

Cornell scientists help reduce racetrack fatalities

By Olivia Hall

New York's four Thoroughbred racetracks (Aqueduct, Belmont, Saratoga and Finger Lakes) provide not only popular entertainment, but – with an estimated impact of \$4.2 billion per year – an important economic engine to the state. Equine fatal injuries, however, put a damper on the sport's finances and reputation and threaten its very existence.

For the past five years, scientists at the Cornell University College of Veterinary Medicine have partnered with the New York State Gaming Commission (NYSGC) to tackle this issue, a top priority shared by the racing industry. The researchers – the core team consists of associate professor Sean McDonough; assistant professor Heidi Reesink, Ph.D. '16; professor Hussni Mohammed; adjunct professor and NYSGC Equine Medical Director Scott Palmer, Ph.D. '08; as well as regulatory racetrack veterinarians – have conducted three Zweig-funded, complementary epidemiological studies to identify the types of prior injuries, changes to bone structure and other factors that increase the risk for catastrophic breakdowns. "Identifying horses at increased risk for catastrophic injury before it happens provides an opportunity for intervention," said Palmer.

The Cornell-NYSGC collaboration began after a well-publicized rash of 21 fatalities at the Aqueduct Racetrack's 2011-2012 winter meet prompted the Governor's Office to appoint the New York Task Force on Racehorse Health and Safety. Under Palmer's leadership, the Task Force recommended the creation of a mandatory necropsy

program, which brought all horses that died at New York racetracks to Cornell's Animal Health Diagnostic Center (AHDC) for a postmortem examination. For the past five years, this program has documented the immediate cause of death as well as other suspected predisposing factors.

Fetlock breakdown injuries emerged as the most common cause of New York equine exercise fatalities, especially biaxial proximal sesamoid bone (BPSB) fractures. Fracture of both of these two tiny, triangular bones at the back of the fetlock causes a mechanical disruption of the joint and generally requires the horse to be humanely euthanized, due to the extensive degree of both bone and soft tissue injury.

"One of the most significant pathologic findings of this study was subchondral bone sclerosis associated with many of the fetlock fracture cases," Palmer said. Making trainers and veterinarians aware of the risk of training horses with this pathology in the joint was a first step toward improving fatality rates, though identifying associated clinical signs and early radiographic changes remains a challenge.

Working with computer scientists at The Jockey Club, the researchers went on to develop an algorithm to tease out links between the exercise histories of horses with BPSB fractures and specific exercise protocols or other confounding factors. "With this information in hand, we were able to begin to identify horses at increased risk for this most common type of fatal musculoskeletal injury, such as horses that experienced an unusually high amount of high-speed training in the interval between their first official recorded workout and their first race," Palmer said.

A parallel research effort has been taking a closer look at the gross and histologic anatomy of the proximal sesamoid bones (PSB) of horses that have experienced PSB fractures. So far, the bones' size and shape appear to play a significant role in their propensity to fracture, furthered by the presence of osteoarthritic changes. PSB bone volume fraction is also influenced by horses' exercise regimens.

With multiple pre-existing conditions contributing to fatal injuries, the pre-race inspection of Thoroughbred racehorses by regulatory veterinarians prior to competition emerges as a critical tool for mitigating risk. In a third



Scott Palmer, Ph.D. '08

study comparing the pre-race inspections of 90 horses that experienced fatal BPSB fractures with those of 180 control animals, horses with abnormal clinical findings of the fetlock joint and gait abnormalities were not only more likely to suffer a BPSB fracture, but the probability increased with the number of abnormalities recorded.

Palmer and his colleagues are pleased with the positive impact their close collaboration with the NYSGC has had on the racing industry. Their research findings have made their way directly into regulatory policy and have provided content for a required continuing education program for horse trainers. "Racing fatalities are no longer considered to be the inevitable result of a 'bad step;' rather they are subject to intervention," Palmer said.

Thanks to these efforts, combined with implementation of many other Task Force recommendations, the number of Thoroughbred fatalities at New York racetracks has fallen by 42 percent since the fateful Aqueduct winter meet, bringing the state's losses in line with or below the national average.

But Palmer and his colleagues aren't stopping there. In future studies, they plan to define a "healthy horse" training profile for Thoroughbreds — comparing exercise regimens for fatally injured and uninjured horses — to provide additional objective criteria to more accurately identify horses at increased risk for catastrophic injury and help provide trainers with guidelines that will reduce that number even further. ■

To mark the 40th anniversary of the Zweig Fund and its partnership with Cornell University, we have many events planned for late 2019, including research presentations by faculty supported by the fund, lectures on other equine-related research topics and a reception to commemorate the event.
Wednesday, November 13, 2019 | Cornell University College of Veterinary Medicine | Ithaca, New York 14853

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