



NSAA FACT SHEET

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Facts About Skiing / Snowboarding Safety

Skiing and snowboarding enjoy an excellent safety record and are less dangerous than other high-energy participation sports. Still, skiing and snowboarding are challenging activities and they require physical skills that are learned over time, with practice and personal responsibility. Snowsports involve a certain level of inherent risk, but in some measure, it is the thrill that entices most skiers and riders to pursue them. Even with these attendant risks, the health and fitness benefits of skiing and snowboarding are enjoyed by people of all ages across the slopes each season.

STATISTICS ON SKIING / SNOWBOARDING

For purposes of compiling accurate data on fatalities and serious injuries, the National Ski Areas Association (NSAA) collects information from all ski areas in the United States annually, either directly or through one of the three main insurance companies that provide coverage to ski areas.

Fatalities – According to NSAA, during the past 10 years, an average of 39.6 people per season have died while skiing or snowboarding at a ski area. During the 2012/13 season, 25 fatalities occurred at U.S. ski areas, out of the 56.9 million skier/snowboarder days reported for the year – a decline of nearly 50 percent from the previous year, in which there were 46 fatalities.

The rate of fatality for the 2012/13 season converts to 0.44 per million skier/snowboarder visits, which is the second lowest fatality rate in the last 10 years (see Table 1). While skier visits in 2012/13 were very close to the 10-year industry average of 57.3 million, the 25 fatalities were significantly lower than the 10-year industry fatality average of 40 per season.

Of the 25 fatalities, 23 of the fatalities were skiers and 2 were snowboarders. Of the 25 fatalities, 20 of the fatalities were male, and 5 were female. Regarding helmet use, 14 of the fatalities were wearing helmets at the time of the incident, and 11 of the fatalities were not wearing helmets.

Serious Injuries – During the past 10 years, skiers and snowboarders suffered an average of 49 serious injuries (paralysis, broken neck/back, traumatic brain injuries, and other serious injuries) per season. During the 2012/13 season, there were 73 serious injuries out of 56.9 million skier visits. The rate of serious injury was 1.28 per million skier/snowboarder visits. Over the past 10 years, the average serious injury rate is 0.86 serious injuries per million skier visits.

Skiers suffered 55 of these serious injuries, and snowboarders suffered 14 of these serious injuries (for four of the serious injuries, the equipment type was not reported). Among the serious injuries, 44 of those involved were reported as wearing a helmet at the time of the incident and 22 were reported as not wearing a helmet. For 7 of the serious injuries, helmet use was not reported.

While the number of serious injuries during the 2012/13 season was above the 10-year average, the number of fatalities was near historic lows. There is no discernible explanation for why the number of serious injuries was high last season, and the rate fluctuates over the span of several years.

During the 2012/13 season, more than three-quarters of the fatalities and serious injuries (77 percent) were the result of collisions with trees or fixed objects or due to impact with the snow. One fatality was the result of an in-bounds avalanche.

Gender played a large role in the total number of fatalities and serious injuries, which is consistent with past seasons. In 2012/13, out of the 98 total incidents (fatalities and serious injuries), 81 were male, and 17 were female.

Table 1: Skiing / Snowboarding Fatality Rate Per Participant and Per Million Visits

2012/13 number of fatalities	25
2012/13 number of ski/snowboard participants (in millions)	9.7
Fatalities per million participants	2.6
Days of participation (in millions)	56.9
Fatalities per days of participation rate (per million)	0.44

NOTE: A skier/snowboarder visit represents one person visiting a ski area for all or any part of a day or night and includes full-day, half-day, night, complimentary, adult, child, season and any other ticket types that gives one the use of an area's facility.



AN ADDITIONAL PERSPECTIVE

To place skiing and snowboarding safety into context, it helps to offer a perspective (keeping in mind this data is limited due to not having data on relative exposures). According to the National Safety Council (*Injury Facts*, 2013 edition), fatalities per common activities include the following:

- 34,600 Americans died in motor vehicle accidents
- 31,758 died from unintentional public poisoning
- 8,600 died from unintentional public falls
- 5,700 pedestrians were killed
- 4,612 motorcyclists were killed
- 2,500 people drowned swimming or playing near water
- 900 died while bicycle riding
- 28 died due to lightening strikes (2012 data)
- 25 died due to skiing or snowboarding at ski areas

NSAA 10-YEAR INJURY STUDIES

Since 1980, NSAA has conducted a national analysis of ski and snowboard injuries using data compiled from ski patrol incidents, using a statistically representative sample of resorts around the country. Ski patrol incident reports are not final diagnoses by medical doctors, therefore conclusions based on data must be cautioned. However, because most ski and snowboard injuries are not treated at hospitals, and therefore subject to federal HIPAA privacy laws, this analysis of ski patrol incident reports is broadly representative of the available data.

NSAA's 10-year injury studies have been conducted in 1980, 1990, 2000, and 2010. Lead author Jasper Shealy, PhD., a biomechanical engineer and professor emeritus at Rochester Institute of Technology, has been involved in all four of these 10-year injury studies, and has used a consistent methodology dating back to the first 10-year injury study in 1980, using more or less the same resorts over this period.

In general, according to the most recent 10-year injury study (analyzing data from the 2010/11 ski season), the overall rate of injury in the sport continues to decline (since 1980). The injury rates for snowboarding are higher than injury rates for skiing. In 1980, there were approximately 3.1 skiing injury incidents per 1,000 visits; by 2010/11 season, that rate had modestly declined to approximately 2.5 skiing injury incidents per 1,000 visits. For snowboarding (which did not become a fully developed sport until the 1990s), injury rates declined from 2000 to 2010. In 2000, there were approximately 6.9 snowboarding injury incidents per 1,000 visits. In 2010, this rate declined from 6.9 incidents to approximately 6.1 incidents per 1,000 visits.

In 2010, the study's authors analyzed incident data for injuries occurring in terrain parks, which was the first 10-year injury study to do so, given the growth of ski areas embracing terrain parks in the 1990s and 2000s. According to the 2010 study, 11 percent of all incidents occurred in terrain parks. Five percent of all skiing injuries occurred in terrain parks, and 17 percent of snowboarding injuries occurred in terrain parks. However, because there is no data available regarding the percent of time (exposure) that skiers and snowboarders spend in terrain parks, the study's authors are not able to determine if terrain park incidents are over- or under-represented based on exposure. Dr. Shealy notes, though, that there is no evidence that terrain parks are increasing the overall rate of injury in the sport.

According to the 2010 study, 88 percent of skiing injuries occurred on-hill; 5 percent of skiing injuries occurred in terrain parks, and 4 percent of injuries to skiers were related to chairlift incidents (3 percent of skier injuries did not report location). For snowboarders, 77 percent of injuries occurred on-hill, 17 percent occurred in terrain parks, and 3 percent were related to chairlift incidents (2 percent of snowboard injuries did not report location).

Gender plays a notable role in skiing and snowboarding injuries, and is more pronounced within snowboarding injuries. According to the 2010 study, injuries by skiers were almost evenly split among the genders (51 percent male; 49 female). For snowboarding injuries, 70 percent of snowboarding incidents were male, and 30 percent were female.

There was almost no difference in helmet usage between skiers and snowboarders. According to the 2010 ten-year study, approximately 51 percent of injured skiers wore helmets, with 49 percent not wearing helmets. Likewise, approximately 51 percent of injured snowboarders wore helmets, with 48 percent not wearing helmets.

According to this study, the types of injury differed notably between skiers and snowboarders. Skiers were more likely to suffer a strain or sprain injury than snowboarders; 48 percent of all skier injuries were strains or sprains compared to 32 percent of all snowboarder injuries. However, snowboarders were nearly twice as likely to suffer a bone fracture as skiers; 29 percent of snowboarding injuries were fractures, while only 15 percent of skiing injuries were fractures. Also, snowboarders were twice as likely to suffer a concussion compared to skiers, with concussions amounting to 12 percent of snowboarding injuries compared to 6 percent of skier injuries.

The predominant body part injured in skiing incidents was the knee, accounting for approximately 33 percent of all ski injuries, according to the 2010 injury study. In sharp contrast, only 7 percent of all snowboarding injuries involved the knee. For snowboarders, the predominant body part injured was the wrist, accounting for 27 percent of all snowboarding injuries; only 4 percent of skier injuries involved the wrist. Snowboarders were more likely to suffer shoulder injuries than skiers (17 percent for snowboarders, 12 percent for skiers). Likewise, snowboarders suffered more head injuries than skiers (13 percent for snowboarders, 8 percent for skiers). Skiers suffered far more thigh, lower leg, and ankle injuries than snowboarders, whereas snowboarders suffered more arm and elbow injuries than skiers.

FREQUENTLY ASKED QUESTIONS

Is the rate of collisions among skiers and snowboarders on the rise?

The number of collisions with other skiers or snowboarders accounts for only 6.4 percent of all reported incidents, according to Jasper Shealy, PhD., professor emeritus at the Rochester Institute of Technology, who has studied ski related injuries for more than 30 years, Dr. Shealy's research also confirms that alpine skiers are three times more likely to be involved in a collision with other people than snowboarders.

Is the number of ski injuries increasing?

No, the number of ski injuries is decreasing. According to Dr. Shealy, the overall rate of reported skiing injuries has declined by 50 percent since the early 1970s. The once-feared broken lower leg from skiing is now a thing of the past, declining more than 95 percent since the early 1970s. The overall rate of reported alpine ski injuries has modestly declined from 1980 to the 2010 (see discussion of 10-year injury study above). From 2000, there were 2.63 reported injuries per 1,000 skier visits; in 2010, there were 2.5 injuries per 1,000 skier visits. To only look at the overall number, or rate of injuries, does not tell the whole story. Moreover, the rate of serious knee injuries has been declining steadily since the 1990s; unfortunately, the number of mid-shaft tibial fractures has been slightly increasing after having declined dramatically from 1970 through the mid 1980s. The reason for the decline in serious knee injuries is believed to be due to the market penetration of the newer, shorter skis. The reason for the increase in mid-shaft tibial fractures appears to be due to a decline in the functional properties of the ski-binding-boot systems.

Have snowboard injuries increased?

No, snowboard injuries are decreasing. According to the NSAA 2000 ten-year injury study, the rate of injury for snowboarding during the 2000/01 season was 6.97 injuries per 1,000 skier visits. In the 2010 injury study, the rate of snowboard injuries dropped to 6.1 injuries per 1,000 visits. One possible explanation for this decline may be the overall maturation of the sport of snowboarding, as well as the increase in the number of snowboarding lessons.

Who gets fatally injured while skiing and snowboarding?

Most fatalities occur in the same population that engages in high-risk behavior. Fatalities within skiing and snowboarding are predominantly males (85 percent) from their late teens to late 30s (70 percent), according to Dr. Shealy. Similarly, in 2012/13, 80 percent of all fatalities at U.S. ski areas were male (20 fatalities), and 20 percent were female (5 fatalities).

Less than 10 percent of fatally injured skiers and snowboarders are under 10 or over 50 years of age, but more than 16 percent of all skiers and snowboarders are in these age groups. In 2012/13, five of the 25 fatalities were aged 10 and under. As the sport continues to age, with

more skiers and snowboarders participating in their 50s, 60, and 70s, the industry is witnessing an increase in fatalities in this age group. In the 2012/13 season, there were 18 fatalities of skiers and snowboarders over the age of 50, including two in their 80s.

Most of those fatally injured are above-average skiers and snowboarders who are going at high rates of speed on the margins of intermediate trails. This is the same population that suffers the majority of unintentional deaths from injury. For example, in 1995 this population suffered 74 percent of fatal car accidents and 85 percent of all industrial accidents, Dr. Shealy reports.

Has the introduction of helmets made any difference in terms of head injuries and fatalities in skiing and snowboarding?

The most recent helmet usage data clearly indicates that skiers and snowboarders already understand the importance of helmets. According to the *2012/13 NSAA National Demographic Study*, 70 percent of skiers and snowboarders wore helmets, a dramatic increase of 180 percent from the 2002/03 season (the first year of NSAA's helmet study) when only 25 percent of skiers and snowboarders wore helmets.

Recent helmet data also shows the following:

- 89 percent of children 9 years old or younger wear ski/snowboard helmets.
- 80 percent of minors, 17 and under, wear helmets.
- 83 percent of children between 10 and 14 wear ski/snowboard helmets.
- 81 percent of adults over the age of 65 wear ski/snowboard helmets.
- Skiers and snowboarders ages 18 to 24 have traditionally represented the lowest percentage of helmet use among all age groups. In 2012/13, 60 percent of all 18 to 24 year-olds wear helmets, representing a staggering increase in usage for this age group since the 2002/03 season, when only 18 percent wore helmets.

According to Dr. Shealy, who has studied ski related injuries for more than 30 years, recent research has shown that the use of helmet reduces the incidence of any head injury by 30 to 50 percent, but that the decrease in head injuries is generally limited to the less serious injuries. There has been no significant reduction in fatalities over the past 10 seasons even as the use of helmets overall has increased dramatically (from 25 percent helmet usage in 2002/03 to 70 percent helmet usage in 2012/13). This trend emphasizes the importance of not increasing risk-taking behavior simply because you are wearing a helmet. Skiing and riding in control – and adhering to the principles of Your Responsibility Code – is the best way to improve slope safety and reduce injuries.

What is the best way to avoid a collision with another skier or snowboarder?

The best way to avoid a collision is to follow the steps of Your Responsibility Code including: stay in control, stop in a safe place for you and others, and when starting downhill or merging,

look uphill and yield. It is also important to obey signs designating slow zones, intersecting areas, and closures. It is recommended that all skiers and snowboarders share the slopes and always show respect for others. For beginners, it is critical to take a ski or snowboard lesson; for more advanced skiers, even if you have skied or snowboarded for years, it is always beneficial to have a refresher lesson.

What is being done to improve safety?

Skiers and snowboarders at NSAA member resorts (currently 329 alpine resorts in the U.S.) are given several opportunities to learn how to ski and ride safely. All ski areas endorse and are asked to display the “Your Responsibility Code,” which encourages skiers and snowboarders to ski and ride within their ability, to watch for skiers downhill, to look uphill before entering a trail, to move to the side of the trail when stopping, to use devices to help prevent runaway equipment, to observe all posted signs and warnings, to have the ability to load and unload lifts, and to practice courteous ski and snowboarding habits. Those who break the Code or violate resort policies are routinely stripped of their passes by ski patrollers.

Ski areas have undertaken several programs to increase ski safety. Those programs range from establishing family ski areas to increasing the number of monitors on the slopes. Alpine and snowboarding lessons are offered and encouraged at ski areas. During the 2012/13 season, NSAA is expanding the traditional “Safety Awareness Week” (usually held over Martin Luther King, Jr., weekend), to the entire month of January.

What do ski areas do to address the safety issue of skiing and boarding?

Mountain resorts expend tremendous energy and expense educating their guests about skier and snowboarder safety. Below are some of the many slope safety campaigns.

“HEADS UP” CAMPAIGN AND THE RESPONSIBILITY CODE

During the 1999/00 season NSAA created the “Heads Up” campaign to support ski area safety education efforts and provide a unified platform for which to proactively reach skiers and snowboarders with timely slope safety information. The objective of the campaign is to further reduce the frequency of incidents through education. The campaign emphasizes the seven points of Your Responsibility Code. Those points include:

1. Always stay in control.
2. People ahead of you have the right of way.
3. Stop in a safe place for you and others.
4. Whenever starting downhill or merging, look uphill and yield.
5. Use devices to help prevent runaway equipment.
6. Observe signs and warnings, and keep off closed trails.
7. Know how to use the lifts safely.

While Safety Awareness Month activities are based on individual resort initiatives, many are based on Your Responsibility Code, and resorts continue to expand upon and add their own creativity to the overall messaging. Each season NSAA recognizes member ski areas that have implemented particularly effective safety campaigns focused in a number of areas including helmet safety, chairlift safety, terrain park safety, avalanche safety, best safety website and best Safety Week campaign. Find more information on NSAA's safety education efforts and initiatives under the Safety and Education menu at www.nsaa.org.

KIDS ON LIFTS

In 2012, NSAA developed the Kids on Lifts educational website. NSAA views using and riding chairlifts in a responsible manner as one of the primary safety considerations for all skiers and boarders. A skier or snowboarder's behavior has as much more to do with their safety, and the safety of others, as does any piece of equipment from helmet to chairlift. The website www.KidsonLifts.org contains FAQ's and safety tips on how to load, ride, and unload responsibly, general skiing and riding tips, coloring pages for kids, public service announcements, and more. The tagline "No Horsing Around" is a motto we hope to ingrain not only in children but in every skier and boarder.

SMART STYLE

NSAA and Burton Snowboards created the Smart Style Terrain Park Safety initiative in 2004. Smart Style enforces a code of conduct in terrain parks. The elements encourage participants to make a plan, look for others before using the jumps, respect other participants, and to participate at their own level of skill. This venture is a cooperative effort to continue to heighten the awareness of the proper use of terrain parks at mountain resorts, while also delivering a unified message that is clear, concise, and effective. The Smart Style program includes four main messages: **Make a Plan, Look Before You Leap, Easy Style It, and Respect Gets Respect**. These messages encourage participants to scope around jumps first, to be aware of their landing areas, to start with the basics, to respect other participants, and to avoid getting yourself into the "backseat" – always land on your feet.

NSAA launched a new consumer website: www.terrainparksafety.org in October 2004. The site incorporates up-to-date information on freestyle terrain safety, and encourages consumers to educate themselves about the use of terrain parks, halfpipes and other freestyle areas at snowsports resorts. As the sport grows in popularity, the elements of the site are meant to educate the consumer about various aspects of freestyle terrain.

GET SMART

NSAA developed the **Get Smart Freestyle Terrain Resource Guide** in 2008. The guide provides freestyle terrain users with useful safety information including the four points of Smart Style, the ATML method, the seven points of Your Responsibility Code and other safety points to

consider when using freestyle terrain.

OBJECTS ARE CLOSER THAN THEY APPEAR

In 2008, NSAA developed an additional component to its Heads Up safety education campaign billed “**Objects are Closer Than They Appear**” to further highlight the first tenet of Your Responsibility Code: Always stay in control and be able to stop or avoid other people or objects. The campaign emphasizes the role that speed plays in staying in control and overtly addresses the risk posed by collisions with trees or other fixed objects on the slopes, which is the predominant cause of serious injuries in snowsports.

LIDS ON KIDS CAMPAIGN

NSAA promotes the use of helmets on the slopes. We urge skiers and riders to wear a helmet – but to ski or ride as if they are not wearing a helmet. NSAA views skiing and boarding in a controlled and responsible manner – not simply one piece of safety equipment – as the primary safety consideration for all skiers and boarders. A skier's behavior has as much or more to do with the safety of the sport as does any piece of equipment. In 2002, Lids on Kids www.lidsonkids.org debuted as a resource for consumers to learn about helmet use in skiing and snowboarding, and the resulting increase in helmet usage has been nothing short of astounding (see Page 6 above on helmet usage). The site contains FAQs about helmet use, fit and sizing information, general slope safety information, related articles and games, and testimonials about helmet use from well-known athletes, including members of the U.S. Ski and Snowboard Teams.

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THE NATIONAL SKI AREAS ASSOCIATION, LOCATED IN LAKEWOOD, COLO., IS A TRADE ASSOCIATION FORMED IN 1962 FOR SKI AREA OWNERS AND OPERATORS NATIONWIDE.

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