

**Statistical Perspectives on ATV Risk**

Testimony of  
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I am the President of Heiden Associates, a product safety and economic consulting firm based in Washington, D.C. Heiden Associates specializes in the application of microeconomic and statistical analysis to business and public policy issues. One of our core areas of expertise is product safety.

During the past few years, Heiden Associates has conducted statistical research on a number of issues relating to the risks associated with the use of ATVs, particularly by children under 16. In 2001, Heiden Associates conducted an exposure survey to determine both the number of ATVs in use and the amount of time that consumers operate them. The exposure survey was sponsored by the major ATV manufacturers and conducted in close consultation with CPSC staff. The data from this survey and the companion CPSC staff study of ATV-related injuries provide the foundation for much of the discussion of ATV injury risk issues in the Commission briefing package.

Heiden Associates also prepared analyses and presented testimony on other ATV-related issues at the 2003 CPSC regional hearings in West Virginia. A major theme of that presentation was that product-related risk should be evaluated in the context of trends over time employing data that are comparable. In addition, it should be compared with the risks associated with other types of products and activities.

Heiden Associates and the ATV manufacturers commend the CPSC staff on presenting an expansive statistical risk analysis and accompanying comparative risk assessment in the current briefing package. In my testimony today, I would like to provide some updates and additional perspectives on these issues that are important to consider as the Commission

determines how best to proceed in the months ahead. These updated results confirm the trend that I have noted previously—namely, that when risk comparisons are performed for the years in which the estimates were produced from the same data sources and statistical methodologies, they show ATV injury and fatality risk has remained stable on a per-vehicle-in-use basis. In particular, the data are clear that no significant change in injury risk has taken place since the ATV Consent Decrees expired in 1998. In addition, new analysis of recent trends in risk suggest that some progress is being made in reducing the rate of children’s injuries and fatalities, relative to the number of ATVs in use.

In addition to this analysis of risk trends, we also discuss other risk-related topics that we have addressed in prior research work and updated here. These consist of:

- An update on the comparative injury and fatality risk of ATVs and other motor vehicles and recreational activities that uses more recent injury and exposure data than previously available.
- A brief discussion of the continuing importance of warned against behavior as an accident and risk factor.
- Presentation of additional evidence on the role of state ATV legislation in reducing the number of fatalities to children under 16 relative to all fatalities.

**Overall ATV Injury Risk has been Stable since the Expiration of the Consent Decrees.**

The 2001 CPSC staff ATV risk study appears to indicate that ATV injury risk rose on an exposure-adjusted basis between 1997 and 2001—the two years in which the most recent ATV

exposure and injury surveys were conducted. However, the NEISS system upon which the ATV injury estimates are based underwent a significant revision in 1997, and the full complement of hospitals in the new sample of reporting emergency rooms was not online until the fall of that year. During the interim period, the statistical weighting procedures used to develop national injury estimates were adjusted to account for delayed reporting from some participants, but the hospitals that came online late were not randomly distributed across geographic regions and hospital size classes. Consequently, there appears to be a consistent pattern of larger increases in estimated injuries from 1997 to 1998 than in any year since. For example, the NEISS injury estimates presented in the three most recent CPSC hazard screening reports on power tools, outdoor activities, and toys all exhibit larger increases from 1997 to 1998 than at any time since then. A large majority of other NEISS product categories also exhibit a similar pattern.

Accordingly, I believe that injury risk trends—both for ATVs and for other products—are best evaluated using estimates beginning in 1998, the first year that a full complement of NEISS hospitals in the new sample was available (and, coincidentally, the year the ATV Consent Decrees expired). With the 2003 injury estimates now available, it is clear that the injury risk associated with the use of ATVs has been essentially stable for the past six years. Measured on a per-vehicle basis (the best metric given the data available), ATV risk has fluctuated in the range between 185 and 200 injuries per 10,000 four-wheel vehicles in use during this time period and has actually decreased slightly during each of the past two years. In fact, the 2003 rate of 188 injuries per 10,000 four-wheel ATVs in use is lower than for any year since 1998. *See Exhibit 1.*

**ATV-Related Injury Risk for Children Under 16 has Declined Steadily since the Expiration of the Consent Decrees.**

The recent trend in injury risk numbers has improved for children under 16 relative to the general ATV-riding population as a whole. In 2003, there were an estimated 57 ATV-related injuries to children under 16 per 10,000 vehicles in use. This represents a 14 percent decrease from the level of injury risk for children under 16 in 1998, when the Consent Decrees expired. The estimates presented in Exhibit 1 show that injury risk for children under 16 has declined in all but one of the past five years.

It is often suggested that injury risk is ideally measured on a usage-adjusted basis such as that measured by full-scale exposure surveys, rather than on a per-vehicle basis, and I would agree with that proposition in many contexts. However, there are several reasons why evaluating risk on a per-vehicle basis is appropriate for the purposes of this proceeding. First, as I noted previously, there have been no new exposure data since 2001. Injury estimates for 2002 and 2003 should not be discarded simply because exposure studies have not been conducted annually.

Second, CPSC set the precedent of evaluating injury and fatality risk for four-wheel ATVs on a per-vehicle basis in the published annual report on ATV injury and fatality estimates that it has prepared since expiration of the Consent Decrees.

Third, and in my view, most important, is that the success or failure of current efforts to restrict riding of adult-sized ATVs by children under 16 can be best evaluated by examining on a

per-vehicle basis the contribution that each ATV in use makes to the current level of ATV-related injuries sustained by children under 16. Specifically, if more ATV dealers, parents, and under-16 riders are complying with the ATV age and size recommendations, that increased compliance will only show up accurately (as a reduction) in an injury rate that is measured on a per-vehicle basis. It will not show up in a reduced injury rate if it is measured by hours of use or number of riders for the remaining participants who ignore the ATV age guidelines and whose risk cannot be expected to fall as a result of increased compliance by others.

**ATV-Related Fatality Risk has Declined or Remained Stable since 1999.**

The CPSC staff analyses of fatalities highlight that there was a significant change in methodology for estimating ATV-related fatalities beginning in 1999. For the same reasons I previously outlined for assessing injury risk trends, it is only appropriate to examine fatality rates using estimates developed using the current statistical methodology. We have less information available on this trend, however, because the change in methodology took place one year later and because there is a substantially longer time lag before the database of incident reports becomes complete enough to develop a reliable annual estimate of ATV fatalities.

However, it appears that there are now sufficient data available for development of adequately reliable fatality estimates for the four-year period from 1999 through 2002. As Exhibit 1 shows, overall ATV fatality risk appears to have been declining on balance since 1999. If the current CPSC annual estimates for fatalities do not change significantly in future reports, there were about 1.4 ATV-related fatalities per 10,000 four-wheel vehicles in use during 1999,

declining to 1.1 fatalities per 10,000 vehicles in use during the two most recent years for which adequate data are available.

**Fatality Risk for Children Under 16 has also Declined or Remained Stable since 1999.**

In addition, we have examined trends in per-vehicle fatality risk for children under 16 since the Consent Decree expired. As Exhibit 1 shows, the estimated fatality rate declined by about 10 percent on a per-vehicle basis from 1999 to 2002 for children under 16.

It should be noted that assessing the per-vehicle trend in fatality risk for children under 16 has one additional complication—because of confidentiality restrictions on the publicly available database, it is not possible to determine the percentage of *estimated* fatalities sustained by children under 16, only the share of those fatalities that are actually reported to CPSC. However, the ratio of estimated fatalities to reported fatalities has declined significantly since the new methodology was implemented in 1999, and it is reasonable, in my view, to assume that ATV-related fatalities involving children are at least as likely to be reported or known to the CPSC as those involving adults. In fact, given the extensive coverage and regulatory interest in these incidents, it is very possible that using the share of *reported* ATV-related fatalities sustained by children under 16 overstates the percentage of estimated fatalities accounted for by younger riders.

**Comparative Risk Assessment Shows Another Perspective on ATV Safety.**

A second way to evaluate ATV risk is in the context of the risk associated with comparable products and activities. By doing so, we are able to determine if the risk associated with a single product or activity such as ATV riding exceeds or falls within the range of the baseline levels of risk that characterize these benchmark products and activities—in this case represented by other recreational activities and other types of motorized vehicles.

In my testimony today, I present an updated version of some risk comparisons that will supplement materials contained in the CPSC briefing package. I previously presented materials on this topic at the West Virginia ATV hearings, and these data have been updated with new injury and fatality data, as well as new data on participation in recreational activities and motor vehicle population. The comparative risk assessment presented in the CPSC briefing package includes several measures under which the risks associated with ATV riding are lower than, or at least comparable to, other recreational activities and motor vehicles, as well as some in which the risks of ATV riding appear to be above the baseline level associated with comparable products/activities. As a general matter, whether ATV risk is higher or lower than the risks of other activities and products depends on the type of risk measured (e.g., total injuries, fatalities, other serious injuries), the measure used (e.g., number of products, total hours of use, number of users or participants), and the type of product/activity involved.

**ATV Risks Are Comparable To Risks Associated With Other Recreational Activities.**

Using newer (2003) recreational activity participation data than the 2001 data previously presented, it remains true that many other recreational products and activities involve a greater

risk of injury than riding an ATV. For example, on the basis of the number of injuries per 100,000 participants, ATV riding is safer than football, basketball, wrestling, bicycling, soccer, baseball, snow skiing, snowboarding, skateboarding, softball, ice hockey, boxing, roller skating, and several other recreational activities. *See* Exhibit 2.

The Comparison of Injury Risks for ATVs and Motor Vehicles Depends on the Measure of Exposure Used. The data presented in my previous West Virginia hearing testimony and the CPSC briefing package memo show that the comparison of injury rates for ATVs and motor vehicles is sensitive to the metric used to make the comparison. Although CPSC's briefing package notes that on a per-vehicle basis the level of injury risk associated with ATVs is higher than that for passenger cars and other types of motor vehicles, ATV injury risk compares favorably on a per-participant basis—an accepted measure that is frequently used for risk comparisons. On a per-participant basis, the most recent (2003) data show that the overall level of injury risk for ATVs is about half that of the general category of motor vehicles (993 per 100,000 riders for motor vehicles versus 488 for ATVs). *See* Exhibit 3.

The Fatality Rate for ATVs is Lower than that for Motor Vehicles Generally and Comparable to that for Passenger Cars. In contrast to the injury picture, the fatality risk comparison between ATVs and motor vehicles is not nearly as sensitive to the metric of exposure used. Measured on a per-vehicle basis, the overall fatality rate for ATVs is well below that for passenger cars and light trucks. On a per-participant basis, the fatality rates for motor vehicles generally and for passenger cars specifically are both several multiples of the risk level for ATVs. *See* Exhibit 4.

**The Great Majority of Accidents Continue to Involve Warned Against Behavior.**

Based on a review of hundreds of CPSC IDI reports of 1997-2002 ATV fatalities, we found that nearly 92 percent of all ATV-related fatalities to riders regardless of age involved at least one type of warned against behavior, defined as: failure to wear a helmet, riding on a public road, drinking alcohol, passenger carrying, excessive speed, or using drugs. Two or more warned against behaviors were reported in more than half of the fatalities reviewed. The most common of these behaviors was failure to wear a helmet (75 percent) followed by driving on public roads (40 percent).

The CPSC briefing package conducted an additional analysis limited to fatalities involving children under 16. For example, CPSC found that 93 percent of fatalities involving children under 16 occurred on ATVs with adult-sized engines, 72 percent involved children not wearing helmets (close to the percentage that we found for all riders), 45 percent involved multiple riders (compared with 28 percent in our analysis), and 25 percent occurred on paved roads.

These results help to provide a risk-factor roadmap as to where future risk reduction efforts through training, state legislation, and information/communication programs on ATV safety and risk reduction might best be focused.

**State Legislation Can Help to Reduce ATV-Related Injuries Involving Children.**

In my testimony at the West Virginia hearings I presented an analysis of fatality data that indicated that the percentage of fatalities to children decreased after ATV legislation was enacted in Kentucky and New Jersey. For this testimony I examined reported ATV fatality data for California, the state with the highest amount of ATV fatalities. I analyzed the change that occurred in the proportion of ATV-associated fatalities for riders under 16 in the five years after enactment in 1990 of ATV legislation with minimum age and parental supervision requirements, relative to the five years before the law. The proportion of fatalities to children under 16 in California declined from 27 percent before the law to 15 percent after the legislation. *See* Exhibit 5.

Although the precise extent to which the state law (as opposed to other factors, such as the CPSC Consent Decree) accounted for this decrease cannot be quantified in the absence of additional analysis, this preliminary analysis suggests that state laws can have a meaningful effect in reducing ATV-related fatalities and injuries involving children.

**Exhibit 1**  
**4-Wheel ATV Injury & Fatality Risk per Vehicle**

Year	Injuries per 10,000 ATVs		Fatalities per 10,000 ATVs	
	Total	< 16	Total	< 16
2003	188.4	57.0	NA	NA
2002	190.0	60.7	1.1	0.27
2001	200.9	62.6	1.1	0.30
2000	197.2	68.0	1.2	0.34
1999	193.0	61.9	1.4	0.31
1998	184.7	66.6	*	*

\*Comparable estimates not available. Fatalities in 1998 were coded under a different classification.

Source: "2003 Annual Report of ATV Deaths and Injuries", CPSC, January 2005.

**Exhibit 2**  
**2003 Injury Risk Estimates Per 100,000 Participants**

Activity	Emergency Room Injuries per 100,000 Participants*
Football	2,292
Basketball	2,051
Wrestling	1,960
Boxing	1,777
Soccer	1,439
Baseball	995
Skateboarding	982
Bicycle Riding	979
Softball	897
Ice Hockey	879
Snowboarding	815
Roller Skating	596
Skiing	520
Snowmobiling	509
Martial Arts	496
Volleyball	476
<b>ATVs</b>	<b>472</b>
Racquetball	338
Scooter Riding	326
In-Line Roller Skating	280
Ice/Figure Skating	271
Roller Hockey	255
Weightlifting	253
Swimming (Heiden)	235
Tennis	221
Paintball	190
Fishing	144
Water Skiing	132
Swimming (CPSC)	128
Golf	123
Archery	83
Fencing	67
Exercising w/ Equipment	62
Scuba Diving	58
Bowling	39
Horseshoe Pitching	32
Badminton	30
Table Tennis	17
Billiards/Pool	12
Camping	6

\*For participants 7 years of age and older.

Sources: "2003 Annual Report of ATV Deaths and Injuries", CPSC, January 2005.

"Sports Participation in 2003", National Sporting Goods Association.

**Exhibit 3**  
**2003 Injury Risk Estimates Per 100,000 Participants**

Activity	Injuries per 100,000 Participants
Motor Vehicles	993
Passenger Cars	604
<b>ATVs</b>	<b>488</b>

Sources: "2003 Annual Report of ATV Deaths and Injuries",  
CPSC, January 2005.

"Traffic Safety Facts 2003", National Highway  
Traffic Safety Administration.

**Exhibit 4**  
**2002 Fatality Risk Estimates Per 100,000 Participants**

Activity	Fatalities per 100,000 Participants
Motor Vehicles	14.9
Passenger Cars	7.1
<b>ATVs</b>	<b>2.7</b>

Sources: "2003 Annual Report of ATV Deaths and Injuries",  
CPSC, January 2005.

"Traffic Safety Facts 2002", National Highway  
Traffic Safety Administration.

**Exhibit 5**  
**Analysis of Impact of California Law on < 16 Fatalities**

	Fatalities		
	Total	< 16	% < 16
Pre-Law	96	26	27%
Post-Law	72	11	15%
Total	168	37	22%

Source: 2003 ATV Deaths Database, CPSC.