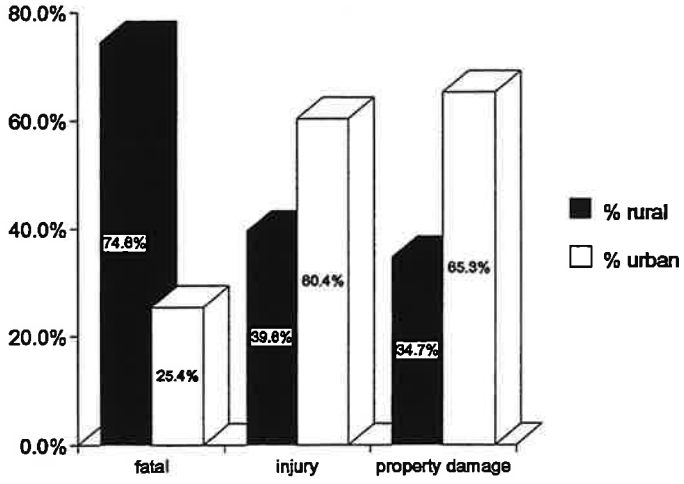


Source: WSP, WSDOT

Figure 1-7 compares collisions in urban and rural areas by severity. Rural areas accounted for 74.6% of all fatal collisions, but for only 39.6% of injury collisions and 34.7% of property-damage-only collisions.

Figure 1-7:

Rural vs urban collisions by severity - 1993



Source: WSP

Collisions by age of driver

Drivers under age 30 were over-represented in both fatal and total collisions while older drivers were generally under-represented. For example For example drivers 17 years of age comprised 1.2% of all licensed drivers in the state in 1993, yet accounted for 3.2% of drivers in total collisions, creating an over-representation ratio of 2.7 for involvement in total collisions. Drivers 19 years of age comprised 1.6% of licensed drivers, but accounted for 4.3% of fatal collisions, creating an over-representation ratio of 2.7 for involvement in fatal collisions (Table 1-8).

Table 1-8: Driver distribution and collision involvement
By age group - 1993

age	lic drivers	% of lic dvrs	total collisions	% of collisions	ratio*of collisions	fatal collisions	% of fatal clsns	ratio*of fatal clsns
Under 16	-------	-------	573	0.3%	-------	4	0.5%	-------
16	31,898	0.8%	4,092	2.1%	2.5	15	1.8%	2.2
17	45,019	1.2%	6,222	3.2%	2.7	21	2.6%	2.2
18	53,024	1.4%	6,783	3.5%	2.5	24	2.9%	2.1
19	59,246	1.6%	6,244	3.2%	2.1	35	4.3%	2.7
20	57,097	1.5%	5,657	2.9%	1.9	30	3.7%	2.4
21	62,222	1.6%	5,531	2.9%	1.7	35	4.3%	2.6
22	70,364	1.9%	5,759	3.0%	1.6	32	3.9%	2.1
23	78,911	2.1%	5,730	3.0%	1.4	25	3.0%	1.5
24	75,333	2.0%	5,507	2.8%	1.4	18	2.2%	1.1
25-29	391,324	10.3%	24,812	12.8%	1.2	106	12.9%	1.3
30-34	457,781	12.1%	24,270	12.5%	1.0	97	11.8%	1.0
35-39	470,579	12.4%	22,013	11.4%	0.9	88	10.7%	0.9
40-44	434,616	11.5%	18,333	9.5%	0.8	75	9.1%	0.8
45-49	366,710	9.7%	14,430	7.5%	0.8	63	7.7%	0.8
50-54	267,752	7.1%	9,707	5.0%	0.7	30	3.7%	0.5
55-59	202,322	5.3%	7,155	3.7%	0.7	31	3.8%	0.7
60-64	175,856	4.6%	5,615	2.9%	0.6	15	1.8%	0.4
65-69	165,006	4.4%	4,792	2.5%	0.6	17	2.1%	0.5
70 & over	319,370	8.4%	10,228	5.3%	0.6	59	7.2%	0.9

*Over/under ratio of age group in total and fatal collisions. Source: WSP, DOL

Table 1-9 summarizes collision involvement for various age groups and for males and females compared to their estimated percentage of miles traveled. Younger drivers, age 24 and younger, and drivers 70 and older were over-represented in fatal and total collisions. Males were over-represented in fatal collisions, and females were slightly over-represented in total collisions.

Table 1-9: Drivers in collisions by age group and sex - 1993
Percent of miles traveled

drivers	% of miles traveled*	drivers in fatal collisions**	%	over-under ratio	drivers in total collisions**	%	over-under ratio
Under 16	-----	4	-----	-----	573	-----	-----
16-19	3.3%	95	11.3%	3.44	23,341	10.5%	3.19
20-24	8.5%	140	16.7%	1.97	28,184	12.7%	1.50
25-29	12.8%	106	12.6%	0.99	24,812	11.2%	0.88
30-34	14.9%	97	11.6%	0.78	24,270	11.0%	0.74
35-39	15.2%	88	10.5%	0.69	22,013	9.9%	0.66
40-44	12.8%	75	8.9%	0.70	18,333	8.3%	0.65
45-49	10.1%	63	7.5%	0.75	14,430	6.5%	0.65
50-54	6.8%	30	3.6%	0.53	9,707	4.4%	0.64
55-59	5.1%	31	3.7%	0.73	7,155	3.2%	0.48
60-64	3.8%	15	1.8%	0.47	5,615	2.5%	0.66
65-69	2.9%	17	2.0%	0.70	4,792	2.2%	0.56
70 & over	3.9%	59	7.0%	1.82	10,228	4.6%	1.19
Age not stated	-----	18	-----	-----	28,050	-----	-----
Male	64.6%	631	75.3%	1.17	127,976	57.8%	0.89
Female	35.4%	192	22.9%	0.65	81,518	36.8%	1.04
Sex not stated	-----	15	-----	-----	12,009	-----	-----

Source: WSP, USDOT

*Est. from 1990 Nationwide Personal Transportation Study - USDOT

**Does not include drivers under 16 or age not stated in fatal or total collisions.

Traffic exposure, deaths, injuries and collisions by county and city

Population, licensed drivers, registered vehicles and miles traveled are useful for comparing traffic exposure for various regions. Table 1-10 summarizes these factors by county.

Table 1-10: Factors indicating traffic exposure
By county - 1993

county	population	licensed drivers*	registered vehicles	miles traveled**
Adams	14,300	10,913	15,466	389,811
Asotin	18,300	13,195	15,929	98,716
Benton	122,800	89,872	103,834	1,098,490
Chelan	56,000	43,117	56,133	576,780
Clallam	61,400	45,063	54,357	438,703
Clark	269,500	197,041	228,542	2,067,242
Columbia	4,100	2,980	4,580	56,700
Cowlitz	86,100	62,448	79,542	1,019,177
Douglas	28,500	19,536	22,706	324,169
Ferry	6,900	4,476	4,604	108,652
Franklin	41,100	27,219	46,948	483,852
Garfield	2,300	1,984	2,707	49,775
Grant	60,300	42,088	53,740	785,930
Grays Harbor	66,500	47,595	55,911	617,319
Island	66,500	45,183	48,557	344,709
Jefferson	23,500	17,710	20,505	304,473
King	1,587,700	1,199,254	1,327,120	13,844,202
Kitsap	210,000	146,282	167,497	1,397,326
Kittitas	29,200	19,843	25,886	848,823
Klickitat	17,500	12,834	16,104	201,759
Lewis	62,900	47,516	61,103	897,770
Lincoln	9,200	6,445	11,431	252,254
Mason	42,900	31,096	38,907	397,334
Okanogan	35,400	27,063	31,230	392,201
Pacific	19,800	14,919	17,206	200,971
Pend Oreille	10,100	7,617	9,149	146,066
Pierce	640,700	431,029	474,515	5,007,897
San Juan	11,900	9,175	12,019	33,299
Skagit	88,500	66,299	89,138	994,970
Skamania	9,000	5,306	5,980	87,373
Snohomish	507,900	359,855	430,957	4,284,186
Spokane	383,600	274,164	317,829	2,983,772
Stevens	33,400	22,574	26,853	320,956
Thurston	180,500	134,267	190,722	1,764,065
Wahkiakum	3,500	2,243	2,912	40,704
Walla Walla	51,800	32,585	36,991	392,702
Whatcom	140,900	100,988	121,898	1,262,912
Whitman	39,400	23,790	28,375	370,977
Yakima	197,000	130,931	171,061	1,538,791
Total	5,240,900	3,784,430	4,428,944	46,425,808

Source: WSP, DOL, DOT

*Total licensed drivers includes 7,935 with unknown county
**Estimated by WSDOT - in 1,000s of miles

Table 1-11 shows deaths, injuries, and collisions for Washington counties. This table also displays rates of persons killed per 100 million vehicle miles traveled. Fatal rates ranged from a low of zero, with no fatalities in Columbia or Garfield Counties, to a high of 7.36 in Ferry county, based upon 8 deaths. Collision rates are similarly computed, with a low of 72.5 collisions per 100 million vehicle miles traveled in Lincoln County and a high of 492.5 in San Juan County .

Table 1-11: Traffic deaths, injuries and miles traveled
By county - 1993

county	miles traveled*	deaths	injuries	collisions	death rate**	collision rate**
Adams	389,811	9	250	396	2.31	101.6
Asotin	98,716	2	118	239	2.03	242.1
Benton	1,098,490	12	1,222	2,621	1.09	238.6
Chelan	576,780	14	821	1,407	2.43	243.9
Clallam	438,703	6	536	1,125	1.37	256.4
Clark	2,067,242	39	3,339	5,165	1.89	249.8
Columbia	56,700	0	74	118	0.00	208.1
Cowlitz	1,019,177	7	1,275	2,125	0.69	208.5
Douglas	324,169	13	313	467	4.01	144.1
Ferry	108,652	8	72	135	7.36	124.2
Franklin	483,852	16	511	861	3.31	177.9
Garfield	49,775	0	30	66	0.00	132.6
Grant	785,930	18	704	1,215	2.29	154.6
Grays Harbor	617,319	15	827	1,517	2.43	245.7
Island	344,709	6	506	826	1.74	239.6
Jefferson	304,473	4	301	478	1.31	157.0
King	13,844,202	115	26,572	43,785	0.83	316.3
Kitsap	1,397,326	21	2,558	4,035	1.50	288.8
Kittitas	848,823	12	627	1,256	1.41	148.0
Klickitat	201,759	2	188	365	0.99	180.9
Lewis	897,770	17	893	1,658	1.89	184.7
Lincoln	252,254	1	97	183	0.40	72.5
Mason	397,334	9	692	970	2.27	244.1
Okanogan	392,201	8	351	686	2.04	174.9
Pacific	200,971	4	213	413	1.99	205.5
Pend Oreille	146,066	1	111	195	0.68	133.5
Pierce	5,007,897	61	11,020	15,247	1.22	304.5
San Juan	33,299	1	85	164	3.00	492.5
Skagit	994,970	16	1,236	2,067	1.61	207.7
Skamania	87,373	4	117	255	4.58	291.9
Snohomish	4,284,186	47	6,893	10,795	1.10	252.0
Spokane	2,983,772	39	5,719	9,201	1.31	308.4
Stevens	320,956	8	417	545	2.49	169.8
Thurston	1,764,065	25	2,399	4,068	1.42	230.6
Wahkiakum	40,704	2	51	74	4.91	181.8
Walla Walla	392,702	15	520	999	3.82	254.4
Whatcom	1,262,912	30	1,673	2,923	2.38	231.4
Whitman	370,977	3	373	693	0.81	186.8
Yakima	1,538,791	51	2,628	4,627	3.31	300.7
Total**	46,425,808	661	76,332	123,965	1.42	267.0

*In millions of vehicle miles traveled. Source: WSP, DOL

**Traffic deaths/collisions per 100 million vehicle miles traveled.

Table 1-12 displays deaths and injury severity by county. Rates in this table are computed by deaths and serious injuries per 10,000 population. The highest death rate was recorded in Ferry County, with 11.59 deaths per 10,000 population, based upon 8 deaths. The highest serious injury rate was recorded in Columbia County, with 24.39 serious injuries per 10,000 population, based upon 10 serious injuries.

Table 1-12: Traffic deaths and injury severity
By county population - 1993

county	population	deaths	serious injuries	evident injuries	possible injuries	death rate*	serious inj rate*
Over 1,000,000							
King	1,587,700	115	1,816	7,197	17,559	0.72	11.44
250,000 to 750,000							
Pierce	640,700	61	677	3,274	7,069	0.95	10.57
Snohomish	507,900	47	354	2,144	4,395	0.93	6.97
Spokane	383,600	39	445	1,863	3,411	1.02	11.60
Clark	269,500	39	255	1,129	1,955	1.45	9.46
100,000 to 250,000							
Kitsap	210,000	21	225	856	1,477	1.00	10.71
Yakima	197,000	51	236	1,059	1,333	2.59	11.98
Thurston	180,500	25	140	749	1,510	1.39	7.76
Whatcom	140,900	30	164	650	859	2.13	11.64
Benton	122,800	12	104	419	699	0.98	8.47
50,000 to 100,000							
Skagit	88,500	16	65	458	713	1.81	7.34
Cowlitz	86,100	7	102	477	696	0.81	11.85
Grays Harbor	66,500	15	102	364	361	2.26	15.34
Island	66,500	6	58	193	255	0.90	8.72
Lewis	62,900	17	115	359	419	2.70	18.28
Clallam	61,400	6	39	219	278	0.98	6.35
Grant	60,300	17	106	311	287	2.82	17.58
Chelan	56,000	14	81	363	377	2.50	14.46
Walla Walla	51,800	15	57	226	237	2.90	11.00
25,000 to 50,000							
Mason	42,900	9	95	219	378	2.10	22.14
Franklin	41,100	16	46	216	249	3.89	11.19
Whitman	39,400	4	46	155	172	1.02	11.68
Okanogan	35,400	8	41	187	123	2.26	11.58
Stevens	33,400	8	48	199	170	2.40	14.37
Kittitas	29,200	12	54	287	286	4.11	18.49
Douglas	28,500	13	42	149	122	4.56	14.74
10,000 to 25,000							
Jefferson	23,500	4	37	125	139	1.70	15.74
Pacific	19,800	4	12	97	104	2.02	6.06
Asotin	18,300	2	13	59	46	1.09	7.10
Klickitat	17,500	2	16	101	71	1.14	9.14
Adams	14,300	9	29	124	97	6.29	20.28
San Juan	11,900	1	16	45	24	0.84	13.45
Pend Oreille	10,100	1	21	50	40	0.99	20.79
Under 10,000							
Lincoln	9,200	1	12	51	34	1.09	13.04
Skamania	9,000	4	21	56	40	4.44	23.33
Ferry	6,900	8	9	38	25	11.59	13.04
Columbia	4,100	0	10	37	27	0.00	24.39
Wahkiakum	3,500	2	3	26	22	5.71	8.57
Garfield	2,300	0	1	18	11	0.00	4.35
Total	5,240,900	661	5,713	24,549	46,070	1.26	10.90

*Deaths, serious injuries per 10,000 population. Source: WSP, OFM

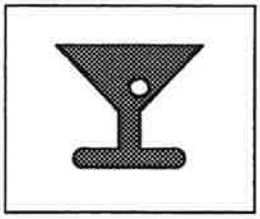
Of cities of 10,000 population and greater, Bainbridge Island recorded the lowest collision rate with 89.5 collisions per 10,000 population. The city with the highest collision rate was Tukwila, recording 858.8 collisions per 10,000 population. Eleven cities over 10,000 population recorded no traffic deaths for 1993 (Table 1-13).

Table 1-13: Traffic deaths, injuries and collisions*
Cities over 10,000 population - 1993

	population	deaths	injuries	collisions	death rate**	collision rate**
250,000 and over						
Seattle	527,700	48	11,812	20,352	0.91	385.7
100,000 to 250,000						
Spokane	183,800	7	3,662	6,015	0.38	327.3
Tacoma	181,200	17	4,769	6,803	0.94	375.4
50,000 to 100,000						
Bellevue	89,710	3	1,671	2,955	0.33	329.4
Everett	76,980	6	1,527	2,627	0.78	341.3
Federal Way	75,320	7	1,254	1,776	0.93	235.8
Yakima	59,580	4	1,063	2,070	0.67	347.4
Bellingham	55,480	3	636	1,336	0.54	240.8
Vancouver	55,450	3	565	1,710	0.54	308.4
25,000 to 50,000						
Kennewick	45,110	1	538	1,214	0.22	269.1
Renton	43,470	1	949	1,762	0.23	405.3
Kirkland	41,700	0	789	1,274	0.00	305.5
Kent	41,090	3	1,117	1,767	0.73	430.0
Redmond	40,095	0	411	851	0.00	212.2
Olympia	36,520	1	650	1,386	0.27	379.5
Bremerton	36,380	2	632	1,193	0.55	327.9
Auburn	34,550	2	605	1,035	0.58	299.6
Richland	34,080	1	342	777	0.29	228.0
Longview	32,650	2	550	886	0.61	271.4
Edmonds	30,970	1	290	459	0.32	148.2
Lynnwood	29,580	2	808	1,355	0.68	458.1
Walla Walla	28,820	1	247	572	0.35	198.5
Burien	27,800	3	330	507	1.08	182.4
Puyallup	26,140	3	427	770	1.15	294.6
15,000 to 25,000						
Bothell	24,530	1	307	498	0.41	203.0
Pullman	23,480	0	115	310	0.00	132.0
Wenatchee	23,000	1	262	555	0.43	241.3
Sea Tac	22,840	1	707	1,065	0.44	466.3
Lacey	22,660	1	442	716	0.44	316.0
Pasco	21,370	4	332	578	1.87	270.5
Mercer Island	21,260	1	133	256	0.47	120.4
Mount Vernon	20,450	2	217	464	0.98	226.9
Mountlake Terrace	19,880	3	245	408	1.51	205.2
Des Moines	19,460	0	161	263	0.00	135.1
Oak Harbor	18,930	0	111	217	0.00	114.6
Port Angeles	18,270	0	165	414	0.00	226.6
Bainbridge Island	17,200	0	64	154	0.00	89.5
Aberdeen	16,665	2	197	542	1.20	325.2
10,000 to 15,000						
Tukwila	14,660	3	846	1,259	2.05	858.8
Marysville	14,570	1	197	399	0.69	273.9
Mukilteo	14,035	0	101	213	0.00	151.8
Ellensburg	12,770	1	76	236	0.78	184.8
Centralia	12,380	0	204	457	0.00	369.1
Anacortes	12,260	0	69	174	0.00	141.9
Kelso	11,850	1	256	443	0.84	373.8
Moses Lake	11,700	0	134	316	0.00	270.1
Sunnyside	11,420	1	92	197	0.88	172.5
Tumwater	11,110	1	144	304	0.90	273.6

*Includes collisions occuring on the interstate system
** Deaths/collisions per 10,000 population
Source: WSP, OFM

II. Alcohol Involvement



Washington State has experienced a gradual reduction in the number and the seriousness of collisions involving alcohol. However, 46.3% of all traffic fatalities in 1993 did involve a driver who had been drinking (Table 2-1). Drivers found to be "under the influence" (DUI) were involved in collisions which resulted in the deaths of 279 persons, 42.2% of the state's total traffic deaths for 1993 (Table 2-2).

Table 2-1: Alcohol-related* collision summary
Five-year comparison

	1993	1992	1991	1990	1989	prev 4-yr avg	'93 vs prev 4-yr avg
Total collisions	12,725	14,113	14,776	15,998	16,061	15,237	-16.5%
Number of drinking drivers	13,341	14,813	15,470	16,760	16,756	15,950	-16.4%
Fatal collisions	267	278	300	372	344	324	-17.5%
Injury collisions	6,981	7,698	8,020	8,667	8,717	8,276	-15.6%
Prpty damage only**	5,477	6,137	6,456	6,959	7,000	6,638	-17.5%
Persons killed	306	308	335	431	392	367	-16.5%
Percent of all traffic fatalities	46.3%	47.3%	49.0%	52.2%	50.1%	49.7%	-6.7%
Total injuries	11,022	12,108	12,575	13,749	13,660	13,023	-15.4%
Serious injuries	1,596	1,938	2,132	2,476	2,595	2,285	-30.2%
Evident injuries	5,083	5,549	5,944	6,486	6,516	6,124	-17.0%
Possible injuries	4,343	4,621	4,499	4,787	4,549	4,614	-5.9%

* All drinking drivers, including DUI
** Damage over $500
Source: WSP

Table 2-2: Collisions involving drivers "under the influence" *
Five-year comparison

	1993	1992	1991	1990	1989	prev 4-yr avg	'93 vs prev 4-yr avg
Total collisions	8,204	8,990	9,237	9,887	9,816	9,483	-13.5%
DWI drivers	8,283	9,086	9,331	9,973	9,901	9,573	-13.5%
Fatal collisions	241	243	271	320	306	285	-15.4%
Injury collisions	4,747	5,174	5,375	5,604	5,622	5,444	-12.8%
Prop. damage only**	3,216	3,573	3,591	3,963	3,888	3,754	-14.3%
Persons killed	279	269	304	371	353	324	-14.0%
% of all traffic fatalities	42.2%	41.3%	44.5%	45.0%	45.2%	44.0%	-4.1%
Total injuries	7,603	8,267	8,598	9,016	8,898	8,695	-12.6%
Serious injuries	1,213	1,455	1,616	1,801	1,840	1,678	-27.7%
Evident injuires	3,664	3,876	4,203	4,322	4,316	4,179	-12.3%
Possible injury	2,726	2,936	2,779	2,893	2,742	2,838	-3.9%

* DUI drivers only
** Minimum damage: $500
Source: WSP

Of persons killed and injured in alcohol-related and DUI-related collisions, most were drivers, followed in order by vehicle passengers, motorcyclists, pedestrians and pedalcyclists (Table 2-3, Table 2-4).

Table 2-3: Status of persons killed & injured in alcohol-related collisions
By injury severity - 1993

status	killed	injury severity			total injured
		serious	evident	possible	
Drivers (no motorcyclists)	182	921	3,327	2,677	6,925
Passengers	94	514	1,504	1,558	3,576
Motorcyclists	17	106	177	52	335
Pedestrians	12	43	51	37	131
Pedalcyclists	1	12	24	14	50
Other	0	0	0	5	5
Total	306	1,596	5,083	4,343	11,022

Source: WSP

Table 2-4: Status of persons involved in DUI-related collisions
By injury severity - 1993

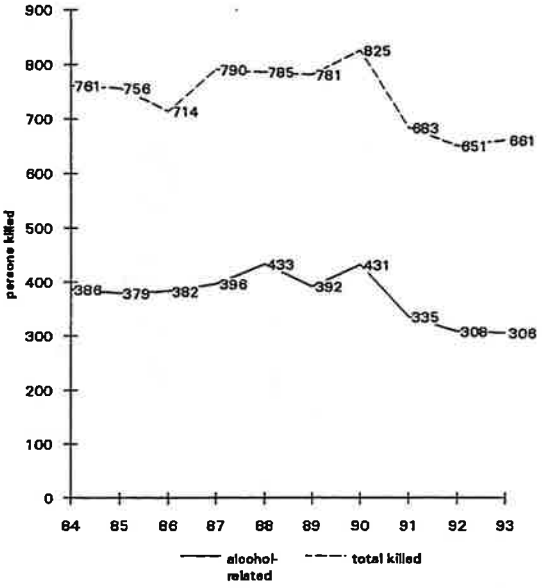
status	killed	injury			total injured
		serious	evident	possible	
Drivers (no motorcyclists)	171	727	2,463	1,718	4,908
Passengers	86	396	1,062	955	2,413
Motorcyclists	14	62	102	27	191
Pedestrians	7	21	27	17	65
Pedalcyclists	1	7	10	4	21
Other	0	0	0	5	5
Total	279	1,213	3,664	2,726	7,603

Source: WSP

Figure 2-1 compares total killed in all collisions to total killed in alcohol-related collisions for the past ten years. The number of persons killed in alcohol-related collisions in 1993 has decreased for four consecutive years. There was a slight increase in total fatalities from 1992 to 1993; however, alcohol-related fatalities still dropped slightly during that same period (Figure 2-1).

Figure 2-1:

Persons killed in alcohol-related crashes vs total killed - 10 year comparison



Source: WSP

Alcohol-related collisions by month/selected times

August was the month with the most alcohol-related fatal collisions and alcohol-related fatalities. July, accounted for the highest number of alcohol-related total collisions. The lowest numbers of alcohol-related collisions were in the winter months (Table 2-5).

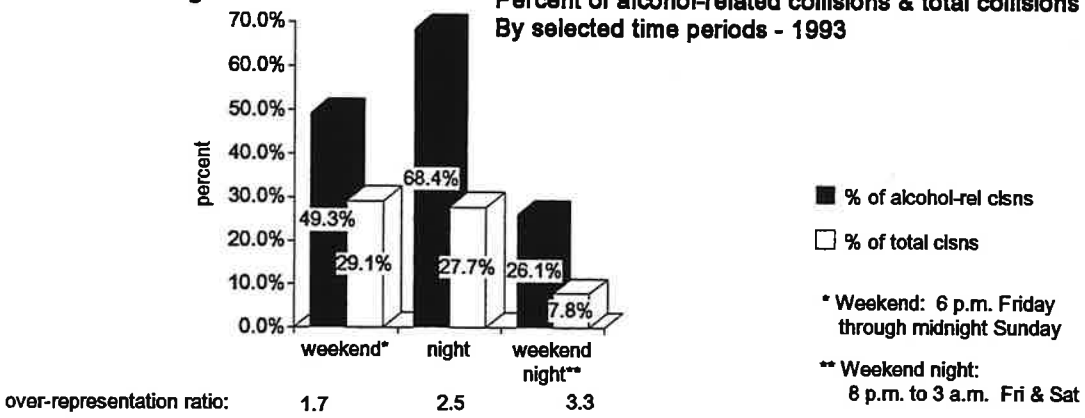
Table 2-5: Alcohol-related fatalities, injuries and collisions
By month - 1993

	persons		collisions			
	killed	injured	fatal	injury	ppty dmg	total
January	19	767	14	506	438	958
February	17	710	15	453	399	867
March	14	788	13	520	459	992
April	22	926	19	610	460	1,089
May	24	1,085	24	700	494	1,218
June	19	899	17	572	395	984
July	27	1,130	25	685	535	1,245
August	45	1,007	38	605	448	1,091
September	37	929	30	567	427	1,024
October	38	1,029	35	630	481	1,146
November	21	827	16	536	425	977
December	23	925	21	597	516	1,134
Total	306	11,022	267	6,981	5,477	12,725

Source: WSP

Figure 2-2 shows that 26.1% of alcohol-related collisions but only 7.8% of all collisions occurred during the time period of 8 p.m. to 3 a.m. Fridays and Saturdays. This comparison shows an over-representation ratio of 3.3 for alcohol-related collisions during that period. Night shows an over-representation ratio of 2.5, and weekend (6 p.m. Friday through midnight Sunday) shows an over-representation ratio of 1.7.

Figure 2-2:
Percent of alcohol-related collisions & total collisions
By selected time periods - 1993



over-representation ratio: 1.7 2.5 3.3

Source: WSP

Location of single- and multiple-vehicle, alcohol-related collisions

Table 2-6 presents data on alcohol-related single and multiple-vehicle collisions in urban and rural areas (2,500 or more population designates urban). Urban multiple-vehicle collisions and rural single-vehicle collisions accounted for most of Washington State's 1993 alcohol-related traffic collisions, with 33.2% and 32.5% of the total. However, rural single-vehicle collisions were much more deadly, with 144 fatal collisions.

Table 2-6: Alcohol-related collisions - 1993
Urban/rural, single/multiple-vehicle by severity*

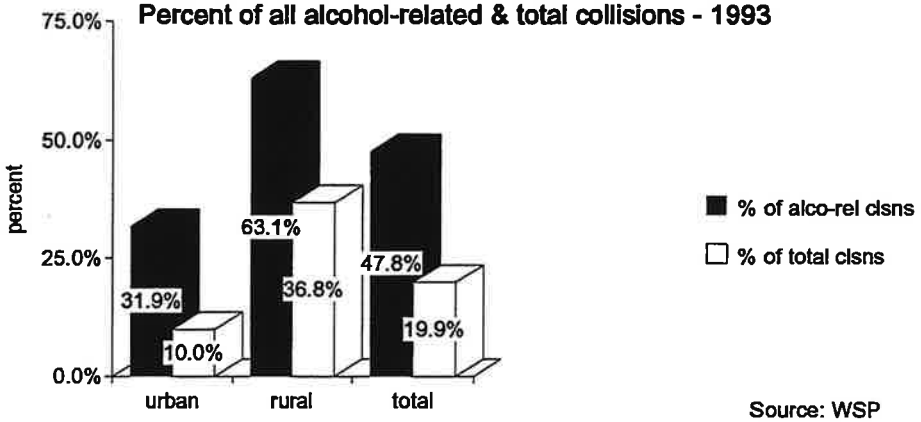
collisions	urban		rural		total
Single-vehicle					
Fatal	35	0.3%	144	1.1%	179
Injury	1,018	8.1%	2,429	19.3%	3,447
Prop dmg	943	7.5%	1,509	12.0%	2,452
Multiple-vehicle					
Fatal	18	0.1%	56	0.4%	74
Injury	2,043	16.3%	1,358	10.8%	3,401
Prop dmg	2,108	16.8%	893	7.1%	3,001
Total	6,165	49.1%	6,389	50.9%	12,554

Source: WSP

*Does not include collisions with pedestrians, bicyclists, trains or animals.

Single-vehicle collisions accounted for 19.9% of all collisions in the state in 1993. Of alcohol-related collisions, single-vehicle collisions made up a much larger percentage, 47.8%. In rural areas, single vehicle-collisions comprised 63.1% of all alcohol-related collisions (Figure 2-3).

Figure 2-3: **Single-vehicle collisions in urban & rural areas**
Percent of all alcohol-related & total collisions - 1993



Source: WSP

Alcohol-related collisions by highway type

Collisions involving alcohol by type of highway indicates that county roads have the highest number of fatal collisions, while city streets account for the most total collisions. "Other traffic ways" had the highest proportion of fatal collisions to total collisions, with 40.5 fatal collisions per 1,000 total collisions (Table 2-7).

Table 2-7: Alcohol-involved collisions and highway type
By severity - 1993

roadway type	fatal collisions	injury collisions	ppty dmg collisions	total collisions	fatal clsns per 1,000 collisions
County roads	123	2,186	1,438	3,747	32.8
State routes - rural	63	1,248	678	1,989	31.7
City streets	38	2,263	2,385	4,686	8.1
Interstate	22	620	452	1,094	20.1
State routes - urban	15	574	472	1,061	14.1
Other traffic ways*	6	90	52	148	40.5
Total	267	6,981	5,477	12,725	21.0

Source: WSP

*Includes parks/forest service roads. Does not include all-terrain-vehicle trails.

Drinking drivers

In fatal collisions, 34.8% of all drivers had been drinking. Of drivers in injury collisions and total collisions, 10.5% and 8.9% had been drinking, respectively (Table 2-8).

Table 2-8: Sobriety of drivers in collisions
By collision severity - 1993

sobriety of driver	fatal collisions		injury collisions		total collisions	
Had been drinking - ability impaired	243	30.5%	4,801	6.9%	8,283	5.5%
Had been drinking - ability not impaired	20	2.5%	1,086	1.6%	2,176	1.4%
Had been drinking - sobriety unknown	15	1.9%	1,424	2.1%	2,882	1.9%
Total drivers drinking	278	34.8%	7,311	10.5%	13,341	8.9%
Had not been drinking	520	65.2%	62,119	89.5%	136,766	91.1%
Total drivers with known sobriety	798	100.0%	69,430	100.0%	150,107	100.0%
Sobriety not stated	40	—	26,085	—	71,395	—

Source: WSP

Alcohol involvement by age group

Table 2-9 shows the number of "had been drinking" (including DUI) drivers involved in fatal, injury and total collisions in 1993. The age group of 20 to 24 had the highest number of drivers involved in fatal collisions with 70, and drivers under age 30 are over-represented relative to vehicle miles traveled.

Table 2-9: "Had been drinking" drivers in collisions
Fatal and total collisions by age - 1993

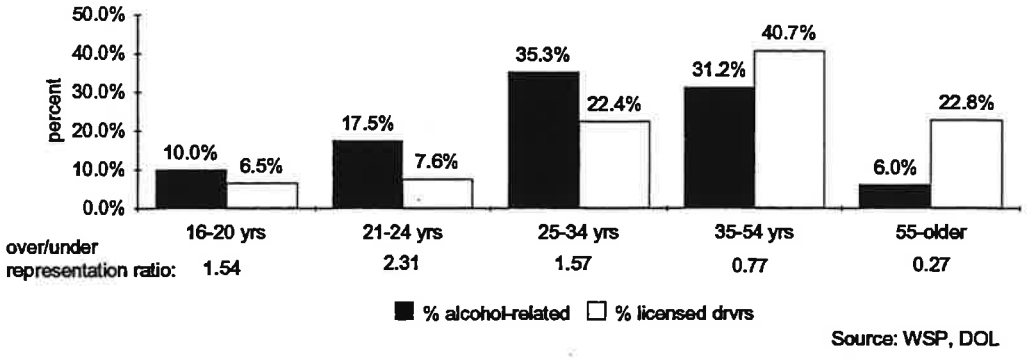
drivers	% of miles traveled*	fatal collisions	%	over-under ratio	total collisions	%	over-under ratio
15 & under	----	0	0.0%	----	32	0.2%	----
16-19	3.3%	24	8.6%	2.62	868	6.5%	1.97
20-24	8.5%	70	25.2%	2.98	2,682	20.1%	2.38
25-29	12.8%	48	17.3%	1.35	2,320	17.4%	1.36
30-34	14.9%	40	14.4%	0.97	2,226	16.7%	1.12
35-39	15.2%	31	11.2%	0.74	1,745	13.1%	0.86
40-44	12.8%	22	7.9%	0.62	1,151	8.6%	0.68
45-49	10.1%	20	7.2%	0.71	727	5.4%	0.54
50-54	6.8%	9	3.2%	0.48	396	3.0%	0.44
55-59	5.1%	3	1.1%	0.21	261	2.0%	0.38
60-64	3.8%	1	0.4%	0.09	178	1.3%	0.35
65-69	2.9%	3	1.1%	0.37	143	1.1%	0.37
70 & over	3.9%	4	1.4%	0.37	197	1.5%	0.38
Not stated	----	3	1.1%	----	415	3.1%	----
Male	56.0%	240	86.3%	1.54	10,398	77.9%	1.39
Female	44.0%	37	13.3%	0.30	2,697	20.2%	0.46
Sex not stated		1			246		
Total		278	100.0%		13,341	100.0%	

Source: WSP, USDOT

*Percent of miles traveled estimate from 1990 Nationwide Personal Transportation Study - USDO

Comparison of the percent of licensed drivers to the percent of alcohol-related collisions, shows drivers under 34 years of age to be over-represented. The 21-24 year age group had the highest over-representation ratio at 2.31 (Figure 2-4).

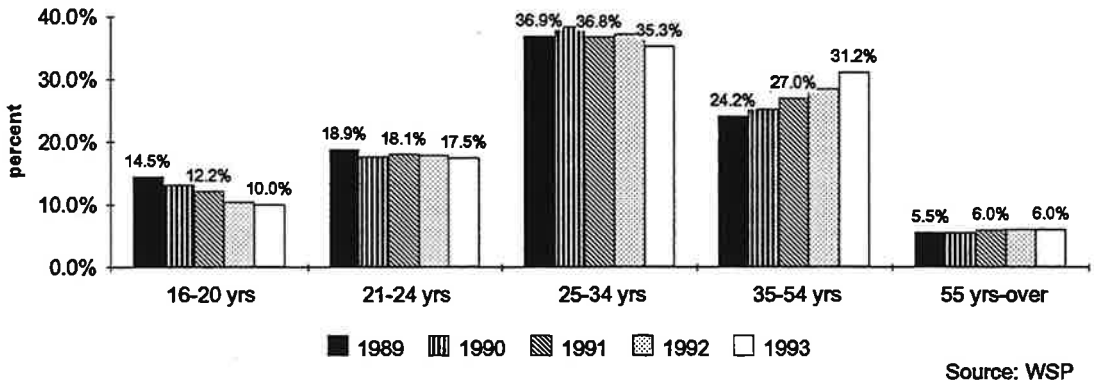
Figure 2-4: **Percent of all alcohol-related collisions & licensed drivers By age group - 1993**



Source: WSP, DOL

Figure 2-5 shows 5-year trends of drivers by age group involved in alcohol-related collisions. The 35 to 54 year group increased from 24.2% of all drivers involved in 1989 to 31.2% in 1993. In the 16-20 age group, the percent of drivers involved dropped from 14.5% in 1989 to 10.0% in 1993.

Figure 2-5: **Percent of total alcohol-related collisions by age group Five-year trend**



Source: WSP

Driver alcohol levels in collisions

Driver blood-alcohol concentration (BAC) levels in fatal and serious injury collisions by sex is presented in Table 2-10. The most frequent BAC level for both males and females was the .15-.19 range. Nearly 30% of BAC tests are at .20 and above. The second highest BAC range for both sexes was between .10 to .14 (Table 2-10).

Table 2-10: Driver alcohol levels in collisions
By sex - 1993

	BAC level						total	results	test
	.01-.04	.05-.09	.10-.14	.15-19	.20-.24	.25-up	results	n/avail	refused
Male drivers	381	977	2,236	2,667	1,537	819	8,617	1,938	2,432
Percent	4.4%	11.3%	25.9%	31.0%	17.8%	9.5%	100.0%		
Female drivers	109	261	615	791	523	300	2,599	602	761
Percent	4.2%	10.0%	23.7%	30.4%	20.1%	11.5%	100.0%		
Sex not stated	0	14	30	29	22	9	104	30	28
Total drivers	490	1,252	2,881	3,487	2,082	1,128	11,320	2,570	3,221
Percent	4.3%	11.1%	25.5%	30.8%	18.4%	10.0%	100.0%		

Source: WSP

Data on the BAC levels for drinking drivers in fatal crashes are shown in Figure 2-6. This figure shows drivers in fatal crashes who were tested for BAC from 1986 to 1993. The numbers of low BAC drivers has decreased significantly over the past eight years, while the numbers of higher BAC drivers in fatal crashes has shown improvement only over the last four years.

Figure 2-6:

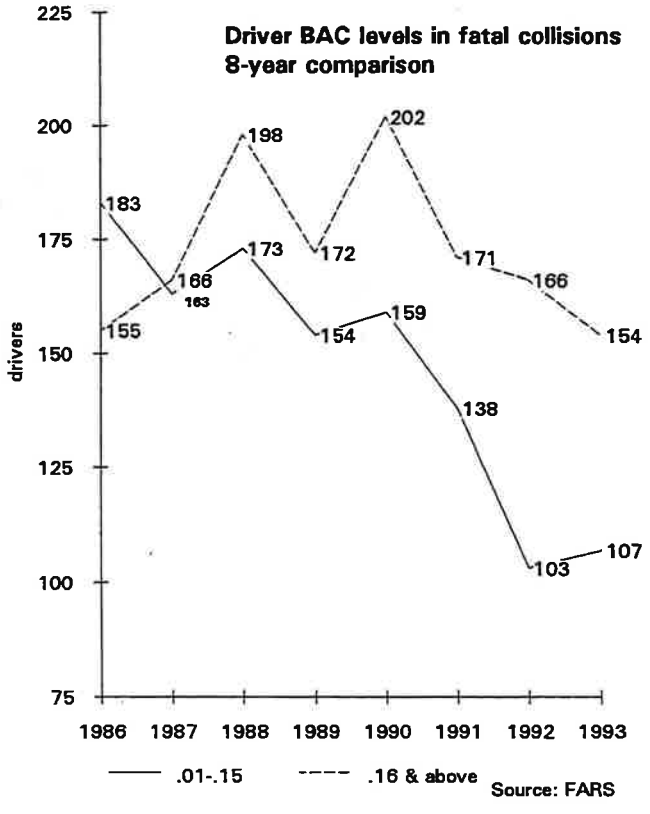


Table 2-11 presents the number of fatally injured drivers with positive tests for blood alcohol, and the average BAC levels of those drivers for the last 3 years as reported by the state toxicologist. The number of positive BAC, fatally injured drivers has gone down during the last three years, but the average BAC has gone up from 0.17 to 0.18. The highest average BAC level was in the 45-54 age group.

Table 2-11: Drivers with positive BAC readings who were killed
Three-year comparison - by age group

	1993		1992		1991		3-yr avg	
age group	dvrs	avg BAC	dvrs	avg BAC	dvrs	avg BAC	dvrs	avg BAC
16 - 20	16	0.15	12	0.13	20	0.18	16	0.15
21 - 24	33	0.18	39	0.18	31	0.17	34	0.18
25 - 34	53	0.19	55	0.19	62	0.17	57	0.18
35 - 44	33	0.17	40	0.20	30	0.21	34	0.19
45 - 54	18	0.25	9	0.23	18	0.18	15	0.22
55 - 64	3	0.17	5	0.13	8	0.18	5	0.16
65 & older	5	0.15	4	0.12	5	0.13	5	0.13
Total	161	0.18	164	0.17	174	0.17	166	0.17

Source: State Toxicologist

DUI & Physical Control Citations and Dispositions

The number of DUI citations filed in the state increased over the preceding year along with the number of persons who were found guilty. The number of reductions of cases also increased while the number of deferred prosecution and not guilty findings dropped (Table 2-12)

Table 2-12: Court dispositions for DUI & Physical Control
Ten-year comparison

	citations	guilty	reduced	deferred prosecution	not guilty
1984	37,897	18,463	4,936	6,151	1,008
1985	36,151	17,530	5,298	5,541	1,207
1986	38,041	19,086	5,506	5,431	723
1987	33,848	15,528	6,407	5,322	640
1988	34,920	14,605	6,071	6,085	565
1989	40,060	16,012	7,454	6,840	546
1990	42,075	15,800	7,969	7,906	499
1991	38,610	17,502	8,767	8,424	437
1992	44,144	20,682	9,420	9,879	529
1993	44,961	23,214	10,239	9,441	484

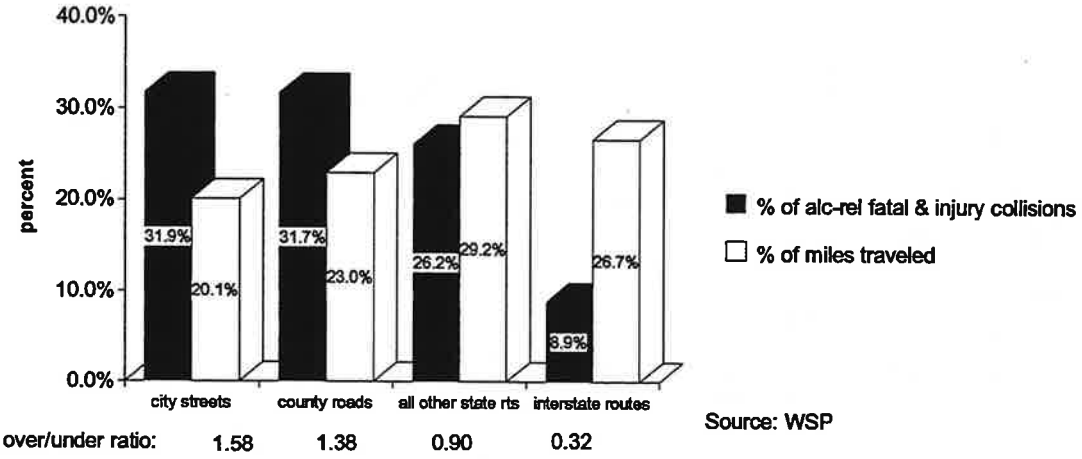
Source: OAC

Alcohol-involved fatal and injury collisions by street type

City streets and county roads have the highest percentage of alcohol-related injury and fatal collisions. When compared to the total miles traveled on those types of streets, they were over-represented by a factor of 1.58 and 1.38 respectively (Figure 2-7).

Figure 2-7:

Fatal and injury collisions involving alcohol
By roadway type - 1993



Source: WSP

Alcohol-related collisions by county and city

Table 2-13 compares total collisions with alcohol-related collisions by county. The highest percentage of alcohol-related collisions to total collisions was in San Juan County, where 23.2% of total collisions were alcohol-related. The lowest percentage was in King County, where 7.7% of collisions were alcohol-related.

Table 2-13: Alcohol-related collisions* vs total collisions
By county - 1993

county	fatal collisions	alc-related fatal collisions	percent alc-related	total collisions	alc-related collisions	percent alc-related
Adams	7	2	28.6%	396	51	12.9%
Asotin	1	0	0.0%	239	21	8.8%
Benton	9	8	88.9%	2,621	232	8.9%
Chelan	13	4	30.8%	1,407	145	10.3%
Clallam	6	2	33.3%	1,125	131	11.6%
Clark	34	16	47.1%	5,165	572	11.1%
Columbia	0	0	—	118	19	16.1%
Cowlitz	7	2	28.6%	2,125	249	11.7%
Douglas	9	4	44.4%	467	68	14.6%
Ferry	5	4	80.0%	135	23	17.0%
Franklin	13	8	61.5%	861	117	13.6%
Garfield	0	0	—	66	8	12.1%
Grant	17	8	47.1%	1,215	162	13.3%
Grays Harbor	14	5	35.7%	1,517	219	14.4%
Island	5	3	60.0%	826	100	12.1%
Jefferson	4	1	25.0%	478	51	10.7%
King	96	42	43.8%	43,785	3,368	7.7%
Kitsap	17	8	47.1%	4,035	557	13.8%
Kittitas	11	2	18.2%	1,256	105	8.4%
Klickitat	2	2	100.0%	365	53	14.5%
Lewis	14	6	42.9%	1,658	199	12.0%
Lincoln	1	0	0.0%	183	25	13.7%
Mason	7	2	28.6%	970	174	17.9%
Okanogan	7	6	85.7%	686	106	15.5%
Pacific	4	3	75.0%	413	80	19.4%
Pend Oreille	1	1	100.0%	195	27	13.8%
Pierce	55	29	52.7%	15,247	1,699	11.1%
San Juan	1	1	100.0%	164	38	23.2%
Skagit	15	6	40.0%	2,067	300	14.5%
Skamania	4	1	25.0%	255	33	12.9%
Snohomish	45	17	37.8%	10,795	1,285	11.9%
Spokane	38	16	42.1%	9,201	854	9.3%
Stevens	8	2	25.0%	545	89	16.3%
Thurston	23	12	52.2%	4,068	414	10.2%
Wahkiakum	2	1	50.0%	74	15	20.3%
Walla Walla	12	6	50.0%	999	101	10.1%
Whatcom	25	16	64.0%	2,923	367	12.6%
Whitman	4	1	25.0%	693	57	8.2%
Yakima	43	20	46.5%	4,627	611	13.2%
Total	579	267	46.1%	123,965	12,725	10.3%

* Includes DWI

Source: WSP

A five-year comparison of collisions by county where drivers "had been drinking" (including DUI) reveals that 4 counties experienced increases in alcohol-related collisions during 1993 compared to the previous 4-year average, and 35 counties recorded reductions (Table 2-14).

Table 2-14: Alcohol-involved collisions*
Five-year comparison by county

county	1993	1992	1991	1990	1989	prev 4-yr avg	'93 vs prev 4-yr avg
Adams	51	44	44	41	55	46	10.9%
Asotin	21	38	36	38	35	37	-42.9%
Benton	232	222	230	249	268	242	-4.2%
Chelan	145	159	170	180	230	185	-21.5%
Clallam	131	171	125	157	192	161	-18.8%
Clark	572	601	622	725	680	657	-12.9%
Columbia	19	21	22	20	30	23	-18.3%
Cowlitz	249	263	244	290	296	273	-8.9%
Douglas	68	56	67	63	58	61	11.5%
Ferry	23	46	34	51	43	44	-47.1%
Franklin	117	135	144	138	131	137	-14.6%
Garfield	8	3	5	5	5	5	77.8%
Grant	162	181	183	174	170	177	-8.5%
Grays Harbor	219	235	276	300	267	270	-18.7%
Island	100	124	124	138	122	127	-21.3%
Jefferson	51	67	80	96	85	82	-37.8%
King	3,368	3,769	4,044	4,530	4,663	4,252	-20.8%
Kitsap	557	667	705	721	699	698	-20.2%
Kittitas	105	121	134	133	142	133	-20.8%
Klickatat	53	60	64	63	54	60	-12.0%
Lewis	199	209	226	230	234	225	-11.5%
Lincoln	25	36	35	25	23	30	-16.0%
Mason	174	209	179	197	214	200	-12.9%
Okanogan	106	126	123	138	125	128	-17.2%
	80	80	88	92	89	87	-8.3%
Pend Oreille	27	27	39	42	42	38	-28.0%
Pierce	1,699	1,877	1,977	2,122	1,992	1,992	-14.7%
San Juan	38	39	37	44	42	41	-6.2%
Skagit	300	328	312	323	343	327	-8.1%
Skamania	33	44	41	48	41	44	-24.1%
Snohomish	1,285	1,375	1,551	1,729	1,672	1,582	-18.8%
Spokane	854	929	931	934	987	945	-9.7%
Stevens	89	101	93	94	104	98	-9.2%
Thurston	414	505	482	503	518	502	-17.5%
Wahkiakum	15	15	10	13	12	13	20.0%
Walla Walla	101	119	114	130	144	127	-20.3%
Whatcom	367	412	423	447	447	432	-15.1%
Whitman	57	63	77	63	102	76	-25.2%
Yakima	611	636	685	712	705	685	-10.7%
Total	12,725	14,113	14,776	15,998	16,061	15,237	-16.5%

* Includes DWI

Source: WSP

Tables 2-15 and 2-16 alcohol-related and DUI-related fatalities, injuries and collisions by county. Garfield County had no or alcohol-related fatalities or serious injuries in 1993.

Table 2-15: Alcohol-related* fatalities, injuries and collisions
By county and street type - 1993

		injuries				collisions				
county	killed	serious injury	evident injury	possible injury	total injuries	city streets	state routes**	county roads	other roads	total collisions
Adams	3	8	29	10	47	7	30	13	1	51
Asotin	0	1	18	2	21	4	6	11	0	21
Benton	11	23	75	63	161	113	73	45	1	232
Chelan	4	17	65	31	113	39	60	45	1	145
Clallam	2	12	59	23	94	28	68	33	2	131
Clark	17	82	231	190	503	145	148	274	5	572
Columbia	0	3	14	1	18	3	5	9	2	19
Cowlitz	2	23	99	82	204	116	80	51	2	249
Douglas	4	16	35	21	72	12	38	17	1	68
Ferry	7	5	15	5	25	2	10	11	0	23
Franklin	10	13	49	43	105	52	29	36	0	117
Garfield	0	0	3	1	4	1	4	2	1	8
Grant	8	26	84	32	142	29	71	60	2	162
Grays Harbor	5	35	88	44	167	61	103	43	12	219
Island	3	10	39	27	76	11	31	57	1	100
Jefferson	1	10	29	12	51	4	26	20	1	51
King	51	429	1,138	1,393	2,960	1,742	1,107	504	15	3,368
Kitsap	11	56	183	142	381	135	154	263	5	557
Kittitas	2	14	43	28	85	18	57	19	11	105
Klickatat	2	8	29	10	47	5	23	25	0	53
Lewis	8	33	100	48	181	34	86	78	1	199
Lincoln	0	1	8	6	15	0	16	9	0	25
Mason	2	44	67	65	176	14	71	83	6	174
Okanogan	7	22	47	18	87	12	33	57	4	106
Pacific	3	4	34	19	57	5	47	23	5	80
Pend Oreille	1	13	20	5	38	0	12	14	1	27
Pierce	32	171	716	767	1,654	609	514	571	5	1,699
San Juan	1	3	13	9	25	8	0	30	0	38
Skagit	6	27	138	74	239	64	133	100	3	300
Skamania	1	13	14	13	40	1	8	10	14	33
Snohomish	19	146	526	476	1,148	381	456	438	10	1,285
Spokane	16	122	344	280	746	433	203	217	1	854
Stevens	2	14	41	24	79	10	36	36	7	89
Thurston	12	30	164	118	312	151	75	184	4	414
Wahkiakum	1	3	12	2	17	0	11	4	0	15
Walla Walla	8	13	46	17	76	42	38	21	0	101
Whatcom	21	48	167	85	300	114	129	117	7	367
Whitman	1	8	14	8	30	18	23	16	0	57
Yakima	22	90	287	149	526	263	130	201	17	611
Total	306	1,596	5,083	4,343	11,022	4,686	4,144	3,747	148	12,725

* Includes DWI

** Includes interstate and U.S. routes.

Source: WSP

Table 2-16: DWI-related collisions, fatalities & injuries

By county and injury severity - 1993

county	fatalities	total injuries	serious injuries	evident injuries	possible injuries	collisions
Adams	3	38	7	23	8	33
Asotin	0	12	1	9	2	13
Benton	10	123	20	53	50	178
Chelan	4	83	16	46	21	96
Clallam	2	79	11	53	15	92
Clark	14	362	57	174	131	372
Columbia	0	14	3	10	1	11
Cowlitz	1	152	15	76	61	165
Douglas	4	65	14	32	19	59
Ferry	7	15	4	8	3	13
Franklin	9	69	7	36	26	76
Garfield	0	4	0	3	1	6
Grant	7	92	18	57	17	102
Grays Harbor	5	115	26	61	28	139
Island	3	48	7	29	12	56
Jefferson	1	28	5	17	6	29
King	46	1,849	308	750	791	1,974
Kitsap	11	274	40	141	93	390
Kittitas	2	62	14	29	19	67
Klickatat	2	36	8	22	6	38
Lewis	8	149	27	83	39	145
Lincoln	0	7	0	4	3	10
Mason	2	109	31	42	36	101
Okanogan	7	56	11	30	15	69
Pacific	2	39	3	24	12	46
Pend Oreille	1	23	11	10	2	15
Pierce	27	1,181	134	531	516	1,139
San Juan	1	16	3	9	4	20
Skagit	5	164	25	97	42	208
Skamania	1	35	13	11	11	25
Snohomish	17	858	123	400	335	878
Spokane	15	503	96	243	164	550
Stevens	2	46	8	28	10	52
Thurston	12	204	19	111	74	255
Wahkiakum	1	15	3	12	0	10
Walla Walla	8	63	11	42	10	72
Whatcom	19	219	43	134	42	254
Whitman	0	16	5	6	5	28
Yakima	20	380	66	218	96	418
Total	279	7,603	1,213	3,664	2,726	8,204

Source: WSP

Table 2-17 displays alcohol-related collisions in cities over 10,000 population. The highest alcohol-related collision rate was in Tukwila, with 28.6 per 10,000 population, based on 99 alcohol-related collisions. Kelso and Bremerton were next highest, with rates of 27.0 and 24.5, respectively.

Table 2-17: Severity of alcohol-related collisions*

Cities over 10,000 population** - 1993

	population	fatal	injury	ppty dmg only	total collisions	collision rate***
250,000 and over						
Seattle	527,700	15	719	625	1,359	11.8
100,000 to 250,000						
Spokane	183,800	4	266	214	484	11.6
Tacoma	181,200	5	366	276	647	15.2
50,000 to 100,000						
Bellevue	89,710	2	75	69	146	7.7
Everett	76,980	1	142	119	262	15.5
Federal Way	75,320	2	73	57	132	7.6
Yakima	59,580	1	81	94	176	15.8
Bellingham	55,480	2	50	64	116	11.5
Vancouver	55,450	2	87	71	160	12.8
25,000 to 50,000						
Kennewick	45,110	0	40	50	90	11.1
Renton	43,470	0	69	53	122	12.2
Kirkland	41,700	0	58	58	116	13.9
Kent	41,090	2	70	60	132	14.6
Redmond	40,095	0	31	26	57	6.5
Olympia	36,520	0	35	57	92	15.6
Bremerton	36,380	1	54	89	144	24.5
Auburn	34,550	1	58	38	97	11.0
Richland	34,080	1	17	27	45	7.9
Longview	32,650	0	43	45	88	13.8
Edmonds	30,970	0	25	18	43	5.8
Lynnwood	29,580	1	52	39	92	13.2
Walla Walla	28,820	0	13	29	42	10.1
Burien	27,800	0	25	25	50	9.0
Puyallup	26,140	2	19	32	53	12.2
15,000 to 25,000						
Bothell	24,530	1	20	21	42	8.6
Pullman	23,480	0	5	11	16	4.7
Wenatchee	23,000	0	17	22	39	9.6
Sea Tac	22,840	1	57	41	99	18.0
Lacey	22,660	0	26	30	56	13.2
Pasco	21,370	3	33	31	67	14.5
Mercer Island	21,260	0	10	10	20	4.7
Mount Vernon	20,450	1	15	19	35	9.3
Mountlake Terrace	19,880	2	19	23	44	11.6
Des Moines	19,460	0	18	8	26	4.1
Oak Harbor	18,930	0	6	8	14	4.2
Port Angeles	18,270	0	11	23	34	12.6
Bainbridge Island	17,200	0	3	10	13	5.8
Aberdeen	16,665	1	13	35	49	21.0
10,000 to 15,000						
Tukwila	14,660	1	56	42	99	28.6
Marysville	14,570	0	15	23	38	15.8
Mukilteo	14,035	0	8	9	17	6.4
Ellensburg	12,770	0	4	10	14	7.8
Centralia	12,380	0	15	18	33	14.5
Anacortes	12,260	0	19	18	37	14.7
Kelso	11,850	0	22	32	54	27.0
Moses Lake	11,700	0	13	16	29	13.7
Sunnyside	11,420	1	10	19	30	16.6
Tumwater	11,110	1	11	11	23	9.9

*Includes DWI

Source: WSP, OFM

**Includes collisions occuring on the interstate system

***Alcohol-related collisions per 10,000 population

III. Safety Restraint Use

Much of the restraint usage data in this summary are based upon collision investigation reports by law enforcement officers. Direct observation is usually not possible, so the investigating officer has to rely on questioning those involved as to their seat belt use. There is a tendency for occupants to falsely report compliance to avoid penalties. In this way, the reported usage rate becomes artificially inflated. The collision-based rates are best used for comparison purposes.

The best available estimates of actual restraint use are from observational surveys. These studies are limited to shoulder-belt use by drivers and front-window-seat occupants of passenger vehicles.

Observed safety restraint use

A steady increase in restraint usage in recent years has been associated with a reduction of 10.1% for 1993 in fatalities and 21.4 % in serious injuries from the previous 4-year average, as well as reductions in the fatal and injury rates per 100 million miles of travel. Observed belt use in passenger vehicles was 36% in 1986; it has more than doubled to 78% in 1993 (Table 3-1).

Table 3-1: Observed seatbelt use, deaths and injuries
Five-year comparison

	1993	1992	1991	1990	1989	prev 4-yr avg	'93 vs prev 4-yr avg
Observed SB use rate +	78%	73%	69%	**	55%	66%	17.9%
Fatal rate*	1.42	1.34	1.50	1.87	1.83	1.63	-13.0%
Serious injury rate*	12.31	13.43	14.98	17.33	18.84	16.14	-23.7%
Deaths	661	651	683	825	781	735	-10.1%
Serious injuries	5,713	6,531	6,839	7,653	8,044	7,267	-21.4%
Motor vehicle travel	46,426	48,644	45,663	44,157	42,696	45,290	2.5%

Source: WSP, DOT, WTSC

*Fatalities/serious injuries per 100 million miles of travel.
+Surveys performed May 1989, Sept. 1991, Sept. 1992 and Sept. 1993.
**1990 observational survey not performed

Western Washington occupants were observed wearing safety restraints at a rate of 80.4%, while Eastern Washington's rate was 70.1%. Both Western and Eastern Washington's rates increased over 1992, with increases of 10.2% and 7.2 % respectively. Interstate highway travel had the highest rate at 80.9 %, while city street use was lowest at 70.9% (Table 3-2).

Table 3-2: Observed belt use
Two-year comparison* by roadway characteristics

characteristic	1993	1992	1991	prev 2-yr avg	'93 vs prev 2-yr avg
Western Washington	80.4%	75.6%	70.3%	73.0%	10.2%
Eastern Washington	70.1%	66.5%	64.3%	65.4%	7.2%
Three or more lanes+	82.5%	76.5%	72.9%	74.7%	10.4%
Two lanes+	73.7%	69.4%	68.3%	68.9%	7.0%
One lane+	72.4%	67.5%	60.9%	64.2%	12.8%
Interstate highways	80.9%	75.4%	71.9%	73.7%	9.8%
County roads	66.5%	60.1%	71.8%	66.0%	0.8%
US routes	73.0%	68.3%	67.2%	67.8%	7.7%
State routes	74.4%	69.7%	66.1%	67.9%	9.6%
City streets	70.9%	62.3%	62.5%	62.4%	13.6%
Commuter rush hours	77.0%	72.2%	70.5%	71.4%	7.9%
Non-rush hours	77.7%	73.6%	67.8%	70.7%	9.9%
Average speed 20 mph	68.7%	61.6%	62.1%	61.9%	11.1%
Average speed 40 mph	72.0%	66.5%	64.0%	65.3%	10.3%
Average speed 60 mph	79.2%	74.4%	72.3%	73.4%	8.0%

Source: WTSC

* Observational surveys performed in September of each year.
\+ For one direction of travel

Types of restraints used

Tables 3-3 and 3-4 summarize the types of restraint systems used and severity of injuries sustained. Table 3-3 demonstrates that the likelihood of fatalities and serious injuries is lower for occupants using some type of restraint system. Persons in collisions wearing some type of restraint had a 0.1% chance of being killed, whereas persons with no restraint used had a 1.5% likelihood of being killed. Table 3-4 analyses restraint systems used in collisions by various age groupings.

Table 3-3: Types of restraints used in collisions
By severity of injury - 1993

restraint type	killed	serious injury	evident injury	possible injury	no injury	total
Lap & shoulder belt	134	2,061	10,476	24,892	119,742	157,305
Lap belt	19	322	1,854	2,906	17,673	22,774
Shoulder belt	8	77	280	500	3,170	4,035
Child restraint	3	17	163	243	3,342	3,768
Air bag*/ belted	3	32	162	103	181	481
Air bag*/ no blt	2	6	20	14	19	61
Total restraints	169	2,515	12,955	28,658	144,127	188,424
Percent	0.1%	1.3%	6.9%	15.2%	76.5%	100.0%
No restraints	314	1,574	4,995	3,881	9,718	20,482
Percent	1.5%	7.7%	24.4%	18.9%	47.4%	100.0%

* Air bag activated

Source: WSP

Table 3-4: Types of safety restraints used in collisions
By occupant age - 1993

age	lap & shldr belt	shldr belt	lap belt	child restraint	total used	restraint not used	% used	air bag* w/rstrnt	air bag* no rstrnt
Under 1	120	6	24	803	953	47	95.3%	1	0
1	181	7	84	1,054	1,326	69	95.1%	1	1
2	368	10	275	909	1,562	109	93.5%	2	0
3	573	22	432	450	1,477	125	92.2%	0	0
4	649	24	498	205	1,376	128	91.5%	1	0
5	663	21	474	78	1,236	127	90.7%	0	0
6 - 10	2,810	61	1,976	47	4,894	663	88.1%	2	0
11 - 15	4,369	121	1,941	--	6,431	1,335	82.8%	6	0
16 - 20	20,686	627	3,238	--	24,551	3,813	86.6%	30	5
21 - 24	21,770	553	2,360	--	24,683	3,718	86.9%	49	10
25 - 29	17,901	468	2,009	--	20,378	2,340	89.7%	48	12
30 - 64	70,931	1,716	7,424	--	80,071	6,433	92.6%	256	28
65 & over	11,795	282	1,028	--	13,105	857	93.9%	80	4
Unknown	2,854	91	586	164	3,695	597	86.1%	4	1
Total	155,670	4,009	22,349	3,710	185,738	20,361	90.1%	480	61

*Air bag activated. Numbers not included with total restraints used. Source: WSP, WSDOT

Male-female safety restraint usage in collisions

Female occupants in collisions reported using restraints more often than male occupants. Percentages for all groups have increased steadily over the past 5 years, with male passengers showing the biggest increase with 8.1% over the previous 4-year average (Table 3-5).

Table 3-5: Percent of safety restraint usage rates in collisions*
Five-year comparison by sex

occupant	1993	1992	1991	1990	1989	prev 4-yr avg	'93 vs prev 4-yr avg
Male driver	90.9%	89.8%	88.3%	85.5%	81.4%	86.3%	5.4%
Female driver	93.9%	93.2%	92.2%	89.4%	86.0%	90.2%	4.1%
Male passenger	83.9%	82.3%	79.9%	76.4%	71.9%	77.6%	8.1%
Female passenger	88.1%	87.3%	85.9%	83.4%	79.0%	83.9%	5.0%

*Excludes occupants where restraint use was unknown Source: WSP

Restraint use by seat position

Drivers are the most frequent users of safety restraints, followed by occupants riding in the right front seat. Mid-front and mid-back occupants continue to have the lowest rates, except for the "other" position, which includes positions in non-designated areas such as the back of station wagons and truck beds (Table 3-6).

Table 3-6: Percentage of restraint use by occupant seat position
Five-year comparison

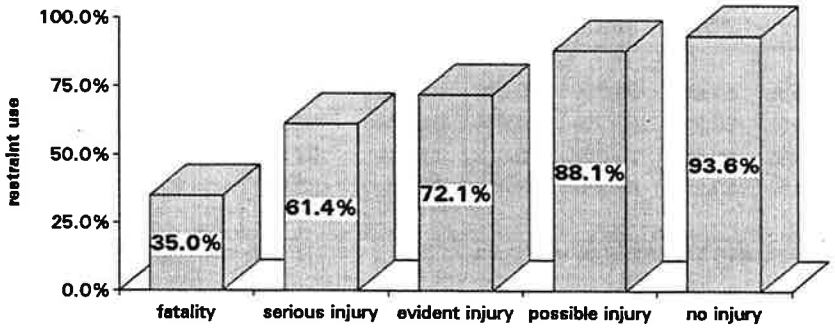
occupants	1993	1992	1991	1990	1989	prev 4-yr avg	'93 vs prev 4-yr avg
Driver	91.9%	91.0%	89.6%	86.8%	82.9%	87.6%	4.9%
Mid-front	71.2%	70.1%	67.4%	62.1%	57.0%	64.2%	11.0%
Right-front	88.5%	87.5%	85.7%	82.5%	78.3%	83.5%	6.0%
Left-back	87.3%	85.9%	84.6%	81.3%	78.4%	82.6%	5.8%
Mid-back	80.7%	79.2%	75.1%	73.0%	68.9%	74.1%	9.0%
Right-back	88.0%	86.3%	85.0%	82.8%	78.4%	83.1%	5.9%
Other*	47.4%	47.2%	40.9%	39.2%	31.6%	39.7%	19.3%
Average	79.3%	78.2%	75.5%	72.5%	67.9%	73.5%	7.8%

*Primarily includes third seat of van or station wagon. Source: WSP

Safety restraint use and injury severity

Figure 3-1 shows that there was a higher percentage of safety-restraint use for persons who received no injuries or minor injuries in collisions. Conversely, there was a lower safety-restraint use rate for persons who were fatality or seriously injured.

Figure 3-1:
Safety restraint use* and injury severity - 1993



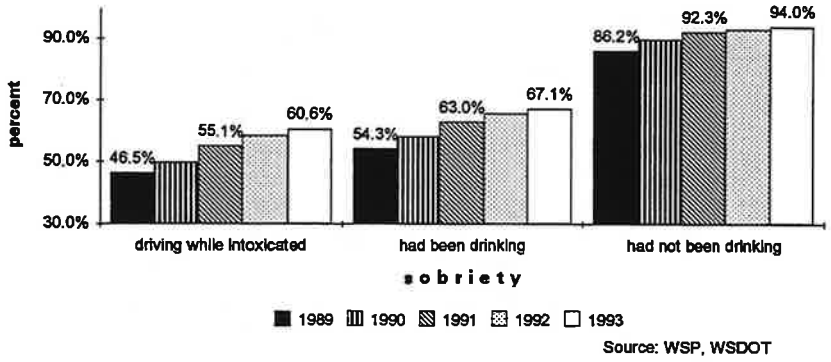
* Includes lap belts, shoulder straps, child restraints and airbags

Source: WSP

Restraint use by sobriety

Among drivers involved in 1993 collisions, those who had been drinking were less likely to be wearing restraints than non-drinking drivers. The restraint usage rate for the non-drinking category was reported at 94.0%. Those drinking had a much lower usage rate, with 60.6% for drivers under the influence and 67.1% for all drivers who had been drinking. Drivers in all three categories have recorded increasing use rates over the past five years (Figure 3-2).

Figure 3-2:
Restraint use by drivers in collisions
Five-year comparison by sobriety

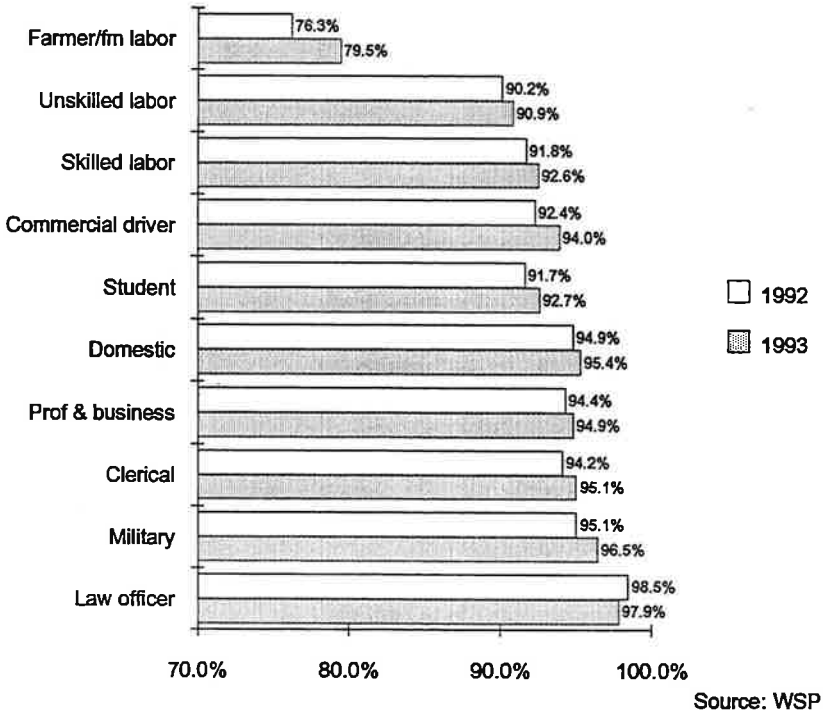


Source: WSP, WSDOT

Restraint use by driver occupation

Law enforcement officers and military personnel reported the highest restraint usage rates for 1993 with 97.9% and 96.5% respectively. Farmers and farm laborers reported the lowest rate with 79.5%. All occupation classes except law enforcement experienced increases in usage compared to 1992 (Figure 3-3).

Figure 3-3:
Safety restraint use in collisions
By driver occupation - two-year comparison



Source: WSP

Ejection of motor vehicle occupants

Table 3-7 compares occupants ejected during a crash with total occupants in collisions. Overall, 18.2% of persons ejected from a vehicle were killed, compared to 0.2% of all occupants in collisions killed. Persons ejected had 99.8 times greater likelihood of being killed than total persons in collisions. In all age groups, the percentage of total occupants killed in collisions was much less than the percentage of persons killed when ejected from the vehicle.

Table 3-7: Ejection of motor vehicle occupants*
Total or partial ejection; by age group - 1993

	occupants ejected			total occupants in collisions			
age	occupant	killed	% killed	occupant	killed	% killed	ratio **
0 - 4	33	1	3.0%	7,889	11	0.1%	21.73
5 - 9	21	1	4.8%	6,321	3	0.0%	100.33
10 - 14	35	2	5.7%	6,881	3	0.0%	131.07
15 - 20	230	41	17.8%	38,281	98	0.3%	69.63
21 - 24	221	46	20.8%	36,390	99	0.3%	76.51
25 - 29	132	22	16.7%	29,641	54	0.2%	91.48
30 - 64	278	63	22.7%	115,522	191	0.2%	137.07
65 & ovr	22	5	22.7%	18,378	71	0.4%	58.83
Unknown age	22	0		33,391	4		
Total	994	181	18.2%	292,694	534	0.2%	99.81

* Includes total and partial ejection - does not include motorcyclists Source: WSDOT
** Percentage of fatals in ejections to percentage of fatals in total collisions

Safety restraint use by county and city

King County reported the highest safety-restraint usage rate in 1993 collisions with 93.6%, up 4.3% from the previous 4-year average. Columbia County had the lowest usage rate with 69.7%. Nine counties had reductions in their usage rates from 1992 and three dropped below the previous four-year averages. San Juan County experienced the largest increase of usage, up 27.3% from the previous 4-year average (Table 3-8).

Table 3-8: Restraint use* in investigated collisions
Five-year comparison - by county

county	1993	1992	1991	1990	1989	prev 4-yr avg	'93 vs prev 4-yr avg
Adams	83.2	79.5	82.6	75.6	71.4	77.3	7.7%
Asotin	77.9	66.7	67.7	54.9	57.8	61.8	26.1%
Benton	90.7	87.2	87.0	82.2	75.0	82.9	9.5%
Chelan	89.3	89.7	88.6	83.7	81.3	85.8	4.0%
Clallam	90.4	86.9	85.2	82.1	76.8	82.8	9.2%
Clark	88.1	86.2	86.0	80.4	75.0	81.9	7.6%
Columbia	69.7	72.1	76.1	67.9	67.7	71.0	-1.8%
Cowlitz	84.6	84.4	82.8	76.2	72.9	79.1	7.0%
Douglas	82.4	84.3	84.1	79.4	77.7	81.4	1.3%
Ferry	68.4	70.9	71.4	73.4	63.2	69.7	-1.9%
Franklin	81.7	77.8	75.6	70.6	68.5	73.1	11.7%
Garfield	77.3	69.8	79.2	57.6	65.7	68.1	13.6%
Grant	83.1	81.6	77.6	75.4	69.3	76.0	9.4%
Grays Harbor	81.5	78.4	76.6	74.3	67.5	74.2	9.8%
Island	92.3	89.5	90.6	89.2	85.4	88.7	4.1%
Jefferson	83.9	84.8	80.5	79.3	75.4	80.0	4.9%
King	93.6	92.5	91.4	89.1	86.0	89.8	4.3%
Kitsap	90.2	89.1	87.1	84.2	81.2	85.4	5.6%
Kittitas	88.9	85.8	85.6	81.4	78.2	82.8	7.4%
Klickitat	74.1	78.6	79.2	72.5	72.7	75.8	-2.2%
Lewis	88.3	86.6	86.0	81.6	77.1	82.8	6.6%
Lincoln	86.1	75.1	74.9	80.7	73.9	76.2	13.1%
Mason	85.3	83.3	81.6	76.7	70.0	77.9	9.5%
Okanogan	78.1	74.7	69.5	67.6	62.0	68.5	14.1%
Pacific	85.4	82.9	81.7	75.0	71.9	77.9	9.7%
Pend Oreille	77.9	76.9	71.1	67.6	58.8	68.6	13.6%
Pierce	90.5	89.3	87.8	85.2	80.0	85.6	5.8%
San Juan	78.7	78.0	59.7	52.7	56.8	61.8	27.3%
Skagit	88.6	87.4	82.9	81.9	77.6	82.5	7.5%
Skamania	82.0	81.0	83.7	70.9	70.7	76.6	7.1%
Snohomish	90.5	90.0	87.6	85.1	80.2	85.7	5.6%
Spokane	88.8	89.8	84.4	84.8	82.4	85.4	4.0%
Stevens	73.9	75.6	77.1	67.0	57.5	69.3	6.6%
Thurston	91.7	90.3	87.9	85.1	82.6	86.5	6.0%
Wahkiakum	86.2	82.6	85.1	82.9	81.8	83.1	3.7%
Walla Walla	84.0	82.2	80.5	76.6	72.0	77.8	7.9%
Whatcom	90.5	89.8	89.9	86.7	81.6	87.0	4.0%
Whitman	88.5	87.9	84.9	81.7	79.4	83.5	6.0%
Yakima	82.5	82.9	79.5	76.0	68.7	76.8	7.5%

Source: WSP

*Includes lap belts, shoulder straps, child restraints and air bags.

Table 3-9 displays safety restraint use and injury severity in Washington cities with populations over 10,000. Table 3-10 provides these comparisons for counties in Washington. In most cases, the percentage of safety-restraint use is lower as injury severity increases.

Table 3-9: Restraint use * and severity of injuries
Cities over 10,000 - 1993 **

	fatality			serious injury			evident/possble injury			no injury		
city	used	n/used	pct	used	n/used	pct	used	n/used	pct	used	n/used	pct
250,000 and over												
Seattle	9	16	36.0%	315	115	73.3%	6,028	748	89.0%	19,823	837	95.9%
100,000 to 250,000												
Spokane	1	2	33.3%	114	48	70.4%	1,584	342	82.2%	4,857	367	93.0%
Tacoma	3	7	30.0%	134	59	69.4%	2,742	562	83.0%	7,886	572	93.2%
50,000 to 100,000												
Bellevue	0	0	—	12	3	80.0%	1,064	87	92.4%	4,050	109	97.4%
Everett	0	1	0.0%	16	20	44.4%	846	163	83.8%	3,329	234	93.4%
Federal Way	1	5	16.7%	40	9	81.6%	683	88	88.6%	2,203	96	95.8%
Yakima	0	1	0.0%	18	15	54.5%	589	159	78.7%	2,752	246	91.8%
Bellingham	1	2	33.3%	14	13	51.9%	389	50	88.6%	1,868	92	95.3%
25,000 to 50,000												
Vancouver	1	0	100.0%	21	15	58.3%	490	95	83.8%	1,994	168	92.2%
Kennewick	0	0	—	25	4	86.2%	309	53	85.4%	1,966	125	94.0%
Renton	0	0	—	54	20	73.0%	510	58	89.8%	2,365	94	96.2%
Kirkland	0	0	—	14	10	58.3%	467	49	90.5%	1,695	61	96.5%
Kent	0	2	0.0%	33	17	66.0%	615	86	87.7%	2,227	118	95.0%
Redmond	0	0	—	13	3	81.3%	221	20	91.7%	1,232	23	98.2%
Bremerton	2	0	100.0%	53	14	79.1%	327	64	83.6%	1,570	136	92.0%
Olympia	0	0	—	6	7	46.2%	370	65	85.1%	2,216	103	95.6%
Auburn	1	0	100.0%	37	12	75.5%	303	54	84.9%	1,404	93	93.8%
Richland	0	1	0.0%	17	6	73.9%	205	29	87.6%	1,121	63	94.7%
Longview	1	0	100.0%	5	10	33.3%	299	94	76.1%	1,228	154	88.9%
Edmonds	0	0	—	4	1	80.0%	196	19	91.2%	677	35	95.1%
Lynnwood	1	1	50.0%	10	2	83.3%	486	48	91.0%	1,963	92	95.5%
Walla Walla	1	0	100.0%	5	4	55.6%	120	38	75.9%	703	102	87.3%
Puyallup	1	2	33.3%	14	3	82.4%	225	49	82.1%	1,148	74	93.9%
15,000 to 25,000												
Pullman	0	0	—	2	2	50.0%	55	15	78.6%	480	34	93.4%
Sea Tac	0	1	0.0%	19	12	61.3%	344	66	83.9%	1,215	68	94.7%
Wenatchee	0	1	0.0%	6	1	85.7%	119	22	84.4%	570	51	91.8%
Lacey	1	0	100.0%	9	1	90.0%	277	38	87.9%	1,254	55	95.8%
Mercer Island	0	0	—	2	2	50.0%	88	5	94.6%	334	11	96.8%
Pasco	1	3	25.0%	8	10	44.4%	147	67	68.7%	648	79	89.1%
Mountlake Terrace	1	0	100.0%	0	1	0.0%	133	27	83.1%	459	25	94.8%
Mount Vernon	0	1	0.0%	3	0	100.0%	143	23	86.1%	713	49	93.6%
Oak Harbor	0	0	—	3	2	60.0%	48	8	85.7%	286	14	95.3%
Des Moines	0	0	—	1	7	12.5%	82	19	81.2%	305	13	95.9%
Port Angeles	0	0	—	1	2	33.3%	93	20	82.3%	648	34	95.0%
Bainbridge Island	0	0	—	0	1	0.0%	43	8	84.3%	203	11	94.9%
Aberdeen	1	0	100.0%	1	4	20.0%	90	20	81.8%	693	68	91.1%
10,000 to 15,000												
Tukwila	1	0	100.0%	32	5	86.5%	504	72	87.5%	1,684	64	96.3%
Mukilteo	0	0	—	1	0	100.0%	59	9	86.8%	315	5	98.4%
Bothell	0	1	0.0%	11	2	84.6%	185	22	89.4%	609	23	96.4%
Marysville	0	0	—	1	1	50.0%	77	16	82.8%	462	22	95.5%
Ellensburg	0	0	—	0	1	0.0%	36	8	81.8%	248	14	94.7%
Centralia	0	0	—	13	4	76.5%	129	18	87.8%	732	44	94.3%
Anacortes	0	0	—	3	1	75.0%	38	11	77.6%	225	22	91.1%
Kelso	0	0	—	5	3	62.5%	124	29	81.0%	494	63	88.7%
Moses Lake	0	0	—	3	2	60.0%	85	21	80.2%	514	42	92.4%
Sunnyside	1	0	100.0%	3	2	60.0%	23	34	40.4%	155	34	82.0%
Tumwater	0	0	—	6	0	100.0%	83	10	89.2%	438	17	96.3%

* Includes lap belts, shoulder straps, child restraints and air bags.

Source: WSP

** Includes collisions occuring on the interstate system

Table 3-10: Restraint use* and severity of injuries
By county - 1993

	fatality			serious injury			evident/possble injury			no injur		
	used	n/used	pct	used	n/used	pct	used	n/used	pct	used	n/used	pct
Adams	3	3	50.0%	15	13	53.6%	148	48	75.5%	428	56	88.4%
Asotin	2	0	100.0%	3	4	42.9%	42	31	57.5%	258	53	83.0%
Benton	0	10	0.0%	55	31	64.0%	693	156	81.6%	3,700	260	93.4%
Chelan	6	5	54.5%	42	17	71.2%	430	104	80.5%	1,561	120	92.9%
Clallam	2	2	50.0%	13	13	50.0%	302	85	78.0%	1,475	90	94.2%
Clark	16	12	57.1%	96	76	55.8%	1,603	395	80.2%	5,583	504	91.7%
Columbia	0	0	—	3	3	50.0%	24	13	64.9%	72	27	72.7%
Cowlitz	4	1	80.0%	29	37	43.9%	672	218	75.5%	2,463	326	88.3%
Douglas	2	5	28.6%	18	16	52.9%	158	57	73.5%	444	56	88.8%
Ferry	1	5	16.7%	2	5	28.6%	20	18	52.6%	44	3	93.6%
Franklin	8	8	50.0%	17	17	50.0%	230	112	67.3%	869	116	88.2%
Garfield	0	0	—	0	1	0.0%	19	3	86.4%	39	13	75.0%
Grant	4	11	26.7%	45	35	56.3%	333	146	69.5%	1,359	162	89.3%
Grays Harbor	3	5	37.5%	30	42	41.7%	344	174	66.4%	1,470	199	88.1%
Island	3	2	60.0%	33	15	68.8%	280	52	84.3%	981	42	95.9%
Jefferson	1	3	25.0%	23	7	76.7%	153	64	70.5%	469	50	90.4%
King	24	49	32.9%	853	349	71.0%	14,343	1,955	88.0%	49,662	2,127	95.9%
Kitsap	8	7	53.3%	109	53	67.3%	1,568	299	84.0%	5,335	408	92.9%
Kittitas	5	5	50.0%	25	16	61.0%	350	102	77.4%	1,368	96	93.4%
Klickitat	0	2	0.0%	6	8	42.9%	76	62	55.1%	278	52	84.2%
Lewis	4	8	33.3%	55	42	56.7%	496	136	78.5%	2,025	156	92.8%
Lincoln	0	1	0.0%	6	4	60.0%	55	21	72.4%	200	16	92.6%
Mason	2	7	22.2%	41	41	50.0%	357	98	78.5%	917	81	91.9%
Okanogan	0	4	0.0%	16	18	47.1%	160	85	65.3%	556	98	85.0%
Pacific	0	4	0.0%	1	6	14.3%	114	38	75.0%	372	35	91.4%
Pend Oreille	0	1	0.0%	12	5	70.6%	45	29	60.8%	140	21	87.0%
Pierce	15	26	36.6%	301	174	63.4%	6,337	1,299	83.0%	19,034	1,214	94.0%
San Juan	0	0	—	4	4	50.0%	25	16	61.0%	124	23	84.4%
Skagit	1	12	7.7%	20	23	46.5%	740	198	78.9%	2,642	207	92.7%
Skamania	0	3	0.0%	3	7	30.0%	55	17	76.4%	223	33	87.1%
Snohomish	11	18	37.9%	142	102	58.2%	3,932	802	83.1%	13,227	917	93.5%
Spokane	10	19	34.5%	189	120	61.2%	2,679	637	80.8%	8,138	617	93.0%
Stevens	0	6	0.0%	16	26	38.1%	174	96	64.4%	361	67	84.3%
Thurston	6	11	35.3%	55	39	58.5%	1,460	306	82.7%	5,751	303	95.0%
Wahkiakum	1	0	100.0%	2	1	66.7%	33	8	80.5%	58	6	90.6%
Walla Walla	6	9	40.0%	26	22	54.2%	261	88	74.8%	1,162	159	88.0%
Whatcom	10	16	38.5%	83	49	62.9%	983	217	81.9%	3,830	234	94.2%
Whitman	2	1	66.7%	18	20	47.4%	202	44	82.1%	804	68	92.2%
Yakima	9	33	21.4%	84	105	44.4%	1,263	571	68.9%	5,023	647	88.6%
Total	169	314	35.0%	2,491	1,566	61.4%	41,159	8,800	82.4%	142,445	9,662	93.6%

*Includes lap belts, shoulder straps, child restraints and air bags.

Source: WSP, DOT

IV. Youthful Driver Involvement

The number of youthful drivers (24 years of age and younger) involved in traffic collisions has decreased for the fifth consecutive year. There were 52,215 youthful drivers involved in 46,189 traffic collisions in 1993. Fatal, injury, and total collisions involving youth declined 6.1%, 2.8% and 7.0%, respectively, from the previous 4-year averages. The fatal collision rate (fatal collisions involving youthful drivers per 10,000 licensed youthful drivers) decreased 11.3% from the previous 4-year average (Table 4-1).

Table 4-1: Collisions involving youthful drivers (24 & younger)
Five-year comparison

collisions & rates	1993	1992	1991	1990	1989	prev 4-yr avg	'93 vs prev 4-yr avg
Total collisions	46,189	47,588	48,564	50,906	51,507	49,641	-7.0%
Fatal collisions	223	219	221	261	249	238	-6.1%
Injury collisions	20,909	21,172	20,922	21,798	22,127	21,505	-2.8%
Property damage only***	25,057	26,197	27,421	28,847	29,131	27,899	-10.2%
Persons killed**	274	243	255	301	287	272	0.9%
Total injuries**	33,275	33,805	32,546	34,225	34,449	33,756	-1.4%
Serious injuries	2,465	2,805	3,017	3,409	3,811	3,261	-24.4%
Evident injuries	10,824	11,139	11,131	11,927	12,837	11,759	-7.9%
Possible injuries	19,986	19,861	18,398	18,889	17,801	18,737	6.7%
Youth licensed drivers	533,114	527,379	518,047	481,691	496,433	505,888	5.4%
Youth drivers in clsns	52,215	54,066	55,559	58,026	58,689	56,585	-7.7%
Total collision rate*	866.4	902.3	937.4	1,056.8	1,037.5	983.5	-11.9%
Fatal collision rate*	4.2	4.2	4.3	5.4	5.0	4.7	-11.3%

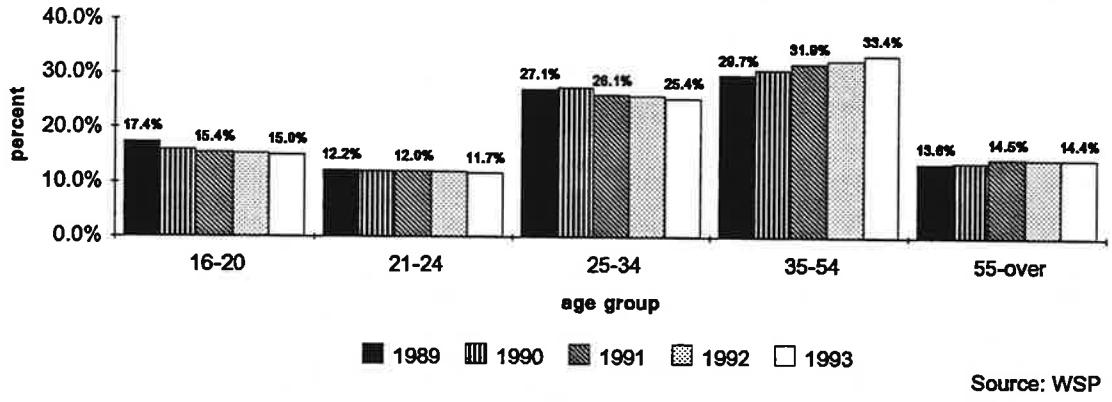
*Fatal collisions/total collisions per 10,000 youthful licensed drivers
Source: WSP, DOL
**All persons killed/injured in collisions involving youthful drivers
***Damage over $500

Collision involvement by driver age

The youthful age group 16-20 continues to show a consistent decrease over the past five years in percentage of collision involvement, while drivers age 35-54 have had an increasing percentage involvement (Figure 4-1).

Figure 4-1:

Percent of collisions by driver age groups
Five-year trend

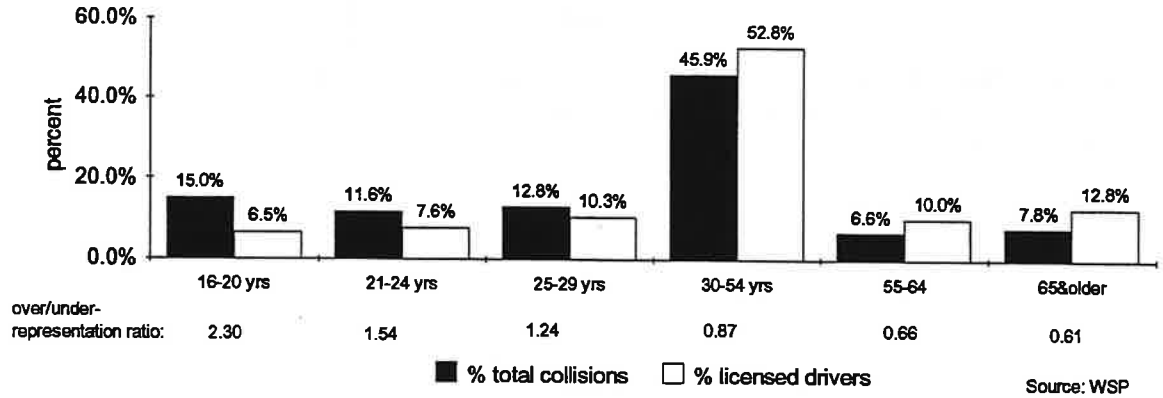


Source: WSP

The 16-20 year age group was involved in 15.0% of all collisions and made up 6.5% of the state's licensed drivers, creating an over-representation ratio of 2.30. The 21-24 year age group was over-represented by a ratio of 1.54 (Figure 4-2).

Figure 4-2:

Percent of total collisions & total licensed drivers
By age groups - 1993



Source: WSP

Youthful drivers in collisions by first harmful event

Of total collisions involving youthful drivers, 76.0% were with other moving vehicles and 14.5% were collisions with fixed/other objects. Of fatal collisions involving youthful drivers, crashes with other moving vehicles accounted for 42.2% and 27.8% were with fixed/other objects. Nearly half of youthful-driver, fatal collisions were single-vehicle crashes (Table 4-2).

Table 4-2: Collisions involving youthful drivers*
By first harmful event - 1993

type of collision	fatal collisions		injury collisions		total collisions	
Collision w/other moving motor vehicles	94	42.2%	15,740	75.3%	35,095	76.0%
Collision w/fixed/other object	62	27.8%	1,191	5.7%	6,695	14.5%
Overturning & other non-collision	42	18.8%	3,032	14.5%	2,086	4.5%
Collisions w/pedestrians & pedalcyclists	22	9.9%	597	2.9%	626	1.4%
Collision w/parked vehicle	2	0.9%	314	1.5%	1,424	3.1%
Other collisions - animal & R.R. train	1	0.4%	35	0.2%	263	0.6%
Total	223	100.0%	20,909	100.0%	46,189	100.0%

*Drivers 24 and younger

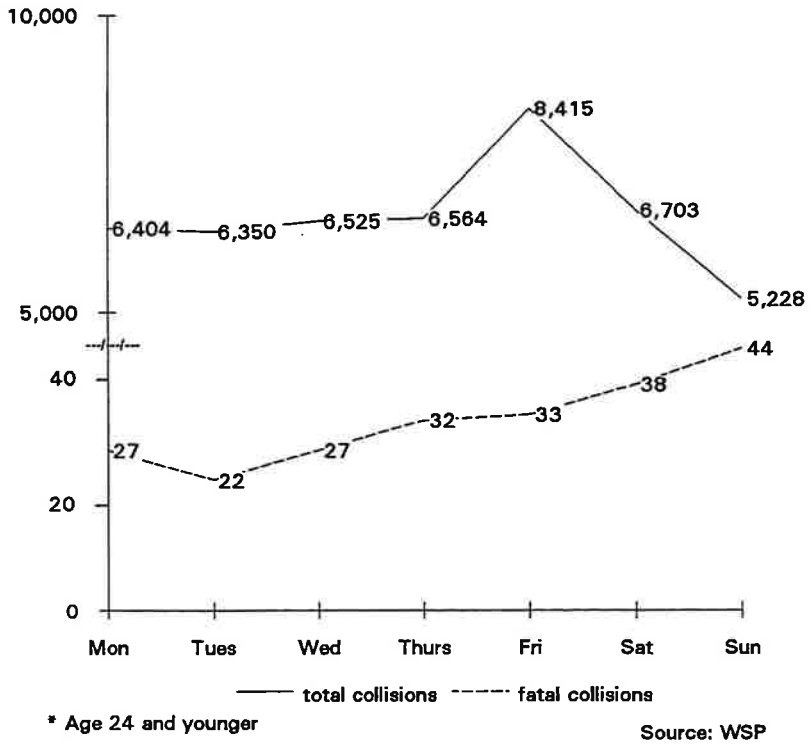
Source: WSP

Youthful drivers involvement by day of week, time of day, month of year

During 1993, Sunday (including Saturday night after 12 midnight) was the day of the week accounting for the highest number of fatal collisions. Friday recorded the highest number of total reported collisions (Figure 4-3).

Figure 4-3:

Youthful drivers* in total & fatal collisions
By day of week - 1993



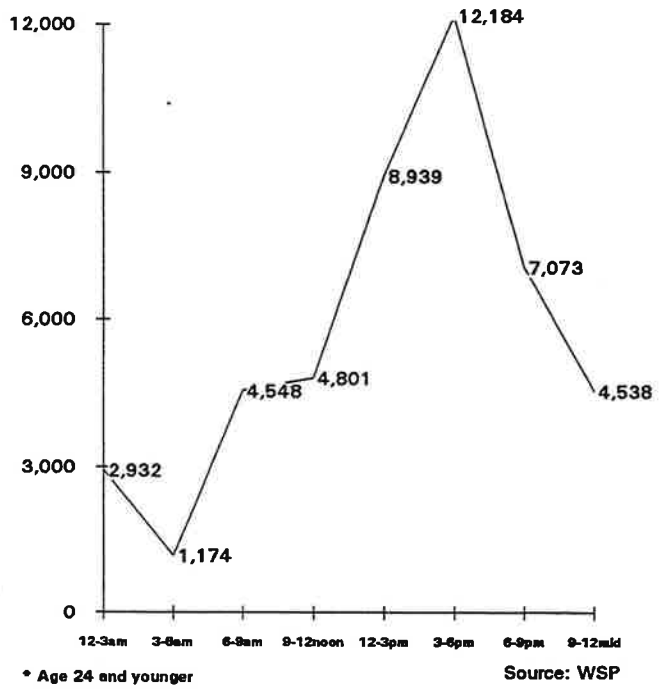
* Age 24 and younger

Source: WSP

The highest number of collisions involving youthful drivers occurred between the hours of 3-6 p.m., with 12,184 collisions. The least reported number of collisions occurred between 3-6 a.m. (Figure 4-4).

Figure 4-4:

Youthful drivers* in traffic collisions
By time of day - 1993



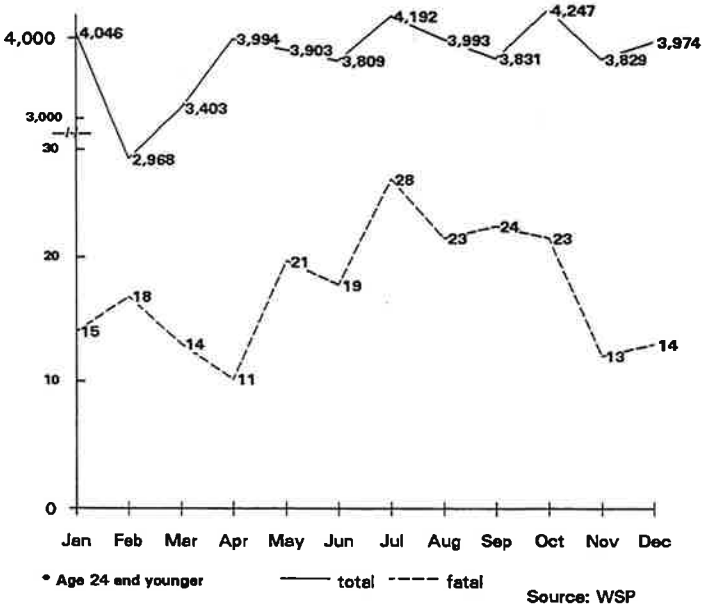
* Age 24 and younger

Source: WSP

July and October accounted for the highest numbers of youthful driver collisions. July was the highest month for fatal collisions involving youthful drivers (Figure 4-5).

Figure 4-5:

Total and fatal collisions involving youthful drivers*
By month - 1993



* Age 24 and younger

—— total ---- fatal

Source: WSP

Teenage driver collisions

Teenage drivers (age 19 and under) were involved in 22,227 collisions, 94 fatal collisions, and 9,825 injury collisions during 1993. The total collision rate for teenagers was 1,260.02 collisions per 10,000 licensed drivers for 1993. This was down 10.3% from the previous four-year average rate. The fatal collision rate was down 8.8% from the previous 4 year average (Table 4-3).

Table 4-3: Teenage driver collisions - 19 years & younger
Five-year comparison

collisions & rates	1993	1992	1991	1990	1989	prev 4-yr avg	'93 vs prev 4-yr avg
Total collisions	22,227	22,519	21,646	23,965	25,312	23,361	-4.9%
Fatal collisions	94	80	89	112	108	97	-3.3%
Injury collisions	9,825	9,936	9,267	10,265	10,821	10,072	-2.5%
Licensed drivers	189,187	181,300	179,409	169,377	186,237	179,081	5.6%
Teenage drivers involved	23,838	24,252	23,209	25,775	27,263	25,125	-5.1%
Fatal collision rate*	4.97	4.41	4.96	6.61	5.80	5.45	-8.8%
Total collision rate*	1,260.02	1,337.67	1,293.64	1,521.75	1,463.89	1,404.24	-10.3%

* Fatal/ total collisions per 10,000 licensed drivers
Source: WSP, DOL

Contributing circumstances in teenage collisions

"Speed too fast for conditions" was the leading contributing circumstance in teenage driver collisions, noted as a factor in 25.1% of all collisions. "Failure to yield right of way" was second, noted in 21.5% of teenage driver collisions. "Following too closely" was the third contributor in teenage driver collisions with 13.6% (Table 4-4).

Table 4-4: Contributing circumstances in teenage driver collisions*
By age - 1993

	16/ yngr	17 yrs	18 yrs	19 yrs	total	
Speed–too fast for conditions	883	1,079	1,139	982	4,083	25.1%
Failure to yield right of way	705	948	998	842	3,493	21.5%
Following too closely	388	592	641	599	2,220	13.6%
Exceeding legal speed	217	258	236	185	896	5.5%
Disregarding traffic sig./ signs	192	244	286	267	989	6.1%
Operating defective equipment	117	142	183	186	628	3.9%
Driving under the influence	44	84	147	177	452	2.8%
Crossing over the center line	71	97	102	77	347	2.1%
Improper passing	54	96	76	97	323	2.0%
All other circumstances+	627	737	777	702	2,843	17.5%
Total	3,298	4,277	4,585	4,114	16,274	100.0%

* Investigated collisions only
Source: WSP
\+ Including driver inattention

Traffic collisions involving youthful drinking drivers

There were 3,522 collisions in 1993 which involved drivers age 24 and younger who had been drinking. These collisions were responsible for 115 persons killed and 3,332 persons injured. Total youthful-driver, alcohol-related collisions have declined 24.8% compared to the previous 4 year-average (Table 4-5).

Table 4-5: Traffic collisions involving youthful drinking drivers*
Five-year comparison

	1993	1992	1991	1990	1989	prev 4-yr avg	'93 vs prev 4-yr avg
Total collisions	3,522	3,988	4,419	4,972	5,345	4,681	-24.8%
Fatal collisions	94	90	102	112	116	105	-10.5%
Injury collisions	1,998	2,215	2,481	2,794	2,989	2,620	-23.7%
Property damage only**	1,490	1,683	1,836	2,066	2,240	1,956	-23.8%
Persons killed	115	102	114	132	139	122	-5.5%
Percent of all traffic fatalities	17.4%	15.7%	16.7%	16.0%	17.8%	16.5%	5.2%
Persons injured	3,332	3,738	4,212	4,785	5,061	4,449	-25.1%
Serious injuries	498	623	746	854	1,030	813	-38.8%
Evident injuries	1,651	1,832	2,138	2,397	2,577	2,236	-26.2%
Possible injuries	1,183	1,283	1,328	1,534	1,454	1,400	-15.5%
Number of drinking drivers	3,587	4,070	4,499	5,075	5,446	4,773	-24.8%

*Drinking drivers age 24 and younger; includes DWI
Source: WSP

** Damage over $500

Collisions involving youthful drivers by county

There were 9 counties in 1993 with no fatal collisions involving youthful drivers (drivers 24 and younger). The highest youthful-driver fatality rate (fatalities involving a youthful driver per 1,000 collisions) was in Ferry County, based upon 3 fatalities and 39 total collisions. Kittitas County had the highest youthful-driver collision rate, with 1,323.9 collisions per 10,000 youthful licensed drivers (Table 4-6).

Table 4-6: Collisions involving youthful drivers (24 and under)
By county - 1993

county	youthful lic. drivers	persons killed	persons injured	total collisions	rate*	deaths per 1,000 clsns
Adams	1,947	4	123	163	837.2	24.5
Asotin	1,848	2	61	108	584.4	18.5
Benton	14,176	8	574	1,104	778.8	7.2
Chelan	6,109	3	335	495	810.3	6.1
Clallam	5,315	2	250	413	777.0	4.8
Clark	28,639	14	1,645	2,203	769.2	6.4
Columbia	391	0	42	43	1099.7	0.0
Cowlitz	9,504	2	581	848	892.3	2.4
Douglas	2,921	8	147	177	606.0	45.2
Ferry	621	3	38	39	628.0	76.9
Franklin	4,983	7	250	368	738.5	19.0
Garfield	270	0	15	20	740.7	0.0
Grant	7,140	10	307	490	686.3	20.4
Grays Harbor	6,311	6	322	543	860.4	11.0
Island	5,928	2	229	334	563.4	6.0
Jefferson	1,659	0	80	125	753.5	0.0
King	156,586	51	10,775	14,751	942.0	3.5
Kitsap	21,177	9	1,246	1,686	796.1	5.3
Kittitas	3,180	3	222	421	1323.9	7.1
Klickitat	1,796	0	74	103	573.5	0.0
Lewis	7,103	10	369	634	892.6	15.8
Lincoln	754	0	31	65	862.1	0.0
Mason	3,603	6	266	340	943.7	17.6
Okanogan	4,044	3	149	222	549.0	13.5
Pacific	1,683	1	93	128	760.5	7.8
Pend Oreille	1,057	0	42	56	529.8	0.0
Pierce	59,938	28	4,877	5,883	981.5	4.8
San Juan	939	0	40	59	628.3	0.0
Skagit	9,394	7	559	828	881.4	8.5
Skamania	691	1	40	82	1186.7	12.2
Snohomish	50,387	18	2,986	4,135	820.6	4.4
Spokane	41,781	9	2,648	3,592	859.7	2.5
Stevens	3,110	3	197	209	672.0	14.4
Thurston	20,228	5	1,158	1,714	847.3	2.9
Wahkiakum	248	0	20	24	967.7	0.0
Walla Walla	4,902	11	240	422	860.9	26.1
Whatcom	15,941	15	810	1,203	754.7	12.5
Whitman	4,622	0	184	316	683.7	0.0
Yakima	20,986	23	1,250	1,843	878.2	12.5
Total	531,912	274	33,275	46,189	868.4	5.9

* Traffic collisions per 10,000 youthful licensed drivers Source: WSP, DOL

V. Senior Driver Involvement

During 1993, 27,790 senior drivers (55 years and older) were involved in 25,509 reported collisions, which included 114 fatal collisions and 10,338 injury collisions. The number of collisions involving senior drivers increased 0.1%, and there were 3.2% more injury collisions when compared to the previous 4-year average. Fatal collisions involving senior decreased 21.1% and property damage collisions decreased 1.7% when compared to the 4-year baseline average. The number of drivers licenses issued to senior drivers (862,554) increased 7.5 % from the baseline period. The collision rate for senior drivers was 295.74 senior drivers in collisions per 10,000 licensed senior drivers, and the fatal collision rate was 1.32 (Table 5-1).

Table 5-1: Collisions involving senior drivers (55 & older)
Five-year comparison by severity

severity & rates	1993	1992	1991	1990	1989	prev 4-yr avg	'93 vs prev 4-yr avg
Total collisions	25,509	26,020	25,101	25,907	24,896	25,481	0.1%
Fatal	114	144	134	142	158	145	-21.1%
Injury	10,338	10,399	9,823	10,059	9,786	10,017	3.2%
Property damage only***	15,057	15,477	15,144	15,706	14,952	15,320	-1.7%
Persons killed**	127	161	151	164	185	165	-23.1%
Persons injuried**	15,831	15,995	14,944	15,378	14,915	15,308	3.4%
Serious injuries	1,155	1,355	1,333	1,445	1,487	1,405	-17.8%
Evident injuries	4,738	4,607	4,547	4,667	4,771	4,648	1.9%
Possible injuries	9,938	10,033	9,064	9,266	8,657	9,255	7.4%
Licensed senior dvrs	862,554	834,826	811,424	781,620	780,607	802,119	7.5%
Senior dvrs in collisions	27,790	28,403	27,237	28,103	26,873	27,654	0.5%
Fatal collision rate*	1.32	1.72	1.65	1.82	2.02	1.80	-26.7%
Total collision rate*	295.74	311.68	309.35	331.45	318.93	317.85	-7.0%

* Fatal/total collisions involving senior drivers per 10,000 licensed drivers — Source: WSP, DOL

** All persons killed and injured in collisions involving senior drivers

*** Damage over $500

Senior driver collisions by first harmful event

The great majority of collisions involving senior drivers were crashes with other moving vehicles, with 87.0%. Collisions with other moving vehicle also accounted for the majority of fatal crashes, with 58.8%. Collisions with fixed/other objects were less frequent, accounting for 23.7% of fatal collisions and 6.1% of total collisions (Table 5-2).

Table 5-2: Collisions involving senior drivers*
By first harmful event - 1993

type of collision	fatal collisions		injury collisions		total collisions	
	number	%	number	%	number	%
Collision w/other moving motor veh	67	58.8%	8,879	85.9%	22,188	87.0%
Collision with fixed/other object	27	23.7%	653	6.3%	1,564	6.1%
Collision with parked vehicle	2	1.8%	101	1.0%	559	2.2%
Collisions with pedestrian & bicycles	9	7.9%	468	4.5%	482	1.9%
Overturning & other non collision	8	7.0%	218	2.1%	450	1.8%
Other collisions inc. RR train, animal	1	0.9%	19	0.2%	266	1.0%
Total	114	100.0%	10,338	100.0%	25,509	100.0%

*Collisions involving one or more senior drivers - age 55 or older
Source: WSP

Contributing circumstances in senior driver collisions by age group

"Failure to yield right of way" was the most frequent driver violation in all of the older age groups. "Speed too fast for conditions" was the second leading driver violation for senior drivers ages 55-74. Disregarding traffic signals/signs was the second leading cause of collisions involving those drivers aged 75 and older (Table 5-3).

Table 5-3: Contributing circumstances in senior driver collisions
By age group - 1993

contributing circumstances	55-59		60-64		65-69		70-74		75 & older	
	number	%	number	%	number	%	number	%	number	%
Failure to yield right of way	837	29.0%	748	32.0%	741	35.5%	855	39.7%	1,632	44.7%
Speed too fast for conditions	481	16.6%	381	16.3%	311	14.9%	254	11.8%	335	9.2%
Disregard traffic signal/signs	215	7.4%	190	8.1%	199	9.5%	240	11.1%	382	10.5%
Following too closely	403	13.9%	329	14.1%	258	12.4%	241	11.2%	359	9.8%
DWI	174	6.0%	125	5.3%	78	3.7%	43	2.0%	45	1.2%
Defective equipment	92	3.2%	62	2.7%	58	2.8%	36	1.7%	73	2.0%
Crossing over the centerline	43	1.5%	40	1.7%	29	1.4%	46	2.1%	58	1.6%
Exceeding legal speed	21	0.7%	9	0.4%	11	0.5%	8	0.4%	16	0.4%
All other circumstances +	623	21.6%	454	19.4%	402	19.3%	430	20.0%	751	20.6%
Total	2,889	100.0%	2,338	100.0%	2,087	100.0%	2,153	100.0%	3,651	100.0%

+Including driver inattention
Source: WSP

Senior driver collisions by age group

Figure 5-1 shows that each of the following senior driver age groups has been under-represented in collisions when compared to the percentage of licensed drivers in that age group. The 55-59 age group was involved in 3.7% of reported collisions but constituted 5.3% of the total licensed drivers, creating a 0.69 under-representation ratio.

Figure 5-1:

Percentage of licensed drivers and drivers in total collisions
By senior age groups - 1993

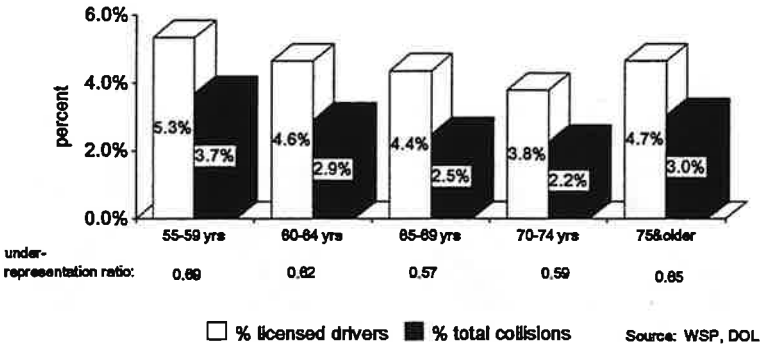
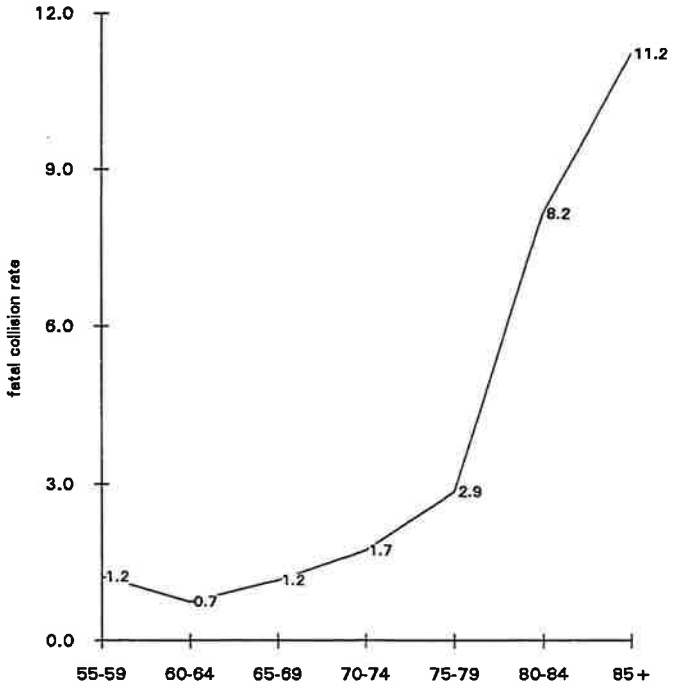


Figure 5-2 displays fatal collision rates by various senior driver age groups based upon estimated percentage of miles traveled. The 75-79, 80-84, and 85+ age groups showed increasing fatal collision rates. The 85+ age group's rate was 11.2 fatal collisions per 100 million vehicle miles of travel.

Figure 5-2:

Washington drivers in fatal collisions - 1993
Rate per miles traveled* by senior age groups

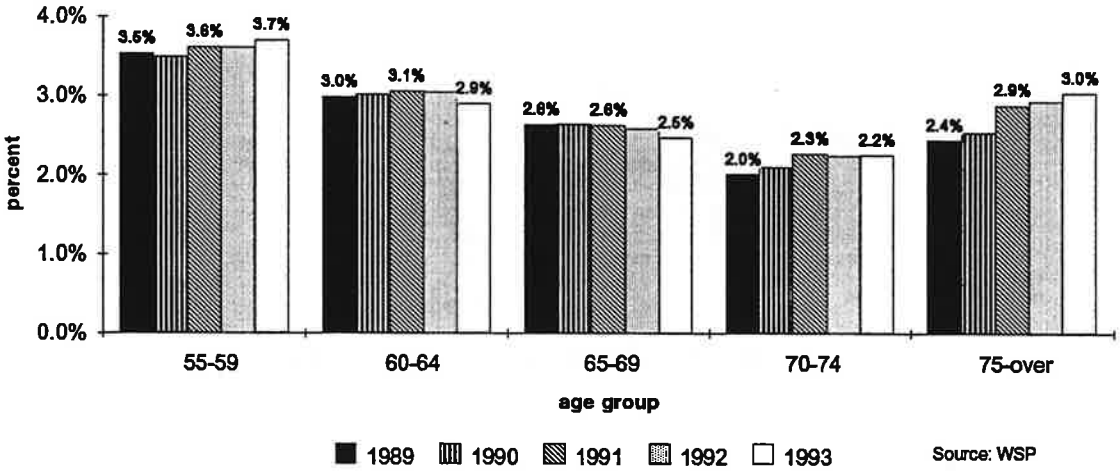


* Fatal collisions per 100 million vehicle miles of travel. Percent of miles traveled by age group estimated for 1990 in USDOT/NHTSA research note, May 1992.

Figure 5-3 shows percentages of all collisions by senior age groups over the past five years. There have been no large increases in collision involvement within the senior driver age groups during this time. The highest increase was in the 75 and older age group, from 2.4% in 1989 to 3.0% in 1993.

Figure 5-3:

Percent of total collision involvement by senior drivers
Five-year comparison by age group

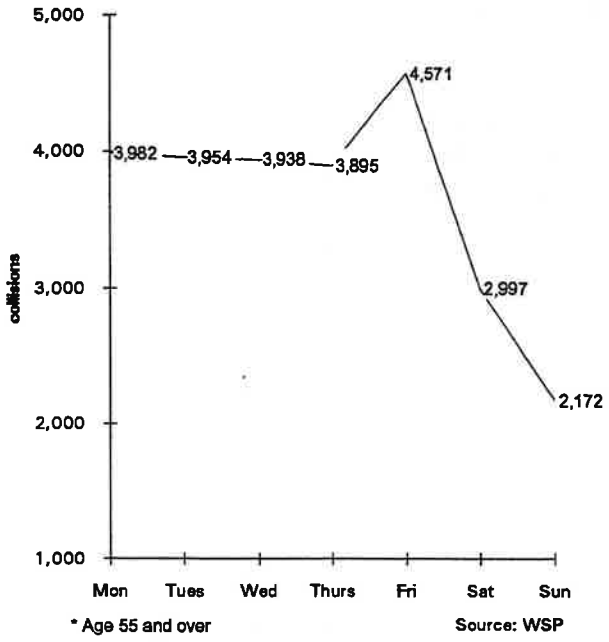


Senior driver collisions by day of week/hour of day

Collisions involving senior drivers occurred most frequent on weekdays, with Friday having the highest number with 4,571 collisions. Sunday had the lowest number with 2,172 collisions (Figure 5-4).

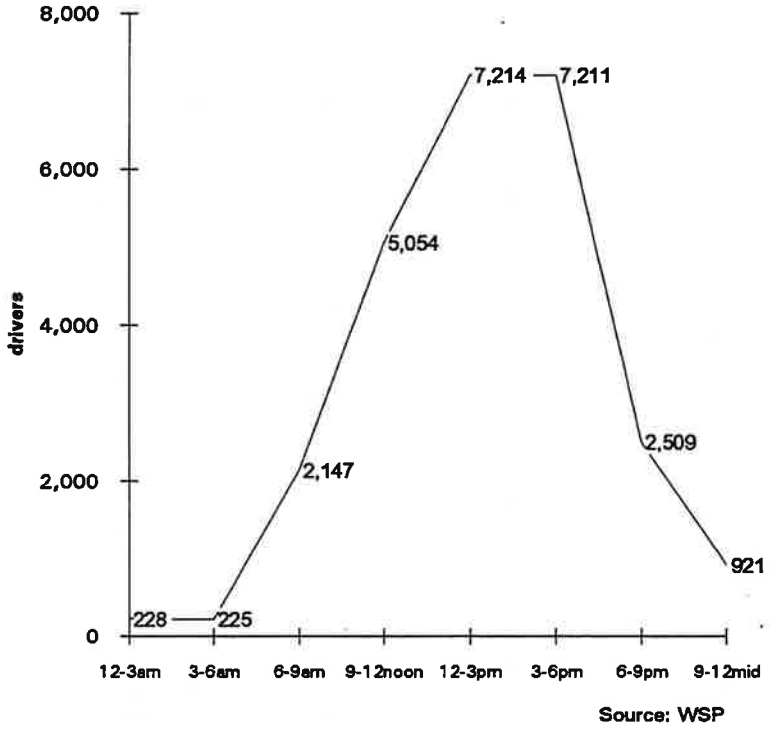
Figure 5-4:

Collisions involving senior drivers*
By day of week - 1993



The greatest number of crashes involving senior drivers occurred between the daylight hours of 9:00 and 6:00 p.m. Very few crashes were recorded between midnight and 6:00 a.m. (Figure 5-5).

Figure 5-5:
Senior drivers in collisions
By time (3-hour intervals) - 1993



Source: WSP

Kittitas, King and Pierce Counties had the highest collision rates involving senior drivers with 452.2, 339.1, and 337.1 collisions per 10,000 licensed drivers, respectively. Adams County had the highest rate of deaths per 1,000 senior-driver-involved collisions, with 64.5, based on 62 collisions and 4 persons killed (Table 5-4).

Table 5-4: Collisions involving senior drivers (55 and older)
By county - 1993

county	senior lic. drivers*	persons killed	persons injured	total collisions	collision rate**	deaths per 1,000 clsns
Adams	2,667	4	27	62	232.5	64.5
Asotin	4,117	0	38	83	201.6	0.0
Benton	19,477	0	259	567	291.1	0.0
Chelan	12,015	6	212	308	256.3	19.5
Clallam	16,199	0	159	338	208.7	0.0
Clark	42,675	11	721	1,119	262.2	9.8
Columbia	1,034	0	3	18	174.1	0.0
Cowlitz	16,325	3	302	496	303.8	6.0
Douglas	5,040	1	44	89	176.6	11.2
Ferry	1,152	0	10	20	173.6	0.0
Franklin	5,973	6	95	174	291.3	34.5
Garfield	770	0	5	11	142.9	0.0
Grant	11,245	0	158	269	239.2	0.0
Grays Harbor	14,385	4	233	406	282.2	9.9
Island	12,796	2	112	189	147.7	10.6
Jefferson	6,615	2	96	127	192.0	15.7
King	241,177	19	5,096	8,179	339.1	2.3
Kitsap	31,161	3	544	824	264.4	3.6
Kittitas	5,374	6	95	243	452.2	24.7
Klickitat	3,570	0	34	73	204.5	0.0
Lewis	14,091	4	232	395	280.3	10.1
Lincoln	2,344	1	21	39	166.4	25.6
Mason	10,666	2	136	209	195.9	9.6
Okanogan	7,554	0	60	147	194.6	0.0
Pacific	5,960	0	64	124	208.1	0.0
Pend Oreille	2,320	0	23	36	155.2	0.0
Pierce	94,529	9	2,356	3,187	337.1	2.8
San Juan	3,053	1	12	25	81.9	40.0
Skagit	19,016	3	237	491	258.2	6.1
Skamania	1,445	2	17	41	283.7	48.8
Snohomish	71,341	8	1,471	2,234	313.1	3.6
Spokane	66,344	6	1,270	1,991	300.1	3.0
Stevens	6,175	2	94	108	174.9	18.5
Thurston	30,148	3	485	845	280.3	3.6
Wahkiakum	855	0	9	16	187.1	0.0
Walla Walla	9,604	3	141	257	267.6	11.7
Whatcom	23,095	3	350	643	278.4	4.7
Whitman	5,332	2	65	120	225.1	16.7
Yakima	33,237	11	545	1,006	302.7	10.9
Total	862,554	127	15,831	25,509	295.7	5.0

Source: WSP, DOL

* Total senior licensed drivers includes 1,678 with unknown county or "other".
** Traffic collisions per 10,000 licensed senior drivers.

VI. Pedestrians

During 1993, 80 pedestrians were killed and 1,813 were injured in the state. This was a decrease of 8.8% in the number killed, and 2.5% in the number injured compared to the previous 4-year average. In urban areas 41 were killed, compared to 39 killed in rural areas. Rural areas showed reductions in pedestrians killed and injured when compared to the previous 4-year average. Urban areas did not exhibit similar reductions (Table 6-1).

Table 6-1: Pedestrians killed and injured in traffic collisions
Five-year comparison

	1993	1992	1991	1990	1989	prev 4-yr avg	'93 vs prev 4-yr avg
Total collisions	1,709	1,716	1,779	1,743	1,778	1,754	-2.6%
Pedestrians killed	80	81	79	81	110	88	-8.8%
Pedestrians injured	1,813	1,809	1,911	1,861	1,858	1,860	-2.5%
Serious injuries	405	431	464	524	538	489	-17.2%
Evident injuries	930	894	918	827	905	886	5.0%
Possible injuries	478	484	529	510	415	485	-1.3%
Rural*							
Pedestrians killed	39	33	41	43	70	47	-16.6%
Pedestrians injured	387	420	455	463	493	458	-15.5%
Urban*							
Pedestrians killed	41	48	38	38	40	41	0.0%
Pedestrians injured	1,426	1,389	1,456	1,398	1,365	1,402	1.7%

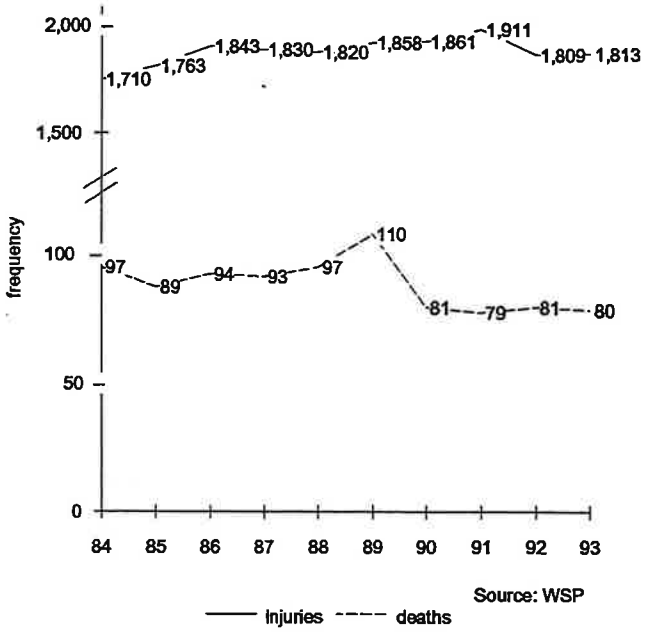
*Rural =Less than 2,500 population
*Urban =2,500 population and greater

Source: WSP

Pedestrian injuries showed a gradual increase between 1984 and 1991, reaching a high of 1,911 in 1991. Pedestrian fatalities, after reaching a high in 1989 with 110 deaths, dropped significantly in 1990 to 81 deaths and have remained relatively constant over the past 4 years (Figure 6-1).

Figure 6-1:

Pedestrian injuries and deaths
Ten-year comparison



Ages of pedestrians killed and injured

The age group with the highest ratio of persons killed and injured compared to their population was the 10-14 age group with 1.63, closely followed by the 15-19 group with 1.62. (Table 6-2).

Table 6-2: Pedestrians involved in motor vehicle collisions
By age & percent of population - 1993

	population		killed	injured	total killed/inj	pct	ratio*
0-4	406,660	7.8%	2	108	110	5.8%	0.75
5-9	396,029	7.6%	3	182	185	9.8%	1.29
10-14	384,762	7.3%	5	222	227	12.0%	1.63
15-19	335,808	6.4%	6	190	196	10.4%	1.62
20-24	366,462	7.0%	5	157	162	8.6%	1.22
25-34	857,927	16.4%	15	289	304	16.1%	0.98
35-44	887,728	16.9%	9	226	235	12.4%	0.73
45-54	604,095	11.5%	8	156	164	8.7%	0.75
55-64	391,590	7.5%	7	82	89	4.7%	0.63
65-74	347,779	6.6%	10	86	96	5.1%	0.76
75 & Older	262,060	5.0%	9	82	91	4.8%	0.96
Age not stated			1	33	34	1.8%	
Total	5,240,900	100.0%	80	1,813	1,893	100.0%	1.00

Source: WSP, OFM

*Ratio of percent pedestrians killed/injured to percent population within age group.

Total pedestrian injuries have stayed relatively constant during the past five years. The biggest increase in pedestrian injuries was in the 45-54 year age group, which experienced an increase of 37.1% from the previous 4-year average. The 5-9 year age group experienced the largest reduction, decreasing 16.4% from the previous 4-year average (Table 6-3).

Table 6-3: Pedestrians injured in motor vehicle collisions
Five-year comparison by age

age	1993	1992	1991	1990	1989	prev 4-yr avg	'93 vs prev 4-yr avg
0-4	108	126	113	75	83	99	8.8%
5-9	182	194	217	225	235	218	-16.4%
10-14	222	214	218	226	226	221	0.5%
15-19	190	203	193	203	218	204	-7.0%
20-24	157	172	186	170	185	178	-11.9%
25-34	289	259	267	312	288	282	2.7%
35-44	226	239	263	205	219	232	-2.4%
45-54	156	122	121	117	95	114	37.1%
55-64	82	66	96	82	87	83	-0.9%
65-74	86	80	76	80	78	79	9.6%
75 & older	82	71	89	90	74	81	1.2%
Not stated	33	63	72	76	70		
Total	1,813	1,809	1,911	1,861	1,858	1,860	-2.5%

Source: WSP

Actions of pedestrians killed and injured in urban and rural areas

In urban areas, the majority of pedestrians were hit while crossing the roadway. Of pedestrians killed or injured the largest percentage, 48.2%, were crossing at an intersection. Of pedestrians who were killed the largest percentage, 43.9%, were crossing not at an intersection (Table 6-4).

Table 6-4: Actions of pedestrians killed & injured - urban areas
By age and action - 1993

	killed & injured								killed	
action	0-4	5-14	15-24	25-64	65+	n/stat	total	%	#	%
Crossing at intersection	30	114	128	334	90	11	707	48.2%	12	29.3%
Crossing not at intersection	38	156	60	151	49	9	463	31.6%	18	43.9%
Not in roadway	5	12	31	41	8	3	100	6.8%	2	4.9%
Standing/working in roadwy	4	2	15	54	2	3	80	5.5%	1	2.4%
Playing in roadway	6	19	5	3	0	0	33	2.2%	0	0.0%
Walking with traffic	1	2	12	12	2	0	29	2.0%	3	7.3%
Walking against traffic	1	1	2	7	1	1	13	0.9%	1	2.4%
Lying in roadway	0	0	1	3	0	0	4	0.3%	0	0.0%
Other & not stated	6	3	3	18	6	2	38	2.6%	4	9.8%
Total	91	309	257	623	158	29	1,467	100.0%	41	100.0%

Source: WSP

In rural areas, 32.6% of the pedestrians killed or injured were crossing the roadway at a location other than at an intersection, accounting for 13 fatalities during 1993. Pedestrians "crossing at intersection" accounted for 22.3% of pedestrians killed or injured in rural areas. "Walking with traffic" accounted for 20.5% of rural pedestrian deaths (Table 6-5).

Table 6-5: Actions of pedestrians killed & injured - rural areas
By age and action - 1993

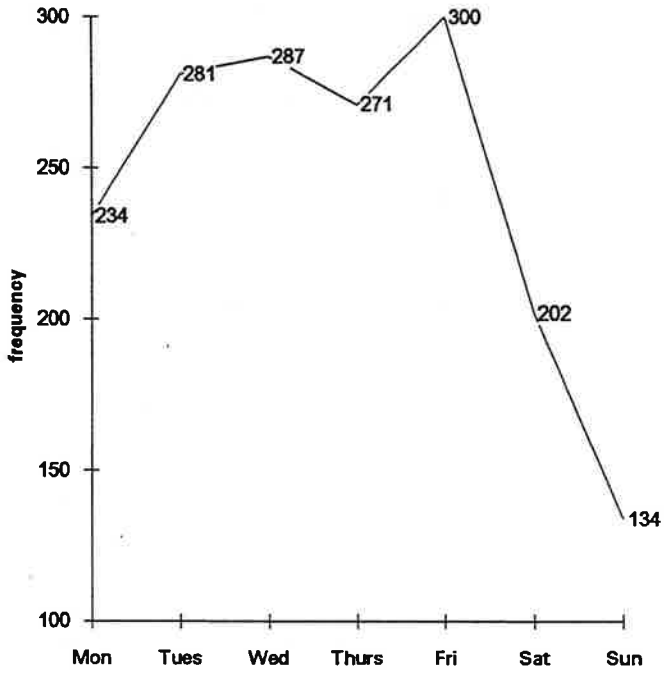
	killed & injured								killed	
action	0-4	5-14	15-24	25-64	65+	n/stat	total	%	#	%
Crossing not at intersection	8	50	29	43	8	1	139	32.6%	13	33.3%
Crossing at intersection	5	25	20	32	11	2	95	22.3%	5	12.8%
Not in roadway	1	11	23	34	6	0	75	17.6%	3	7.7%
Standing/working in roadwy	0	1	13	32	2	0	48	11.3%	1	2.6%
Walking with traffic	0	1	3	8	1	2	15	3.5%	8	20.5%
Playing in roadway	3	8	1	1	0	0	13	3.1%	1	2.6%
Walking against traffic	2	1	3	5	0	0	11	2.6%	0	0.0%
Lying in roadway	0	1	2	2	0	0	5	1.2%	2	5.1%
Other & not stated	0	5	7	12	1	0	25	5.9%	6	15.4%
Total	19	103	101	169	29	5	426	100.0%	39	100.0%

Source: WSP

Pedestrian collisions by day of week/hour of day

Pedestrian collisions in 1993 were least likely to occur on Saturdays and Sundays. Friday was the day of the week when most pedestrian collisions occurred (Figure 6-2).

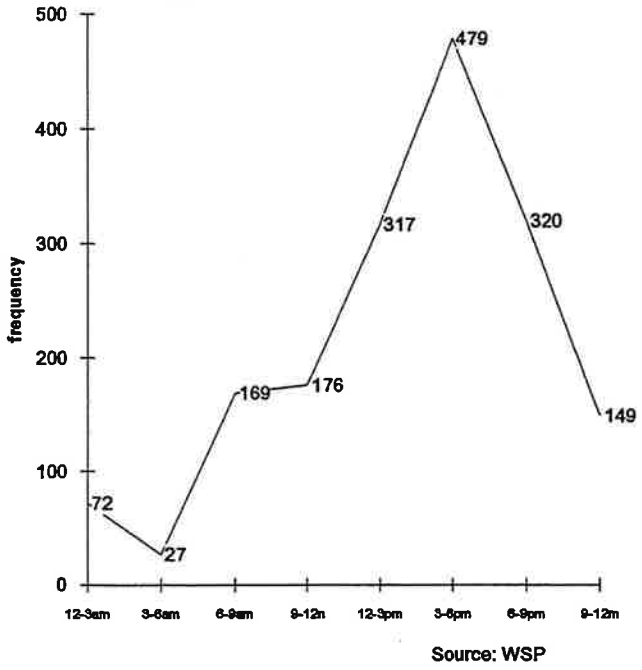
Figure 6-2:
Pedestrian collisions
By day of week - 1993



Source: WSP

Most pedestrian collisions occurred between 12 noon to 12 midnight, peaking during the 3:00 to 6:00 p.m. period (Figure 6-3).

Figure 6-3:
Pedestrian collisions
By hour of day - 1993

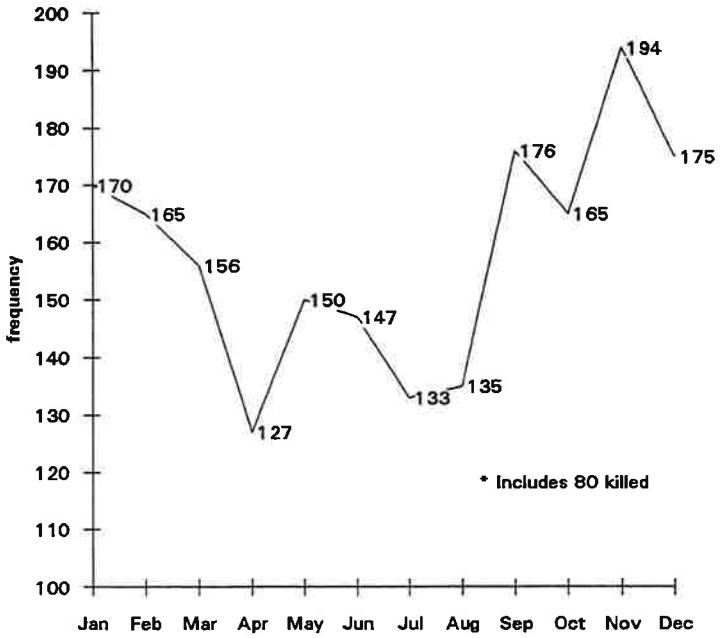


Source: WSP

Pedestrian collisions reached a peak in November with a total of 194. April was the month that experienced the fewest pedestrian collisions with 127 (Figure 6-4).

Figure 6-4:

Pedestrians injured and killed by motor vehicles
By month - 1993

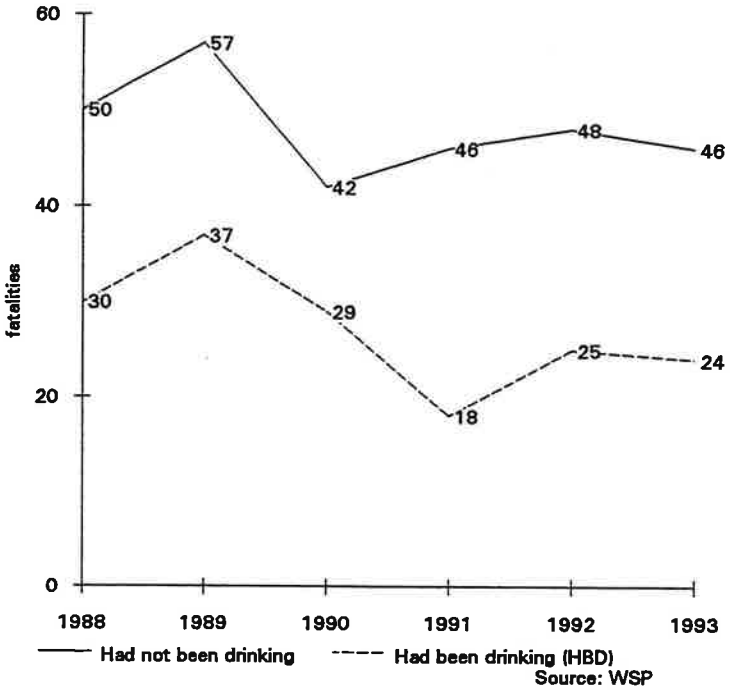


Source: WSP

During 1993, over half of pedestrians 15 years and older who were killed had been drinking when involved in the fatal crash. A similar pattern occurred over the past six years (Figure 6-5).

Figure 6-5:

Pedestrians fatalities - age 15 and over
Pedestrian drinking vs not drinking



Vehicle-pedestrian collisions in cities over 15,000

The city of Everett had the highest pedestrian fatality rate, with .65 pedestrians killed per 10,000 population, based upon 5 pedestrian fatalities. Seattle had the highest pedestrian total collision rate with 9.36 vehicle-pedestrian collisions per 10,000 population, followed by Aberdeen with 8.40 (Table 6-6).

Table 6-6: Pedestrian fatalities, injuries & collisions - 1993
Cities 15,000 population & greater

		fatalities		injuries		total ped clsns	
city	population	number	rate*	number	rate*	number	rate*
250,000 and over							
Seattle	527,700	8	0.15	519	9.84	494	9.36
100,000 to 250,000							
Spokane	183,800	2	0.11	110	5.98	110	5.98
Tacoma	181,200	7	0.39	125	6.90	124	6.84
50,000 to 100,000							
Bellevue	89,710	1	0.11	33	3.68	33	3.68
Everett	76,980	5	0.65	59	7.66	60	7.79
Federal Way	75,320	1	0.13	28	3.72	29	3.85
Yakima	59,580	1	0.17	28	4.70	25	4.20
Bellingham	55,480	2	0.36	20	3.60	20	3.60
Vancouver	55,450	2	0.36	21	3.79	32	5.77
25,000 to 50,000							
Kennewick	45,110	1	0.22	8	1.77	9	2.00
Renton	43,470	0	0.00	10	2.30	10	2.30
Kirkland	41,700	0	0.00	19	4.56	19	4.56
Kent	41,090	1	0.24	20	4.87	22	5.35
Redmond	40,095	0	0.00	5	1.25	5	1.25
Olympia	36,520	0	0.00	21	5.75	20	5.48
Bremerton	36,380	0	0.00	24	6.60	22	6.05
Auburn	34,550	0	0.00	19	5.50	19	5.50
Richland	34,080	0	0.00	7	2.05	7	2.05
Longview	32,650	1	0.31	15	4.59	15	4.59
Edmonds	30,970	1	0.32	6	1.94	6	1.94
Lynnwood	29,580	0	0.00	17	5.75	17	5.75
Walla Walla	28,820	0	0.00	6	2.08	6	2.08
Burien	27,800	1	0.36	13	4.68	13	4.68
Puyallup	26,140	0	0.00	17	6.50	16	6.12
15,000 to 25,000							
Bothell	24,530	0	0.00	1	0.41	1	0.41
Pullman	23,480	0	0.00	6	2.56	5	2.13
Wenatchee	23,000	0	0.00	12	5.22	12	5.22
Sea Tac	22,840	0	0.00	16	7.01	16	7.01
Lacey	22,660	0	0.00	10	4.41	10	4.41
Pasco	21,370	0	0.00	8	3.74	8	3.74
Mercer Island	21,260	0	0.00	4	1.88	3	1.41
Mount Vernon	20,450	0	0.00	5	2.44	4	1.96
Mountlake Terrace	19,880	1	0.50	5	2.52	5	2.52
Des Moines	19,460	0	0.00	8	4.11	8	4.11
Oak Harbor	18,930	0	0.00	6	3.17	6	3.17
Port Angeles	18,270	0	0.00	8	4.38	8	4.38
Bainbridge Island	17,200	0	0.00	2	1.16	2	1.16
Aberdeen	16,665	1	0.60	14	8.40	14	8.40

*Frequency per 10,000 population

Source: WSP, OFM

Vehicle-pedestrian collisions in Washington counties

King County had the highest pedestrian collision rate with 4.93 collisions per 10,000 population, followed by Grays Harbor and Chelan Counties with 3.91 and 3.57 respectively. King County also had the highest rate of fatalities and injuries with 5.18 killed or injured per 10,000 population. This was followed by Grays Harbor and Pierce Counties with 4.06 and 3.68 per 10,000 population respectively. There were seven counties with no reported car-pedestrian collisions, and twenty counties that had no pedestrians killed (Table 6-7).

Table 6-7: Pedestrians killed or injured in traffic collisions
By county - 1993

county	population	killed	injured	rate*	collisions	rate*
Over 1,000,000						
King	1,587,700	18	847	5.45	782	4.93
250,000 to 750,000						
Pierce	640,700	11	237	3.87	224	3.50
Snohomish	507,900	11	154	3.25	150	2.95
Spokane	383,600	6	130	3.55	129	3.36
Clark	269,500	9	57	2.45	59	2.19
100,000 to 250,000						
Kitsap	210,000	2	55	2.71	51	2.43
Yakima	197,000	4	56	3.05	49	2.49
Thurston	180,500	3	47	2.77	46	2.55
Whatcom	140,900	2	20	1.56	20	1.42
Benton	122,800	1	18	1.55	18	1.47
50,000 to 100,000						
Skagit	88,100	0	15	1.70	12	1.36
Cowlitz	86,100	1	26	3.14	22	2.56
Grays Harbor	66,500	2	26	4.21	26	3.91
Island	66,500	0	9	1.35	7	1.05
Lewis	62,900	0	12	1.91	10	1.59
Clallam	61,400	2	12	2.28	14	2.28
Grant	60,300	1	9	1.66	8	1.33
Chelan	56,000	0	20	3.57	20	3.57
Walla Walla	51,800	0	10	1.93	9	1.74
25,000 to 50,000						
Mason	42,900	0	8	1.86	8	1.86
Franklin	41,100	0	8	1.95	8	1.95
Whitman	39,400	0	6	1.52	5	1.27
Okanogan	35,400	2	6	2.26	5	1.41
Stevens	33,400	1	2	0.90	3	0.90
Kittitas	29,200	2	4	2.05	4	1.37
Douglas	28,500	1	2	1.05	3	1.05
10,000 to 25,000						
Jefferson	23,500	0	3	1.28	3	1.28
Pacific	19,800	0	4	2.02	4	2.02
Asotin	18,300	0	3	1.64	3	1.64
Klickitat	17,500	0	0	0.00	0	0.00
Adams	14,300	1	3	2.80	3	2.10
San Juan	11,900	0	2	1.68	2	1.68
Pend Oreille	10,100	0	2	1.98	2	1.98
Under 10,000						
Lincoln	9,200	0	0	0.00	0	0.00
Skamania	9,000	0	0	0.00	0	0.00
Ferry	6,900	0	0	0.00	0	0.00
Columbia	4,100	0	0	0.00	0	0.00
Wahkiakum	3,500	0	0	0.00	0	0.00
Garfield	2,300	0	0	0.00	0	0.00
Total	5,240,500	80	1,813	3.61	1,709	3.26

Source: WSP, OFM

*Killed/injured and car-pedestrian collisions per 10,000 population

VII. Pedalcyclists

Vehicle-pedalcycle collisions and injuries in 1993 decreased 0.3% from the previous 4-year average. There were 8 pedalcyclists killed, a decrease of 11.1% from the previous four-year average. The number of pedalcyclists injured increased 5.8% in urban areas and decreased 16.0% in rural areas from the previous 4-year averages. There were 1,438 vehicle-pedalcycle collisions, down 204 from 1992, which recorded a 10-year high of 1,642 (Table 7-1, Figure 7-1).

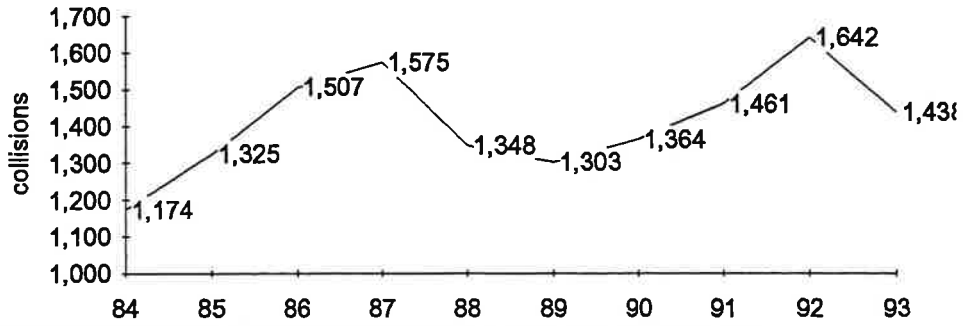
Table 7-1: Pedalcyclists killed & injured in traffic collisions
Five-year comparison

	1993	1992	1991	1990	1989	prev 4-yr avg	'93 vs prev 4-yr avg
Total pedalcycle collisions	1,438	1,642	1,461	1,364	1,303	1,443	-0.3%
Pedalcyclists killed	8	9	5	14	8	9	-11.1%
Pedalcyclists injured	1,430	1,622	1,463	1,349	1,302	1,434	-0.3%
Serious injuries	202	224	226	221	238	227	-11.1%
Evident injuries	889	1,052	909	813	819	898	-1.0%
Possible injuries	339	346	328	315	245	309	9.9%
Urban* injured	1,095	1,208	1,045	978	910	1,035	5.8%
Urban killed	4	4	1	4	2	3	45.5%
Rural injured	335	414	418	371	392	399	-16.0%
Rural killed	4	5	4	10	6	6	-36.0%

*Cities with population of 2,500 and greater

Source: WSP

Figure 7-1:
Vehicle-pedalcyclist collisions*
Ten-year comparison

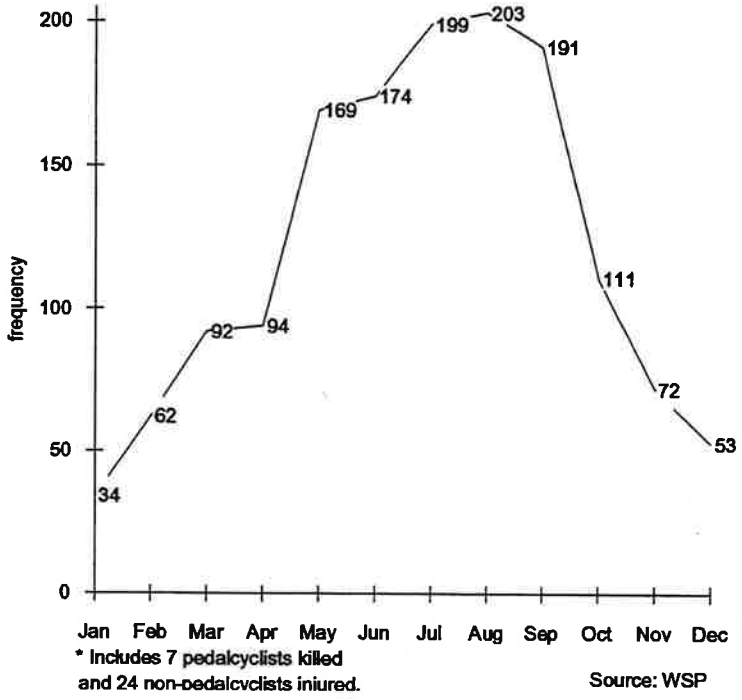


* Only includes collisions where vehicle-pedalcycle collision was first occurrence.

Source: WSP

The months of May through September recorded the highest numbers of persons killed and injured in pedalcycle-related collisions during 1993. January recorded the least number of pedalcycle injuries with 34, and August recorded the most with 203 (Figure 7-2).

Figure 7-2:
Persons injured in vehicle-pedalcycle collisions*
By month - 1993



* Includes 7 pedalcyclists killed and 24 non-pedalcyclists injured.

Source: WSP

Ages of pedalcyclists injured

In 1993, 419 pedalcyclists between the ages of 10 to 14 were killed or injured; this was the highest frequency for any age group. There were five age groups which experienced reductions in pedalcycle-related collision involvement when compared to previous 4-year averages (Table 7-2).

Table 7-2: Pedalcyclists injured or killed in motor vehicle collisions
Five-year comparison by age group

age	1993	1992	1991	1990	1989	prev 4-yr avg	'93 vs prev 4-yr avg
0-4	41	40	32	16	14	26	60.8%
5-9	209	230	232	191	233	222	-5.6%
10-14	419	408	386	381	356	383	9.5%
15-19	161	228	181	194	216	205	-21.4%
20-24	164	195	207	163	130	174	-5.6%
25-34	248	267	217	213	186	221	12.3%
35-44	94	134	97	96	69	99	-5.1%
45-54	44	56	34	35	31	39	12.8%
55-64	22	13	20	18	14	16	35.4%
65-74	5	9	17	9	7	11	-52.4%
75 & older	5	6	5	5	3	5	5.3%
Not stated	26	45	40	42	51	45	-41.6%
Total (inc. killed)	1,438	1,631	1,468	1,363	1,310	1,443	-0.3%
Total killed	8	9	5	14	8	9	-11.1%

Source: WSP

Pedalcycle collisions in cities

The city of Kelso recorded the highest pedalcycle collision rate in the state during 1993 with 11.81 collisions per 10,000 population. Ellensburg was second highest in this category with 10.18, followed by Marysville with 7.55 and Tukwila 7.50 (Table 7-3).

Table 7-3: Pedalcycle collisions in cities
Cities 10,000 population & greater - 1993

city	population	killed	killed & injured	death/ inj rate*	collisions	collision rate*
250,000 and over						
Seattle	527,700	2	280	5.31	280	5.31
100,000 to 250,000						
Spokane	183,800	0	100	5.44	100	5.44
Tacoma	181,200	0	74	4.08	73	4.03
50,000 to 100,000						
Bellevue	89,710	0	40	4.46	41	4.57
Everett	76,980	0	32	4.16	32	4.16
Federal Way	75,320	0	23	3.05	21	2.79
Yakima	59,580	0	34	5.71	35	5.87
Bellingham	55,480	0	25	4.51	26	4.69
Vancouver	55,450	0	24	4.33	24	4.33
25,000 to 50,000						
Kennewick	45,110	0	9	2.00	7	1.55
Renton	43,470	0	12	2.76	12	2.76
Kirkland	41,700	0	16	3.84	16	3.84
Kent	41,090	0	20	4.87	21	5.11
Redmond	40,095	0	18	4.49	18	4.49
Olympia	36,520	0	25	6.85	24	6.57
Bremerton	36,380	0	12	3.30	12	3.30
Auburn	34,550	0	17	4.92	18	5.21
Richland	34,080	0	11	3.23	9	2.64
Longview	32,650	0	23	7.04	21	6.43
Edmonds	30,970	0	3	0.97	4	1.29
Lynnwood	29,580	0	18	6.09	18	6.09
Walla Walla	28,820	0	7	2.43	7	2.43
Burien	27,800	0	9	3.24	9	3.24
Puyallup	26,140	0	16	6.12	16	6.12
15,000 to 25,000						
Bothell	24,530	0	7	2.85	6	2.45
Pullman	23,480	0	10	4.26	9	3.83
Wenatchee	23,000	0	12	5.22	12	5.22
Sea Tac	22,840	0	6	2.63	7	3.06
Lacey	22,660	0	9	3.97	9	3.97
Pasco	21,370	0	9	4.21	9	4.21
Mercer Island	21,260	0	6	2.82	5	2.35
Mount Vernon	20,450	0	1	0.49	2	0.98
Mountlake Terrace	19,880	0	4	2.01	4	2.01
Des Moines	19,460	0	3	1.54	3	1.54
Oak Harbor	18,930	0	8	4.23	8	4.23
Port Angeles	18,270	0	8	4.38	8	4.38
Bainbridge Island	17,200	0	2	1.16	2	1.16
Aberdeen	16,665	0	4	2.40	4	2.40
10,000 to 15,000						
Tukwila	14,660	0	11	7.50	11	7.50
Marysville	14,570	0	11	7.55	11	7.55
Mukilteo	14,035	0	5	3.56	5	3.56
Ellensburg	12,770	0	13	10.18	13	10.18
Centralia	12,380	0	9	7.27	9	7.27
Anacortes	12,260	0	2	1.63	2	1.63
Kelso	11,850	1	14	11.81	14	11.81
Moses Lake	11,700	0	5	4.27	6	5.13
Sunnyside	11,420	0	2	1.75	2	1.75
Tumwater	11,110	0	5	4.50	5	4.50
TOTAL	2,250,925	3	1,009	4.48	1,005	4.46

*Injuries/collisions per 10,000 population

Source: WSP, OFM

Pedalcycle collisions in unincorporated areas

The unincorporated area of Columbia County experienced the highest collision rate for unincorporated areas in Washington State with 7.22 collisions per 10,000 population in 1993. This was followed by Snohomish County with 5.31 and Chelan with 3.08 collisions per 10,000 population. Twelve counties experienced no pedalcycle collisions in their unincorporated areas during 1993 (Table 7-4).

Table: 7-4: Pedalcycle collisions in unincorporated areas
By county - 1993

county	unincorp. population	killed	killed & injured	fatal/inj rate*	collisions	collision rate*
Over 100,000						
King	513,257	0	69	1.34	69	1.34
Pierce	339,679	1	63	1.85	61	1.80
Snohomish	259,796	2	134	5.16	138	5.31
Clark	173,844	0	39	2.24	37	2.13
Spokane	165,443	0	15	0.91	16	0.97
Kitsap	138,676	0	25	1.80	24	1.73
25,000 to 100,000						
Thurston	94,098	0	13	1.38	13	1.38
Yakima	88,214	0	8	0.91	8	0.91
Whatcom	59,187	0	7	1.18	6	1.01
Island	40,797	0	6	1.47	5	1.23
Skagit	37,841	0	6	1.59	6	1.59
Lewis	35,829	0	6	1.67	4	1.12
Cowlitz	33,170	0	1	0.30	1	0.30
Clallam	32,039	0	1	0.31	1	0.31
Mason	31,100	0	6	1.93	6	1.93
Benton	27,849	0	0	0.00	0	0.00
Grant	26,406	0	6	2.27	5	1.89
Grays Harbor	25,000	0	1	0.40	1	0.40
10,000 to 25,000						
Chelan	22,760	1	7	3.08	7	3.08
Stevens	22,644	0	4	1.77	4	1.77
Douglas	19,958	0	0	0.00	0	0.00
Okanogan	19,294	0	2	1.04	2	1.04
Franklin	14,712	0	1	0.68	1	0.68
Walla Walla	14,384	0	0	0.00	0	0.00
Jefferson	13,405	0	2	1.49	2	1.49
Pacific	12,356	0	3	2.43	3	2.43
Klickitat	10,786	0	0	0.00	0	0.00
Kittitas	10,418	0	0	0.00	0	0.00
Asotin	9,871	0	2	2.03	2	2.03
Under 10,000						
San Juan	8,543	0	0	0.00	0	0.00
Skamania	6,711	0	0	0.00	0	0.00
Whitman	6,629	0	0	0.00	0	0.00
Adams	6,466	0	0	0.00	0	0.00
Pend Oreille	6,114	0	1	1.64	1	1.64
Ferry	5,355	0	1	1.87	1	1.87
Lincoln	3,669	0	0	0.00	0	0.00
Wahkiakum	2,819	0	0	0.00	0	0.00
Columbia	1,386	0	1	7.22	1	7.22
Garfield	855	0	0	0.00	0	0.00
Total	2,341,360	4	430	1.84	425	1.82

Source: WSP, OFM

*Rates are frequency per 10,000 population

Pedalcycle collisions by county

In 1993, Cowlitz County experienced the highest pedalcycle collision rate with 4.53 collisions per 10,000 population. Kittitas County was second highest, with a rate of 4.45 collisions, and Chelan County was third with a rate of 3.75. Collision rates and the rate of pedalcyclists injured or killed were very close, indicating that in most reported pedalcycle crashes, a single pedalcyclist is injured (Table 7-5).

Table 7-5: Pedalcycle collisions and injuries+
By county - 1993

county	population	killed	killed & injured +	killed/ inj rate*	collisions	collision rate*
Over 1,000,000						
King	1,587,700	2	546	3.44	546	3.44
250,000 to 750,000						
Pierce	640,700	1	161	2.51	158	2.47
Snohomish	507,900	2	139	2.74	138	2.72
Spokane	383,600	0	117	3.05	118	3.08
Clark	269,500	0	70	2.60	68	2.52
100,000 to 250,000						
Kitsap	210,000	0	40	1.90	39	1.86
Yakima	197,000	0	47	2.39	48	2.44
Thurston	180,500	0	52	2.88	51	2.83
Whatcom	140,900	0	37	2.63	37	2.63
Benton	122,800	0	22	1.79	18	1.47
50,000 to 100,000						
Skagit	88,100	0	14	1.59	14	1.59
Cowlitz	86,100	1	41	4.76	39	4.53
Grays Harbor	66,500	0	14	2.11	14	2.11
Island	66,500	0	14	2.11	13	1.95
Lewis	62,900	0	18	2.86	16	2.54
Clallam	61,400	0	12	1.95	12	1.95
Grant	60,300	0	15	2.49	15	2.49
Chelan	56,000	1	21	3.75	21	3.75
Walla Walla	51,800	0	7	1.35	7	1.35
25,000 to 50,000						
Mason	42,900	0	10	2.33	10	2.33
Franklin	41,100	0	10	2.43	10	2.43
Whitman	39,400	0	12	3.05	11	2.79
Okanogan	35,400	0	3	0.85	3	0.85
Stevens	33,400	0	5	1.50	5	1.50
Kittitas	29,200	0	13	4.45	13	4.45
Douglas	28,500	0	0	0.00	0	0.00
10,000 to 25,000						
Jefferson	23,500	0	3	1.28	3	1.28
Pacific	19,800	0	3	1.52	3	1.52
Asotin	18,300	0	4	2.19	4	2.19
Klickitat	17,500	0	0	0.00	0	0.00
Adams	14,300	0	1	0.70	1	0.70
San Juan	11,900	0	0	0.00	0	0.00
Pend Oreille	10,100	0	1	0.99	1	0.99
Under 10,000						
Lincoln	9,200	0	0	0.00	0	0.00
Skamania	9,000	0	0	0.00	0	0.00
Ferry	6,900	0	1	1.45	1	1.45
Columbia	4,100	0	1	2.44	1	2.44
Wahkiakum	3,500	0	0	0.00	0	0.00
Garfield	2,300	0	0	0.00	0	0.00
Total	5,240,500	7	1,454	2.77	1,438	2.74

*Frequency per 10,000 population

Source: WSP, OFM

VIII. Motorcyclists

Motorcycle fatalities, injuries and collisions all decreased compared to their previous 4-year averages. Motorcycle registrations decreased for the fourth straight year to 96,609. The total collision rate, based on collisions per 1,000 registered motorcycles, was down 15.1% from the 4-year average. The total number persons killed in motorcycle collisions was down from 58 for the 4-year baseline to 39 in 1993, a reduction of 32.2% (Table 8-1).

Table 8-1: Collisions involving motorcycles

Five-year comparison

	1993	1992	1991	1990	1989	prev 4-yr avg	'93 vs prev 4-yr avg
Total collisions	1,739	2,044	2,048	2,167	2,516	2,194	-20.7%
Fatal	38	48	41	60	70	55	-30.6%
Injury	1,489	1,745	1,751	1,840	2,171	1,877	-20.7%
Property dmg only	212	251	256	267	275	262	-19.2%
Persons killed**	39	49	44	62	75	58	-32.2%
Persons injured**	1,810	2,112	2,114	2,223	2,724	2,293	-21.1%
Serious injury	439	533	576	639	897	661	-33.6%
Evident injury	909	1,073	1,018	1,137	1,329	1,139	-20.2%
Possible injury	462	506	520	447	498	493	-6.2%
MC drivers killed	35	42	35	55	59	48	-26.7%
MC drivers injured	1,452	1,699	1,709	1,789	2,119	1,829	-20.6%
MC passengers killed	3	6	8	5	10	7	-58.6%
MC passengers inj	211	253	228	272	392	286	-26.3%
Urban - persons killed	13	18	17	12	23	18	-25.7%
Urban - persons injured	878	1,005	1,005	1,106	1,376	1,123	-21.8%
Rural - persons killed	25	30	26	48	46	38	-33.3%
Rural - persons injured	785	947	932	955	1,135	992	-20.9%
MC drivers involved	1,742	2,031	2,035	2,163	2,510	2,185	-20.3%
MC endorsements	225,230	225,316	210,862	196,512	184,259	204,237	10.3%
Registered motorcycles	96,609	98,131	100,970	103,537	110,617	103,314	-6.5%
Collision rate*	18.00	20.83	20.28	20.93	22.75	21.20	-15.1%

*Motorcycle collisions per 1,000 registered motorcycles.

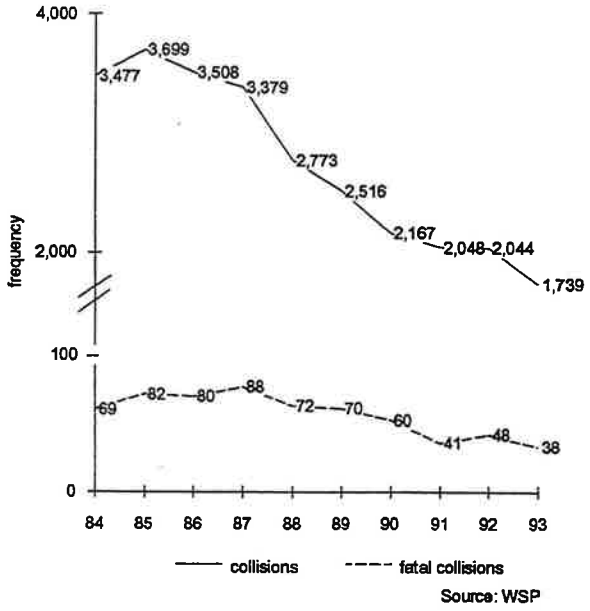
**Includes occupants of other vehicles

Source: WSP, DOL

Figure 8-1 shows a ten-year trend for total and fatal collisions involving motorcycles. The most motorcycle collisions were recorded in 1985, with 3,699, and 1987 recorded the most fatal crashes with 88. The fewest total and fatal motorcycle collisions was in 1993, with 1,739 total crashes and 38 fatal crashes.

Figure 8-1:

Motorcycle fatal collisions & total collisions
Ten-year comparison



Source: WSP

Table 8-2 contains a 23-year motorcycle registration and collision comparison. The number of motorcycle registrations peaked in 1981, and has declined steadily since then, except during 1987 when there was a slight increase. The number of reportable collisions increased from 1971 until 1979, then decreasing through 1993 (with the exception of 1984-1985). During 1993 there were fewer collisions, injuries or fatalities than there were during the 23-year

Table 8-2: Reported motorcycle collisions
1971 to 1993

year	registered m'cycles	collisions	m'cycles involved	rate*	total fatalities	m'cyclsts killed	total injuries	m'cyclsts injured
1971	74,574	1,957	1,972	26.24	54	51	2,107	1,934
1972	81,200	1,893	1,937	23.31	48	43	2,076	1,932
1973	91,782	2,200	2,235	23.97	38	35	2,406	2,230
1974	110,024	2,605	2,657	23.68	60	58	2,764	2,583
1975	110,130	2,518	2,556	22.86	57	51	2,664	2,459
1976	111,211	2,761	2,807	24.83	61	61	2,978	2,752
1977+	115,454	3,093	3,230	26.79	76	75	3,432	3,230
1978	106,212	3,282	3,350	30.90	117	115	3,610	3,416
1979	129,641	3,992	4,054	30.79	121	119	4,350	4,126
1980	135,899	3,914	3,985	28.80	129	119	4,201	3,991
1981	139,931	3,727	3,796	26.63	105	101	3,920	3,752
1982	131,667	3,376	3,424	25.64	109	108	3,341	3,289
1983	127,950	3,312	3,362	25.89	77	77	3,555	3,351
1984	126,703	3,477	3,527	27.44	75	72	3,656	3,434
1985	125,224	3,699	3,762	29.54	85	82	3,884	3,632
1986	122,751	3,508	3,562	28.58	81	80	3,673	3,427
1987	124,215	3,379	3,443	27.20	90	90	3,497	3,288
1988	117,155	2,773	2,813	23.67	77	77	2,896	2,737
1989	110,617	2,516	2,557	22.75	75	69	2,724	2,511
1990@	103,537	2,167	2,198	20.93	62	60	2,223	2,061
1991	100,970	2,048	2,087	20.28	44	43	2,114	1,965
1992	98,131	2,044	2,078	20.83	49	48	2,112	1,952
1993	96,609	1,739	1,742	18.00	39	38	1,810	1,663

*Collisions/ fatal collisions per 1,000 motorcycles registered
+Repeal of the Mandatory Helmet Law effective 9/27/77
@Mandatory Helmet Law Reinstated 6/30/90

Source: WSP,DOL

Location of motorcycle collisions

City streets recorded the highest number of fatal, injury, and property damage collisions involving motorcycles. Other trafficways and rural state routes had the highest rates of persons killed per 1,000 collisions (Table 8-3).

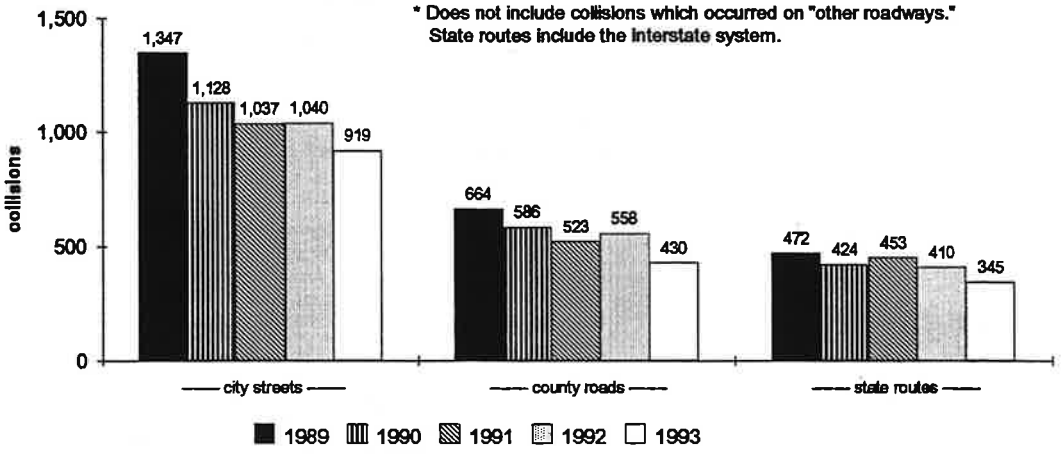
Table 8-3: Location of motorcycle collisions
By severity - 1993

location	collisions				persons		persons killed per 1,000 clsn
	fatal	injury	pty dmg*	total	killed	injured	
City streets**	12	760	147	919	12	901	13.1
County roads	9	391	30	430	9	474	20.9
State route- rural	11	194	21	226	12	257	53.1
Interstate	3	103	13	119	3	121	25.2
Other trafficways***	3	41	1	45	3	57	66.7
Total	38	1,489	212	1,739	39	1,810	22.4

*Property damage only collisions (no deaths or injuries) Source: WSP
**Including U.S. and state routes in cities
***Includes parks/forest service roads. Does not include all-terrain-vehicle trails.

Motorcycle collisions on city streets, county roads and state routes have all shown reductions over the past five years. On city streets during 1993, the number of motorcycle collisions was 919, down from 1,347 in 1989 (Figure 8-2).

Figure 8-2: **Motorcycle collisions by road type* Five-year comparison**



Source: WSP

First harmful event in motorcycle collisions

The majority of motorcycle collisions were multiple-vehicle collisions, and the most frequent types were rear-end collisions and angular direction collisions. Of single-vehicle, motorcycle collisions, overturning was the most prevalent with 65.6% (Table 8-4).

Table 8-4: First harmful event in motorcycle collisions
Single & multiple collisions - 1993

	fatal	injury	ppty dmg only	total collisions	
Single motorcycle collisions					
Overturned	7	402	23	432	65.6%
Struck fixed object	14	137	9	160	24.3%
Motorcycle-animal	0	34	2	36	5.5%
Motorcycle-pedestrian	0	13	0	13	2.0%
Non-collision	0	7	1	8	1.2%
Struck other object	0	7	0	7	1.1%
Motorcycle-pedalcyclist	0	3	0	3	0.5%
Total single motorcycle	21	603	35	659	100.0%
Multiple vehicle clsns (w/mc)					
Rear-end	0	218	58	276	26.7%
Angular direction	2	192	18	212	20.5%
Enter/leave driveway	4	175	26	205	19.8%
One left/one straight-opp dir	3	112	10	125	12.1%
Sideswipe	1	70	15	86	8.3%
Struck parked vehicle	2	17	36	55	5.3%
Broadside (same or opp. dir.)	3	35	5	43	4.2%
Enter/leave parked position	0	14	3	17	1.6%
Head-on	2	13	0	15	1.5%
Total multiple vehicle	17	846	171	1,034	100.0%
Total motorcycle collisions	38	1,449	206	1,693	

Source: WSP

Collision involvement by age group

When compared to their percentage of licensed drivers, motorcyclists aged 20 and younger were over-represented by nearly 20 times in 1993 collisions. Figure 8-3 shows that the younger group was involved in 18.0% of total collisions, but they comprised only 0.9% of motorcycle-endorsed drivers, creating an over-representation ratio of 19.7. The 21 to 24 age group was over-represented by a factor of 4.8. Table 8-5 illustrates that as the age of the motorcycle driver increased, the ratio of collisions to licensed drivers decreased.

Figure 8-3:

Motorcycle drivers in collisions by age group
Percent of motorcycle-endorsed drivers and collisions - 1993

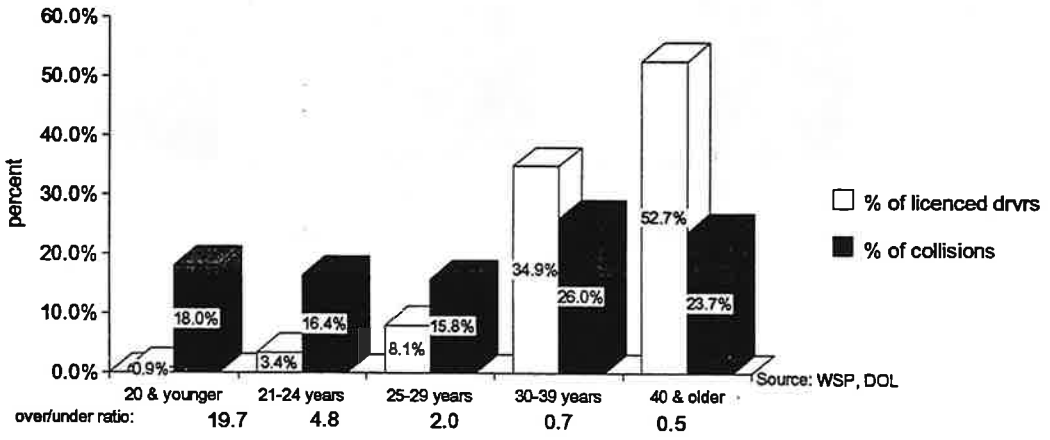


Table 8-5: Motorcycle drivers in collisions
By age group - 1993

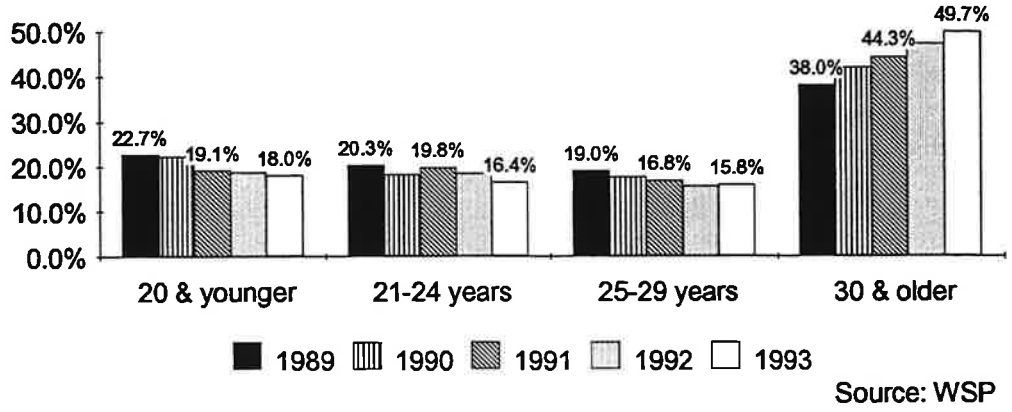
age	licensed m/cyclists number	%	dvrs - fatal clsns number	%	dvrs - inj clsns number	%	dvrs - totl clsns number	%	ratio*
Under 16		-------	3	7.1%	29	1.9%	32	1.8%	-------
16	25	0.0%	0	0.0%	10	0.7%	11	0.6%	56.89
17-18	440	0.2%	3	7.1%	77	5.1%	87	5.0%	25.56
19-20	1,600	0.7%	3	7.1%	153	10.1%	171	9.8%	13.82
21-22	2,962	1.3%	2	4.8%	131	8.6%	151	8.7%	6.59
23-24	4,686	2.1%	1	2.4%	113	7.5%	123	7.1%	3.39
25-29	18,170	8.1%	5	11.9%	239	15.8%	264	15.2%	1.88
30-34	32,390	14.4%	2	4.8%	198	13.1%	221	12.7%	0.88
35-39	46,218	20.5%	9	21.4%	183	12.1%	213	12.2%	0.60
40-44	43,146	19.2%	7	16.7%	138	9.1%	158	9.1%	0.47
45-54	48,831	21.7%	5	11.9%	147	9.7%	173	9.9%	0.46
55-64	18,687	8.3%	2	4.8%	44	2.9%	49	2.8%	0.34
65/over	8,075	3.6%	0	0.0%	15	1.0%	15	0.9%	0.24
Not stated			0		39		74		

*Ratio of percent of licensed drivers to percent of drivers in total collisions Source: WSP, DOL

Figure 8-4 shows a 5-year trend of motorcyclist collisions by various age groups. Younger motorcyclists (20 and younger) have accounted for a decreasing percentage of total collisions over the past five years, from 22.7% in 1989 to 18.0% in 1993. Motorcyclists 30 and older have shown increases over the last five years, from 38.0% to 49.7% of total collisions.

Figure 8-4:

Percent of total motorcycle collisions
Five-year trend by age groups



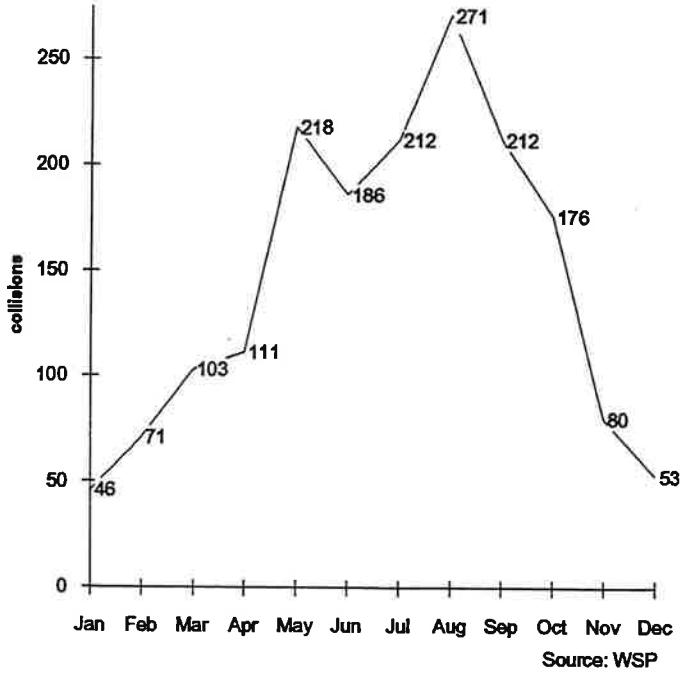
Source: WSP

Motorcycle collisions by month of year, day of week, and hour of day

The months of May through October recorded the greatest numbers of motorcycle collisions in 1993. January and December recorded the fewest collisions (Figure 8-5).

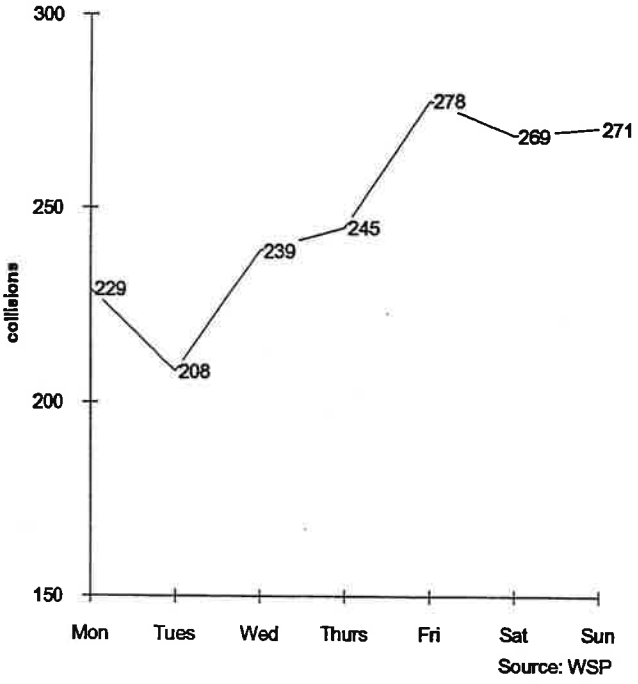
Figure 8-5:

Motorcycle collisions
By month - 1993



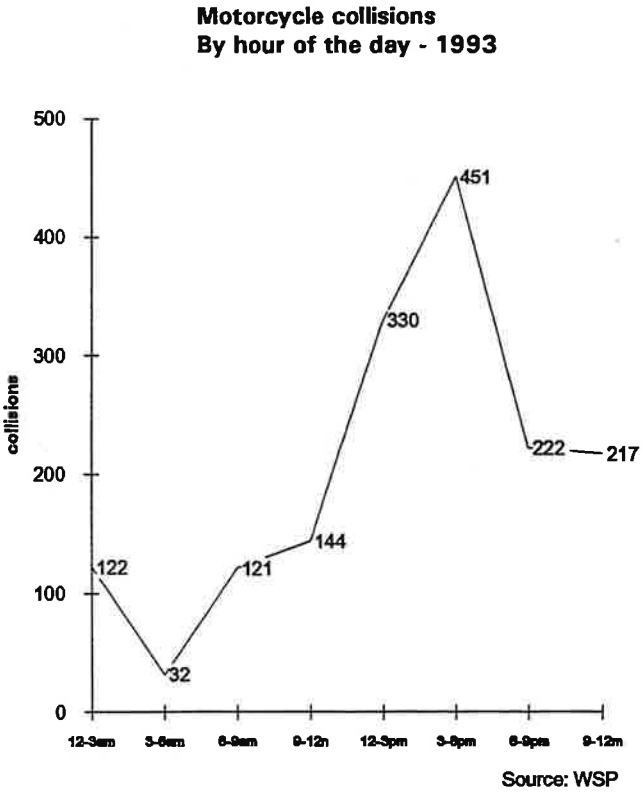
Friday, Saturday and Sunday accounted for the highest number of motorcycle collisions. Friday recorded the highest number of collisions with 278, and Tuesday had the fewest with 208 (Figure 8-6).

Motorcycle collisions
By day of week - 1993



Total motorcycle collisions peaked during the 3:00 to 6:00 p.m. time period with 451 collisions. The 12:00 noon to 3:00 p.m. period was next highest with 330 (Figure 8-7).

Figure 8-7:



Source: WSP

Contributing circumstances in motorcycle collisions

Table 8-6 shows that speeding was the most-reported motorcyclist violation in fatal, injury and property-damage-only collisions. DWI was the second most-reported violation in fatal collisions.

Table 8-6: Motorcyclist violations in investigated collisions
By severity - 1993

violation	fatal	injury	ppty dmg only	total collisions
Speeding	20	441	33	494
D.W.I.	14	139	6	159
Following too closely	0	103	24	127
Defective equipment	0	69	4	73
Improper passing	0	56	3	59
Failed to yield	2	40	6	48
Over center line	1	28	1	30
Disregd signs/signals	1	15	2	18
Other violations	5	152	20	177
Total	43	1043	99	1,185

Source: WSP

Helmet use in collisions

In 1993, there were 1,442 motorcyclists in collisions wearing a helmet, and there were 115 in collisions while not wearing a helmet. Among the helmeted riders, 1.9% died and 21.6% were seriously injured, as compared to 9.6% killed and 31.3% receiving serious injuries among the non-helmeted motorcycle riders (Table 8-7).

Table 8-7: Motorcyclist injuries and helmet use
By severity - 1993

severity	helmet used		helmet not used		unknown use		total*	
Killed	27	1.9%	11	9.6%	0	0.0%	38	2.2%
Serious injury	312	21.6%	36	31.3%	21	13.2%	369	21.5%
Evident injury	659	45.7%	52	45.2%	56	35.2%	767	44.7%
Possible injury	268	18.6%	8	7.0%	33	20.8%	309	18.0%
No injury	176	12.2%	8	7.0%	44	27.7%	228	13.3%
Injury status unknown	0	0.0%	0	0.0%	5	3.1%	5	0.3%
Total	1,442	100.0%	115	100.0%	159	100.0%	1,716	100.0%

*Including unknown use

Source: WSP

Motorcycle collisions by county and city

Motorcyclist fatalities, injuries and collisions for 1993 are summarized for counties and cities in Tables 8-8 and 8-9. Clallam County had the lowest collision rate with 80.9 collisions per 1,000 registered motorcycles. Marysville was the only city with population over 10,000 with no motorcycle collisions.

Table 8-8: Motorcyclists killed and injuried
Collisions by county - 1993

county	registered motorcycles	m/cyclsts killed	m/cyclsts injured	total m/c collision	collision rate*	m/cyclsts killed per 1,000 clsns
Adams	204	0	2	2	9.8	0.0
Asotin	328	0	3	3	9.1	0.0
Benton	2,319	0	31	33	14.2	0.0
Chelan	1,727	1	26	24	13.9	41.7
Clallam	1,236	0	10	10	8.1	0.0
Clark	3,939	2	74	77	19.5	26.0
Columbia	93	0	4	3	32.3	0.0
Cowlitz	1,558	0	31	30	19.3	0.0
Douglas	697	0	10	9	12.9	0.0
Ferry	100	2	2	3	30.0	666.7
Franklin	696	0	10	6	8.6	0.0
Garfield	15	0	3	2	133.3	0.0
Grant	1,104	0	28	23	20.8	0.0
Grays Harbor	1,138	1	23	20	17.6	50.0
Island	1,157	0	24	20	17.3	0.0
Jefferson	643	0	11	10	15.6	0.0
King	28,489	10	529	597	21.0	16.8
Kitsap	4,818	2	77	87	18.1	23.0
Kittitas	940	0	13	12	12.8	0.0
Klickitat	274	0	8	7	25.5	0.0
Lewis	1,223	2	12	14	11.4	142.9
Lincoln	174	0	3	3	17.2	0.0
Mason	861	0	24	22	25.6	0.0
Okanogan	801	2	16	16	20.0	125.0
Pacific	268	0	5	5	18.7	0.0
Pend Oreille	186	0	4	2	10.8	0.0
Pierce	9,801	3	203	202	20.6	14.9
San Juan	375	1	8	6	16.0	166.7
Skagit	2,240	2	27	27	12.1	74.1
Skamania	132	1	14	11	83.3	90.9
Snohomish	10,574	2	152	162	15.3	12.3
Spokane	6,878	4	110	104	15.1	38.5
Stevens	603	0	8	10	16.6	0.0
Thurston	3,915	1	64	66	16.9	15.2
Wahkiakum	33	1	1	2	60.6	500.0
Walla Walla	842	0	9	8	9.5	0.0
Whatcom	2,859	0	43	44	15.4	0.0
Whitman	605	0	9	8	13.2	0.0
Yakima	2,764	1	48	49	17.7	20.4
Total	96,609	38	1,679	1,739	18.0	21.9

Source: WSP, DOL

* Collisions involving motorcycles per 1,000 motorcycles registered.

Table 8-9: Motorcyclists killed and injured*

Collisions by city population - 1993

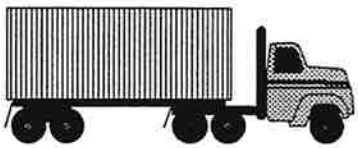
city	population	m/cyclsts killed	m/cyclsts injured	total m/c collisions	collision rate+	m/cyclsts killed per 1,000 clsns
250,000 and over						
Seattle	527,700	5	267	308	5.8	16.2
100,000 to 250,000						
Spokane	183,800	4	110	104	5.7	38.5
Tacoma	181,200	0	72	77	4.2	0.0
50,000 to 100,000						
Bellevue	89,710	1	22	26	2.9	38.5
Everett	76,980	0	25	31	4.0	0.0
Federal Way	75,320	0	23	24	3.2	0.0
Yakima	59,580	1	48	49	8.2	20.4
Bellingham	55,480	0	43	44	7.9	0.0
Vancouver	55,450	2	74	77	13.9	26.0
25,000 to 50,000						
Kennewick	45,110	0	15	16	3.5	0.0
Renton	43,470	0	16	17	3.9	0.0
Kirkland	41,700	0	6	10	2.4	0.0
Kent	41,090	0	13	16	3.9	0.0
Redmond	40,095	0	8	8	2.0	0.0
Olympia	36,520	0	26	26	7.1	0.0
Bremerton	36,380	0	20	22	6.0	0.0
Auburn	34,550	0	16	15	4.3	0.0
Richland	34,080	0	8	10	2.9	0.0
Longview	32,650	0	10	11	3.4	0.0
Edmonds	30,970	0	2	2	0.6	0.0
Lynnwood	29,580	0	22	23	7.8	0.0
Walla Walla	28,820	0	6	6	2.1	0.0
Burien	27,800	0	3	3	1.1	0.0
Puyallup	26,140	0	9	9	3.4	0.0
15,000 to 25,000						
Bothell	24,530	0	4	4	1.6	0.0
Pullman	23,480	0	5	5	2.1	0.0
Wenatchee	23,000	0	7	6	2.6	0.0
Sea Tac	22,840	0	15	18	7.9	0.0
Lacey	22,660	0	10	13	5.7	0.0
Pasco	21,370	0	8	5	2.3	0.0
Mercer Island	21,260	1	1	3	1.4	333.3
Mount Vernon	20,450	1	2	2	1.0	500.0
Mountlake Terrace	19,880	1	3	5	2.5	200.0
Des Moines	19,460	0	5	5	2.6	0.0
Oak Harbor	18,930	0	5	5	2.6	0.0
Port Angeles	18,270	0	10	10	5.5	0.0
Bainbridge Island	17,200	0	2	3	1.7	0.0
Aberdeen	16,665	0	5	6	3.6	0.0
10,000 to 15,000						
Tukwila	14,660	0	13	13	8.9	0.0
Marysville	14,570	0	0	0	0.0	----
Mukilteo	14,035	0	2	3	2.1	0.0
Ellensburg	12,770	1	13	12	9.4	83.3
Centralia	12,380	0	5	5	4.0	0.0
Anacortes	12,260	0	6	5	4.1	0.0
Kelso	11,850	0	2	3	2.5	0.0
Moses Lake	11,700	0	4	3	2.6	0.0
Sunnyside	11,420	0	1	2	1.8	0.0
Tumwater	11,110	1	4	5	4.5	200.0

*Includes collisions occuring on the interstate system

Source: WSP, OFM

+Collisions involving motorcycles per 10,000 population

IX. Heavy Trucks



During 1993 there were 5,816 heavy trucks (10,000 pound gross weight and over) involved in traffic collisions, down 5.1% from the previous 4-year average. The heavy truck collision rate (collisions per 10,000 registered heavy trucks) was up from the previous year but down from the previous four-year average (Table 9-1).

Table 9-1: Traffic collisions involving heavy trucks (10,000 lbs & greater)
Five-year comparison

	1993	1992	1991	1990	1989	prev 4-yr avg	'93 vs prev 4-yr avg
Collisions involving heavy trucks	5,816	5,530	5,617	6,486	6,374	6,002	-3.1%
Fatal collisions	62	49	54	76	77	64	-3.1%
Injury collisions	1,853	1,650	1,687	2,051	1,955	1,836	0.9%
Property damage only clsns	3,901	3,831	3,876	4,359	4,342	4,102	-4.9%
Persons killed	71	60	63	82	86	73	-2.4%
Persons injured	2,695	2,335	2,354	2,879	2,785	2,588	4.1%
Serious injuries	234	279	275	372	368	324	-27.7%
Evident injuries	953	810	826	995	960	898	6.2%
Possible injuries	1,508	1,246	1,253	1,512	1,457	1,367	10.3%
Heavy-truck drivers involved	5,884	5,546	5,684	6,561	6,432	6,056	-2.8%
Heavy trucks involved	6,029	5,683	5,811	6,725	6,575	6,199	-2.7%
Heavy trucks registered**	130,000	132,300	136,500	128,100	124,800	130,425	-0.3%
Fatal collision rate**	4.77	3.70	3.96	5.93	6.17	4.94	-3.5%
Collision rate*	447.4	418.0	411.5	506.3	510.7	461.64	-3.1%

*Colisions per 10,000 registered trucks
**Estimated by DOT and DOL
Source: WSP, DOL, DOT

Heavy truck collisions by first harmful event

During 1993, heavy trucks were involved in 4,346 collisions involving other moving motor vehicles. This accounted for 74.7% of all heavy truck collision, including 42 fatal crashes. In addition, heavy trucks were involved in 634 collisions with fixed or other objects (Table 9-2).

Table 9-2: Heavy truck collisions by first harmful event
By severity - 1993

type of collision	fatal	injury	ppty dmg only	total collisions	percent
Clsn w/other moving motor veh	42	1,484	2,820	4,346	74.7%
Collision with fixed/other object	4	116	514	634	10.9%
Collision with parked vehicle	1	59	282	342	5.9%
Overturning	3	128	166	297	5.1%
Other non-collision	2	25	100	127	2.2%
All other collisions*	10	41	19	70	1.2%
Total	62	1,853	3,901	5,816	100.0%

*Pedestrians, pedalcyclists, RR train & animal.
Source: WSP

Heavy truck defects

Defective brakes were present in 166 of 394 collisions, and in 10 of 14 fatal collisions where heavy-truck vehicle defects were reported. Worn or smooth tires were present in 37, or 9.4%, of heavy-truck defects in collisions (Table 9-3).

Table 9-3: Defects of heavy trucks in collisions
By collision severity - 1993

condition of vehicle	fatal	injury	ppty dmg only	total collisions	percent
Defective brakes	10	68	88	166	42.1%
Worn or smooth tires	1	15	21	37	9.4%
Defective rear lights	0	5	9	14	3.6%
Puncture or blowout	1	6	7	14	3.6%
Defective steering	0	6	4	10	2.5%
Defective headlights	0	0	3	3	0.8%
Other defects	2	41	107	150	38.1%
Total	14	141	239	394	100.0%

Source: WSP

Age of drivers involved in heavy truck collisions

In 1993, 14.5% of drivers endorsed to drive heavy trucks were in the 20-29 year age group. This same age group was involved in 19.6% of all heavy truck collisions, and were over-represented by a ratio of 1.35. The 19-and-younger age group was over-represented by a larger ratio, but the ratio was based on low percentages for endorsed drivers and total collisions (Table 9-4).

Table 9-4: Drivers in heavy truck collisions by age
And percentage of classified drivers - 1993

age	% of lic dvrs*	fatal collisions	injury collisions	total collisions		ratio +
19 & under	0.13%	0	12	29	0.5%	3.67
20-29	14.5%	11	399	1,153	19.6%	1.35
30-39	33.5%	17	552	1,731	29.4%	0.88
40-49	28.5%	17	434	1,328	22.6%	0.79
50-59	16.8%	13	263	814	13.8%	0.82
60 & over	6.6%	3	95	278	4.7%	0.72
Not stated		2	122	551	9.4%	

Source: WSP, DOL

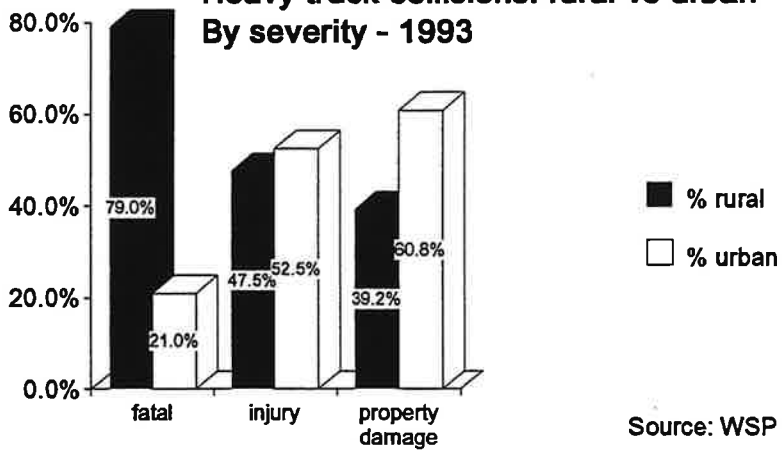
*Percent of WA drivers in age group with classified endorsement
(Required only for operators of larger trucks & truck combinations)
+Percent collision involvement to percent licensed drivers

Location of heavy truck collisions

During 1993, 79.0% of fatal collisions involving heavy trucks occurred in rural areas. In injury and property-damage-only collisions involving heavy trucks, the majority occurred in urban areas (Figure 9-1).

Figure 9-1:

Heavy truck collisions: rural vs urban
By severity - 1993



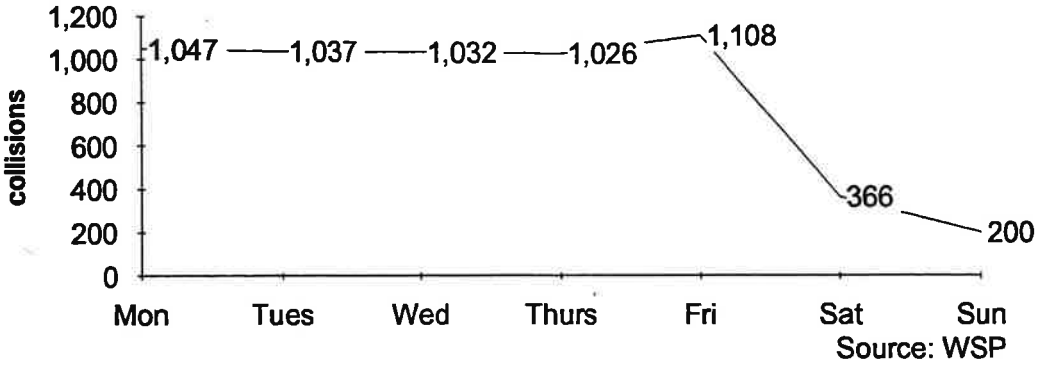
Source: WSP

Heavy truck collisions by day of week and hour of day

The number of collisions were roughly equivalent for weekdays, with just over 1,000 each for Monday through Friday during the year. Saturday and Sunday had dramatically lower numbers with 366 and 200 for the year respectively (Figure 9-2).

Figure 9-2:

Collisions involving heavy trucks
By day of week - 1993

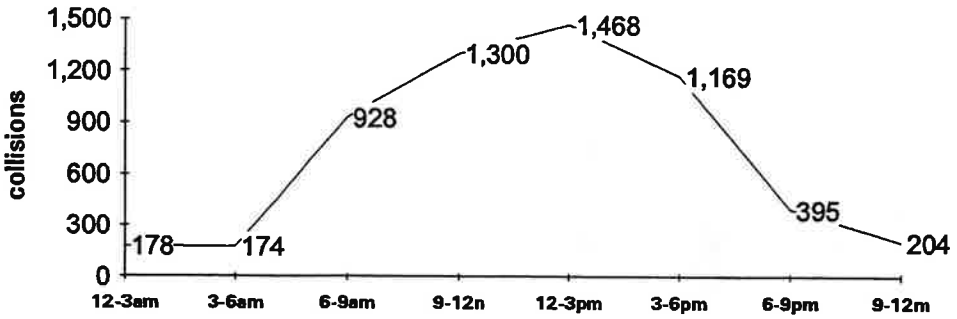


Source: WSP

The number of heavy truck collisions peaked during the 12:00 noon to 3:00 p.m. time period, with 1,468 during 1993. The vast majority occurred between 6 a.m.and 6 p.m. (Figure 9-3).

Figure 9-3:

Collisions involving heavy trucks
By time (3-hour intervals) - 1993



Source: WSP

Collisions involving light trucks

Table 9-5 displays a four-year comparison of collisions involving light trucks (gross weight of under 10,000 pounds). The number of collisions during 1993 involving light trucks increased 4.5% when compared to the previous three-year average. The number of persons injured increased by 8.6% over the same period, and the collision rate, the number of light-truck collisions per 10,000 registered light trucks, increased 6.6%. However, the number of fatal collisions, persons killed, and the number of persons seriously injured all declined compared to the previous three years.

Table 9-5: Traffic collisions involving light trucks (less than 10,000 lbs)
Four-year comparison

	1993	1992	1991	1990	prev 3-yr avg	'93 vs prev 3-yr avg
Collisions involving light trucks	57,757	56,270	52,907	56,655	55,277	4.5%
Fatal collisions	249	266	259	306	277	-10.1%
Injury collisions	22,866	21,892	20,364	21,076	21,111	8.3%
Property damage only clsns	34,642	34,112	32,284	35,273	33,890	2.2%
Persons killed	289	292	294	357	314	-8.1%
Persons injured	34,868	33,384	30,926	31,971	32,094	8.6%
Serious injuries	2,453	2,742	2,827	3,084	2,884	-15.0%
Evident injuries	10,830	10,330	10,109	10,603	10,347	4.7%
Possible injuries	21,585	20,312	17,990	18,284	18,862	14.4%
Total light trucks involved	67,967	65,896	61,344	65,713	64,318	5.7%
Light trucks registered*	1,053,200	1,092,900	1,081,900	1,051,300	1,075,367	-2.1%
Fatal collision rate**	2.36	2.43	2.39	2.91	2.58	-8.3%
Collision rate**	548.4	514.9	489.0	538.9	514.3	6.6%

* Estimated by DOT and DOL

Source: WSP, DOL, DOT

**Collisions per 10,000 registered trucks

X. Pupil Transportation

During the 1992-1993 school year, there were 402 school bus collisions reported in which 237 persons were injured. Of the injured, there were 104 pupils, 26 school bus drivers and 2 occupants of school buses other than students.

There were 2 fatalities in 1992-1993 school bus collisions, neither of which was a school bus occupant. No school bus occupants have been killed during the last five school years. The 8 fatalities during this time were pedestrians, bicyclists or occupants of other vehicles (Table 10-1).

Table 10-1: Collisions involving school buses
Five-year comparison

Severity, exposure & rates	92-93	91-92	90-91	89-90	88-89	prev 4-yr avg	92-93 vs prev 4-yr avg
Total collisions	402	348	340	325	371	346	16.2%
Fatal collisions	2	0	4	1	1	2	33.3%
Injury collisions	108	92	92	98	121	101	7.2%
Property damage collisions	292	256	244	226	249	244	19.8%
Total persons killed	2	0	4	1	1	2	33.3%
Pupils	0	0	0	0	0	0	-----
School bus drivers	0	0	0	0	0	0	-----
Other occupants of school bus	0	0	0	0	0	0	-----
Pedestrian/bicyclist	1	0	2	1	0	1	33.3%
Occupants/other vehicles involved	1	0	2	0	1	1	33.3%
Total persons injured	237	192	189	232	216	207	14.4%
Pupils	104	85	82	85	66	80	30.8%
School bus drivers	26	20	16	17	21	19	40.5%
Other occupants of school bus	2	2	1	1	1	1	60.0%
Pedestrian/bicyclist	4	3	4	6	5	5	-11.1%
Occupants/other vehicles involved	101	82	86	123	123	104	-2.4%
Injuries to school bus occupants*	132	107	99	103	88	99	33.0%
Serious injuries	5	0	1	8	2	3	81.8%
Evident injuries	34	16	8	31	18	18	86.3%
Possible injuries	93	91	90	64	68	78	18.8%
School bus registration	7,534	7,349	7,113	6,906	6,627	6,999	7.6%
Collision rate by school bus registration**	53.4	47.4	47.8	47.1	56.0	49.5	7.7%
Miles traveled (in thousands)	87,691.4	87,972.7	83,060.5	78,127.9	73,799.7	80,740	8.6%
Collision rate by mileage***	0.46	0.40	0.41	0.42	0.50	0.43	6.4%

* Includes school bus passengers and driver

Source: WSP, SPI

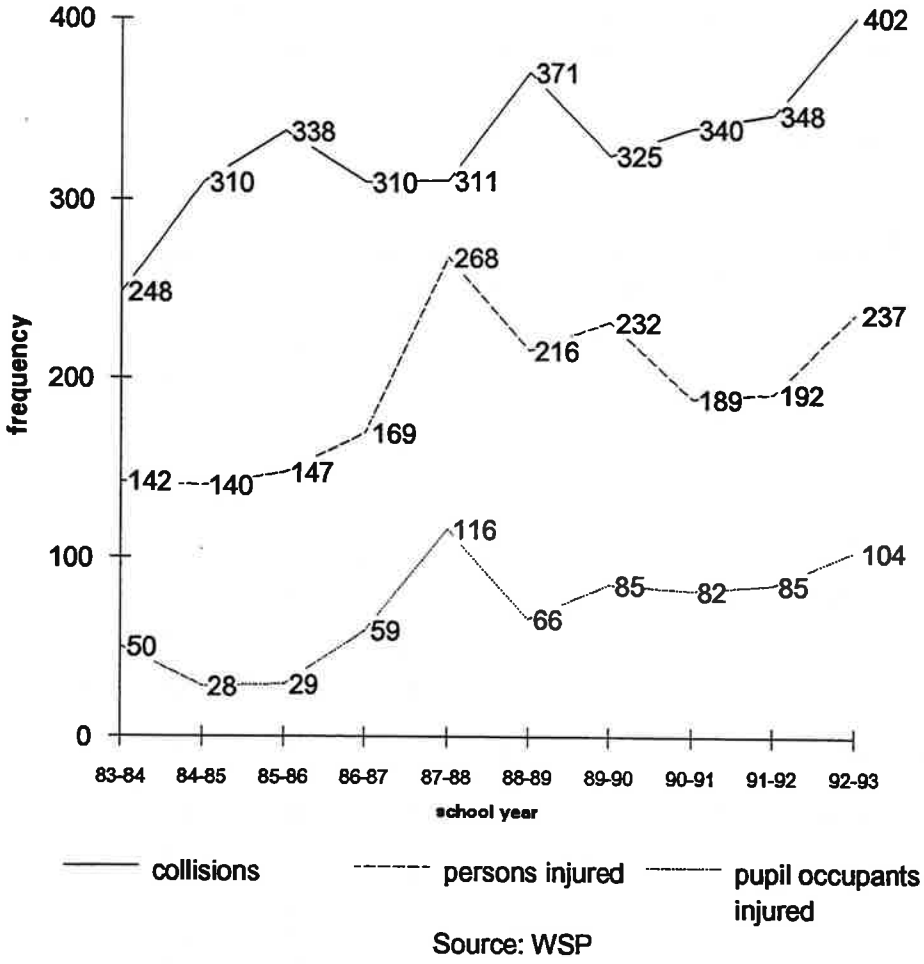
** Collisions per 1,000 registered vehicles

*** Collisions per 100,000 miles traveled

Figure 10-1 displays a ten-year trend of school bus collisions, persons injured and pupil occupants injured. There has been an overall upward trend in these three categories.

Figure 10-1:

School bus collisions and injuries
Ten-year comparison



Source: WSP

XI. Vehicle Defects

In investigated collisions in 1993, the most common vehicle defects noted were defective brakes, found in 1,382 vehicles, and worn or smooth tires, found in 1,288 vehicles. There were 5,073 defects noted in investigated collisions during 1993, comprising 3.0% of all vehicles. The number of defects noted in collisions declined in nearly all categories during 1993 (Table 11-1).

Table 11-1: Vehicle condition in investigated collisions

Five-year comparison

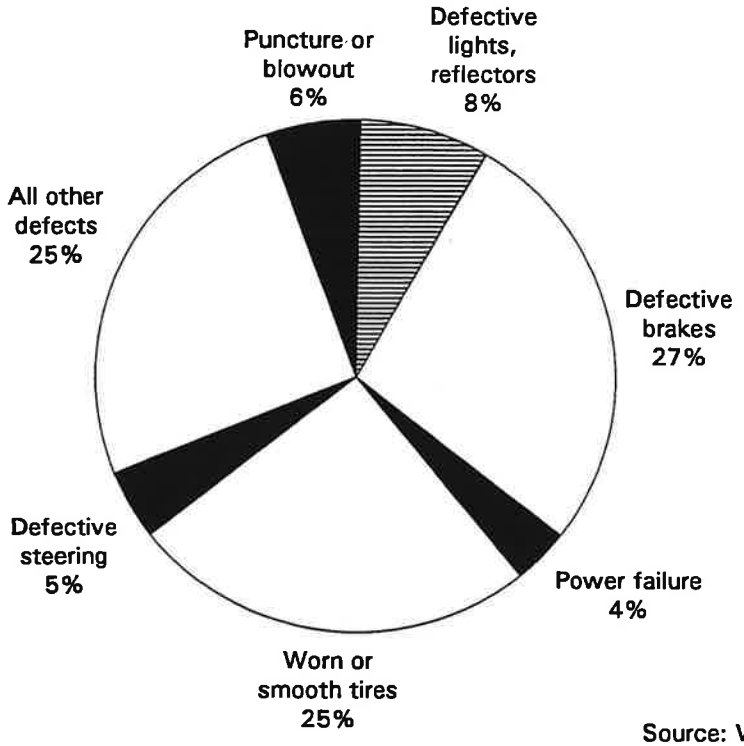
description	1993	1992	1991	1990	1989	prev 4-yr avg	'93 vs prev 4-yr avg
Defective brakes	1,382	1,486	1,485	1,682	1,671	1,581	-12.6%
Worn or smooth tires	1,288	1,211	1,497	1,948	2,165	1,705	-24.5%
Puncture or blowout	306	293	309	399	405	352	-12.9%
Defective rear lights	228	236	283	305	387	303	-24.7%
Defective steering	230	236	196	272	279	246	-6.4%
Power failure	183	161	186	182	196	181	1.0%
Defective headlights	100	97	121	112	164	124	-19.0%
Other lights/reflectors	67	71	71	97	114	88	-24.1%
All other defects	1,289	1,456	1,353	1,319	1,775	1,476	-12.7%
Total defects	5,073	5,247	5,501	6,316	7,156	6,055	-16.2%
No defects noted	167,315	168,706	159,398	170,881	161,829	165,204	1.3%
Percent with defects	3.0%	3.1%	3.5%	3.7%	4.4%	3.7%	-17.4%

Source: WSP

Defective brakes made up 27% of all defects noted in 1993 investigated collisions. Worn or smooth tires worn accounted for 25 % of reported defects (Figure 11-1).

Figure 11-1:

Vehicle defects in investigated collisions - 1993



Source: WSP

XII. Contributing Driver Violations

The driver violation reported most frequently in investigated collisions during the last five years was failure to yield right of way followed by exceeding safe speed. The violation which showed the largest increase during 1993 was following too closely, which displayed a 20.1% increase over the previous 4-year average (Table 12-1).

Table 12-1: Contributory driver violations in collisions*
Five-year comparison

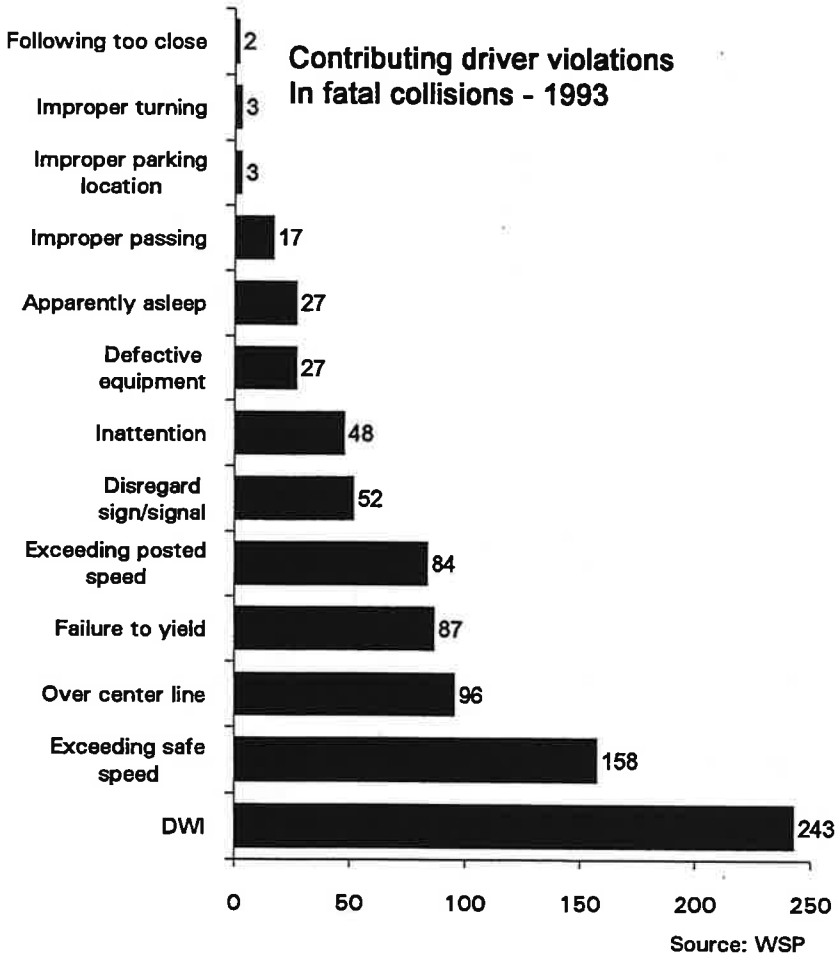
	1993	1992	1991	1990	1989	prev 4-yr avg	'93 vs prev 4-yr avg
Failure to yield right of way**	24,650	25,532	24,492	25,687	24,119	24,958	-1.2%
Exceeding safe speed	23,036	20,950	18,941	22,796	22,566	21,313	8.1%
Following too closely	14,972	14,383	12,597	12,058	10,830	12,467	20.1%
Driver inattention	14,310	15,234	16,587	19,118	18,547	17,372	-17.6%
Driving under the influence	8,284	9,088	9,331	9,973	9,900	9,573	-13.5%
Disregarding signs/signals	7,481	7,715	7,508	8,160	7,925	7,827	-4.4%
Improper turning - inc. "U" turn	4,123	3,919	3,670	3,717	3,484	3,698	11.5%
Defective equipment	3,689	3,626	3,348	3,247	3,084	3,326	10.9%
Exceeding posted speed	3,619	3,895	4,004	4,475	4,783	4,289	-15.6%
Other violations	2,773	2,652	2,625	2,662	2,495	2,609	6.3%
Over center line	2,137	2,141	2,041	2,537	2,555	2,319	-7.8%
Improper passing	1,911	1,998	1,919	2,093	1,989	2,000	-4.4%
Apparently asleep	1,756	1,856	1,776	1,801	1,814	1,812	-3.1%
Improper parking location	626	619	615	672	594	625	0.2%
Failing to signal***	424	474	467	586	529	514	-17.5%
Did not dim headlights	174	219	208	256	242	231	-24.8%
Total violations	113,965	114,301	110,129	119,838	115,456	114,931	-0.8%

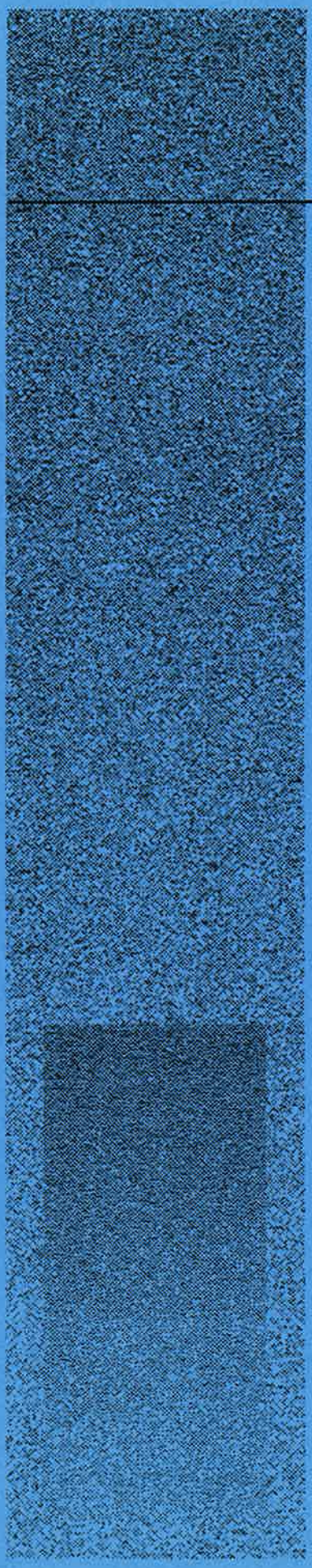
* Investigated collisions only
Source: WSP
** Includes failure to yield to pedestrians
*** Includes signaling improperly

XII / Contributing Driver Violations

The thirteen most-reported contributing driver violations in 1993 fatal collisions are shown in Figure 12-1. Driving under the influence was the highest factor, reported 243 times in fatal collisions. The next most prevalent contributing driver violations in fatal collisions were exceeding safe speed with 158, and over center line with 96 (Figure 12-1).

Figure 12-1:

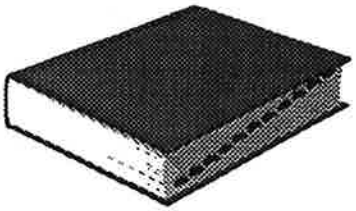




Appendix

Data
Summary and
Highway
Safety
Problem
Analysis

Glossary



Collisions

Collision - A crash involving one or more motor vehicles on a public trafficway which results in personal injury or death, or damage to any one person's property to an apparent extent of $500 or more.

Fatal collision - A traffic collision where one or more persons are killed or die within 30 days as a result of the collision.

Investigated collision - A collision that has been investigated by a law enforcement officer. Data relating to alcohol involvement, contributing circumstances (driver violations), vehicle defects and safety-restraint use are collected from investigated collisions.

Injury classes

Fatal injury / fatality - A motor-vehicle, traffic-related injury that results in death. (There can be more than one "fatality" in a single "fatal collision.")

Serious injury - An injury other than fatal that prevents the injured person from continuing normal activities.

Evident injury - Any injury not disabling but evident to others at the scene.

Possible injury - Any injury reported or claimed which is not a fatal, disabling, or non-disabling injury but includes momentary unconsciousness, limping, complaint of pain, nausea or hysteria.

Death/injury rates

Vehicle miles traveled - Traffic deaths/injuries per 100 million vehicle miles of travel (travel is estimated by WSDOT).

Registered vehicles - Traffic deaths/injuries per 10,000 registered vehicles; 1,000 for motorcycles.

Population - Traffic deaths/injuries per 10,000 population.

Licensed drivers - traffic deaths/injuries per 10,000 licensed drivers.

Calculations of economic loss

The calculable costs of motor vehicle collisions are wage loss, medical expense, insurance administration costs, and property damage. Costs are figured per person for deaths and injuries and per crash for property damage only collisions. The National Safety Council estimated average 1992 costs as follows:

- Death $880,000
- Disabling injury $ 32,600
- Non-disabling injury $ 10,700
- Possible injury $ 6,700
- Property damage only $ 6,500

Persons Involved in Collisions (Status)

Occupant - Any person who is sitting, standing upon, or within a motor vehicle. Occupants include drivers and passengers.

Driver - An occupant who is in actual physical control of a motor vehicle in transport.

Passenger - Any occupant of a motor vehicle other than the driver.

Pedalcyclist - Any rider of a pedalcycle in transport. Pedalcycles include bicycles and tricycles. Motor-driven cycles are not included.

Pedestrian - Any person who is not an occupant or a pedalcyclist.

Senior driver - Drivers 55 years and older.

Youthful driver - Drivers 24 years of age and younger.

Location

Urban area - Incorporated areas with population of 2,500 or greater.

Rural area - Unincorporated or incorporated areas with population less than 2,500.

Trafficway - Any public roadway or highway used for motor vehicle travel.

Alcohol Involvement

Alcohol-involved collision - a collision in which one or more drivers had some level of alcohol in their system; includes DUI.

DWI / driving while intoxicated - Driving while under the influence of alcohol (BAC of .10 and over) and/or when the investigating officer determines that the driver's driving ability was impaired by alcohol.

DUI / driving under the influence - Same as DWI/driving while intoxicated.

HBD / had been drinking - The investigating officer has determined that the driver had consumed some amount of alcohol and/or BAC test results greater than zero.

Vehicles

Motorcycle - Does not include mopeds, motorized bicycles, or motorized wheelchairs.

Heavy truck - 10,000 pounds or more gross weight

Light truck - Under 10,000 pounds gross weight

Milestones in Washington Traffic Safety

1963 Driver Education Act.

1967: Creation of Washington Traffic Safety Commission.
Mandatory motorcycle helmet law.
Minimum driver's license age raised from 16 to 18 (16 with driver education).

1968: Implied consent law.

1971: Habitual traffic offender law.

1973: Speed limit reduced to 55 mph.

1975: Negligent homicide statute.
Deferred prosecution statute.

1979 Motorcycle helmet law repealed.

1979: DWI law modified to make .10% BAC illegal per se.
Mandatory day in jail for first DWI offense.

1982: "Day in Jail" changed to mean 24 consecutive hours.
Alcohol assessment and education/treatment required for DWI.

1983: Vehicular homicide and assault statute.
Open container law for alcoholic beverages.
Mandatory child restraint law.

1985: Deferred prosecution procedures made more stringent.

1986: Mandatory seat belt law.

1987: Speed limit increased to 65 mph (60 mph for trucks) on rural interstates.
Motorcycle Helmets required for persons under 18 years of age.
Children under 5 years of age prohibited from riding on motorcycles.

1989: DWI youth (under 19) lose license for 90 days or until age 19, whichever is longer.

1990: Mandatory insurance required.
Mandatory motorcycle helmet law for all ages.

1991: Mandatory installation of crossing arms on school buses.

1992: DWI victim panels authorized as a sentencing option.

1993: Age requirement for child safety seat raised from 1 to 2 years.
Enhancement of pedestrian crosswalk law.

1994: Omnibus Drunk Driving Act of 1994 - stiffer penalties for higher BAC/repeat offenses.
Child safety seats required for children up to age 3.
Primary seatbelt enforcement for children up to age 10.

Appendix

Traffic Safety Resource Material

Accident Facts
National Safety Council
Statistics Department (Chicago, Illinois).
444 N. Michigan Ave, Chicago, IL 60611
+ Includes a section on motor vehicle traffic collisions.

Annual Traffic Report
Washington State Department of Transportation
Planning, Research and Public Transportation Programs.
Transportation Building, P.O. Box 47372, Olympia, WA 98504-7372
+ Contains traffic volumes on state highways.

Caseloads of the Courts of Limited Jurisdiction of Washington
Office of the Administrator for the Courts
1206 S. Quince St., P.O. Box 41170, Olympia, WA 98504-1170
+ Includes DWI citation and disposition information.

Crime Trends in Washington Jurisdictions
Washington Association of Sheriffs and Police Chiefs (WASPC)
P.O. Box 826, Olympia, WA 98507
+ Includes statistics on DWI arrests.

Fatal Accident Reporting System
National Highway Traffic Safety Administration (NHTSA)
U.S. Department of Transportation (USDOT).
National Transportation Systems Center, DTS-44
Kendall Square, Cambridge, MA 02142
+ Statistics on nationwide traffic fatalities.

Population Trends for Washington State
Office of Financial Management (OFM), Forecasting Division.
300 Insurance Building, P.O. Box 43113, Olympia, WA 98504-3113

Washington State Highway Accident Report
Washington State Department of Transportation
Planning, Research and Public Transportation Division.
Transportation Building, P.O. Box 47372, Olympia, WA 98504-7372
Olympia, WA 98504-5201
+ Accident rates for state highway sections.

Washington State Reportable Motor Vehicle Traffic Collision Statistics
Washington State Patrol
Accident Records Section
4242 Martin Way, P.O. Box 42628, Olympia, WA 98504-2628

Documents listed above are updated annually.

The Counties of Washington State