

Reuss, Vicki A. (CDC/NIOSH/EID)

From: Michael McCann
Sent: Monday, June 18, 2007 8:26 PM
To: NIOSH Docket Office (CDC)
Subject: FW: NIOSH horse racing docket (No. NIOSH-104)

Attachments: ILO horses.doc; Preventing Barn Fires.doc; Fire rips through Ky_ barn MSNBC_com.doc



ILO horses.doc (49 KB) Preventing Barn Fires.doc (90 ... Fire rips through Ky_ barn MSN...

I would like to submit the following information to the NIOSH horse racing docket.

I have been around race tracks and horse barns sporadically for fifty plus years. My father trained race horses and as a teenager I worked at the track. In addition, my sister raises and trains thoroughbreds (and is the author of the ILO article listed below). In that time, I have seen few changes in safety. Many jockeys are beginning to wear protective clothing in case of falls, but are still subject to life-threatening injuries.

Repetitive motion injuries and other ergonomic problems, as well as injuries caused by horses, are still prevalent among barn workers. Exposure to biological hazards such as mold, bacteria in manure, and horse dander from currying horses is common. The fire hazards in barns are still a major hazard and the press abounds with articles on barn fires where large numbers of horses and sometimes barn workers are killed. The presence of large amounts of combustibles such as bales of hay and straw in combination with poor electrical systems, lack of sprinklers, and lack of smoking bans (or lack of enforcement of them), for example, contribute to the fire hazard.

I am attaching three relevant articles:

- 1) "Horses and Other Equines", by Lynn Barroby, ILO Encyclopaedia of Occupational Health and Safety, , 4th edition, Volume III, 1998, pp. 70.28-70.29.
- 2) "Preventing Barn Fires", by Jane Seegal, Equus 280. Available at: http://preview.equisearch.com/horsses_care/farm_ranch/barns/eqfires1141/
- 3) "Fire rips through KY_barn, killing seven horse", Associated Press 2007. Available at: <http://www.msnbc.msn.com/id/17777775/from/ET/>

In addition, the National Fire Protection Association has a standard, "NFPA 150: Standard on Fire and Life Safety in Animal Housing Facilities", 2007 edition. .

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Preventing Barn Fires

From the publisher of EQUUS, Dressage Today, Horse & Rider,
Practical Horseman and Arabian Horse World

Preventing Barn Fires

Barn fires are horribly destructive - and usually preventable. Take action now to protect your horses and property through proper fireproofing.

By Jane L. Seegal

Karen Waldron was at dinner in town the Friday night of Memorial Day weekend 1999 when she had what she describes as "one of those weird senses that you need to go home."

As she neared her farm, Bent Tree Farm Ltd., in southwest Virginia, she could see why. The red sky in the distance was directly over her property. "I crested the hill and saw flames topping out of the roof [of the main barn]," she recalls. "I was literally screaming."

Maryland resident Miki Carroll was sitting by a window in her kitchen with her adult daughter, Dawn, looking at photographs of some of their horses. The Carrolls' downstairs tenant, Greg Gibson, was there, and they were talking about foaling. It was 10 p.m. on a bitterly cold February night four years ago. Suddenly Carroll saw a glare in the sliding glass. "Greg hit the phone to call 911," she recalls. "My daughter and I hit the door. We each pulled on shoes and one coat. The barn was fully engulfed."

Allen and Marian Belt, also Marylanders, were asleep when a neighbor banged on the front door after midnight in midsummer of 1996. One of two 60-year-old former dairy barns out back was ablaze. Sixty-five hundred bales of timothy hay had just been put up in the barn. And Tess, a young Quarter Horse mare, was inside recuperating from jaw surgery.

"Nothing is worse than a barn fire," says Don Faison, head of equine insurance for the Markel Insurance Company, one of the country's largest insurers. Yet by one estimate, more than 4,500 barn fires, most of them preventable, break out each year in the United States. Responsible horse owners, who are fastidious about protecting their horses from injury and illness, too often leave fire prevention entirely to chance.

"It's in God's hands" is how one longtime horse owner puts it. Peter Winants, a lifelong rider and past editor of *The Chronicle of the Horse*, admits to suffering that same sort of inertia in dealing with his century-old Virginia horse barn. "I'll go home and see wires looking frayed and not do anything about it," he says. "I'm typical of the breed. Having reported on a lot of these fires, I should be more sensitive."

Face the facts

"Even well-protected facilities aren't fireproof. People just need to be far more aware of safety," says Waldron, a real-estate developer who breeds, trains and shows Hackneys, Saddlebreds and Friesians. According to the investigating fire marshal, lint buildup, smoldering in the barn dryer

since that morning's use, had ignited the fire that consumed the 22-stall barn 12 hours later. A fire-protection security system alerted nearby farm staff, who were able to pull out eight horses, seven of whom survived. The show string had been shipped to a Devon, Pennsylvania, show that morning, but other horses had been moved up to the main barn for a few days. When Waldron got to the farm, she got to work. "There was an assembly line going that was unbelievable," she says. "It included help from the community and the nearby Virginia Tech veterinary school. But 11 horses died, most of them young Hackney ponies bred on the farm."

Carroll says that she and her daughter "did the wrong thing" that bitter night in 1997 when their barn burned: They opened the sliders and were thrown back 30 feet by a back draft from inside. The outside air oxygenated the fire, allowing the back of the barn to fall in. Joined by her tenant and her husband Alan, Carroll brought out four horses, including two who planted themselves in the backs of their roomy box stalls and had to be wheelbarrowed out.

"We had rafters fall on us. My coat was on fire," Carroll recalls. "The noise-it's like a rumble; it's wavery. The roar of a fire is something you'll never I forget." Six horses in the Carrolls' barn died; three survived but endured long recovery periods. One of the victims was Chester, a champion large-pony hunter who, says Carroll, taught 50 or 60 kids to ride. "He was 32 years old and healthy, and he didn't deserve to die that way."

Tess, the Belts' Quarter Horse, was able to survive burns that blanketed her back, mainly because her lungs weren't damaged. After Allen Belt unlatched her stall and had to run out of the barn, Tess ran from window to window before managing to escape. The chestnut mare cooperated through months of diligent and, no doubt, painful care; her back is too sensitive to be ridden; the Belts plan to make her a broodmare.

Fire safety boils down to two key principles: First, keep heat and burnables well separated from each other; second, be prepared and preemptive when emergencies do occur. Certainly, barn fires are less likely today than in the era before electrification when, as California horseman Terry Akins remembers of his Mississippi childhood, kerosene lanterns were routinely used to light the way during predawn and evening barn chores. Electric lighting is safer, but electrical appliances continue to be among the primary igniters of barn fires. They're just different heat sources allowed to get too close to the combustible materials inevitably part of the stable environment.

A serious risk-reduction effort begins with a written fire-safety plan for the property-written so you will be more conscientious about carrying out the changes on the to-do list. Ask your insurer or an expert from the local fire department to walk through your barn with you to identify hazards and to give suggestions for reducing fire risk. Some large riding and show facilities are inspected at least twice yearly, and you may want to have regular inspections, too, even if you have a small operation.

In addition to defining the steps you need to take to improve fire safety, such contacts familiarize emergency personnel with the location and layout of your place. Don't assume, however, that one walk-through puts your facility on the fire department's map in perpetuity. Personnel change; memories fade. The fire-safety recommendations that follow range from

simple housekeeping improvements to major building overhauls. If you institute these safeguards, you'll never know exactly how much property was spared or how many lives were saved by them, and that is a blessed state of ignorance. Just ask Waldron, the Carrolls and the Belts.

Eliminate burnables

With all that flammable bedding, hay and structural wood contained within most stables, horses and combustible materials would seem to be inseparable. Additionally, many of the normal elements of stable surroundings -- landscaping plants, dried vegetation, bedding-filled manure heaps and gasoline-powered machinery -- provide ready tinder for fires started elsewhere and spread by wind. One of the most readily accomplished fire-prevention measures, then, is to reduce the potential fuel for a barn fire inside and outside your buildings.

Start with a spring cleaning of your stable, even if it isn't spring. Remove refuse, chaff and other barn wastes that can feed and spread a fire. Check storage areas for flammables, such as pesticides, cleaning fluids and paints, and dispose of unneeded items according to your county hazardous-waste guidelines. Store necessary flammables in approved containers well away from heat sources.

When possible, store hay and bedding away from the stabling area. Keep only a certain amount in the main barn, and replenish it when you need it, insurance agent Faison advises.

Clear shrubbery from around the barn, and keep surroundings mowed or trimmed to eliminate flame-spreading dead vegetation. Tim Collins, an emergency-rescue expert based in California, where wildfires are a problem, follows this guideline from a U.S. Forest Service staffer: Clear a distance around your buildings that is three times the height of the burnable material plus 10 feet for every 15 degrees of slope on the land. Thus, if the vegetation is eight feet tall ($3 \times 8 = 24$) on a 30-degree slope ($30 + 15 = .2 \times 10 = 20$), you would clear a radius of 44 feet ($24 + 20 = 44$) around the barn.

Consider removing railroad ties in the surrounding landscaping. Some wood treatments, including the creosote used on railroad ties, accelerate combustion.

Prevent ignition

Human intent and human error are the two major causes of barn fires; electrical failures and lightning strikes are the next most common fire starters. Even with minimal flammables in and around your stable, you'll still be only half protected if possible ignition sources remain.

Minimize opportunity for human error. Forbid smoking in and near the barn, and exercise extreme caution in allowing mechanical heat sources, such as welders and propane torches, to be used for repairs and construction around horse stabling. A discarded cigarette can smolder unnoticed to ignite bedding, hay or yard litter. A welding spark or torch flame may touch off an immediate conflagration in a chaff or litter-filled area.

Treat every gas-burning vehicle and machine as if it were a lighted

match. For the same reason fire departments warn against parking vehicles on leaf piles, avoid parking tractors or other farm equipment near piles of bedding, hay or litter in which hot engines can spark fires. A barn fire in Santa Ynez, California, last October reportedly started after a hay truck backed up to a hay pile and the hot exhaust pipe ignited the hay. Also, park all internal-combustion machinery and store all fuel outside the stable at all times. The convenience of having the machinery nearby is not worth the risk of engine heat, backfires and gasoline spills.

Thoroughly check and immediately correct weaknesses in the electrical system, and make sure the work is done by a licensed electrician who knows how the system will be used. Frayed wiring, short circuits and other electrical problems cause one out of every seven barn fires. In addition to deterioration due to aging and weathering, wiring that does not run through metal tubing, called conduit, is subject to direct damage by chewing rodents (and sometimes horses), equipment collisions, and wear and tear. Have additional electrical outlets installed on new circuits instead of relying on extension cords. For the utmost safety, have all wiring run through conduit and operating on circuit breakers that, unlike fuses, can't be reset until the triggering electrical problem is fixed. In wash stalls and other watery areas, have ground-fault circuit interrupters installed. If living quarters are part of the barn complex, include those electrical and heating systems in your maintenance program.

Keep stable appliances to a minimum. Do not use space heaters in the tack room or barn. Some barns restrict radio use to battery-powered models. Overloaded electrical circuits can heat wiring to ignition levels without your being aware of the failure. "I thought my barn was fire safe," says Maryland race trainer Nancy Heil, whose barn burned in January 1995. "When I flicked the switch off at 11 one night, I never thought we'd have a fire." The blaze in her 3-year-old barn likely started because the wiring could not support several stall fans that had been connected to a single circuit. Heil's replacement barn has beefed-up wiring, and she allows no electrical appliances in her barn except for a few fans in summer and a plug-in radio that's used only when someone is present. The lightbulbs are caged to prevent breakage; switches are covered so roaming horses can't turn them on. If you want to have a laundry center in the stable, install and vent the dryer well away from combustible materials, and keep its vent lint-free.

For protection against nature's fire starter, install lightning rods on your stable and outbuildings, and check them periodically to be sure they're in good condition. Lightning rods on rooftop high points are connected by cables that run to ground to divert the energy of a strike away from the structure itself. Some barn owners choose not to use lightning rods, mistakenly believing that they attract lightning, but the devices simply conduct lightning that would have hit a structure anyway. Kenneth Howard, a research meteorologist with the National Severe Storms Laboratory in Oklahoma points out that lightning rods, which have been used since colonial days, require proper installation and grounding to carry out their purpose. Inadequate cables, wrongly placed rods and grounding failures all interfere with the system's ability to relay the voltage into the ground. A vehicle parked against a system cable interferes with the grounding, as do phone cables, television antennas or satellite dishes connected to it. If you consider

having lightning rods installed, contact your local fire department or county extension office for references to reliable services.

Guard against spontaneous combustion. Self-ignition can occur in large masses of organic material, such as piles of wood shavings, manure piles and tightly packed stacks of insufficiently cured hay. In damp hay, for example, decomposition begins near the center of the mass but, because there's no ventilation, the heat thrown off by the process builds until the ignition point for the drier surface hay is reached. The spontaneous fire that erupts may occur several days after the storage area has been filled. If you store large amounts of new hay during the summer, be sure it is well cured before it gets into your loft. Also avoid leaving piles of other organic material undisturbed for long periods of time.

Meet emergencies fully prepared

Human error and plain bad luck happen, making fire a very slim but still real possibility in well-managed stables. Reducing the chance of a barn fire includes preemptive strategies to hit the fire before it can take hold and emergency actions to ensure that the barn's most valuable contents -- the horses and people -- come out intact.

Install a warning system. Consult with a fire-safety expert and electrician about the most reliable sensing system for your stable. The choice is between smoke detectors and heat sensors. Both sound alarms at the first flicker of fire but heat sensors may be more reliable in dusty stable conditions where smoke alarms may read the particles as smoke and give off false alarms.

Mount fire extinguishers at key points around the stable. Although extinguishers are useless against established fires, they are effective at ignition. Consult with a fire-safety expert for recommendations on the optimum number and placement of extinguishers, which should be the "all-purpose" dry-chemical ABC type. Inspect them at the intervals described in the operator's manual, and have them recharged immediately if they fail a routine check. Captain John Feissner of the Montgomery County (Maryland) Fire Department emphasizes the importance of learning safe, effective extinguisher operation in advance and cautions against placing too much confidence in the devices. In an emergency, call the fire department first before picking up an extinguisher. Even when you think you've snuffed a blaze, notify the local fire department immediately -- a requirement of some local fire codes -- because 5 percent of barn fires result from rekindling of a fire believed to be extinguished.

Make your property accessible to emergency services. See that your street address and/or name is clearly visible at the entrance to your property and large enough to be noticed by drivers of speeding emergency vehicles. Check to see that your lanes, gates and stream crossings can accommodate fire trucks and that there's a clear right-of-way for them to reach all your buildings.

Equip your building with lifesaving tools. Keep a halter and lead shank on every stall door, ready to lead your horses to safety. Have a fully charged cell phone on the premises so you can call emergency services even if your phone lines burn out. Consider installing a backup generator to light the barn aisles and/or pump well water even if your

electricity is cut off. If you have water tanks on your property for fire protection, keep them completely full at all times, both for the water they provide and to prevent their destruction by a nearby blaze.

Familiarize your horses with emergency procedures. The more obedient your horses are to all the general handling expectations of leading, standing, loading and so forth, the better control you'll have over them during unsettling circumstances. Practice evacuating your horses from the stable, and make the experience as close to the real thing as you can. "A lot of what we do with our horses is on the ground," says Collins in explaining his emergency-preparedness lessons for horses. "You're de-spooking your horse before an emergency." Wear a big hat around your horse. Approach him with a flashlight in case that's the only light source during an evacuation. Put on a crinkly coat or a trash bag with holes in it for your head and arms so you'll sound like a firefighter. If you intend to blindfold your horses for evacuation, practice covering their eyes and leading them to see how they react and expect them to be less cooperative during an actual time of panic.

Build in safeguards

No barn can be 100 percent fireproof, but yours can be constructed or retrofitted to make safety the foremost concern. Upgrading your buildings' fire resistance is likely to be a major expense, but insurance savings can help lessen the bite. According to Faison, a sprinkler system can result in a 10 percent discount in an insurance premium. Mickey Nussinow, owner of Best Insurance Brokerage Ltd. in Huntington, New York, says that multiple safety improvements can increase that discount to 15 to 20 percent, depending on the company and the safety features you've implemented. Fire victim Waldron advises barn owners to reevaluate their insurance coverage periodically. She thought coverage was being regularly upgraded for her horse barn, as it was for the rest of her property, but she discovered at claim time it was not.

Select building materials with low flammability. Wood is the most burnable material. With Carroll's barn, an old cattle run-in, "What burned fast was the beautifully seasoned hardwood," she says. If you do choose wood, opt for heavy-timber construction, and check out fire-retardant lumber. Metal and masonry are far less flammable building choices, though they're not as "kind" to horses stabled in direct contact with them. You may need to devise a buffer system of padding or separate interior stall walls. A metal barn costs a few hundred dollars more to construct than one of wood, says Carroll, who investigated a half-dozen choices before building an eight-stall metal replacement barn. But, considering the total construction cost of tens of thousands of dollars, a few hundred more for greater fire safety isn't much of an add-on.

Investigate the feasibility and effectiveness of a sprinkler system for your setup. "Sprinklers have been around more than a century and operate by simple mechanical principles," says Phillip Brown, manager of codes for the American Fire Sprinkler Association. "If a fire starts, heat causes a sprinkler head to open up and control the fire. Sprinklers are designed to control, not extinguish, a fire. Usually only two or three sprinkler heads close to a heat source will go off." The sensors are not wrongly triggered by dust or fumes, Brown says, with the odds of failure occurring during a system's 40-year life span being one in three

million.

"Sprinklers are incredibly effective if properly maintained, installed and inspected," says Feissner. But, despite their good reputation, they are rarely found in boarding stables and private barns. Richard Forfa, DVM, a Maryland veterinarian whose practice covers about 1,000 horse operations, recalls seeing no sprinkler systems. One reason for the scarcity, according to insurance broker Nussinow, is the installation expense. Retrofitting a stable with a sprinkler system costs perhaps as much as \$2 per square foot, according to Brown, depending on the structural circumstances and water availability. The systems are less expensive if included as part of new construction. Waldron, who fitted her new barn with sprinklers, concedes they were "a huge cost factor, but nothing compared to the value of the horses."

Another facility that's sold on sprinklers is Hastings Park, a racetrack in Vancouver, British Columbia. Every stall, sleeping room, tack room and feed room is equipped with sprinklers, says Ross Mansell, manager of racecourse operations. They are water-filled in summer and air-filled in winter, when they might otherwise freeze, ready to be flooded with water. The track is satisfied with the safety devices despite the occasional accident. "We've had them hit by hay trucks," says Mansell. "They really do throw off a lot of water. It does make a lot of mess. But it is worth it in a stable with straw and loose hay. It's ridiculous if you don't have a system like that."

Horse-barn owners who have been through a fire are understandably more vigilant the second time around. Waldron, the Belts and the Carrolls have all changed the way they run their operations. All of them have ceased storing large quantities of hay in the same buildings with their horses; even Carroll, whose hayloft was empty when her barn burned, built a loftless replacement.

Waldron researched all the safety angles before rebuilding her 16-stall barn. Completed in October 2000, the stable contains a sprinkler system. Exits are plentiful, with eight sets of exterior doors instead of five, as in the previous building. Stall doors are easy to open, requiring just the removal of a pin. A backup generator is in place to provide lighting in the event of fire. The barn has no stall guards or tail boards, which had hindered efforts to evacuate horses quickly. And there's no clothes dryer in the place.

In Carroll's new stable, the only appliance is a wall heater in the tack room set at 40 degrees to prevent freezing of water pipes. In addition to rebuilding with metal rather than wood, Carroll installed sliding Dutch doors that allow direct exit to the outside from every stall. Investigators believe rodents might have chewed a microwave cord, causing a fire-starting arc that wasn't detected by the barn's electrical sensing system. Carroll says she and her husband had been planning to install a circuit breaker on that line. Now, she says, "I will never have one piece of wire in my barn that is not in secured conduit to prevent inadvertent movement and wear."

Even four years later, Carroll and her family sometimes stand on the back porch at 2 a.m. to look at the barn just to make sure everything's okay. "I'm not going to re-live what I lived through that night," she says. She was meticulous about safety even before the fire, but now her full focus

on fire safety in the aftermath make a new disaster even more unlikely.

This article appeared first in EQUUS 280.

Available at:

http://www.equisearch.com/horses_care/farm_ranch/barns/eqfires1141/

Fire rips through Ky. barn, killing seven horses

Chat and Maui Girl, saddlebred worth over \$1 million, among those lost

Updated: 1:15 a.m. ET March 25, 2007

LEXINGTON, Ky. - A barn fire killed seven horses worth more than \$1 million, authorities said.

The fire early Friday destroyed the 12-stall barn at Hipp Farm, a division of Clifton Farm, in Lexington. Calhoun Clifton, the 23-year-old daughter of the farm's owner, said among the horses killed in the blaze were champion saddlebred Chat and Maui Girl, one of the first saddlebreds to be sold for more than \$1 million.

Maui Girl was the dam for My Chanel, the winner of the Ladies Five Gaited Gelding Stakes.

"We never even considered putting a price on them, and that is pretty rare for our family because this is what we do for a living," Clifton said. "They have just been a part of this family for as long as we have had them. There is no amount of money we would have ever sold them for."

The cause of the fire was under investigation, fire officials said.

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HORSES AND OTHER EQUINES

Lynn Barroby

Horses belong to the equine family, which includes the domesticated African wild ass, also known as the donkey or burro. Historians believe that domestication of the horse began circa 6000 BC and the donkey at least as early as 2600 BC. The mule, bred for work, is a cross between a male donkey (jack or jackass) and a female horse (mare). A mule is unable to reproduce. When a male horse (stallion) is bred with a female donkey (jennet), the offspring, also sterile, is called a hinny. Horses and donkeys have also been crossed with another equine, the zebra, and the offspring are collectively called zebroids. Zebroids are also sterile and of little economic importance (Caras 1996).

Processes

Of the 10 million horses in the United States, about 75% are used for personal pleasure riding. Other uses include racing, ranching, breeding and commercial riding. The horse has become a performer in racing, jumping, rodeo and many more events.

The three main horse enterprises are breeding, training and boarding stables. Horse breeding farms breed mares and sell the offspring. Some farms specialize in training horses for show or racing. Boarding stables feed and care for horses for customers who have no facilities to house their horses. All three of these enterprises are labour intensive.

Horse breeding is an increasingly scientific process. Pasture breeding was typical, but now it is generally controlled within a breeding barn or corral. Although artificial insemination is used, it is more common that mares are brought to the stallion for breeding. The mare is checked by a veterinarian and, during breeding, trained workers handle the stallion and the mare.

After giving birth, the mare nurses the foal until it is from 4 to 7 months of age; after weaning, the foal is separated from the mare. Some colts not meant for breeding may be castrated (gelded) as early as 10 months of age.

When a racehorse becomes a two-year-old, professional trainers and riders start breaking it to ride. This involves a gradual process of getting the horse used to human touch, being saddled and bridled, and finally mounted. Horses that race with carts and heavy draught horses are broke to drive at about two years of age, and ranch horses are broke at closer to three years old, sometimes using the rougher method of bucking a horse out.

In horse racing, the groom leads the horse to the saddling paddock, a trainer and a valet saddle it, and a jockey mounts it. The horse is led by a pony horse and rider, warmed up and loaded into the starting gate. Racehorses can become excited, and the noise of a race can further excite and frighten the horse. The groom takes a winning horse to a drug test barn for blood and urine samples. The groom must then cool the horse down with a bath, walking and sipping water.

A groom cares for the performance horse and is responsible for brushing and bathing it, saddling it for the exercise rider, applying any protective bandages or boots to its legs, cleaning the stall and bedding down straw, shavings, peat moss, peanut skins, shredded newspaper or even rice hulls. The groom or a "hot" walker walks the horse; sometimes a mechanical walker is used. The groom feeds the horse hay, grain and water, rakes and sweeps, washes the horse's laundry and carts manure away in a wheelbarrow. The groom holds the horse for others such as the veterinarian or farrier (farrier work is traditionally done by a blacksmith). All horses require parasite control, hoof care and teeth-filing.

Performance horses are typically stabled and given daily exercise. However, young stock and pleasure riding horses are generally stabled at night and released during the day, while others are kept outdoors in paddocks or pastures with sheds for shelter. Race horses in training are fed three or four times a day, while show horses, other performance horses, and breeding stock are fed twice a day. Range or ranch stock are fed once a day, depending on the forage present.

Horses travel for many reasons: shows, races, for breeding or to riding trails. Most are shipped by truck or trailer; however, some travel by rail or plane to major events.

Hazards and Precautions

Several hazards are associated with working around horses. A groom has a physically demanding job with a lot of forking of manure, moving 25 to 50 kg hay and straw bales and handling active horses. Startled or threatened horses may kick; thus, workers should avoid walking behind a horse. A frightened horse may jump and step on a worker's foot; this can also occur accidentally. Various restraints are available to handle fractious horses, such as a chain over the nose or a lip chain. Stress on horses due to shipping may cause balking and injuries to the horses and handlers.

The groom is potentially exposed to hay and grain dust, dust from bedding, moulds, horse dander and ammonia from the urine. Wearing a respirator can provide protection. Grooms do a lot of leg work on the horses, sometimes using liniments containing hazardous chemicals. Gloves are recommended. Some leather-tack care products can contain hazardous solvents, requiring ventilation and skin protection. Cuts can lead to serious infections such as tetanus or septicaemia. Tetanus shots should be maintained current, especially because of exposure to manure.

A farrier is exposed to injury when shoeing a horse. The groom's job is to hold the horse to keep it from kicking the farrier or pulling its foot in a way that could strain the farrier's back or cut the farrier with the horseshoe and nails.

In the drug test barn, the test person is enclosed in a stall with a loose, excited and unfamiliar horse. He or she holds a stick (with a cup for urine) that may frighten the horse.

When riding horses, it is important to wear a good pair of boots and a helmet. Any mounted person needs a protective vest for racing, jumping, rodeo broncs, and ponying or exercising racehorses. There is always a danger of being bucked off or of a horse stumbling and falling.

Studs can be unpredictable, very strong and can bite or kick viciously. Brood mares are very defensive of their foals and can fight if threatened. Studs are kept individually in high-fenced paddocks, while other breeding stock are kept in groups with their own pecking order. Horses trying to move away from a boss horse or a group of yearlings at play can run over anyone who gets in the way. Foals, weanlings, yearlings and two-year-olds will bite and nip.

Some drugs (e.g., hormones) used in breeding are given orally and can be harmful to humans. Wearing gloves is recommended. Needle-stick injuries are another hazard. Good restraints, including stocks, can be used to control the animal during administration of medication. Topical sprays and automatic stable spray systems to control flies can easily be overused in horse rearing. These insecticides should be used in moderation, and warning labels should be read and recommendations followed.

There are a variety of zoonoses that can be passed from horses to humans, especially skin infections from contact with infected secretions. Horse bites can be a cause of some bacterial infections. See table 70.19 for a list of zoonoses associated with horses.

Table 70.19 Zoonoses associated with horses

Viral diseases

Rabies (very low occurrence)
Eastern, western and some subtypes of Venezuelan equine encephalomyelitis
Vesicular stomatitis
Equine influenza
Equine morbillivirus disease (first documented in Australia in 1994)

Fungus infections

Ringworm (dermatomycoses)

Parasitic zoonoses

Trichinosis (large outbreaks in France and Italy in the 1970s and 1980s)
Hydatid disease (echinococcosis) (very rare)

Bacterial diseases

Salmonellosis

Glanders (now very rare, restricted to Middle East and Asia)

Brucellosis (rare)

Anthrax

Leptospirosis (relatively rare, direct human contamination not definitively proven)

Melioidosis (outbreaks in France in the 1970s and 1980s; direct transmission not reported)

Tuberculosis (very rare)

Pasteurellosis

Actinobacillus lignieresii, *A.*, *A. suis* (suspected in Lyme disease transmission, Belgium)
