All-Terrain Vehicle 2001 Injury and Exposure Studies

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Mark S. Levenson, Ph.D.
U.S. Consumer Product Safety Commission
Directorate for Epidemiology
Division of Hazard Analysis
4330 East West Highway
Bethesda, MD 20814

Executive Summary

In 2001 the U.S. Consumer Product Safety Commission (CPSC) and members of the all-terrain vehicle (ATV) industry conducted studies of ATV-related injuries and exposure in order to help understand the reasons for the recent rise in ATV-related injuries. These studies provide information on the injuries and exposure in 2001 and can be compared to similar studies conducted in 1997.

From 1997 to 2001, the estimated number of ATV-related injuries treated in hospital emergency rooms rose from 54,700 to 111,700 (a 104% increase). In this time period, the estimated number of ATV drivers rose from 12 to 16.3 million (a 36% increase), the estimated total number of driving hours rose from 1575 to 2364 million (a 50% increase), and the estimated number of ATVs rose from 4 to 5.6 million (a 40% increase). None of these exposure measures accounts completely for the rise in injuries over the time period.

Riders, including drivers and passengers, under the age of 16 have comparable risk to riders 16 years and over as measured by injuries per rider. However, the risk is substantially larger for the younger group of riders as compared to the older group when measured by injuries per riding hour. When focus is on the driver's age, the risk to drivers under the age of 16 is greater than for the older drivers by both risk measures. Riders in both age groups have experienced notable percent increases in injuries and risk between 1997 and 2001. The 16 years and over riders accounted for a greater increase in injuries between 1997 and 2001, with corresponding increases in both exposure and risk.

ATVs come with a warning against carrying passengers. The risk to drivers is larger than that of passengers when measured by injuries per rider. However, the risk is larger for passengers than drivers when measured by injuries per riding hour.

Drivers with less than one year of driving experience have the highest risk among drivers of differing experience levels. This is particularly true when measured by injuries per driving hour, because drivers in this group tend to drive less than other drivers. The number of drivers with less than one year of driving experience has had a large percentage increase from 1997 to 2001 with a corresponding increase in injuries.

Drivers who drive less than 25 hours a year have substantially greater risk as measured by injuries per driving hour than drivers who drive more hours per year. There has been a large increase in the injuries to drivers with 200 or more driving hours a year. The increase corresponds to increases in the number of these drivers and the total number of driving hours for these drivers.

There has been a very large increase, both in absolute and percentage terms, of injuries associated with ATVs with engine sizes 400 cc or greater. This was accompanied by both a large increase in the number of these vehicles and a large increase in risk associated with these vehicles. However, the risk associated with these vehicles in 2001 was similar to that for ATVs with engine sizes from 200 to 399 cc.

Only a small percentage of ATV drivers in 2001 (7%) learned to operate an ATV through a dealer, salesman, or an organized training program. Significant percentages of the ATVs in 2001 were purchased used (44%). Among the used ATVs, 83% were purchased from a previous owner, as opposed to a dealer.

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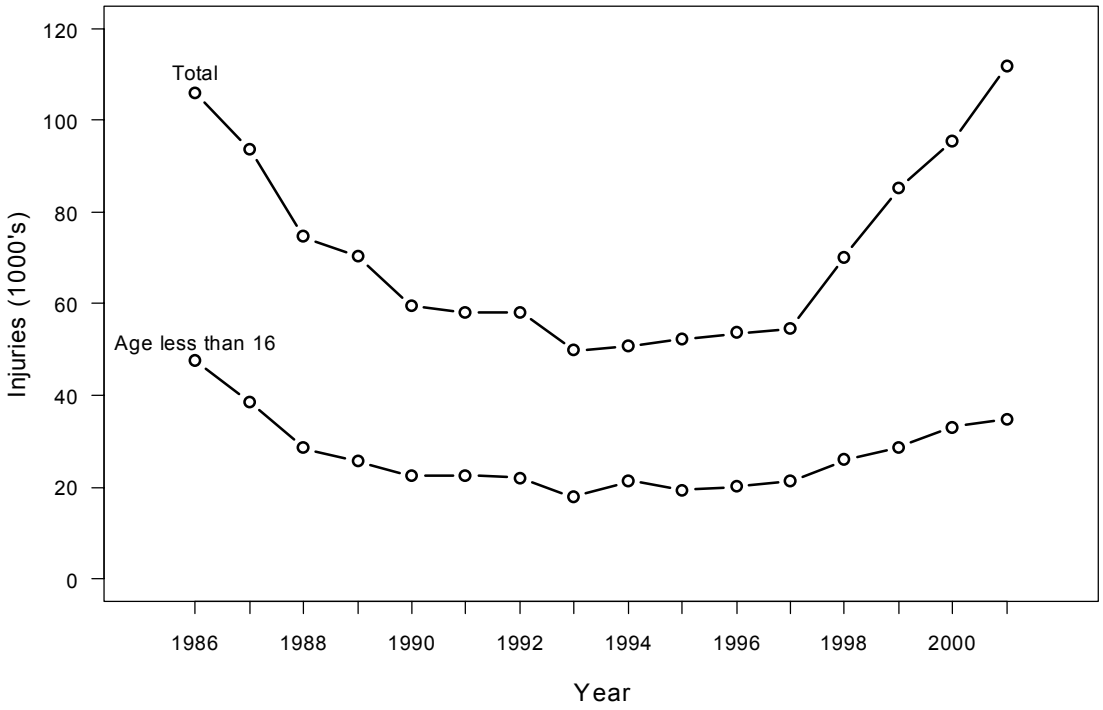
1. Introduction

Since 1997 there has been a notable increase in injuries associated with all-terrain vehicles (ATVs) (Ingle 2002). In 1997 there were an estimated 54,700 injuries treated in hospital emergency rooms. In 2001 the number had risen by over 100% to 111,700. Figure 1 displays the trends in the estimated number of ATV-related injuries treated in hospital emergency rooms for the entire U.S. population and for children less than 16 years of age. The recent rise in total injuries from 1997 to 2001 is apparent. The rise in injuries to children is less pronounced.

Figure 1: U.S. Annual Estimates of Emergency Room-Treated ATV Injuries.



The U.S. Consumer Product Safety Commission (CPSC) continuously collects data on ATV injuries, which are summarized in annual reports (Ingle 2002). However, CPSC does not routinely obtain information on ATV usage or in-depth information on injuries. Increased usage, technically referred to as exposure, may result in an increase in injuries without changing common notions of risk. Prior to 2001, the most recent exposure and in-depth injury data came from CPSC studies conducted in 1997 (Kyle and Adler 1998, Rodgers 1998, Rodgers and Adler 1998).

In 2001 in order to help understand the reasons for the recent rise in ATV-related injuries, CPSC conducted an in-depth injury study and ATV-industry representatives conducted an exposure study. The two studies were designed in conjunction with one another and with parallel studies conducted in 1997. Taken together, there are now available in-depth

injury and exposure studies for both 1997 and 2001. Because these studies have been designed in conjunction with one another, it is possible to evaluate ATV risk for 1997 and 2001 and to compare risk between these two years.

The purpose of this report is to summarize the risks associated with ATVs for the years 1997 and 2001 and examine changes between 1997 and 2001. The report will consider the risks for various subgroups of interest and explore possible factors associated with increased risk. Additional pertinent findings from the injury and exposure studies will also be presented.

The reports on the 1997 studies (Kyle and Adler 1998, Rodgers 1998, Rodgers and Adler 1998) contain a review of previous CPSC ATV studies and some of the regulatory history. Briefly, CPSC conducted regulatory proceedings in the 1980s prompted by large numbers of ATV-related deaths and injuries. In the late 1980s ATV manufacturers entered into consent decrees with CPSC. Among other things, the consent decrees stopped the sale by dealers of three-wheel ATVs, placed engine size restrictions on sales intended for children, and implemented driver-training programs. The consent decrees expired in 1998. However, features of the consent decrees are still in place voluntarily by major manufacturers.

The remainder of this report is organized as follows. Section 2 reviews the data sources that are used in the report. Section 3 introduces the injury, exposure, and risk measures and presents the results for the U.S. as a whole. Section 4 presents the results for various subgroups. Section 5 discusses and summarizes the findings. Appendix 1 contains the specifics of the data sources and analyses. Appendix 2 contains some supplemental results. For information on ATV deaths, see the CPSC annual report (Ingle 2002).

2. Data Sources

This report makes use of four studies: the 1997 and 2001 CPSC injury studies and the 1997 and 2001 industry-sponsored exposure studies. The injury studies collected information to measure the size and characteristics of the injured population in the U.S. The information includes details on the injury incident, such as usage at the time of the incident and the characteristics of the ATV involved in the incident, and general information on the driver of the ATV, such as driver experience. The exposure studies collected information on the overall ATV vehicle, driver, and passenger populations in the U.S. to measure the sizes and characteristics of these populations. Comparisons of the injured population to the exposure population provide measures of risk. Additionally, comparisons can be made between various subgroups to identify groups with higher risk.

In 1997 CPSC conducted in-depth injury and exposure studies. CPSC staff designed the studies so that they could be used jointly to evaluate the risks associated with ATVs. In the same year industry sponsored its exposure study. The industry study was very similar to the CPSC exposure study in the form of the survey questionnaire, but differed in some notable ways. The CPSC study was based on a random-digit-dialing survey, in which U.S. households are randomly selected for surveying based on telephone numbers. The industry study used a market panel survey, in which a large pre-selected collection of

households is maintained for surveying. Also, the CPSC study was limited to households that owned at least one ATV. The industry study also included households that did not own an ATV, but contained members who rode ATVs. Finally, the CPSC study concentrated on ATV drivers, whereas the industry study also included detailed questions on ATV passengers.

In 2001 industry agreed to sponsor a new exposure study using the market panel approach. At that time, CPSC staff and industry representatives compared the 1997 CPSC and industry exposure studies. Both CPSC staff and the industry representatives agreed in discussions that the studies were comparable. CPSC staff and industry representatives then set about designing the 2001 injury and exposure studies. The studies very closely paralleled the 1997 counterparts. The notable differences between the 1997 and 2001 studies are the inclusion of additional questions to obtain hard to get information, changes in question wording for clarification, and the ordering of questions to improve responses to key questions.

CPSC staff has chosen to use the 1997 industry exposure study rather the 1997 CPSC exposure study to represent the 1997 exposure in this report. The choice produces the best comparability between the 1997 and 2001 exposure estimates.

Appendix 1 contains specifics on the four studies and the methodology of the calculations of the summary measures presented in this report. The appendix includes important information on defining the scope of the analysis and adjusting for seasonal differences and survey non-response.

3. Injury, Exposure, and Risk Measures for the U.S.

Injury, Exposure, and Risk Measures

The injury measure used in this report is the number of hospital emergency room-treated injuries associated with the non-occupational use of ATVs. Except when noted, injuries to drivers, passengers, or non-riders, such as bystanders, are included. Appendix 1 contains additional details on the scope of the injuries included.

There are five basic exposure measures used in this report. Each exposure measure emphasizes different aspects of exposure. To present these measures, it is necessary to distinguish between drivers and passengers. ATV *riders* are made up of *drivers* and *passengers*. A *driver* is a rider who operated an ATV at least once in the last year. A driver may also ride at times as a non-operator. A *passenger* is a rider who has not operated an ATV in the last year. The measure *Driving Hours* refers to the amount of time ATVs are driven. The measure *Riding Hours* is made up of driving hours multiplied by the number of riders exposed. For example, if an ATV is driven for one hour with a driver and a passenger, then the contribution to driving hours is one hour and the contribution to riding hours is two hours.

The five basic exposure measures used are the number of ATV drivers, the number of ATV riders, the annual driving hours, the annual riding hours, and the number of ATVs.

Drivers and riders include all those riders in the U.S. who rode an ATV in the year prior to the exposure survey. Driving and riding hours include the total numbers of driving and riding hours in the U.S. in the year prior to the exposure survey. Because of the difficulty of obtaining reliable separate estimates of non-occupational and occupational driving and riding hours, these measures include both non-occupational and occupational use. The number of ATVs includes only those that are owned by households and are in operating order.

Five risk measures are derived from the injury measure divided by each of the exposure measures. The five measures are *injuries per driver*, *injuries per rider*, *injuries per driving hour*, *injuries per riding hour*, and *injuries per ATV*. Because of the magnitudes of the measures, they are expressed in the tables as *injuries per thousand drivers*, *injuries per thousand riders*, *injuries per million driving hours*, *injuries per million riding hours*, and *injuries per thousand ATVs*.

U.S. Total

Table 1 gives the injury, exposure, and risk measures for 1997 and 2001 for the U.S. Included in the table are the percent increases of the measures between the two years. From 1997 to 2001, the number of ATV-related injuries had risen from 54,700 to 111,700, representing an increase of 104%. The largest increase among the exposure measures was for driving hours, which increased by 50%. The fact that driving hours increased faster than the number of drivers indicates that drivers on the average drove more hours in 2001 than in 1997. The same pattern exists for riders and riding hours. Likewise, the exposure measures indicate that ATVs were on the average driven and ridden more hours in 2001 than in 1997.

Injuries have increased at a greater rate than any of the five exposure measures. This disparity between the increase in injuries and exposure is reflected in the risk measures, which show that risk has increased anywhere from 36% to 62% depending on the risk measure.

Table 1: U.S. ATV Injury, Exposure and Risk Estimates.

	Year		
	1997	2001	% Increase
Injuries	54,700	111,700	104.2%
Exposure Measures			
Drivers (Million)	12.0	16.3	35.5%
Riders (Million)	18.1	22.9	26.4%
Driving Hours (Million)	1,575	2,364	50.1%
Riding Hours (Million)	1,801	2,608	44.8%
ATVs (Million)	4.0	5.6	39.5%
Risk Measures			
Injuries / Thousand Drivers	4.5	6.8	50.7%
Injuries / Thousand Riders	3.0	4.9	61.6%
Injuries / Million Driving Hours	34.7	47.3	36.1%
Injuries / Million Riding Hours	30.4	42.8	41.0%
Injuries / Thousand ATVs	13.7	20.0	46.4%

Note: The risk and percent increase values are calculated from the injury and exposure measures based on values with greater precision than the values presented in the table.

4. Subgroup Analyses

This section presents subgroup analyses of the injury, exposure, and risk measures, as well as some information on driver training and the ATV market. The subgroups fall into four classes: rider characteristics, driver characteristics, ATV characteristics, and joint characteristics. It is important to note that an injured person may be a driver, a passenger, or a non-rider. For example, consider an incident where a 25-year-old person is injured as a passenger on an ATV that was driven by a 15-year-old person. For the rider characteristics, the incident would be classified as an over-16-year-old-rider incident. However, for the driver characteristics, it would be classified as an under-16-year-old-driver incident.

The analysis of subgroups based on the rider characteristics addresses overall risk to a group of interest, such as the risk to children under the age of 16, whether or not they are drivers, passengers, or non-riders. However, the driver characteristics are likely more related to ATV risk than the rider characteristics, since it is the driver who controls the ATV. If the injured person was the driver then the driver and rider characteristics are the same for the incident.

The joint characteristic analyses consider two characteristics simultaneously, such as the ATV engine size and the driver age. The joint analysis permits, to some degree, the separation of the effects of the two characteristics and the identification of interaction between two characteristics.

For each subgroup, the injury, exposure, and risk measures are given for the years 1997 and 2001. Considering each year separately, the risk measures can be used to identify groups with higher risk. Additionally, the percent changes in the measures between the two years are given. The percent changes highlight groups with large changes in injuries, exposure, or risk. The identification of such changes helps to explain the observed increase in injuries. For example, an increase in injuries can be associated with an increase in exposure, an increase in risk, or a combination of the two.

Rider Characteristics

This section explores the risk associated with subgroups based on the rider characteristics: the age, gender, and riding position (driver versus passenger) of the rider. For these measures, only injuries to riders are included, because exposure measures do not exist for non-riders. The number of injuries to non-riders is small, representing 1% and 2% of the estimated injuries in 1997 and 2001 respectively.

Rider Age

Table 2 gives the injury, exposure, and risk measures for the rider age groups *under 16* and *16 and over*. The two subgroups do not differ much from each other in the *injuries per rider* measure. However, the *injuries per riding hour* measure is higher for the *under 16* age group, indicating that for each riding hour the *under 16* age group is more likely to be injured than the *16 and over* age group.

Comparing 1997 and 2001, the *16 and over* age group has undergone a more substantial percent increase in the number of injuries. Similarly, this age group has experienced a larger percent increase in the exposure and risk measures. However, the *under 16* age group has experienced notable percent increases in injuries and *injuries per rider*.

Appendix 2 contains a more detailed age breakdown analysis than is presented here. From that analysis, the large increases in injuries and risk for the *16 and over* age group are seen over a wide range of rider ages for this group. Noteworthy, riders ages 12 to 15 have also experienced large percent increases in injuries and risk.

Table 2: U.S. ATV Injury, Exposure and Risk Estimates by Rider Age.

	Year				% Increase	
	1997		2001			
	Age (Years)		Age (Years)		Age (Years)	
	< 16	≥ 16	< 16	≥ 16	< 16	≥ 16
Injuries	21,132	32,882	33,071	76,059	56.5%	131.3%
Exposure Measures						
Riders (Million)	6.6	11.5	7.2	15.7	9.1%	36.2%
Riding Hours (Million)	428	1,373	575	2,033	34.2%	48.1%
Risk Measures						
Injuries / Thousand Riders	3.2	2.9	4.6	4.8	43.4%	69.8%
Injuries / Million Riding Hours	49.4	24.0	57.6	37.4	16.6%	56.2%

Notes: Injuries do not include injuries to non-riders and do not sum to the totals on Table 1. The risk and percent increase values are calculated from the injury and exposure measures based on values with greater precision than the values presented in the table.

Rider Gender

Table 3 gives the injury, exposure, and risk measures for female and male riders. By both risk measures, *injuries per rider* and *injuries per riding hour*, males have a much greater risk than females. Comparing 1997 and 2001, males have experienced a greater percent increase in injuries and risk by both measures than females. However, females have had a greater percent increase in exposure by both measures.

Table 3: U.S. ATV Injury, Exposure and Risk Estimates by Rider Gender.

	Year				% Increase	
	1997		2001			
	Female	Male	Female	Male	Female	Male
Injuries	13,934	40,079	22,832	86,298	63.9%	115.3%
Exposure Measures						
Riders (Million)	7.1	11.0	9.4	13.5	33.0%	22.1%
Riding Hours (Million)	511	1,290	761	1,846	49.0%	43.1%
Risk Measures						
Injuries / Thousand Riders	2.0	3.6	2.4	6.4	23.2%	76.3%
Injuries / Million Riding Hours	27.3	31.1	30.0	46.7	9.9%	50.4%

Note: Injuries do not include injuries to non-riders and do not sum to the totals on Table 1. The risk and percent increase values are calculated from the injury and exposure measures based on values with greater precision than the values presented in the table.

Rider Position

Table 4 gives the injury, exposure, and risk measures for the drivers and passengers. ATVs come with a warning against carrying passengers. The number of riding hours by drivers is overwhelmingly larger than that of passengers. However, in terms of number of riders, the difference is not as large. The risk to drivers is larger than that of passengers when measured by *injuries per rider*. However, the risk is larger for passengers than drivers when measured by *injuries per riding hour*. Comparing 1997 and 2001, drivers have experienced the larger percent increase in injuries, exposure by both measures, and risk by both risk measures. However, passengers have experienced notable percent increases in injuries and *injuries per rider*.

Table 4: U.S. ATV Injury, Exposure and Risk Estimates by Rider Position.

	Year				% Increase	
	1997		2001			
	Driver	Passenger	Driver	Passenger	Driver	Passenger
Injuries	41,547	12,467	89,589	19,541	115.6%	56.7%
Exposure Measures						
Riders (Million)	12.0	6.1	16.3	6.6	35.5%	8.1%
Riding Hours (Million)	1,575	200	2,364	290	50.1%	44.6%
Risk Measures						
Injuries / Thousand Riders	3.5	2.1	5.5	3.0	59.1%	45.0%
Injuries / Million Riding Hours	26.4	62.2	37.9	67.4	43.7%	8.4%

Notes: Injuries do not include injuries to non-riders and do not sum to the totals on Table 1. Because of incomplete reporting, the riding hours do not sum to those in Table 1 (see Appendix 1). The risk and percent increase values are calculated from the injury and exposure measures based on values with greater precision than the values presented in the table.

Driver Characteristics

This section explores the risk associated with subgroups based on the driver characteristics: the age, gender, driving experience, annual driving hours, and recreational use. In this section, injuries include non-rider injuries in addition to those of riders, because the purpose is to associate overall injuries to the driver characteristics.

Driver Age

Table 5 gives the injury, exposure, and risk measures for the driver age groups *under 16* and *16 and over*. The risk for the *under 16* age group is higher than that of the *16 and over* group as measured by either *injuries per driver* or *injuries per driving hour*. Interestingly, when considering the rider age subgroups in Table 2, the *injuries per rider* did not differ much between the two age groups. When focus is given to the driver age, the difference is larger.

Comparing 1997 to 2001, the *16 and over* age group had much larger percent increases in the number of injuries, exposure by both measures, and risk by both risk measures. However, the *under 16* age group has experienced notable percent increases in injuries and risk.

Appendix 2 contains a more detailed age breakdown analysis than is presented here. From that analysis, the large increases in injuries and risk for the *16 and over* age group were seen over a wide range of driver ages for this group. Noteworthy, drivers ages 12 to 15 have also experienced large percent increases in injuries and risk.

Table 5: U.S. ATV Injury, Exposure and Risk Estimates by Driver Age.

	Year				% Increase	
	1997		2001			
	Age (Years)		Age (Years)		Age (Years)	
	< 16	≥ 16	< 16	≥ 16	< 16	≥ 16
Injuries	18,454	36,246	29,013	82,687	57.2%	128.1%
Exposure Measures						
Drivers (Million)	2.5	9.5	2.8	13.5	13.0%	41.5%
Driving Hours (Million)	344	1,231	411	1,953	19.3%	58.6%
Risk Measures						
Injuries / Thousand Drivers	7.3	3.8	10.2	6.1	39.1%	61.2%
Injuries / Million Driving Hours	53.6	29.5	70.6	42.3	31.7%	43.8%

Note: The risk and percent increase values are calculated from the injury and exposure measures based on values with greater precision than the values presented in the table.

Driver Gender

Table 6 gives the injury, exposure, and risk measures for the female and male drivers. By both risk measures, *injuries per rider* and *injuries per riding hour*, males have a greater risk than females. Comparing 1997 and 2001, males have experienced a substantially greater percent increase in injuries and risk by both measures as compared to females. In fact, the risk for females decreased by both risk measures. However, females have experienced a greater percent increase in exposure by both measures.

Table 6: U.S. ATV Injury, Exposure and Risk Estimates by Driver Gender.

	Year				% Increase	
	1997		2001			
	Female	Male	Female	Male	Female	Male
Injuries	11,033	43,667	15,740	95,960	42.7%	119.8%
Exposure Measures						
Drivers (Million)	3.6	8.5	5.5	10.8	55.4%	27.2%
Driving Hours (Million)	414	1,161	632	1,732	52.8%	49.1%
Risk Measures						
Injuries / Thousand Drivers	3.1	5.1	2.8	8.9	-8.2%	72.7%
Injuries / Million Driving Hours	26.7	37.6	24.9	55.4	-6.6%	47.4%

Note: The risk and percent increase values are calculated from the injury and exposure measures based on values with greater precision than the values presented in the table.

Driver Experience

Table 7 gives the injury, exposure, and risk measures by the number of years of experience driving ATVs of the driver. The least experienced drivers, those with less than 1 year of driving experience, have considerably higher risk, as measured by either *injuries per driver* or *injuries per driving hour*. This is particularly true for the *injuries per driving hour*, because this group drives many fewer hours per driver than the other groups.

The least experienced group also had the highest percent increase in the number of drivers from 1997 to 2001. The large increase in the riskiest group corresponds to a large percent increase in injuries.

The most experienced group, those with 10 or more years of experience, exhibited a large percent increase in risk by both measures. Since this is a large group, there is a corresponding large absolute increase in injuries.

Table 7: U.S. ATV Injury, Exposure and Risk Estimates by Driver Experience.

		Experience (Years)			
		< 1	1 to < 5	5 to < 10	≥ 10
Injuries	1997	10,137	17,951	8,518	18,094
	2001	20,584	28,588	18,360	44,168
	% Increase	103.1%	59.3%	115.5%	144.1%
Exposure Measures					
Drivers (Million)	1997	1.0	4.1	2.4	4.5
	2001	1.7	5.8	2.5	6.3
	% Increase	73.8%	40.0%	2.9%	40.4%
Driving Hours (Million)	1997	31	553	289	708
	2001	69	785	505	1,039
	% Increase	127.2%	42.0%	74.6%	46.8%
Risk Measures					
Injuries / Thousand Drivers	1997	10.2	4.3	3.5	4.0
	2001	11.9	4.9	7.4	7.0
	% Increase	16.9%	13.8%	109.4%	73.8%
Injuries / Million Driving Hours	1997	331.9	32.5	29.5	25.6
	2001	296.6	36.4	36.4	42.5
	% Increase	-10.6%	12.2%	23.4%	66.3%

Notes: Because of incomplete reporting, the driving hours do not sum to those in Table 1 (see Appendix 1). The risk and percent increase values are calculated from the injury and exposure measures based on values with greater precision than the values presented in the table.

Driving Hours

Table 8 gives the injury, exposure, and risk measures by the annual driving hours of the driver. By the *injuries per driver* risk measure, the drivers with 200 or more annual driving hours have the greater risk. However, when considering the *injuries per driving hour* risk measure, these drivers have the lowest risk and drivers with less than 25 annual driving hours have overwhelmingly the greatest risk.

Comparing 1997 and 2001, there has been a large percent increase in the number of drivers with less than 25 hours of annual driving, resulting in a large absolute increase in

the number of injuries. Drivers with 200 or more driving hours have also experienced a large absolute increase in injuries, corresponding to a large percent increase in the number of drivers and an even larger percent increase in the number of driving hours.

Table 8: U.S. ATV Injury, Exposure and Risk Estimates by Driver Annual Driving Hours.

		Hours			
		< 25	25 to < 50	50 to <200	≥ 200
Injuries	1997	12,246	5,686	16,097	20,671
	2001	28,338	8,904	31,229	43,229
	% Increase	131.4%	56.6%	94.0%	109.1%
Exposure Measures					
Drivers (Million)	1997	5.4	1.9	2.8	1.9
	2001	8.4	1.7	3.4	2.9
	% Increase	53.8%	-12.2%	23.1%	48.5%
Driving Hours (Million)	1997	49	70	302	1,154
	2001	69	61	355	1,879
	% Increase	40.0%	-12.6%	17.5%	62.8%
Risk Measures					
Injuries / Thousand Drivers	1997	2.3	3.0	5.8	10.6
	2001	3.4	5.4	9.1	15.0
	% Increase	50.5%	78.3%	57.6%	40.8%
Injuries / Million Driving Hours	1997	247.9	81.5	53.3	17.9
	2001	409.6	145.9	88.1	23.0
	% Increase	65.2%	79.1%	65.1%	28.5%

Note: The risk and percent increase values are calculated from the injury and exposure measures based on values with greater precision than the values presented in the table.

Recreational Use

Table 9 gives the injury, exposure, and risk measures by recreational use of the ATV. Examples of non-recreational use include household chores and transportation. The injuries are classified into whether the associated ATV was being used for recreation at the time of the incident. The only available exposure measures are the estimated driving hours for recreational and non-recreational use in 2001.

In 2001 recreational use of ATVs is associated with much higher risk than non-recreational use. There has been a large increase in non-recreational injuries from 1997 to 2001, but there is no parallel exposure information to judge changes in risk.

Table 9: U.S. ATV Injury, Exposure and Risk Estimates by Recreational Use.

	Year				% Increase	
	1997		2001			
	Recreational Use		Recreational Use		Recreational Use	
	Yes	No	Yes	No	Yes	No
Injuries	52,944	1,756	107,274	4,426	102.6%	152.1%
Exposure Measures						
Driving Hours (Million)	NA	NA	1,505	859	NA	NA
Risk Measures						
Injuries / Million Driving Hours	NA	NA	71.3	5.2	NA	NA

Notes: NA=Not available. The risk and percent increase values are calculated from the injury and exposure measures based on values with greater precision than the values presented in the table.

ATV Characteristics

This section explores the risk associated with subgroups based on ATV characteristics: the engine size and the number of wheels. In this section, injuries include non-rider injuries in addition to riders, because the purpose is to associate overall injuries to the vehicle characteristics.

Engine Size

Table 10 gives the injury, exposure, and risk measures by the engine size of the ATV. The number of ATVs is the only available exposure measure. Because the driving hour exposure measure is not available, the engine size results may be confounded by any association between driving hours and engine size.

There has been a large increase in absolute terms and an exceptionally large increase in percent terms in the number of injuries associated with ATVs with engine sizes of 400 cc or more. This is associated with corresponding large percent increases in the number of ATVs and the risk associated with this class of ATVs. However, the risk for these ATVs in 2001 is comparable to those in the 200 to 299 cc and 300 to 399 cc engine size classes. The 200 to 299 cc engine class has also experienced a large percent increase in risk.

Table 10: U.S. ATV Injury, Exposure and Risk Estimates by Engine Size.

		Engine Size (cc)				
		≤90	91 to 199	200 to 299	300 to 399	≥400
Injuries	1997	3,316	7,450	22,317	17,955	3,662
	2001	4,437	6,779	44,577	31,470	24,437
	% Increase	33.8%	-9.0%	99.7%	75.3%	567.2%
Exposure Measure						
ATVs (Million)	1997	0.3	0.6	1.8	1.0	0.4
	2001	0.4	0.5	1.9	1.7	1.1
	% Increase	32.0%	-16.1%	5.2%	77.7%	202.7%
Risk Measure						
Injuries / Thousand ATVs	1997	12.0	12.7	12.3	18.6	10.0
	2001	12.2	13.8	23.5	18.3	22.0
	% Increase	1.4%	8.5%	90.0%	-1.3%	120.4%

Note: The risk and percent increase values are calculated from the injury and exposure measures based on values with greater precision than the values presented in the table.

Number of Wheels

Table 11 gives the injury, exposure, and risk measures by the number of wheels of the ATV. Three-wheel ATVs have not been manufactured since the consent decrees in 1988. The number of three-wheel ATVs and number of driving hours on three-wheel ATVs have decreased from 1997 to 2001.

Past studies have demonstrated the larger risk of three-wheel ATVs versus four-wheel ATVs (Rodgers and Adler 1998). In 2001 the risk associated with three-wheel ATVs was somewhat lower than that of four-wheel ATVs. The analysis does not imply that three-wheel ATVs are inherently safer than four-wheel ATVs. The risk measure used in this report is an empirical measure of the rate of injuries. The relatively small remaining population of three-wheel ATVs may be associated with other factors that account for the lower risk of these ATVs. For example, the three-wheel ATVs were manufactured when engine sizes were generally smaller than they are on today's four-wheel models. The drivers and use patterns of these remaining ATVs may be different from those of the four-wheel ATVs. The ability to separate the effects of various driver and vehicle characteristics is discussed in Section 5.

Table 11: U.S. ATV Injury, Exposure and Risk ATV Estimates by Number of Wheels.

	Year				% Increase	
	1997		2001			
	Four	Three	Four	Three	Four	Three
Injuries	39,710	14,990	100,943	10,757	154.2%	-28.2%
Exposure Measures						
Driving Hours (Million)	1,232	344	2,049	276	66.4%	-19.7%
ATVs (Million)	2.8	1.2	4.8	0.8	75.4%	-39.6%
Risk Measures						
Injuries / Million Driving Hours	32.2	43.6	49.3	38.9	52.8%	-10.6%
Injuries / Thousand ATVs	14.4	12.0	20.9	14.3	44.9%	18.8%

Notes: Because of incomplete reporting, the driving hours do not sum to those in Table 1 (see Appendix 1). The risk and percent increase values are calculated from the injury and exposure measures based on values with greater precision than the values presented in the table.

Joint Characteristics

The previous analyses address one characteristic at a time to identify relationships between injuries, exposure, and risk. Such analyses are known as univariate analyses. This section contains two bivariate analyses that address two characteristics at a time. These joint characteristic analyses allow, to some degree, the separation of the individual effects of the two characteristics. Also, they permit the identification of combinations of the characteristics that result in unique effects, known as interactions.

The two joint analyses provide the injury, exposure, and risk measures for combinations of (1) the driver age and the ATV engine size and (2) the driver experience and the ATV engine size. These joint analyses have additional limitations over the univariate analyses. Because drivers may ride more than one ATV, it is difficult to derive exposure measures for combinations of driver and ATV characteristics. This is not a problem for the injury measure, since the characteristics of the driver and ATV associated with the injury are fixed. From the exposure studies, it is only possible to associate drivers and ATVs for households that own an ATV. As explained in Appendix 1, in most cases, it is not possible to determine how much the driver uses the particular ATV. For these reasons, the results in this section should be interpreted with caution.

Because joint characteristic analyses result in more subgroups than the univariate analyses, the numbers of subgroups per characteristic are reduced from those of the univariate analyses. For simplicity, only the year 2001 is considered.

Driver Age and ATV Engine Size

Table 12 gives the injury, exposure, and risk measures for combinations of the driver age and the ATV engine size for households that own an ATV. By the consent decrees, manufacturers established the recommendation of engine sizes 90 cc or less for drivers under the age of 16.

In 2001 the large majority of injuries associated with drivers under the age of 16 occurred with ATVs larger than recommended for the age group. By both measures of risk, these drivers were at greater risk than those who use ATVs with recommended engine sizes. However, the risk for the drivers 16 and over versus engine size followed a similar pattern.

Table 12: U.S. ATV Injury, Exposure and Risk Estimates by Driver Age and Engine Size of Owning Households for 2001.

		Engine Size (cc)		
		≤90	91 to 199	≥200
	Age (Years)			
Injuries	< 16	3,429	2,998	19,770
	≥ 16	739	2,822	61,544
Exposure Measure				
Drivers (Million)	< 16	0.2	0.1	1.0
	≥ 16	0.2	0.5	6.5
Driving Hours (Million)	< 16	38	24	181
	≥ 16	40	52	1,220
Risk Measure				
Injuries / Thousand Drivers	< 16	14.4	22.4	20.2
	≥ 16	3.2	5.5	9.5
Injuries / Million Driving Hours	< 16	90.1	123.7	109.5
	≥ 16	18.5	54.5	50.5

Note: The risk and percent increase values are calculated from the injury and exposure measures based on values with greater precision than the values presented in the table.

Driver Experience and ATV Engine Size

Table 13 gives the injury, exposure, and risk measures for combinations of driver experience and ATV engine size for households that own an ATV. The results are similar to those from the univariate analyses of driver experience and ATV engine size. Drivers with less experience have greater risk by both measures for each of the engine size classes. This is particularly true for the *injuries per driving hour* measure.

Table 13: U.S. ATV Injury, Exposure and Risk Estimates by Driver Experience and Engine Size of Owning Households for 2001.

		Engine Size (cc)			
		≤199	200 to 299	300 to 399	≥400
	Driver Experience (Years)				
Injuries	< 1	1,777	6,560	4,694	2,724
	1 to < 5	3,544	8,349	5,198	4,666
	≥ 5	4,863	17,972	17,570	13,215
Exposure Measure					
Drivers (Million)	< 1	0.1	0.1	0.2	0.1
	1 to < 5	0.3	0.8	1.0	0.6
	≥ 5	0.7	2.0	1.7	1.1
Driving Hours (Million)	< 1	9	11	7	6
	1 to < 5	44	109	152	115
	≥ 5	102	401	348	260
Risk Measure					
Injuries / Thousand Drivers	< 1	20.4	44.2	23.0	33.3
	1 to < 5	12.7	10.8	5.4	8.1
	≥ 5	6.5	9.0	10.5	12.4
Injuries / Million Driving Hours	< 1	198.3	574.6	629.9	428.4
	1 to < 5	81.4	76.3	34.2	40.6
	≥ 5	47.4	44.9	50.4	50.8

Note: The risk and percent increase values are calculated from the injury and exposure measures based on values with greater precision than the values presented in the table.

Driver Training and ATV Market Information

This section provides additional information on the driver and ATV population in 2001 derived from the exposure study.

Driver Training

Table 14 presents the number of drivers in 2001 by how they learned to operate an ATV. These drivers include all drivers who operated an ATV in the year previous to the survey. A large majority of drivers stated they learned from a friend, relative or themselves. A small percentage of drivers (7%) stated they learned from an organized training program, dealer, or salesman.

Table 14: Number of Drivers by How They Learned to Operate an ATV for 2001.

	Organized Program, Dealer, Salesman	Friend, Relative, Self	Other
Drivers (Million)	1.1	14.6	1.2

Note: Multiple responses were permitted.

ATV Market

Table 15 presents some market characteristics of the ATV population in 2001. This population includes all ATVs owned by households that were in operating condition the year previous to the survey. Among the population of ATVs in 2001, significant percentages were purchased used (44%). Among the used ATVs, 83% were purchased from a previous owner, as opposed to a dealer. The overwhelming majority (99%) of the ATVs in 2001 were of manufacturers that have voluntarily agreed to abide by the major aspects of the consent decrees.

Table 15: ATV Market Characteristics for 2001.

	ATVs (Million)
Purchased New	3.1
Purchased Used	2.5
Purchased from Dealer	3.5
Purchased from Previous Owner	2.0
Voluntary Consent Manufacturer	5.5
Other Manufacturer	0.1

5. Discussion

The comparison between 1997 and 2001 of injury, exposure, and risk estimates for the U.S. reveals that ATV risk according to multiple measures has increased between these two years. This increase in risk has occurred for both riders under the age of 16 and riders 16 years and older and for both drivers and passengers. The riders 16 years and over have experienced larger percent increases in injuries, exposure, and risk than the under the age of 16 riders. However, riders under the age of 16 continue to be associated with greater risk than older riders when measured by injuries per riding hour.

Examining the injury, exposure, and risk measures for each of various subgroups based on driver and vehicle characteristics highlights characteristics associated with higher risk. Comparing these measures between the two years, 1997 and 2001, highlights subgroups associated with large changes in injuries, exposure, or risk. Injuries may increase for a subgroup because of increased exposure, increased risk, or both.

Drivers under the age of 16 are associated with greater risk than the older drivers. Both drivers under the age of 16 and drivers 16 years and older have experienced notable percent increases in injuries and risk between 1997 and 2001. However, the drivers 16 years and over are responsible for the greater increase in injuries both because of increased exposure and increased risk.

There has been a large percent increase in the number of drivers with less than 1 year of driving experience. These drivers have the highest risk associated with them and therefore, there has been a disproportionate increase in injuries for these drivers.

Drivers who drive less than 25 hours a year have substantially greater risk as measured by injuries per driving hour than drivers who drive more hours per year. There has been a large increase in the injuries to drivers with 200 or more driving hours a year. The increase corresponds to increases in the number of these drivers and the total number of driving hours for these drivers.

For ATVs with engine sizes 400 cc or greater, there have been large increases in the number of vehicles and the risk between 1997 and 2001. Correspondingly, there have been a large absolute increase and an exceptionally large percent increase in the number of injuries associated with these vehicles. However, the risk for these ATVs in 2001 was comparable to that for ATVs with engine sizes from 200 to 399 cc.

As discussed in the analyses sections, there may be relationships among the characteristics of the drivers and ATVs, such as driver age, driver experience, engine size, and use. For example, the driver and use patterns of three-wheel ATVs may be different from those of four-wheel ATVs. Because of such relationships, associations between characteristics and injury, exposure, and risk measures are only indicative and not conclusive.

Appendix 1: Study Details

Injury Studies

The 1997 and 2001 CPSC injury studies are based on the CPSC National Electronic Injury Surveillance System (NEISS) (Schroeder and Ault 2001). NEISS uses a stratified probability sample of hospitals with emergency rooms with 6 or more beds in the United States and its territories. Information from each consumer product related injury case in these hospitals is entered into NEISS. From the statistical design of NEISS, it is possible to make national estimates of injuries related to individual consumer products. These injury estimates reflect only those injuries that resulted in an emergency room visit.

For detailed information associated with particular consumer products, CPSC conducts special studies, which consist of follow-up survey efforts of NEISS cases. For special studies, CPSC relies on the NEISS hospitals to provide contact information on the injured people. CPSC maintains the contact information only until the survey process is complete. Some of the NEISS hospitals do not provide contact information to CPSC, and it is generally not possible to obtain survey information for cases from these hospitals.

For both the 1997 and 2001 injury studies, each ATV-related NEISS case during the study periods was assigned for surveying. The completed surveys were examined to determine if they were in the scope of the study. For a case to be in scope the following criteria must be met:

- The case must involve an ATV.
- The ATV must have been operating at the time of incident. (This includes the ATV being started, stopped, and in motion, but excludes incidents related to transporting or repairing the ATV.)
- The case must involve a non-occupational use of the ATV.
- There was no deliberate or otherwise external cause of the injury.

The surveys included questions to verify the vehicle was an ATV. In the 1997 survey, this included verifying the vehicle had either 3 or 4 wheels and was not a motorcycle or dune buggy. In 2001 an additional question was added that clarified that the vehicle was an ATV. In both years, if the make and model of the vehicle was identified, it was examined to see if it was an ATV. Examples of out-of-scope cases in 2001 included incidents where a child touched a hot engine part, an ATV rider was deliberately hit by a bottle, and an ATV rider was hit by a drunk automobile driver who had veered onto a trail.

To derive the national injury numbers presented in this report, the completed in-scope surveyed cases were scaled to the 93.5% of the annual national estimates based on the NEISS. The 93.5% rate, which is used in CPSC annual reports from 1997 onwards, was used to account for out-of-scope cases in the NEISS. The common rate was used for both study years, rather than rates based on the analysis of completed surveys from the two years. This was done because the two studies differed in the degree to which the scope of cases was examined prior to survey assignment. By using the common rate, the results are more comparable between the two years.

For each of the 20 subgroups, the NEISS weights of the completed in-scope surveys were rescaled to the corresponding estimated yearly total of the subgroup. The 20 subgroups consisted of all the combinations of the five NEISS strata, the age class of the injured person (<16 versus ≥16), and the gender of the injured person.

This scaling accounts for both the effects of (1) the survey non-response in the study period and (2) the differences in the injured population during the study period and the year as a whole. More specifically, the scaling adjusts for any under representation in the NEISS strata, the injured person age class, or injured person gender among the completed surveys as compared to the injured population for the study period. Additionally, the injured population during the study period may not reflect the annual injured population. For example, the study period mainly consisted of summer months. Therefore, children may be over represented in the study period as compared to the year as a whole. The rescaling based on the 20 subgroups adjusts for such differences.

For each analysis, all cases with non-missing information were scaled to the estimated yearly total by this procedure. For example, consider the driving hours estimate for male drivers. For each of the 20 subgroups, the cases with surveys that had both driver gender and driving hour information available were scaled to the corresponding yearly national estimate of the number of cases in the subgroup.

1997 Injury Study

The details of the 1997 injury study can be found in its associated report (Kyle and Adler 1998). The study consisted of all NEISS cases with treatment dates from May 1 to August 31, 1997 and product codes 3285-3287. This resulted in 529 cases. Of these, 42 were determined to be out of scope prior to surveying. Of the remaining cases, 319 cases were contacted and surveyed.

2001 Injury Study

The study consisted of all NEISS cases with treatment dates from July 25 to December 31, 2001 and product codes 3285-3287. The disposition of the cases was as follows:

1165 Cases with treatment dates from July 25 to December 31, 2001 and product codes 3285-3287.
846 Cases from hospitals that provide contact information.
532 Cases contacted and surveyed.
476 Cases surveyed and declared in scope.

The overall survey completion rate was 532/1165=46%. Removing from consideration 319 cases from hospitals that do not regularly provide contact information, the survey completion rate was 532/846=63%. Note that the percent of the surveys that were in-scope should not be used directly to adjust the yearly NEISS estimates of ATV injuries. The assignment for surveying was performed automatically and immediately based on the NEISS product codes. All NEISS cases are routinely examined with quality control procedures to identify coding errors. Some cases that were assigned as ATV-related cases

would have been identified at a later time as not involving an ATV through these quality control procedures.

Exposure Studies

The 1997 and 2001 exposure studies were sponsored by industry and designed and overseen by Heiden Associates, Inc. They were designed to be analogous to the CPSC ATV studies. The studies used market panels and were conducted by NFO Research, Inc.

The studies each had two stages. In the first stage, a screener survey was mailed to a market panel of approximately 100,000 households. The screener survey asked how many ATVs the household owned and how many members of the household had ridden ATVs during the past year. Based on the results of the screener survey, two samples of households were generated. The first sample consisted of households that owned an ATV. The second sample consisted of households that did not own an ATV, but had members that had ridden an ATV in the last year.

The owning and non-owning household samples were each surveyed by telephone in the second stage. Both classes of households were surveyed about the members of the household that rode ATVs, either as drivers or as passengers. A driver was defined as a rider who operated an ATV and may have also rode as a passenger on an ATV. A passenger was defined as a rider who rode only as a passenger on an ATV. From each household, the rider whose birthday was closest to the survey date was selected. The selected rider was asked a set of detailed questions about his or her riding experience and usage. The owning households were also surveyed about each ATV owned by the household.

From the two survey stages, national estimates of the number of ATVs, drivers, and passengers were calculated. For example, the number of ATVs in the U.S. was calculated as follows. The proportion of U.S. households that owned an ATV was estimated from the screener survey. From the second stage survey, the proportion of these households that had a verifiable ATV in operating condition was estimated. From the second stage survey, the average number of ATVs owned by such households was estimated. Using the U.S. Census estimates of the number of U.S. households, the total number of ATVs was calculated as the product of these estimates. The estimated numbers of ATV drivers and passengers were calculated similarly. One notable difference for these estimates was that they consisted of two estimates each: the number of U.S. riders in owning households and the number of U.S. riders in non-owning households. Each of these two estimates was derived using the corresponding sample of households.

To derive the total driving and riding hour estimates, the average hours per driver and passengers were calculated for 8 estimation subgroups among the surveys with the available data. The 8 subgroups consisted of all the combinations of ATV ownership (owning households versus non-owning households), age class (<16 versus ≥ 16), and gender. The total estimates were calculated as the sum of the products of these averages multiplied by the corresponding estimates of the number of riders in the subgroup.

For the subgroup analyses, drivers and riders with the available information were scaled to the national estimates by the 8 estimation subgroups defined in the last paragraph. For example, consider the driver experience subgroup analysis. The drivers with available driver experience information were weighted to the national estimate of the number of drivers for each the 8 estimation subgroups. To derive the number of drivers estimate, the drivers were then classified by their driving experience and the corresponding weights summed. To derive the number of driving hours measure, drivers with both driver experience and driving hour information were weighted to the national estimates by the 8 estimation subgroups. For each driver experience subgroup, the driving hours of each driver were weighted and summed. Because of missing data and the fact that the weights are based on the number of drivers and not the number of driving hours, there are small differences in the sum of the hours across the subgroups and the total hours.

For the joint characteristic analyses, it was necessary to associate individual ATVs and drivers. The surveys only obtained ATV vehicle information from owning households and therefore, this association was only possible for drivers in owning households. In households in which there was only one ATV, this ATV was associated with all drivers from the household. In 2001 drivers from households with more than one ATV could specify a second ATV as their primary ATV. The first ATV from the households was associated with the driver, unless the driver explicitly stated the second ATV was their primary ATV. It is not always possible from the survey to determine how much, if ever, the driver used the ATV associated with the driver. For this reason the results in the section should be interpreted with caution.

1997 Exposure Study

In 1997 the screener survey was mailed to the panel of households in July and August 1997. The second stage survey was conducted in October 1997.
For the screener survey, the disposition of the households was as follows:

140,000	Number of Surveys Mailed
101,758	Number of Surveys Completed.
73%	Completion rate.

For the second stage survey, the disposition of households is as follows:

	Owning Households	Non-Owning Households
Number of Surveys Attempted	1,600	400
Number of Surveys Completed	1,273	342
Completion Rate	80%	86%

2001 Exposure Study

In 2001 the screener survey was mailed to the panel of households in July 2001. The second stage survey was conducted in October and November 2001. For the screener survey, the disposition of the households was as follows:

100,000	Number of Surveys Mailed
69,978	Number of Surveys Completed.
70%	Completion rate.

For the second stage survey, the disposition of households is as follows:

	Owning Households	Non-Owning Households
Number of Surveys Attempted	2,200	1,100
Number of Surveys Completed	1,419	709
Completion Rate	65%	64%

Additional Analysis Details

In the analysis of riding hours in both the exposure and injury studies, some common rules proposed by Heiden Associates, Inc were used.

- Observations with riding time per day greater than 24 hours were removed.
- Observations with driving time per year greater than 5,400 hours were removed.
- Observations with driving time per year between 1,800 and 5,400 hours were assigned 1,800 hours.
- Observations with passenger time per year greater than 2,100 hours were removed.
- Observations with passenger time per year between 240 and 2,100 hours were assigned 240 hours

Appendix 2: Rider and Driver Age Details

Table A1: U.S. Injury, Exposure and Risk ATV Estimates by Rider Age Details.

		Age							
		0 to <6	6 to <12	12 to <16	16 to <18	18 to <25	25 to <45	45 to <65	≥65
Injuries	1997	1,311	8,191	11,629	5,071	10,137	14,257	2,952	464
	2001	1,968	12,093	19,010	7,567	26,867	33,143	7,792	689
	% Increase	50.1%	47.6%	63.5%	49.2%	165.0%	132.5%	163.9%	48.6%
Riders (Million)	1997	1.5	2.7	2.4	1.0	1.2	6.3	2.6	0.4
	2001	2.0	3.0	2.2	1.2	1.7	7.6	4.4	0.9
	% Increase	35.3%	10.0%	-8.1%	15.7%	44.9%	21.1%	64.9%	104.4%
Riding Hours (Million)	1997	29	137	262	115	133	734	330	60
	2001	66	215	293	154	217	936	592	134
	% Increase	132.6%	56.7%	11.8%	33.4%	63.5%	27.4%	79.4%	122.8%
Injuries / Thousand Riders	1997	0.9	3.0	4.9	5.0	8.8	2.3	1.1	1.1
	2001	1.0	4.1	8.6	6.5	16.0	4.4	1.8	0.8
	% Increase	10.9%	34.3%	77.9%	29.0%	82.9%	91.9%	60.1%	-27.3%
Injuries / Million Riding Hours	1997	46.0	59.6	44.4	44.0	76.4	19.4	8.9	7.7
	2001	29.7	56.2	64.9	49.2	123.8	35.4	13.2	5.1
	% Increase	-35.5%	-5.8%	46.2%	11.9%	62.1%	82.4%	47.2%	-33.3%

Note: The risk and percent increase values are calculated from the injury and exposure measures based on values with greater precision than the values presented in the table.

Table A2: U.S. Injury, Exposure and Risk ATV Estimates by Driver Age Details.

		Age							
		0 to <6	6 to <12	12 to <16	16 to <18	18 to <25	25 to <45	45 to <65	≥65
Injuries	1997	256	7,224	10,974	6,594	11,161	15,270	2,985	236
	2001	854	8,883	19,277	9,444	29,364	33,564	8,895	1,420
	% Increase	233.1%	23.0%	75.7%	43.2%	163.1%	119.8%	198.0%	502.2%
Drivers (Million)	1997	0.0	0.7	1.8	0.8	0.9	5.3	2.1	0.4
	2001	0.1	1.0	1.8	1.1	1.5	6.5	3.6	0.8
	% Increase	149.7%	43.0%	-1.6%	43.6%	57.3%	21.9%	70.5%	111.5%
Driving Hours (Million)	1997	8	105	232	98	118	661	297	56
	2001	13	148	250	150	209	898	566	130
	% Increase	70.5%	41.5%	7.7%	52.5%	76.5%	35.7%	90.7%	133.0%
Injuries / Thousand Drivers	1997	6.9	10.3	6.2	8.6	12.0	2.9	1.4	0.6
	2001	9.2	8.9	11.0	8.6	20.1	5.2	2.4	1.8
	% Increase	33.4%	-14.0%	78.5%	-0.2%	67.3%	80.3%	74.8%	184.7%
Injuries / Million Driving Hours	1997	33.3	69.1	47.3	67.2	94.4	23.1	10.1	4.2
	2001	65.1	60.0	77.2	63.1	140.8	37.4	15.7	10.9
	% Increase	95.3%	-13.1%	63.2%	-6.1%	49.1%	61.9%	56.3%	158.5%

Note: The risk and percent increase values are calculated from the injury and exposure measures based on values with greater precision than the values presented in the table.

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