

# NEWS

## Concussion Diagnosis and Management

Donna K. Broshek, Ph.D.

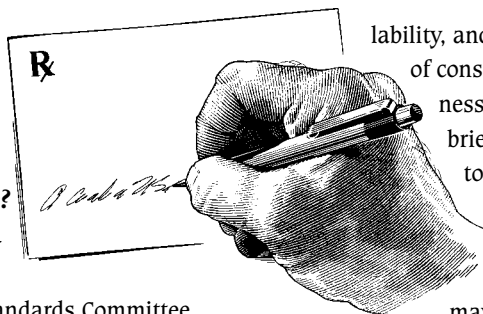
Division of Neuropsychology  
Department of Psychiatric Medicine  
University of Virginia School of Medicine

The interaction between a horse weighing 1,000 to 2,500 pounds and traveling up to 40 miles per hour, the unpredictable behavior of the horse, irregularities in the ground surface, and the rider's experience and skill result in significant potential for equestrian-related concussion. In addition, the head-forward riding stance of equestrians increases the risk of head and spinal injury (Brooks & Bixby-Hammett, 1991; Brooks & Bixby-Hammett, 1998). In fact, a review of the medical literature revealed an estimated rate of concussion in equestrian sports that ranged from 3 to 91% (Ruchinskas, Francis, & Barth, 1997). These figures indicate that equestrians may be at greater risk for concussion than those participating in football, soccer, rugby, and boxing. Because of the significant potential risk of concussion, it is important for equestrians to recognize the signs and symptoms of concussion, to understand how to manage concussion and when to seek further evaluation and treatment (Broshek, Brazil, Freeman, and Barth, in press). In addition, equestrian sports have been identified as an important area of future research due to the high incidence of concussion and the risk for multiple con-

cussions (Broshek & Barth, 2000).

### What is a concussion?

According to the Quality Standards Committee of the American Academy of Neurology (AAN), concussion is defined as a "trauma-induced alteration in mental status that may or may not involve loss of consciousness. Confusion and amnesia are the hallmarks of concussion" (AAN 1997, p. 582). Commonly observed features of concussion described in the AAN practice parameter include confusion, difficulty focusing attention, disorientation, memory impairment, slurred or incomprehensible speech, slowed motor or verbal responses, observable gross coordination difficulties, emotional overreactivity or mood



lability, and any loss of consciousness, however brief. Symptoms of concussion that may occur

within minutes to hours are headache, vertigo or dizziness, nausea or vomiting, and lack of awareness of surroundings. The AAN also identified symptoms that may persist for days or weeks after concussion: low grade headaches, lightheadedness, deficits in attention and concentration, impaired memory, fatigue, low frustration tolerance and irritability, difficulty focusing vision, sensitivity to bright lights or loud noises, tinnitus, sleep disturbance, and anxiety or depression.

Many professionals and lay people have the misconception

that the diagnosis of concussion requires a loss of consciousness. In fact, concussion requires only an alteration of consciousness (i.e., confusion, disorientation), but does not require loss of consciousness. Many athletes readily acknowledge sustaining "dings" or having their "bell rung" but deny any history of concussion, when in fact these terms refer to alterations of consciousness associated with concussion. Loss of consciousness has even been called into question as an indicator of concussion severity since it does not appear to predict neurocognitive functioning during acute recovery (Lovell, Iverson, Collins, McKeag, & Maroon, 1999). Another important diagnostic issue is that concussion is a mild traumatic brain injury. Many professionals and the public minimize the importance of concussion as an inevitable and relatively insignificant aspect of sports participation, although the recent attention given to this issue in high profile athletes, such as Steve Young, Troy Aikman, and Eric Lindros, has raised awareness.

### When should an equestrian return to riding after a concussion?

Within the equestrian com-

*Continued on Page 3*

# AMERICAN MEDICAL EQUESTRIAN ASSOCIATION

A tax exempt 501c3 organization.

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Newsletter Design  
pat\_hutson@centurytel.net



## MISSION STATEMENT

The American Medical Equestrian Association is dedicated to the philosophy, principles and application of safety of people in equestrian activities. This purpose is achieved through education, research and resource.

▲ EDUCATION of health care professionals, organizational representatives and individuals, including an emphasis on public awareness;

▲ RESEARCH to better define injury patterns and risks, efficacy of safety measures and equipment, and assistance in equipment design;

▲ A RESOURCE of experience and expertise to be shared and utilized for the benefit of equestrian safety.



## A note from the AMEA President

*Janet M. Friesen MD*

**M**any good things have happened since the last newsletter.

Please join me in welcoming Rusty Lowe as our new Executive Director. He comes to us with a background in emergency response medicine. He works on various rider safety committees including the AHSA. He is enthusiastic and will help the AMEA grow into an organization recognized by others in the horse industry as a great resource for education and safety. Already new memberships are coming in to support the organization.

Other good news includes the AHSA helmet requirements changing to ASTM/ SEI approved helmets from the article of attire. Congratulations to some foreword thinkers. This is long overdue. Tests of old style helmets showed them only capable of withstanding the same forces as a good cowboy hat!

The safety conscious members of the horse industry have a lot of work to do. This was obvious to me when I participated in the Kamloops Cattle Drive, an annual international event here in British Columbia. Participants were encouraged to wear authentic cowboy gear. This included a cowboy hat and boots. There were many safety rules, including not riding faster than a trot, but no where was there mention of a helmet. Very few participants bucked the trend in order to

don a helmet. I believe 3 out of 250 did so. This can be very frustrating and we must continue to set a personal example as well as speaking out in whatever forums are available

Thank you for your continuing support during this time of transition. We hope to

deliver the Newsletter in a more timely fashion. Please help us by updating your addresses and phone numbers. Contact Rusty at our new e-mail address:  
amea@charter.net.

*Janet M. Friesen*  
President  
AMEA



*(Left) Janet Freisen, right, at the Kamloops Cattle Drive, an annual international event in British Columbia. The use of helmets (above) was not on the safety list and only a handful of riders out of about 250 used them.*

## Concussion Diagnosis and Management, *continued from page 1*

munity, riders often follow the general adage of “when you fall off a horse, get right back on again.” In the event of a concussion, however, return to riding while still symptomatic puts the equestrian at significant risk for further injury. Although there are multiple sets of return to play criteria for determining when to return a concussed athlete to activity, the common factor in these criteria is protecting an athlete from premature return to play (i.e., when an athlete is still in a cognitively vulnerable state). The AAN (1997, p. 582) grading system for concussion and return to play criteria have been covered in the AMEA NEWS, [www.ameaonline.org](http://www.ameaonline.org) (November 1997 page 11).

Upon consideration of these criteria, the take home message is that any equestrian who sustains a concussion should not immediately resume riding. Any alteration of consciousness, however transient, merits a minimum of 15 minutes of rest. If the symptoms last longer than 15 minutes, the equestrian should not return to riding that day. Ideally, when an equestrian sustains a concussion, a mental status exam should be performed by trained personnel on-site. Equestrians and other athletes are often highly competitive and motivated to minimize or deny their symptoms, including alterations in mental status. The presence of objective and trained personnel at equestrian events, who can identify and diagnose concussion, particularly when the equestrian denies symptoms, is an optimal

system for protecting health and preventing further injury.

### ***What is the role of neuropsychological assessment in concussion management?***

Neuropsychology is a specialty area within clinical psychology that focuses on the assessment and understanding of brain-behavior relationships. Neuropsychologists are skilled in the qualitative and quantitative assessment of neurocognitive functioning, including reasoning and problem solving, attention and concentration, processing speed and efficiency, memory, language, visuo-spatial ability, intellectual ability, academic skills, motor skills, sensory-perceptual performance, and psychological distress. A traditional neuropsychological evaluation is conducted one-on-one with a skilled examiner (either a neuropsychologist or a psychometrician supervised by a neuropsychologist) and generally takes between four to six hours to complete. Neuropsychological assessment has been called the “most sensitive method of detecting post concussion symptoms” (Lovell & Collins, 1998) and is particularly helpful in detecting persisting neurocognitive deficits despite negative results on neurological examination and neuroimaging. Medical professionals should consider referring an equestrian with persisting post-concussion symptoms for neuropsychological assessment to determine the presence and level of impairment, recovery of function, and to provide information that can assist in

determining when the injured equestrian should return to riding.

### ***How can neuropsychological assessment be used proactively to aid in concussion management?***

Dr. Barth and his colleagues at the University of Virginia pioneered the Sports-as-a-Laboratory Assessment Model (SLAM) in the mid-1980s (Barth, Alves, Ryan, et al., 1989; Machiocchi, Barth, Alves, Rimel, & Jane, 1996). This model was originally developed to gain a better understanding of mild head injury in a clinical population by studying football athletes at high risk for concussion. In this model, large groups of individuals undergo brief (approximately 20-30 minutes) neuropsychological screening during the preseason using those measures most sensitive to altered cognition after a concussion. The screening then serves as a baseline for comparison when a concussed athlete undergoes serial reassessment after injury. In SLAM, a non-injured matched control is also assessed at the same intervals providing important information about the recovery curve. Dr. Barth and his associates found that football players who sustained a concussion recovered to the level of the non-injured controls within five to 10 days after injury.

Based on the SLAM research, the gold standard for concussion management is baseline screening of neurocognitive functioning that can be used for comparison in

the event of a concussion. Because the symptoms of concussion are often subtle and because of the great variability in cognitive performance across non-injured individuals, it can be difficult to interpret neuropsychological performance post-concussion. An individual with exceptional ability who performs within the average range after sustaining a concussion is clearly demonstrating neurocognitive impairment, but these results may be missed unless baseline data is available for comparison. Optimally, athletes in sports with a high risk for concussion, including equestrians, should undergo baseline neuropsychological testing for comparison in the event of concussion.

### ***What methods are available for baseline neuropsychological screening?***

Unlike traditional neuropsychological assessment, baseline screening as part of a concussion management program is administered to large groups of people and typically takes 20-30 minutes per person. The screening may consist of brief traditional neuropsychological paper and pencil measures that have been selected for their sensitivity to concussion (see Echemendia & Julian, 2001). Although this method takes only approximately 30 minutes per person, it is still time consuming because test administration is one-on-one and additional time is required for scoring and interpretation of the test data.

More recently, computerized neurocognitive screening mea-

asures have been developed that allow for baseline administration to multiple individuals simultaneously. The Concussion Resolution Index (CRI) is a 25-minute web-based computerized measure that assesses reaction time, processing speed, memory, and other neurocognitive functions. Because it is web based, the CRI is accessible to specialists even at remote locations. This feature is particularly helpful to those athletes who travel during competition. Upon reassessment after concussion, a report is available immediately that compares the injured athlete's performance to the baseline data for that athlete. Recent research suggests that the CRI is a valid and reliable measure of concussion (Erlanger et al., 2001). For more information on the CRI, see the Headminder website at [www.headminder.com](http://www.headminder.com). Another computerized measure is the Immediate Post-Concussion Assessment and Cognitive Testing (ImPACT program). ImPACT is a software based computerized neuropsychological testing program that can also be administered in-group settings. Like the CRI, a baseline performance is obtained for comparison with serial assessment post-concussion. Both the CRI and ImPACT can be administered by athletic trainers or other similarly trained individuals allowing for more efficient and practical administration during preseason assessment. For more information on ImPACT, see their website at [www.impacttest.com](http://www.impacttest.com). The Automated Neuropsychological Assessment Metrics (ANAM) is

a computerized neurocognitive assessment developed by the U.S. Army MR & M Command for baseline screening and serial assessment (Reeves et al., 1995). Although not currently widely available, the ANAM has been found to be sensitive to concussion and the authors hope to make it available for general use in the near future.

It should be noted that each of the concussion management programs described above should be used in consultation with a neuropsychologist. Although computerized measures have been developed to aid in baseline assessment of large groups of individuals, those athletes with persisting concussion symptoms should be referred for a neuralgic examination and a more comprehensive neuropsychological evaluation. Equestrian organizations, particularly youth oriented groups such as the U.S. Pony Clubs, might wish to consider obtaining baseline neurocognitive screening and establishing a consultative relationship with a neuropsychologist as part of a comprehensive and proactive concussion management program.

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## Editorial Comment

Dr. Broshek does an excellent job summarizing the fundamental aspects of sports-related concussion and the high prevalence of this injury within equestrian sports. Several facts of this injury bear repeating. First, concussion may or may not result in a loss of consciousness. Other symptoms such as confusion, anterograde/retrograde amnesia, balance problems, subtle personality change, excessive fatigue, photosensitivity and headache

should be considered every bit as severe as is a loss of consciousness. Though great debate exists about return to sport activity after concussion, one uniform principle exists: no athlete should return to sport participation until he/she is completely symptom free. In addition, if an athlete claims to be symptom-free, subsequent physical exertion should be conducted to determine whether symptoms manifest following increased cerebral blood flow. Again, any symptoms should preclude the athlete from returning to sport participation. Athletes should be aware that re-injury during the recovery process of an initial concussion can result in Second Impact Syndrome, progressive and cumulative neurobehavioral deficits (i.e. Post-Concussion Syndrome), and/or a lowered threshold for subsequent injury.

As Dr. Broshek outlines, relying on the self-report of the athlete may be difficult for any number of reasons. First, athletes may minimize symptoms since they perceive inactivity as jeopardizing their playing status or career aspirations. Second, athletes may generally be unaware of the subtle symptoms of concussion. Given these issues, the implementation of neuropsychological testing has become the "gold standard" for safe concussion management. Again, as Dr. Broshek outlines, traditional "paper and pencil" measures are currently being replaced by more sensitive, practical, and cost-effective computerized neuropsychological test batteries. Our group has developed ImPACT, a 20 minute battery of

cognitive tests (measures memory, reaction time, processing speed, problem solving, etc) that is also inclusive of a 20-item symptom inventory.

ImPACT is currently being utilized clinically within the National Football League, Major League Baseball, the National Basketball Association and in approximately 200 high schools and colleges nationally. The Web-Based Concussion Resolution Index and ANAM appear to be two other viable computerized programs currently available for use within sport populations. Clearly, the implementation of baseline and post-injury neuropsychological screening is the most prudent approach to safe concussion management.

In summary, I appreciate the work being done within the equestrian community to minimize the effects of concussion. I believe strongly that the pioneering efforts of Dr. Doris Hammett and colleagues have paved the way for better management protocols to take hold. Clearly, better education, knowledge, and comprehensive management programs are indicated given the very high incidence of concussion in your sport. Though concussion and mild head injury have been generally deemed "a silent epidemic," your vigilance to this issue will pay dividends to the thousands of participants within equestrian sport.

*Micky Collins, Ph.D.*  
*University of Pittsburgh*  
*Medical Center*  
*UPMC Sports Concussion*  
*Program*

Clin Experiment Ophthalmol 2001 Aug; 29 (4)208-12

## Neuro-ophthalmological sequelae of horse-related accidents

*Fleming PR Crompton JI, Simpson DA.*  
*Royal Adelaide Hospital, University of Adelaide, South Australia*

**PURPOSE:** The aim of this study was to highlight the neuro-ophthalmological dangers associated with horse riding and working around horses and the importance of wearing adequate headgear to protect the rider from neuro-ophthalmic injuries. It raises the questions of whether the current laws regarding helmet use are satisfactory and whether helmets currently used are often adequate standard.

**METHOD:** The records over a 20 year period of one neuro-ophthalmologist in Adelaide were reviewed producing 22 patients with neuro-ophthalmological sequelae of head injuries as a result of horse-related accidents.

**RESULTS:** There were 22 patients (16 female, six male), one of whom was involved in three separate accidents. Of these, seven were professional riders and 15 amateur. In 20 of the 24 accidents, patients were either thrown or fell from the horse. Helmets were worn in 15 of the accidents. All the patients had closed head injuries of varying severity. The most common neuro-ophthalmological complication found was a fourth nerve palsy in 11 patients. Five patients had a significant loss of vision and two of these were severe enough to warrant a blind pension.

**CONCLUSIONS:** Horse

riding and working around horses constitute an occupation or recreation with inherent dangers. Previous studies have shown that wearing of protective headgear reduces the risk and severity of head injuries and helmet use should be vigorously promoted. The current laws and practices regarding helmet use are not uniform and seem to be inadequate. The current standard for equestrian safety helmets embodies improvements on earlier helmet standards and certainly increases the rider's chances of surviving a severe impact. Nevertheless, serious brain injuries have occurred in wearers of approved helmets and further research is desirable to ensure the optimum degree of protection compatible with rider acceptance.

### Editorial note:

The last statement: "Further research is desirable to ensure the optimum degree of protection compatible with rider acceptance" is a basic truth. However, the figures in this paper are not evidence relative to optimum degree of protection. The authors state that seven of the injured did not wear any helmets. The other 15 were over a 20-year period. There was a standard for horse riding helmets introduced in Australia (AS2063.3) in 1988, which was superseded

in 1998 by the improved AS/NZS3838. We assume that those injured before 1988 had no protective headgear, and we do not know how many of the injured after 1988 wore the available protective headgear. The injuries of those wearing the fitted secured protective helmet should be compared with the injuries of those who were not wearing such helmets and the injuries with protective headgear from 1988 should be compared with the injuries of those wearing the improved AS/NZS3838.

The authors state that helmet use should be vigorously promoted. We would add that those who are preparing to ride or are mounted on the horse should wear the highest protective standard fitted secured helmets. We thank Dr. Fleming and his researchers for giving us additional figures of horse related injuries.

*Doris Bixby Hammett, MD*

**REMINDER**

AMEA membership  
renewal  
is due  
if you haven't  
already done so.

# AMEA Vision

by Rusty Lowe, EMT-P, Executive Director, AMEA

As I sit here thinking of what to write about my vision for the AMEA as its new Executive Director, many things come to mind. First and foremost, I am overwhelmed and honored to be given the opportunity to occupy this position. Secondly, I hope that I meet the expectations of the Board and membership. Thirdly, I ask myself, "Where do I begin?"

The AMEA has been a driving force to improve safety within the equestrian world for quite some time. The pioneers of this organization have done a remarkable job to build a professional, well-respected association. Their work will never be forgotten and who knows how many lives have been saved by their unselfish dedication. As the AMEA continues to grow and explore new opportu-

nities, many more lives will be saved.

As to where do I begin in my new position, I feel I should start from the beginning. The beginning of the future starts with our membership. Our

membership needs to increase significantly. Already, in discussion with the Board, I have encouraged each Board member to try and recruit 5 new members. I encourage anyone reading this



*Julie, Carolyn, Drake (the horse), Russell & Rusty Lowe.*

newsletter to do the same. By building our membership, we increase our opportunities and our funds. Any health care professional or interested party is welcomed within the AMEA. By having diversity among our ranks, we will have the resources to do many good things.

Accountability is another area that I seek to improve. The Board and membership deserve the right to know at any time the status of our financial situation and any ongoing activities of the AMEA. At any time, if anyone has any questions regarding finances, activities or status of the organization, please do not hesitate to contact me. An answer will be readily available. It never hurts to have a system of checks and balances.

With membership and accountability comes the vision for the future. University affiliation, affiliation with other

safety organizations, grants, and other suggestions leave us with many options. I encourage the membership to contact the Board or myself regarding their suggestions or ideas. There are too many opportunities to list

and it is exciting to know what we may be able to do.

As a 501c3 not for profit organization, contributions to the AMEA are tax deductible. Cash donations in addition to mem-

bership, donations of tangible items, memorials and bequests to the AMEA are just a few ways in which you can help us grow. Corporate sponsorship is another area that can improve our abilities. Please consider the AMEA for year-end donations.

The AMEA has a definite future. As I work with the Board and the membership, I hope to begin with the basics to let us expand and grow again to meet the current needs of the equestrian community. We can not look back. My vision is for us to look ahead, explore our possibilities and build on the foundation of this fine organization started by the dedicated individuals who still share in our vision.

*Rusty Lowe, EMT-P  
Executive Director  
American Medical  
Equestrian Association  
P.O. Box 130848  
Birmingham, AL35213-0848*



The American Medical Equestrian Association is a non-profit professional association working in the field of research & education in equestrian injuries.

It serves as a resource for safety committees and others dealing with rider safety, injuries and recovery.

Rider injuries are a fact of life in the sport and important work needs to be done in this field for the benefit of all riders.

[www.ameaonline.org](http://www.ameaonline.org)

Please access our site at for our newsletter and information on joining our organization to support this worthy cause.

Janet Friesen, MD  
President  
American Medical Equestrian Association

AMERICAN MEDICAL EQUESTRIAN ASSOCIATION  
P.O. Box 130848, Birmingham, AL 35213-0848  
1-800-441-AMEA (2632) • E-mail: [amea@charter.net](mailto:amea@charter.net)  
[www.ameaonline.org](http://www.ameaonline.org)

# National Electronic Injury Surveillance System: Horse Related Injuries 2000

The American Medical Equestrian Association has followed the horse-related injuries as reported by the National Electronic Injury Surveillance System. National Electronic Injury Surveillance System (NEISS) is a division of the US Consumer Product Safety Commission. Through the National Injury Information Clearinghouse, NEISS provides figures on horse related injuries that go to hospital emergency rooms over the nation. These figures omit injuries not treated, treated on site, by private physicians, in freestanding clinics or die without emergency room admission. This reports on the year 2000, the latest figures available.

The number of injuries for 2000 has increased.

## NEISS Adjusted Totals<sup>1</sup>

1991	65729
1992	66512
1993	60908
1994	62430
1995	56280
1996	52048
1997	58710
1998	64693
1999	72790
2000	79095

During the years 1995 to 1996, observers felt that the horse community was making progress in safety and that the total number of injuries was decreasing. However, the years of 1997 through 2000 show increases in injuries.

## Body Part Injured

BODY PART	%2000	%91-2000
LowerTrunk	17.5%	15.5%
Head	14.0%	11.8%
Upper Trunk	10.4%	10.0%
Shoulder	7.3%	7.7%
Wrist	6.7%	7.1%
LowerArm	5.1%	5.4%
LowerLeg	5.1%	4.5%
Ankle	4.6%	5.2%
Face	4.0%	5.2%
Finger	3.7%	4.1%
Knee	3.5%	4.0%
Neck	3.3%	2.5%
Foot	2.6%	3.5%
UpperArm	2.5%	1.8%
UpperLeg	2.2%	2.2%
Elbow	2.0%	2.8%
Hand	1.6%	2.4%
25-50%Body	1.3%	1.3%

*The injured body part with less than 1% is omitted.*

Not only have the total number of injuries increased in 2000, the three most frequent areas of injury, lower trunk, head, and upper trunk, have all increased in percent during 2000 compared with the percent of 1991-2000.

The lower leg, upper arm and neck have also increased during 2000.

## Body Area

YEAR	2000	%2000	TOTAL	% 91-20
TRUNK	27985	35.5%	232177	33.8%
U EXTREMITY	17127	21.7%	161350	23.5%
L EXTREMITY	14753	18.7%	138938	20.2%
HEAD	15188	19.3%	125710	18.3%
NECK	2612	3.3%	17007	2.5%
25-50% BODY	995	1.3%	8839	1.3%
ALL BODY	222	0.3%	3445	0.5%
Total	78882		687466	

*Trunk includes upper trunk, lower trunk, pubic area  
Upper extremity: shoulder, wrist, lower arm, finger, upper arm, elbow, hand.*

*Lower extremity: lower leg, ankle,*

*knee, foot, toe.*

*Head: head, face, mouth, dental, ear, eyeball.*

When body areas are considered, in 2000 the rank has changed from the years 1991-2000, with the trunk and upper extremity remaining first and second. However, the head has replaced the lower extremity in the third highest position. The trunk, head and neck percent have increased, while the upper extremity and lower extremity have decreased.

## Type of Injury

TYPE OF INJURY	%2000	%Total91-2000
CONTUSION/ABRASION	28.5%	30.4%
FRACTURE	26.2%	28.8%
SPRAIN/STRAIN	17.8%	16.6%
LACERATION	6.8%	7.9%
CONCUSSION	4.9%	3.6%
INTERNAL INJURY	5.1%	3.9%
DISLOCATION	2.7%	2.1%
HEMATOMA	0.6%	1.1%

*The type of injury with less than 1.0% injuries is omitted.*

Comparing 2000 with the 10-year figures, the injuries of sprain/strain, concussion and internal injury

have increased. Contusion/abrasion, fractures, lacerations and hematoma have decreased.

## Gender

GENDER	2000	91-2000
MALE	37.8%	40.0%
FEMALE	62.2%	60.0%

During the 10 years of these figures, females have consistently had more injuries than males, but in 2000 the percent for females increased.

## Age

	2000	91-2000
0-4 YEARS	1.2%	1.8%
5-14 YEARS	19.8%	20.0%
15-24 YEARS	17.2%	19.6%
25-44 YEARS	37.6%	40.1%
45-64 YEARS	21.6%	16.5%
65+ YEARS	2.7%	2.0%

The year 2000 continues the trend that we have seen in which the younger horse persons, those under the ages of 45 years, have decreased their percent of the injuries. However, the ages over 44

years have increased their percent of injuries.

## Location

	2000	91-2000
SPORTS	41.1%	34.4%
HOME	31.0%	39.5%
FARM	15.0%	12.0%
PUBLIC	10.1%	11.9%
STREET	2.7%	1.7%
SCHOOL	0.1%	0.4%

Beginning in 1996, sports have increased their percent of horse related injuries. Farm injuries increased their percent beginning in 1997 with the greatest increase in 2000. The percent of home injuries have a marked decrease in 2000

over the ten-year period. The public, which includes trails on city, county, state and national lands as well as arenas, has decreased,

but those on the street sharing with motorized vehicles have increased.

### **Discussion**

The increase of horse related injuries has been addressed in previous articles in the AMEA NEWS (Sept 2001 Vol. XII). NEISS adjusts the totals of horse related injuries as needed. The figures prior to 1998 vary from those reported in the AMEA NEWS of September 2001 which were preliminary figures. Although the figures have changed, the trends remain in that since the 1996 low number (in preliminary figures that year was 1997) the total number of horse related injuries has increased.

If we assume NEISS figures correctly report horse related accidents, several reasons can be projected. The first is that the United States Equine Inventory is up as reported by the United States Department of Agriculture. (AMEA NEWS June 1999). This view is supported by the Barrent's study "The Economic Impact of the Horse Industry in the United States" (1996 American Horse Council). The National Sports Goods Association reports that horseback riding has increased since 1992 the earliest year for which their figures are available.<sup>2</sup>

Another reason may be that more persons are seeking medical attention at the hospital for horse related injuries than in the past. Hospitals may have better reporting procedures giving more accurate figures for horse related injuries. The baby boomer generation is entering the older age group. This segment of the population is keeping their active life styles increasing the number of the older

participants. As new members enter the horse activities they may lack the experience with farm animals as urban life replaces rural living.

The increase in the percent of injuries in lower trunk has increased over the last 10 years. In 1989 and 1990 the percent of injuries to the lower trunk was 10.2%. This percent increased to 1996 when it was 18.7%. Since that date, the percent has remained between 15.8% and the present 17.5%. The reasons are vague. No protective equipment has been developed for the lower trunk.

Although ASTM standard, SEI certified protective headgear is widely available and may be worn by more riders, the percent of head injuries has increased. The lowest percent was in 1993 at 10.9% and has increased since that date and is 14% in 2000. Unfortunately NEISS figures do not differentiate between helmeted and unhelmeted head injuries, or between protective and cosmetic headgear. It may be that the majority of reported head injuries were incurred in unhelmeted riders.

Additional information on the increase in head injuries can be found in looking at bicycle head injuries. The number of bicycle head injuries<sup>3</sup> sustained in bicycle accidents has increased 10% since 1991. Half of all bicycle riders use helmets today compared with fewer than 18 percent a decade ago. The National Sporting Goods Association survey found that overall bicycle use has declined about 21% during this same period. This results in the rate of increase of head injuries for bicycle riders

at 51%. Horseback head injuries have not increased at the rate that bicycle head injuries have increased. The recreational activities of bicycling and horseback riding are very different, but the figures are given for comparison.

The upper trunk percent has varied little, being lowest in 1998 at 9%.

In the last 10 years the highest percent was in 1998 and 1999 at 11.6%. The year 2000 percent of 10.4% is lower than these years and perhaps will continue the reduction reflecting increased use of standard certified chest protectors. Studies in which information is available on whether the chest-injured rider was using a standard certified chest protector would assist in determination of the effectiveness of chest protectors. Current use is extremely limited, with the only requirements for its use in eventing and thoroughbred racing on the flat and over fences. This group would include a maximum of 20,000 of the U. S. total of millions of riders per year.

When the body area is compared and when the head (head, eye, mouth, dental and ear) are considered as a unit, this percent now ranks third after the trunk, and upper extremity where over the 10 year period head injuries have ranked fourth. The ASTM/SEI helmets can prevent or reduce the severity of these injuries if they are worn, fitted, and secured on the head while riding.

In year 2000 the percent of concussions have increased over the previous periods. This is consistent with the increase in head injuries as shown

above. Concussion percent stated at 4.3% in 1991 reaching that level again in 1995. Concussion had the lowest percent in 1996 at 2% and has increased every year since that date reaching its highest percent in the year 2000. The medical community may have an improved its concept of concussion resulting in this diagnosis with greater frequency.

Fractures in the percent of the type of injuries had their highest percent in 1992, and have been general lower (1996 percent was 31.1%) with the last three years decreasing every year with the lowest percent in 2000. Sprain/strain percent has increased perhaps replacing fractures during this period.

Internal injuries percent has its lowest figure in the ten year review in 1991 at 3.8% and has increased every year since that date with the highest jump in 2000. As proposed above, we have not had equipment that protects the abdomen/lower trunk. As percents are relative to other injuries, perhaps as the head and upper trunk injuries percent has decreased the percent of internal injuries increase.

Dislocation has increased. Again as with sprain and strain, dislocation may be replacing fracture (which has decreased) as the reported injury.

In the NEISS figures the highest percent of females injured occurred in 1992 and again in 1998 at 63%. The lowest percent occurred in 1996 at 55%. We do have not have good figures on the percent of females/males in the horse community. We do have figures on the United States

Pony Clubs which has maintained figures on horse related accidents since 1979.

In 2000 eight percent of accidents involved male pony clubbers which matched the membership percentage. Boys appeared to be no more or no less likely to be involved in accidents in this year. (AMEA NEWS September 2001) However, in the 15 years of 1982-1996 the percent of male membership was 11.4% and the accident percent was 7.9% showing that male pony clubbers were less likely to have a horse related accident than their female counterparts. There was a change in the years 1997-1998 in which male membership had dropped to 8.5% but the accident percent had increased to 9.4% showing that during these years males had more accidents than females. The next few years will show what the trend in this percent of males/female youth injuries will take.

The lowest percent of injuries in the children under 4 years occurred in 1999, but 2000 is the lowest second lowest percent. This figure shows increased concern for safety for the young child around and on the horse.

Although the percents have differed in the various age groups during the 10 years under discussion, an increase has occurred in the older 45-64 years and above age groups with a corresponding decrease in the younger riders below 44 years. (AMEA NEWS Sept. 2001). The horse community has heightened its safety concerns in its education programs including increased use of ASTM/SEI protective helmets in

this age group.

The great increase in the percent of injuries in sports must be highlighted in a discussion of horse related injuries. The horse population is up with a likely a corresponding increase in riders. Many of these new horse owners may be participating in sports activities. However, the great increase should be a concern for those sponsoring, conducting and managing these events. Equestrian sports are the areas that give role models for the horse community. They represent the highest level of performance and the greatest influence of leadership with their governing bodies making the rules and regulations for the activity. These are the governing bodies that could change rules and regulations for increase in safety. The statistics show that sports have not successfully addressed safety for the participants in their activities.

### **Conclusions**

Although there may be many facets shown in the National Electronic Injury Surveillance System figures, three stand out in 2000.

The first is that lower trunk, head with corresponding concussions and internal injury percent have all increased.

The second is that the age of the injured has increased over the past years with the ages 25-44 years having the highest percent of injuries with the greatest percent increase in the ages 45-64 years.

The third is that equestrian sports have the largest percent of injuries and have had a continuous increase during the 10

years of these figures.

### **Recommendations:**

Head injuries can be prevented or their severity reduced by wearing ASTM/SEI fitted and properly secured protective headgear. All horse sports activities should require this headgear for participants. Recreational riders should continue to increase their use of protective headgear thus continuing the decrease in injuries at home. Injuries on the highway would be addressed by highway safety education for the horse community and the vehicle driver. (AMEA NEWS June 2000)

The details relative to internal injuries need to be specifically studied to find if education, tack, protective equipment or rule changes might be most effective in reducing these injuries.

The educational programs, which have involved the youth and young riders, must be targeted to the older riders. These riders are traditionalist but as evidenced by the changes in the Masters of Foxhound survey (AMEA NEWS March 2001) they can change with education and leadership.

Equestrian sports must improve their safety record. This can be done by the disciplines forming safety committees whose job description includes review of every injury in order to find if there is a common basis for the injury. Non injury accidents, which must be clearly defined, give another source of information to identify the difference between the accident with an injury and an accident without injury. These records should be under regu-

lar review, and the safety committee should meet as needed, but at least once a year to make recommendations to the governing body in aspects where safety can be improved. The governing bodies should validate their considered conclusions by the implementation of well-enforced rules and procedural guidelines.



*Doris Bixby Hammett, MD  
103 Surrey Road  
Waynesville, NC 28786*

<sup>1</sup> NEISS changes the base figure as indicated by opening of new hospital emergency rooms, closing of some hospital emergency rooms and changes in the caseload in other hospital emergency rooms. This base figure was changed in 1990 and again in 1997 to reflect the most current figures from hospital emergency rooms in the United States.

<sup>2</sup> The National Sporting Goods Association, 1601 Feehandville Drive, Ste 300. Mt Prospect, IL 60056-6935 info@nsga.org, www.naga.org/public/articles

<sup>3</sup> Barnes, Julia E., New York Times

# *Chronicle Commentary*

## The ASTM Standard Really Works

By John Strassburger, Editor  
*Chronicle of the Horse*  
Middleburg, VA

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*Do you know the only good thing about suffering a severe head injury?*

*You can't remember the crash, so you aren't afraid when you try it again.*

*But the side effects are hell. You can't remember people's names, how to use your computer, or the tasks you're supposed to be doing.*

*And that's if you're lucky.*

I know almost all of our readers have either suffered or seen head injuries, but the American Horse Shows Association's new rule requiring ASTM/SEI-certified helmets for juniors in hunter and jumper classes is still heading toward its enactment date facing a minor but vocal opposition. That's why we've created a guide to the available helmets and invited Joe Dotoli and Margie Hough-Sabbatini to express their support and opposition. But make no mistake, opponents, the change to Article 318 will go into effect on Dec. 1. The AHSA Board of Directors has voted unanimously for it—twice.

In support of the rule, I'll address several points often made in criticism of this rule and of ASTM/SEI-certified helmets. First, Ms. Hough-Sabbatini suggests that the American Society for Testing Materials standard needs to be replaced by one written by hunter/jumper people. Good luck. Writing an ASTM standard is very expensive and takes at least four years, and then it must be independently tested and overseen by the Safety Equipment Institute. And then you'd have to convince the seven helmet manufacturers (who've already spent hundreds of thousands of dollars to develop 65 ASTM/SEI-

certified models) to meet another standard. Second, Ms. Hough-Sabbatini said there's been no field testing of the ASTM standard. But the U.S. Pony Club has required it for its more than 10,000 members since 1990 and seen a dramatic decrease in the number and severity of head injuries. Also, the manufacturers sell more than 100,000 helmets year, it's required in most 4-H groups (it's a county or state decision), and the American Endurance Ride Conference now requires it for all competitions.

Third, Hough-Sabbatini criticizes how the helmets fit, which, admittedly, can be a challenge with ASTM/SEI-certified helmets, either because of oddly shaped heads or because local tack stores carry only a few models. Dru Malavase of Bloomfield, NY, who has worked tirelessly on helmet rules for two decades, recommends ordering several helmets from a catalog if necessary and returning the ones that don't fit. She also said that she's not aware of any USPC parent having trouble fitting small children and that she has written a guide to fitting helmets that is available from the USPC office.

Still, enforcement of the new rule will be the key to its success. Just like the old rule, it

places primary responsibility on the parents and trainers, not the judges, stewards and show management. But show officials, who are about to receive enforcement guidelines from the AHSA, are obligated to inspect any child's helmet they believe isn't ASTM/SEI-certified and prevent them from competing until they're wearing one that is.

I doubt many riders will try to get away with a helmet that's not ASTM/SEI-certified, but if you read the Chronicle, you know they'll try to continue with the "cool" look of a ludicrously loose chinstrap. Here's where parents and trainers will have to draw the line. They must convince juniors that the harness is an integral part of the retention system and that only a properly secured helmet can keep them from experiencing the life-threatening or -altering injuries that many of us have endured.

## Update From the USEA (formerly USCTA) Safety Committee

The USEA Safety Committee has proposed two new rules for safety in eventing. The USEA Board of Governors must first approve them before submittal to the USA Equestrian Board for final approval.

The first proposed rule requires all riders competing at an USEA event wear an ASTM/SEI certified helmet with the chinstrap fastened during all jumping phases.

The second proposed rule states: If a rider sustains a blow to the head or body and experiences momentary confusion or alteration in mental status, unless she/he is completely symptom free within 15 minutes, she/he may not compete in eventing at any level for a minimum of 7 days. A medical release is required before returning to competition.

If a rider is rendered unconscious or experiences symptoms which do not clear within 15 minutes, then the rider cannot compete in eventing at any level for a minimum of 21 days, and must present a signed medical release to compete after the mandatory suspension.

Every rider competing in an event run under USEA/USA Equestrian rules must sign a statement on his/her entry form, which signifies understanding of and acceptance of the preceding rules.

The members of the Safety Committee fully acknowledge that these rules are in no way all encompassing. They will not help, for example, the rider who falls off the horse with an

unapproved helmet on while warming up for dressage. There will be ways for a head-injured rider to get around the restrictions. However, these rules are a way to begin addressing the serious nature of head injuries in the equestrian and hopefully will prevent a catastrophic equestrian head injury from occurring.

*Julie Ballard, M.D. (Haralson)*  
Chairman  
USEA Safety Committee  
5067 Smoky Road  
Newman, GA 30263

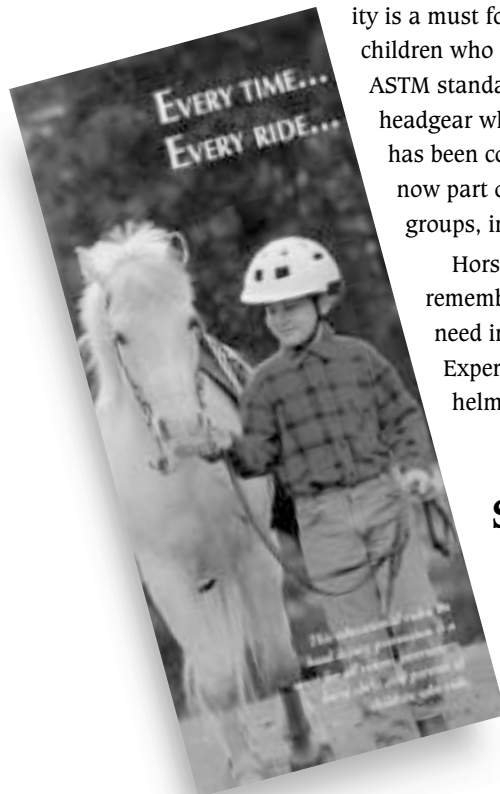


*Loris Henry, President*  
USEA

*The American Medical Equestrian Association strongly supports the efforts of the USEA (formerly USCTA) recommending ASTM equestrian standard SEI certified helmets for all participants in the sport of riding. The AMEA has supported and recommended the use of ASTM/SEI approved helmets for all mounted riders. There is good evidence, as reviewed by Dr. Doris Bixby-Hammett, that this intervention has decreased the incidence and severity of head injuries for these riders. The AMEA hopes that the new ruling will be passed with a minimum of dissension. It is agreed that the helmets should fit well for maximum benefit but fashion should never take the place of prudence and common sense, particularly when the sequelae of a head injury can be devastating.*

*Janet M. Friesen MD, President*  
American Medical Equestrian Association

## Every Time...Every Ride...



This education video on preventing head injury in equestrian activity is a must for all riders, instructors, horse clubs and parents of children who ride. The 20-minute video demonstrates the need for ASTM standard/SEI-certified, properly fitted and secured protective headgear when mounted on a horse. Produced five years ago, it has been consistently well received by thousands of riders and is now part of the curriculum for many equestrian educational groups, instructor training organization, and riding clubs.

Horse activities have new participants of all ages. We must remember that these new members of the riding community need introduction to the use of ASTM/SEI-certified helmets. Experienced riders also need a reminder that they too use a helmet Every Time...Every Ride.

Doris Bixby Hammett, MD

**\$15**

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Every Time...Every Ride

**INSIDE**



Rusty Lowe, Executive Director  
P.O. Box 130848  
Birmingham, AL 35213-0848

**American Medical Equestrian Association**



**MEMBERSHIP APPLICATION**



**American Medical Equestrian Association**

Rusty Lowe, Executive Director  
P.O. Box 130848  
Birmingham, AL 35213-0848  
1-800-441-AMEA (2632)  
E-mail: [amea@charter.net](mailto:amea@charter.net)  
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