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Hitting the Threshold of Common Sense: The Time for Screening Limits to Guard Against Environmental Transfer Is Now

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HITTING THE THRESHOLD OF COMMON SENSE

THE TIME FOR SCREENING LIMITS TO GUARD AGAINST ENVIRONMENTAL TRANSFER IS NOW

By Clara Fenger, DVM, PhD, DACVIM; Thomas Tobin, MRCVS, PhD, DABT; Maria Catignani; and Theodore Shults

Recreational drug use and the opiate epidemic have taken a great toll on the human population of the United States and beyond. Year over year, deaths from synthetic opioids—of which fentanyl ranks as the most prevalent—have skyrocketed, reaching 29,406 in 2017. Environmental transfer of drugs of human addiction to horses is nothing new. Cocaine and its primary metabolite, benzoylecgonine, have long been identified as environmental substances in post-race samples, and many jurisdictions have screening limits in place as a result. More recently, methamphetamine has begun to show up in post-race samples, reflecting the increasing addiction problem associated with this drug. In recognition of this growing problem, the National HBPA and North American Association of Racetrack Veterinarians made a Model Rule recommendation to the Association of Racing Commissioners International for screening limits for substances of human addiction in racing horses.

Fentanyl at Penn National

With fentanyl becoming the primary synthetic opioid implicated in overdose deaths, it should come as no surprise that trace environmental identifications should start to turn up in horse racing. Fortunately, this identification occurred in Pennsylvania, where rational heads prevail on the Pennsylvania Horse Racing Commission, and trace-level detections of environmental substances are seen as mitigating circumstances.

There is an evolving recognition of the arbitrary, capricious and totally antiquated status of "zero tolerance" when it comes to trace-level detections of environmental substances. In June 2018, a trace-level fentanyl

A FENTANYL POSITIVE AT PENN NATIONAL WAS ATTRIBUTED BY THE STEWARDS TO LIKELY HAVE BEEN CAUSED BY A DRUG-USING GROOM, AND HUMAN-TO-EQUINE TRANSFER IS ALSO A CONCERN AT TRACKS LIKE KEENELAND (ABOVE) THAT ALLOW THE GENERAL PUBLIC TO VISIT THE BACKSIDE WITHOUT A RACING LICENSE.

identification in a post-race urine sample collected from the horse Kion at Penn National Race Course was listed as positive. The stewards, strictly following the rules of racing, found the trainer, Guadalupe Preciado, in violation of the Pennsylvania medication rules but decided that "due to mitigating circumstances, there will be no further action on this drug positive."

Reviewing this fentanyl identification, the stewards stated: "The drug positive probably occurred due to contamination of the horse Kion by stable employee Jeffrey Harris. Jeffrey Harris was the groom for Kion and was responsible for escorting the horse to the paddock and to the test barn following race 7 on June 23, 2018. Jeffrey Harris was interviewed by the Pennsylvania Horse Racing Commission investigators, and his dormitory room was searched at Parx. The result of the search and interview was that various drug paraphernalia was found in his room and Jeffrey Harris' admission that he has a very serious drug dependency, and he was admitted to a drug rehabilitation center. There also has been an ongoing issue with this particular drug in the Philadelphia area."

Fentanyl has a number of characteristics that make it a widely available and used street substance. The synthesis of fentanyl is, for a chemist, relatively straightforward, yielding an opiate about 100 times more potent than morphine or heroin. Because fentanyl is relatively easy to synthesize and small amounts, by weight, are very effective pharmacologically, the drug can be used to "cut," or more likely to "enhance," other street medications. The end result is wide availability and distribution of fentanyl and thus its random presence in the environment.

Bringing this point home, there have been numerous stories in the news recently about major fentanyl busts, including a Customs Border Patrol seizure of about 100 pounds of fentanyl in July. This fentanyl shipment, identified by a drug-sniffing dog, was hidden in a shipment of iron oxide coming into the port of Philadelphia from China, reportedly a not-unusual source of fentanyl. News articles noted the danger to the sniffing dog of exposure to fentanyl because the drug is very easily and effectively absorbed transdermally and by inhalation.

As well as being widely available, fentanyl is a poster-child for inadvertent transfer from a human user to a horse. The transdermal bioavailability of fentanyl is 92 percent, an unusually effective transfer, meaning that more than 90 percent of an amount inadvertently contacted by the skin can be directly absorbed through the skin, and virtually the same fractional absorption occurs by inhalation. This means that, like the drug-sniffing dog, the horse only has to come into brief contact with a user for a transfer to occur, fully consistent with the recently increased numbers of trace-level identifications of fentanyl in Pennsylvania racing.

The high sensitivity of modern equine drug testing has also contributed to the rise of these trace-level identifications. We understand that at least one fentanyl identification in Pennsylvania racing has been in the order of 300 femtograms/ml in plasma, to date the lowest concentration identification of a medication in horse racing anywhere in the world that we are aware of. To put this concentration in perspective, one nanogram/ml is one part per billion, or one second in your life when you are 32 years old; one picogram/ml is one second in your life when you are 32,000 years old; and one femtogram/ml is one second in your life when you are a rather mature 32 million (yes, 32,000,000) years old. When substances are identified at femtogram/ml concentrations, or parts per quadrillion, such a substance is clearly present at levels in "Trace"—with a capital T—concentrations.

So, long story short, equine drug testing, the most sensitive routine drug testing on earth, is now picking up parts per quadrillion trace levels of fentanyl in equine blood and urine samples. These traces of fentanyl transfer randomly from individuals in the environment of the horse, are absorbed transdermally and are readily detected in post-race blood and urine samples. The Pennsylvania stewards are to be congratulated on recognizing the fact that these identifications are, in terms of racing regulation, non-events, and as such the stewards correctly *declined to take any further action on this positive identification.*

Fentanyl in West Virginia

Similarly, the stewards at Charles Town Races in West Virginia recently ruled on another trace-level fentanyl identification, finding the trainer innocent and declining to penalize the trainer with either days or Multiple Medication Violation penalty points, although they did redistribute the purse. This was not as clear a statement of regulatory irrelevance of these trace-level identifications as was made in Pennsylvania, but it was at least a significant move in the right direction.

Another recent environmental transfer case in Charles Town racing involved identification of the human prescription medication gabapentin in blood and urine samples. Once the trainer was notified, he went back and checked his employees, at which point he discovered that one of his grooms was prescribed 2,000 mg/day of gabapentin to treat his diabetic neuropathy. The stewards interpreted this information as mitigating circumstances and, as in the fentanyl matter, issued no fine or penalty other than loss of purse. Again, the stewards moved in the right direction in recognizing the innocent and inadvertent nature of these environmentally driven identifications, in this case associated with a human prescription medication.

These matters identify the reality of inadvertent transfer of substances from members of a trainer's staff to horses in their care. The next question to be addressed is, if a substance readily transfers dermally like fentanyl, what is the probability of transfer of a substance of concern from, let us say, a starting gate crew member to a horse in the starting gate? To answer this question, we should first look to see if there is compelling evidence of the use of substances of concern by starting gate crew members.

Environmental Transfer from Assistant Starters?

On May 20, 2017, a horse named Carson's Storm finished first in the eighth race at Canterbury Park in Minnesota and was blood and urine tested. The horse tested positive for methamphetamine, in the order of 150 pg/ml in blood and 5 ng/ml in urine. Those concentrations are entirely consistent with inadvertent environmental exposure and are of no pharmacological significance. Reviewing the circumstances of this case, the attorney involved asked his expert whether transfer of methamphetamine could occur via dermal transfer from starting gate crew members, who handle horses without gloves, to give rise to the levels

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IT'S POSSIBLE THAT ENVIRONMENTAL TRANSFER COULD OCCUR IN THE STARTING GATE FROM AN ASSISTANT STARTER TO A HORSE.

reported in Carson's Storm, to which the expert answered yes.

What is particularly interesting about this Minnesota case is that from a review of contemporary rulings of Minnesota Racing Commission stewards, it appears that more than one member of the Canterbury Park starting gate crew was associated with or was a user of methamphetamine. Given this circumstance, the question put to his expert by the attorney concerned the likelihood of transfer of methamphetamine from a starting gate crew member to Carson's Storm, at the levels reportedly identified in the horse. Reviewing the data and in agreement with the expert in this case, the answer has to be yes, and that transfer of sufficient methamphetamine to give rise to the concentrations identified in Carson's Storm could indeed have occurred in the starting gate. The second point of concern is that the concentrations identified in Carson's Storm are widely considered to be pharmacologically insignificant and as such of no regulatory or forensic significance. The concentrations were also well below a published cut-off for environmental exposure to methamphetamine in racing horses.

The Solution: Due Process

The final question then is how can trainers and indeed the industry itself protect against inadvertent environmental exposure to trace levels of prescription and recreational substances?

Moving away from the unsustainable concept of zero tolerance is the first step in protecting the due process rights of horsemen. Investigations into medication positives should include all aspects that may provide exculpatory evidence for the trainer. The first area of concern is the need to correctly identify the substance present in the sample and the concentrations present and also any metabolites present in each portion of the analytical sample, which usually consists of both blood and urine. In the data available to us in the case of the horse Kion in Pennsylvania, we do not know whether the detection was in blood or urine or both, and we also do not know the concentrations detected and whether the expected metabolites were present in the sample. Where metabolites are not identified, the timing of the introduction of the substance in the sample cannot be surmised.

In the methamphetamine identification in the Carson's Storm case, the specific isomer of methamphetamine present was not identified in the initial $95 A sample analysis performed by the racing commission. The penalty for l-methamphetamine differs from d-methamphetamine and, therefore, should critically have been part of that initial confirmation. However, the racing commission apparently did require that the much more expensive B split sample analysis specifically identify the methamphetamine isomer present, which turned out to be the more pharmacologically active and higher penalty d-isomer of methamphetamine. This created an unusual circumstance whereby the defendant was paying in the split sample analysis to generate evidence against himself, presumably in conflict with his right to remain silent.

A critical piece of the epidemiological forensic evidence for horsemen is an estimate of the concentrations of the environmental substance and its metabolites. Because these identifications are of environmental origin, the only relevant data is the actual field data, so one must then "walk backward" to determine the source of the identifications and their forensic relevance. Additionally, environmental exposures will most likely vary from environment to environment and also from season to season, so concentration data is absolutely critical. Many substances in the environment differ from one season to the next or even depending on the day of the week. One study showed five times higher levels of NyQuil (which contains dextrorphan) in the winter months than the summer months in the South Platte River in Colorado, presumably reflecting the higher usage of cough suppressants by Denver residents during "flu season." Another study showed higher levels of MDMA or "ecstasy" in wastewater facilities in Ontario after the weekend.

Concentration data in blood and urine and metabolite data also can be helpful in directing attention to the actual time of exposure. Detection in blood only, with no detection in urine or no metabolites in urine, obviously indicates more recent exposure to a substance. This is important because we cannot rule out inadvertent exposure from the starting gate crew as possible in Minnesota and elsewhere or even in the test barn. The authors are aware of instances of test barn personnel being prescribed fentanyl patches and paddock judges taking tramadol, suggesting test barn and other racetrack personnel may serve as the source of either equine exposure or, in at least one case, contamination of a collection sample with cocaine.

Another matter arises concerning the testing of personnel. Where possible, the rule in personnel testing is to include hair testing as a prerequisite for employment. Drug addiction is a chronic behavior, and blood and urine testing only reflect recent exposure. Hair testing is longitudinal and tells you what the individual has been exposed to/consuming/recreating with/prescribed for a matter of weeks prior to testing. Standard human urine tests have two significant problems. First, they only detect recent drug use, and second, they are also easily circumvented by the individual being tested. In fact, our human forensic colleagues tell us that the "railroad rule" is to test the hair of potential employees at the time of application. If the potential employees pass the hair test, employers can proceed with confidence that the individuals hired are by and large members of the distinct subculture of non-recreational drug users.

Conclusion

With the advent of ever-increasing sensitivity of equine drug testing, there is an urgent need for industry-wide communication of regulatory experience and regulatory cut-offs in the area of random environmental exposure. As pointed out above, communication of the actual substance concentrations identified is an important first step in understanding the environmental realities driving the identifications. Second, based on regulatory experience, if a cut-off is established, it is important that this cut-off be communicated as an advisory to other jurisdictions. In this regard, it is difficult, from either a scientific or regulatory point of view, to understand the recent decision by the Oklahoma Horse Racing Commission to change its environmental exposure cut-off for methamphetamine from a published value to a confidential in-house one, thereby depriving the racing community of ready access to their best current regulatory wisdom concerning the need for an environmental cut-off for methamphetamine. **HJ**