

Some recent scientific studies provide insights on starting foals on the right foot

Early Advantages

RECENT STUDY FINDS **FOALS BORN EARLY**IN YEAR **FARE BETTER** ON THE TRACK

By AMANDA DUCKWORTH

FOR ALL OF the pedigree research and effort put into bringing a foal into the world, the wild cards of genetics and unforeseen problems also come into play. Continuing research into both common practices, as well as rare issues, will help give future foals their best chances at success.

Even before foals are born, the decisions being made can vastly impact their viability as racehorses. One of these factors would be the timing of the mating. Because Northern Hemisphere Thoroughbreds celebrate their birthdays Jan. 1, a great effort is made to have foals born

earlier in foaling season rather than later. Whether this plays out as beneficial on the racetrack, however, remains a debated point in the industry.

In December 2022, Veterinary Record Open published "Date of birth and purchase price as foals or yearlings are associated with Thoroughbred flat race performance in the United Kingdom and Ireland"

"Current industry convention is to maximize efforts to produce foals as early in the breeding season as possible, given the likelihood of such individuals to be physically precocious, which (might) be advantageous both in the sales ring and on the racecourse," explained researchers. "Thoroughbred breeders aim to have foals born early in the season, but scientific evidence on the advantages for race performance is scarce and contradictory."

In order to perform this retrospective cohort study, Weatherbys and the British Horseracing Authority provided researchers the required data under non-disclosure agreements with both. The 2014 and 2015 Thoroughbred foal crops from the United Kingdom and Ireland, which totaled 28,282 foals, were included. The study measured race performance by the end of horses' second and third years of life, leading to a data set of 9,456 horses that competed at least once in a flat race.

Researchers found that both prize money—and prize money per start—decreased with each additional day beyond Jan. 1 that a foal was born.

"Foals born early in the season had higher earnings by the end of their second and third years of life than foals born later," researchers concluded. "Differences were more marked among males than females.

"In general, total prize money and prize money earned per start by the end of the third year of life decreased by 2% for every seven days after Jan. 1 of the corresponding year of birth. However, the interaction observed between date-of-birth and sex for both these outcomes indicates that this association was different for males and females."

As a secondary focus of the study, the report also determined that the most expensive horses sold as foals or yearlings ran fewer races but earned more prize money—and prize money per start—than less expensive horses. Results from this population-based study could inform strategies and management practices aiming to maximize horses' racing performance potential and increase financial returns.

"A thorough economic analysis to esti-

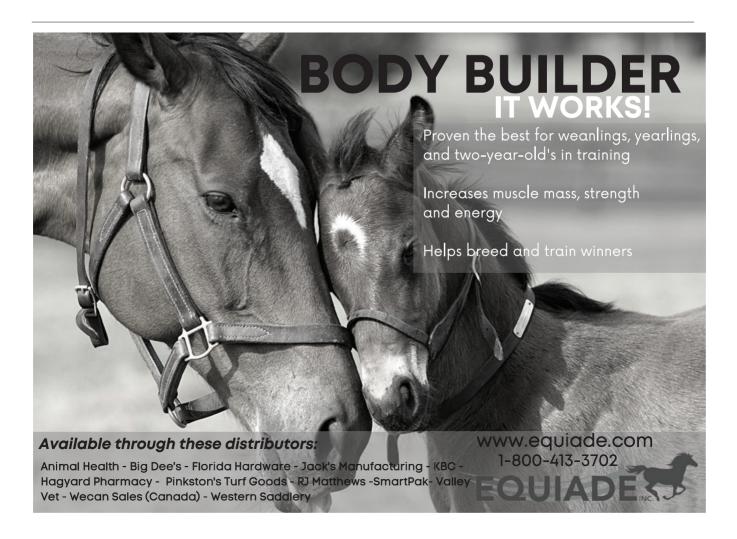
mate the profitability of breeding horses for racing is needed, given that a notable proportion of horses did not earn any money by the end of their third year of life, and a low percentage of horses earned enough prize money to at least cover their purchase price."

Many factors go into a foal's growing up to be a productive racehorse. One undeniably important influence is hoof health. In November 2022, *Animals (Basel)* examined this issue with "Hoof Matters: Developing an Athletic Thoroughbred Hoof."

"Conformation of the hooves and distal limbs of foals and factors influencing their morphological development have not been reported in detail for the Thoroughbred breed," researchers said. "In



Bred by St. Simon Place, this Audible-Sunday Driver, by Quality Road filly was born Jan. 15, 2022



Foal Health

this paper we explore morphogenesis of the equine distal limb in Thoroughbred foals with emphasis on adaptations in response to weight bearing early in life that prepare the foal for an athletic career."

Researchers conducted four independent studies that examined changes in hoof shape using a sampling of Thoroughbred fetuses and foals ranging from 38 days pre-partum to 503 days post-partum.

"The functional capacity of the hoof in the Thoroughbred racehorse begins with the development of the hoof capsule in utero," explained researchers. "Post-partum changes due to growth and in response to loading influence the form and function of the mature hoof."

The first study measured epidermal features and used 15 Thoroughbred cadaver fetuses and foals—aged 38 to 134 days—that had died naturally or were still born. They all presented with healthy limbs and hooves.

Another study examined skeletal conformational features and was based on 22 foals that were born at three geographically close stud farms that used the same farrier and veterinary practice. Of this group, none of the foals had obvious conformational faults or had been treated for lameness.

A third study, which measured growth and compression, used 28 Thoroughbred foals spread across two farms. All were selected for being healthy with no behavioral difficulties. Data were collected when acquired flexural deformities were reported. These same foals were used for the fourth study, which measured solar load distribution.

"Dorsal epidermal thickness increased from 2.84 ± 0.41 mm in utero to 4.04 ± 1.10 mm by 4 months of age," researchers found. "The increase in thickness was accompanied by decreased tubular density, increased inter-tubular material, and an increase in number and size of tubules at the quarters, which provided a malleable hoof capsule to allow for skeletal growth. Between 4-6 months of age, the hoof wid-



From the start, hoof health is an important factor for a developing racehorse



THE FUNCTIONAL
CAPACITY OF THE HOOF
IN THE THOROUGHBRED
RACEHORSE
BEGINS WITH THE
DEVELOPMENT OF
THE HOOF CAPSULE
IN UTERO. POSTPARTUM CHANGES DUE
TO GROWTH AND IN
RESPONSE TO LOADING
INFLUENCE THE FORM
AND FUNCTION OF THE
MATURE HOOF."

-RESEARCHERS IN THE NOVEMBER 2022 EDITION OF ANIMALS (BASEL)

ens, and higher loading on the medial side (60%) vs. the lateral side (40%) might be factors that influence mature asymmetric hoof shape. Shortly after 12 months of age, the dorsal hoof wall angle and dorsal parietal angle of the distal phalanx be-

come parallel, thus optimizing the functional capacity of the hoof capsule in the weanling Thoroughbred."

Lameness in foals can result in varus deformities, which are inward deviations of a joint or limb and might require medical attention. In the September 2022 issue of *Veterinary Surgery*, researchers published "Single-incision drilling technique to achieve hemiepiphysiodesis of the distal metacarpus—complications and outcome in 207 foals with metacarpophalangeal varus deformities."

For this retrospective case-control cohort study, researchers reviewed the medical records from 2017-2020 of 207 Thoroughbred foals. Of those, 171 were age- and sex-matched maternal siblings. They examined signalment (age and sex), limb(s) treated, location of the surgery, and any reported complications. Then follow-up radiographs obtained for the yearling sale were assessed for abnormalities. Using an online database, horses were matched to maternal siblings and their sales and racing performances compared.

The data showed that the average age at time of surgery was 97 days. The most common treated limb was actually both fronts in 119 cases. The left front was treated 52 times and the right front 31

Kerckhaert Offers Best Options for HISA Compliant Race Plates

The Horseracing Integrity and Safety Authority has put into place new rules for race plates allowed at Thoroughbred tracks in the U.S. These changes went into effect in 2022. The following Kerckhaert Race Plates are HISA compliant as of December 2022, HISA rules do not apply to Canadian Thoroughbred tracks. For the most upto-date HISA compliant shoe styles, visit www. farrier-products.com/ hisa.

COMPLIANT ON DIRT, TURF AND SYNTHETIC TRACKS



Kerckhaert Flush Toe Inserts (omm)

- Kings Flush Front
- · Tradition Flush Front
- · Legendary Flush Front
- · Fast Break Flush Front
- · Kings Flush Hind Unclipped
- Tradition Flush Hind Unclipped
- · Tradition Flush Hind Toe Clipped
- Kings Extra Sound Flush Hind Side Clipped

COMPLIANT ON DIRT TRACKS ONLY Kerckhaert XT Toe Inserts (2mm)

- Kings XT Hind Unclipped
- Tradition XT Hind Unclipped
- Tradition XT Hind Toe Clipped

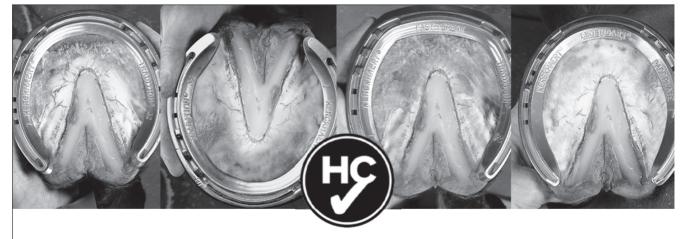
Kerckhaert Low Toe Inserts (4mm)

- · Kings Low Toe Hind Unclipped
- Tradition Low Toe Hind Unclipped
- Tradition Low Toe Hind Toe Clipped

Kerckhaert Outer Rim (4mm)

 Safety Tracks Outer Rim Hind Toe Clipped this Rim is 4mm and the toe insert is flush with the Rim, making it legal.

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FIND AN FPD[™] DEALER NEAR YOU Visit www.farrierproducts.com/locations or call FPD at 1-800-468-2879. View product photos, videos and specifications at farrierproducts.com.







Altren® (altrenogest)

SOLUTION 0.22% (2.2 mg/mL)

CAUTION:

Federal law restricts this drug to use by or on the order of a licensed veterina

DESCRIPTION:

DESCRIPTION:
Altren® (altrenogest) Solution 0.22% contains the active synthetic progestin, altrenogest. The chemical name is 17α-allyl-17β-hydroxyestra-4,9,11-trien-3-one. The CAS Registry Number is 850-52-2. The chemical structure is

Each mL of Altren® (altrenogest) Solution 0.22% contains 2.2 mg of altrenogest in an oil solution.

ACTIONS:

Altren® (altrenogest) Solution 0.22% produces a progestational effect in mares.

INDICATIONS:

INDICATIONS:
Altren® (altrenogest) Solution 0.22% is indicated to suppress estrus in mares. Suppression of estrus allows for a predictable occurrence of estrus following drug withdrawal. This facilitates the attainment of regular cyclicity during the transition from winter anestrus to the physiological breeding season. Suppression of estrus will also facilitate management of prolonged estrus conditions. Suppression of estrus may be used to facilitate scheduled breeding during the physiological

CONTRAINDICATIONS:
Altren* (althernogest) Solution 0.22% is contraindicated for use in mares having a previous
or current history of uterine inflammation (i.e.,
acute, subacute, or chronic endometritis). Natural
or synthetic gestagen therapy may exacerbate
existing low-grade or "smodlernig" uterine
inflammation into a fulminating uterine inflection in
some instances.

PRECAUTIONS:

PRECAUTIONS:
Various synthetic progestins, including altrenopest, when administered to rats during the embryogenic stage of pregnancy at doses manyfold greater than the recommended equine dose caused fetal anomalies, specifically masculinization of the female genitalia.

DOSAGE AND DIRECTIONS:

While wearing protective gloves, remove shipping cap and seal; replace with enclosed plastic dispension can Remove cover from hottle alspensing cap. Remove cover from bottle dispensing tip and connect luer lock syringe (without needle). Draw out appropriate volume of Altren® solution. (Note: Do not remove syringe while bottle is inverted as spillage may result.) Detach syringe and administer solution orally at the rate of 1 mL per 110 pounds of body weight (0.044 mg/kg) once daily for 15 consecutive days Admi nister solution directly on the base of days. Administer solution directly on the base of the mare's tongue or on the mare's usual grain ration. Replace cover on bottle dispensing tip to prevent leakage. Excessive use of a syringe may cause the syringe to stick; therefore, replace

DOSAGE CHART

Approximate Weight in Pounds	Dose in mL
770	7
880	8
990	9
1100	10
1210	11
1320	12

WHICH MARES WILL RESPOND TO ALTREN

WHICH MARES WILL RESPOND TO ALTREN' (altrenoges) SOUTION 0.22%. Extensive clinical trials have demonstrated that estrus will be suppressed in approximately 95% of the mares within three days; however, the post-treatment response depended on the level of ovarian activity when treatment was initiated. Extens in masse achibition results extens under Settins in masse achibition results extens achibition results extens achibition results extens achibition results extens achibition results achibition results extens achibition results Estrus in mares exhibiting regular estrus cycles during the breeding season will be suppressed during treatment; these mares return to estrus during beautient, these times retained to desire four to five days following treatment and continue to cycle normally. Mares in winter anestrus with small follicles continued in anestrus and failed to exhibit normal estrus following withdrawal.

Response in mares in the transition phase between winter anestrus and the summer breed-ing season depended on the degree of follicular activity. Mares with inactive ovaries and small activity. Mares with inactive ovaries and small folicles failed to respond with normal cycles post-realment, whereas a higher proportion of mares with ovarian folicles 20 mm or greater in diame-ter exhibited normal estrus cycles post-treatment. Altrenogest Solution 0.22% was very effective for suppressing the prolonged estrus behavior frequently observed in mares during the transition period (February, March and April). In addition, a high proportion of these mares respi regular estrus cycles post-treatment onded with

SPECIFIC USES FOR ALTREN® (altrenogest) SOI LITION 0.22%:

SUPPRESSION OF ESTRUS TO

- Facilitate attainment of regular cycles during the transition period from winter anestrus to the physiological breeding season. To facili-tate attainment of regular cycles during the transition phase, mares should be ex to determine the degree of ovarian activity. to determine the degree of ovarian activity.

 Estrus in mares with inactive ovaries (no fol-licles greater than 20 mm in diameter) will be suppressed but these mares may not begin regular cycles following treatment. However mares with active ovaries (follicles greater than 20 mm in diameter) frequently respond with regular post-treatment estrus cycles.
- 2 Eacilitate management of the mare exhibiting racinate management or the mare exhibit prolonged estrus during the transition perion Estrus will be suppressed in mares exhibiti prolonged behavioral estrus either early or late during the transition period. Again, the post-treatment response depends on the level of ovarian activity. The mares with greate ovarian activity initiate regular cycles and conceive sooner than the inactive mares. conceive sconer than the inactive mares. Altren® (altrenogest) Solution 0.22% may be administered early in the transition period to suppress estrus in mares with inactive ovaries to aid in the management of these mares or to mares later in the transition period with active ovaries to prepare and schedule the mare for
- Permit scheduled breeding of mares during Permit scheduled breeding of mares during the physiological breeding season. To permit scheduled breeding, mares which are regularly cycling or which have active ovarian function should be given Altren[®] (altrenogest) Solution 0.22% daily for 15 consecutive days beginning 20 days before the date of the planned estrus. Ovulation will occur 5 to 7 days following the onset of estrus as expecte days ronowing the oriset or estrus as expected for non-treated mares. Breeding should follow usual procedures for mares in estrus. Mares may be regulated and scheduled either individually or in groups.

ADDITIONAL INFORMATION:

A 3-year well controlled reproductive safety study was conducted in 27 pregnant mares, and compared with 24 untreated control mares. and compared with 24 untreated control mares. Treated mares received 2 mL altrenogest solution 0.22%/110 lb body weight (2x dosage recommended for estrus suppression) from day 20 to day 325 of gestation. This study provided

- 1. In filly offspring (all ages) of treated mares
- Filly offspring from treated mares had shorter interval from Feb. 1 to first ovulation than fillies from their untreated mare counterparts.
- There were no significant differences in reproductive performance between treated and untreated animals (mares & their respective offspring) measuring the following
- interval from Feb. 1 to first ovulation, in
- mean interovulatory interval from first to second cycle and second to third cycle
- at 50 days gestation, pregnancy rate in treated mares was 81.8% (9/11) and untreated mares was 100% (4/4).
- · after 3 cycles, 11/12 treated mares were pregnant (91.7%) and 4/4 untreated mares were pregnant (100%).
- reached puberty at approximately the same age (82 & 84 weeks respectively).
- stallion offspring from treated and control mares showed no differences in seminal volume, spermatozoal concentration, spermatozoal motility, and total sperm
- stallion offspring from treated and control mares showed no difference in sexual
- testicular characteristics (scrotal width testicular characteristics (scrotal width, testis weight, parenchymal weight, epididymal weight and height, testicular height, width & length) were the same between stallion offspring of treated

REFERENCES: maker, C.F., E.L. Squires, and R.K.

Safety of Altrenogest in Pregnant Mares and on Health and Development of Offspring. Eq. Vet. Sci. (9); No. 2: 69–72.

Squires, F.L., R.K. Shideler, and

productive Performance of Offspring from res Administered Altrenogest During station. Eq. Vet. Sci. (9); No. 2: 73–76.

WARNING:

For oral use in horses only. Keep this and all other medications out of the reach of children. Do not use in horses intended for

HUMAN WARNINGS

Skin contact must be avoided as Altren® (altrenogest) Solution 0.22% is readily absorbed through unbroken skin. Protective gloves must be worn by all persons handling this product. Pregnant women or women who suspect they are pregnant should not handle Altren® (altrenogest) Solution 0.22%. Women of child bearing age should exerc extreme caution when handling this product Accidental absorption could lead to a disrup Accidental absorption count lead to a distri-tion of the menstrual cycle or prolongation of pregnancy. Direct contact with the skin should therefore be avoided. Accidental spillage on the skin should be washed off

INFORMATION FOR HANDLERS: WARNING: Altren® (altrenogest) Solution 0.22% is readily absorbed by the skin. Skin contact must be avoided; protective gloves ust be worn when handling this pr

product. The information contained in this section is extrapolated from data available on other products of the same pharmacological class that have been used in humans. Effects anticipated are due to the progestational activity of altrenoges

Acute effects after a single exposure are possible; however, continued daily exposure has the potential for more untoward effects such as disruption of the menstrual cycle, uterine or abdominal cramping, increased or decreased uterine bleeding, prolongation of pregnancy and headaches. The oil base may also cause mnlications if swall

In addition, the list of people who should not handle this product (see below) is based upon the known effects of progestins used in humans on a chronic basis

PEOPLE WHO SHOULD NOT HANDLE THIS

- 1. Women who are or suspect they are
- Anyone with thrombophlebitis or thrombo-embolic disorders or with a history of these
- 3. Anyone with cerebral-vascular or coronary-
- 4. Women with known or suspected carcinom
- 5. People with known or suspected estrogen
- 6. Women with undiagnosed vaginal bleeding
- People with benign or malignant tumors which developed during the use of oral contracep-tives or other estrogen-containing products.
- 8. Anyone with liver dysfunction or disease

Accidental Exposure

Accidental Exposure
Altrenogest is readily absorbed from contact with
the skin. In addition, this oil based product can
penetrate prorous gloves. Altrenogest should not
penetrate intact rubber or impervious gloves;
however, if there is leakage (i.e., pinhole, spillage, etc.), the contaminated area covered by such occlusive materials may have increas absorption. The following measures are recommended in case of accidental exposure.

Eye Exposure: Immediately flush with plenty of water for 15 minutes. Get medical attention.

If Swallowed: Do not induce vomiting. Altrent If Swallowed: Do not induce vomiting, Altren® (altrenogest) Solution 0.22% contains an oil. Call a physician. Vomiting should be supervised by a physician because of possible pulmonary damage via aspiration of the oil base. If possible bring the container and labeling to the physician

Store upright at or below 25° C (77° F).

HOW SUPPLIED:

Altren® (altrenogest) Solution 0.22% (2.2 mg/mL).
Each mL contains 2.2 mg altrenogest in an
oil solution. Available in 150 mL and 1000 mL plastic bottles

Manufactured by: Aurora Pharmaceutical, In-Northfield, Minnesota 55057

Annroyed by EDA under ANADA # 200-620



07/2021

EQUISUL-SDT°

(Sulfadiazine/Trimethoprim) Oral Suspension

Annroyed by FDA under NADA # 141-360

Federal law (USA) restricts this drug to use by or on the order of a licensed vetering

EQUISUL-SDT is a broad-spectrum antimicrobia from the potentiated sulfonamide class of chemo therapeutic agents. These two drugs block different sequential steps in the biosynthesis of nucleic acids. Sulfadiazine inhibits bacterial synthesis of dihydrofolio acid by competing with para-aminobenzoic acid.

Trimethoprim blocks the production of tetrahydrofolic acid from dihydrofolic acid by reversibly inhibiting dihydrofolate reductase. The effect of the dual action is to reduce the minimum inhibitory concentration of each agent (synergism) and to convert a bacteriostatic action to a bactericidal action. Sulfadiazine installar action to a observation action, somewhat is the non-proprietary name for 4-amino-N-2-py-rimidinylbenzenesulfonamide. Trimethoprim is the non-proprietary name for 5-((3,4,5-trimethoxyphenyl) methyl)-2,4-pyrimidinediamine.

Each mL of EQUISUL-SDT contains 400 mg combined active ingredients (333 mg sulfadiazine and 67 mg trimethoprim) in an aqueous suspensi

FOUISUL-SDT is indicated for the treatment of lower respiratory tract infections in horses caused by susceptible strains of Streptococcus equi subsp.

DOSAGE AND ADMINISTRATION

Shake well before use.

Administer EQUISUL-SDT orally at the dosage of 24 mg combined active ingredients per kilogram body weight (10.9 mg/lb) twice daily for 10 days. EQUISUL-SDT can be administered by volume at 2.7 mL per 45.4 kg (2.7 mL/100 lb) body weight.

27 mL per 43-8 kg (2.7 mL roll or los) registers (280 mL and 560 mL with draw-off caps: Remove cap. Peel off white fail backed bottle seal and replace cap. Peel off outer cap seal exposing [find-lo) pering. Puts an oral tip syrings into the cap opening. Invert and draw out appropriate volume of ECUISUL-SST solution. (Note: Do not remove syrings while the bottle is inverted as possible spillage may result.) Detach syrings and administer orally at the dosage of 24 mg combined active ingredients per kilorgram body weight (10.9 mg/b) bive daily for 10 days. ECUISUL-SST can be administed by volume at 2.7 mL per 45.4 kg (2.7 mL/100 lb) body weight.

CONTRAINDICATIONS

ON I RAINDICATIONS

QUISUL-SDT is contraindicated in horses with a nown allergy to sulfadiazine, sulfonamide class ntimicrobials, or trimethoprim.

HUMAN WARNINGS
Not for use in humans. For use in animals
only. Keep this and all drugs out of the reach
of children. Consult a physician in the case of

Antimicrobial drugs, including sulfonamide cause mild to severe allergic reactions in so individuals. Avoid direct co ntact of the product with the skin, eyes, mouth, and clothing. Person with a known sensitivity to sulfonamic trimethoprim should avoid exposure to this product. If an allergic reaction occurs (e.g., skir rash, hives, difficulty breathing, facial swelling)

PRECAUTIONS

Prescribing antibacterial drugs in the absence of restricting annuacinal urugs in the ausence of a proven or strongly suspected bacterial infection is unlikely to provide benefit to treated animals and may increase the risk of development of drug-resistant animal pathogens.

The administration of antimicrobials, including sulfa-diazine and timethoprim, to horses under conditions of stress may be associated with acute diarrhea that can be fatal. If acute diarrhea or persistent changes in fecal consistency are observed, additional doses of EQUISUL-SDT should not be administered and appropriate therapy should be initiated.

The safe use of EQUISUL-SDT has not been The safe use of EQUISUL-SDT has not been evaluated in breeding program, or lackstap horses. Potentiated sufformindes should only be used in registrative control of the safe of the many justify the risks to the fetus. Use of potentiated sufformative during prepared yes here assisting many terms of the safe of companial abnormalities that may be related to foliate deficiency. In human sufformatives pass shrough the placents, as sufformatives of the placents of sufformatives of sufformatives of sufformatives and sufformatives of sufformatives and sufformatives of sufformatives and sufformatives suff Decreased hematopoetic activity and blood dyscrasias have been associated with the use of elevated doses and/or protonged administration of potentiated sulfornamides. EQUISU.SOT should be discontinued if prolonged clotting times, or decreased platelet, white blood cell or red blood cell crusts are observed.

mides should be used with caution in horses saired hepatic function. Although rare, nide use has been associated with fulminant necrosis in humans.

neurologic abnormalities have been reported in se-eral species following administration of potentiated suffonamides. In horses, potentiated suffonamides have been associated with gail alterations and behavior changes that resolved after discontinuatio of the drug.

The safe use of FOUISUL-SDT has not been evalu-

ADVERSE REACTIONS

Adverse reactions reported during a field study of 270 horses of various breeds, ranging from 1 to 25 years of age, which had been treated with either EQUISUL-SDT (n = 182) or with a saline control (n = 88) are summarized in Table 1. At least one en sode of loose stool of varying severity was observed in 69 of 182 (38%) of the EQUISUL-SDT-treated horses, and 29 of 88 (33%) saline control horses Of those animals experiencing loose stool, 2 of 182 (1.1%) of the EQUISUL-SDT-treated horses and 0 of 88 (0%) placebo-treated horses were removed from the study due to diarrhea (defined as at least one episode of watery stool). Both cases of diarrhea in this study were self-limiting and resolved without treatment within 5–10 days after discontinuation of EQUISUL-SDT.

Table 1. Number of Horses with Adverse Reactions During the Field Study with EQUISUL-SDT

Adverse Reactions	Equisul-SDT (n=182)	Saline control (n=88)
Loose stool (including diarrhea)	69 (38%)	29 (33%)
Colic	3 (1.6%)	2 (2.2%)
Diarrhea	2 (1.1%)	0 (0%)

To report suspected adverse events, for technical assistance or to obtain a copy of the SDS, contact Aurora Pharmaceutical, Inc. at 1-888-215-1256 or www.aurorapharmaceutical. com. For additional information about adverse drug experience reporting for animal drugs, contact FDA at 1-888-FDA-VETS or online at www.fda.gov/reportanimalae.

CLINICAL PHARMACOLOGY

CLINCAL PHARMACOLOGY
Following oral administration, EQUISUL-SDT is ragidly absorbed an widely distributed throughout body
tissues. Sulfadiations levels are usually highest in the
strikery, with the issues concentration in other issues
is only alignity lower than plasma concentrations.
Concentrations of timend-prima are usually higher
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f an brood concentrations. Frim are 20% and 35% bo stration of sulfadiazine thonrim with food has no apparent effect on the absorption of sulfadiazine but the absorption of

concentrations following repeat oral administration of 24 mg/kg EQUISUL-SDT to 6 horses reached entration in 0.5 to 12.0 hours. The median plasma elimination half-life was 3 hours, with a range of 2.31 to 4.96 hours. Peak sulfadiazine concentions were reached within 1.0 to 12.0 hours in the same study. The median plasma elimination half-life for sulfadiazine was approximately 7.80 hours, with a range of 6.78 to 10.39 hours. Only minor accumulation of both drugs was observed following repeat oral administration of EQUISUL-SDT and both drugs reached steady state by day 3. Sulfadiazine and trimethoprim key steady state parameters assoc with administration in 6 fed horses over a period of 7 days are found in Table 2.

Table 2. Median (Range) of sulfadiazine and trim ethoprim pharmacokinetics parameters following repeat dosing of 24 mg/kg bid EQUISUL-SDT for 7 days to six horses in fed condition

Drug	Sulfadiazine	Trimethoprim
Tmax (hr)	4.75 (1.00–12.00)	8.50 (0.50–12.00)
Cmax (µg/mL)	17.63 (10.10–31.15)	0.78 (0.60-1.14)
AUC 0-12 (last dose) (hr*µg/mL)	159.35 (73.90-282.54)	5.47 (3.31–10.91)
T 1/2	7.80	3.00

MICROBIOLOGY

EQUISUL-SOT is the combination of the sufforamid sulfadiazine and trimethoprim. These two drugs block sequential steps in nucleic acids biosynthesis. Sulfadiazine inhibits bacterial synthesis of dihydrofolic acid by competing with para-aminoberazoic acid. Trimethoprim blocks the production of tetrahydrofolic acid from dihydrofolic acid by reversibly inhibiting dihydrofolate reductase. The two drugs act synergis-tically, reducing the minimum inhibitory concentration of each, while enhancing the bacteriostatic action of each separately to a bactericidal action when

FOUISUI -SDT administered as a combined sulfadiazine-trimethoprim dose of 24 mg/kg body weight twice daily for 7 days provided concentration of sulfadiazine and trimethoprim with T>MIC90 (%T) values of 100% and 98% respectively. The minimum inhibitory concentration (MiC) values for EQUISUL-SDT against indicated pathogens isolated from lower respiratory text inflictions in horses enrolled in a 2010–2011 effectiveness field study are presented to Table 3.A MIM Cover determined in accordance with the Clinical and Laboratory Standards Institute (CLSI) Approved Standard MIS1-AS surjay a broth microdilution system and 3% lysed horse blood.

lable 3. Trimethoprimisulfadiazine minimum inhibitory concentration (MIC) values of isolates recovered from horses with lower respiratory infection caused by Streptococcus equi subsp. zooepidemicus treated with EQUISUL-SDT in the II.S (2010-2011

Treatment Outcome	Success	Failure
Number of Isolates	65°	46
Time of Sample Collection	Pre- Treatment	Pre- Treatment
MIC 50 ^b (µg/mL)	0.25/4.75	0.25/4.75
MIC 90 ^b (µg/mL)	0.25/4.75	0.25/4.75
MIC Range (μg/mL)	0.12/2.4 to 0.5/9.5	0.12/2.4 to 0.5/9.5

- The correlation between in vitro susceptibility data
- and clinical effectiveness is unknown.

 The lowest MIC to encompass 50% and 90% of the most susceptible isolates, respectively.

 One isolate of S. equi subsp. zooepidemicus was

EFFECTIVENESS

A negative control, randomizzed, masked, field study evaluated the effectiveness of EQUISUL-SDT administered at 24 mg/kg body weight, orally, those daily for 10 days for the treatment of lower reportably tract infections in horses caused by Shrephococus equi subsp. zoopedimica. In this study, a total of 182 horses were treated with EQUISUL-SDT, and 85 horses were treated with Sellico. De hundred severety-three horses (112 EQUISUL-SDT and 61 sassien) were included in the statistical analysis. Therapselic success was characterized by absence of feer and no workening of clinical signs at Day 5 and Day 10, and significant clinical improvement or resolution of clinical signs of lower respiratory tract infection by Day 17. The observed success rates are 58.9% (6817) and 14.8% (681) for the EQUISUL-SDT and saline-heated groups, respectively.

Table 4 Overall Clinical Effectiveness Results

	Equisul-SDT	Saline	P-value*
Least Square Means	61%	13.1%	0.0123
* P-value and estimated success rates are based on back-transformed mean estimates from the			

ANIMAL SAFETY

AMIMAL SAFETY In a target arimal safety study, EOUISUL-SDT was administered orally to 32 healthy adult horses at 0 (0X), 24 (XX), 72 (3X), or 120 (3X) mg/kg twice daily for 30 days, Loose stol was the most common abnormal observation. Observations of loose stool (pellets with liquid or unformed/compile stool) occurrer owner often in horses treated with EOUISUL-SDT with the incidence of loose stool increasing in a dose related manner. All incidents of loose stool were self-

Horses in all FOLIISUL SDT groups demonstrater statistically significantly higher mean serum creati-nine concentrations, and those in the 3X and 5X groups demonstrated statistically significantly higher nean serum albumin concentrations. Statisticall higher mean neutrophil counts and mean serur ma olutamyl transferase (GGT) activity were gamma glutamyl transterase (GG1) acuvuy were seen in the 1X and 5X groups. Individual animal cre atinine, GGT, and albumin concentrations remained within the reference range, Individual animal eleva tions in absolute neutrophil counts ranged up to 7.09 x 10³/mcL (reference range: 1.96-5.31 x 10³/mcL).

the study, it was noted that the sulfadiazine and imethoprim plasma concentrations did not increas i proportion to dose. For sulfadiazine, a 3X and e resulted in an average exposure of 2.0X and 2.6X the concentrations observed following a 1X dose. For trimethoprim, the corresponding values were 2.5X and 3.5X as compared to the 1X dose. Furthermore, marked intersubject variability, particularly with sulfadiazine, resulted in substantial overlap of individual subject blood levels across the three dosing groups.

STORAGE CONDITIONS
Store upright at 59"-86" F (15"-30" C).
Brief periods up to 104" F (40" C) are permitted.
Protect from freezing. FCUISUL-SDT in contail of 280 mL and 580 mL — discard 60 days after removing bottle seal.

HOW SUPPLIED

EQUISUL-SDT is available in the following

1 Kahn CM, Line S, eds. The Merck Veterinary Manual. 10th Ed. Merck & Co. 2010.



01/2021

ALTREN®

(altrenogest)

Throughout the mare breeding season, Altren® (altrenogest) is quickly becoming the product of choice in handling estrus issues in horses.

Containing the same formulation and active ingredient as Regu-Mate®(altrenogest) and backed by Aurora's Best-Price-Always commitment, Altren is becoming the industry's most requested altrenogest product line, enhanced by Altren's proprietary 150 mL dose and FDA-approved vented cap.

Spending more no longer makes sense when it comes to effective estrus management.

Wade Shoemaker, DVM Countryside Large Animal Veterinary Clinic Greeley, CO

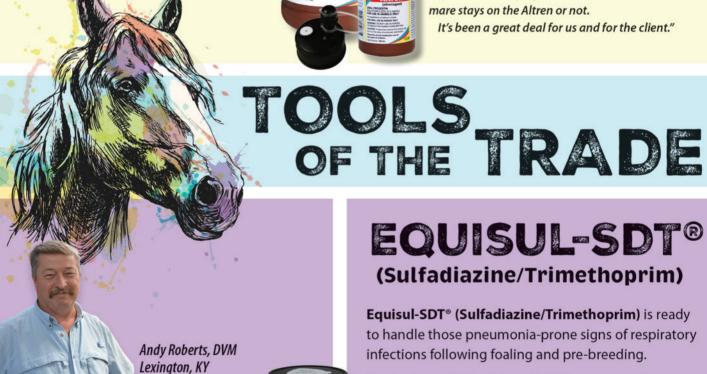
"Altren® (altrenogest) is a product our practice relies on to provide the same active ingredient as Reau-Mate® (altrenogest), but at a much better price point.

My clients appreciate the cost savings I can pass on to them. Altren has quickly become the #1 altrenogest in our practice due to the cost savings and specialized packaging.

We routinely send the Altren 150 mL home with clients, especially if we have a problem mare that needs to be on altrenogest after breeding.

That will allow us to get out to the ranch at 15 days for the first preg-check and then decide if the mare stays on the Altren or not.

It's been a great deal for us and for the client."



"EQUISUL-SDT" is my first course broad spectrum antibiotic. Because the combination of Sulfadiazine/Trimethoprim is so broad spectrum, I can treat problematic respiratory bacteria before they become a major problem.

EQUISUL-SDT is mainly used for respiratory issues, i.e., a febrile horse, elevated SAA, no cough and making a presumptive diagnosis that they have an early respiratory issue. I want a horse on this product a minimum of 10 days.

With the convenient 560 mL bottles, I can script it out to a trainer/owner for 10 days."

EQUISUL-SDT®

(Sulfadiazine/Trimethoprim)

Equisul-SDT® (Sulfadiazine/Trimethoprim) is ready to handle those pneumonia-prone signs of respiratory infections following foaling and pre-breeding.

Containing a higher bioavailability compared to

approved paste products, Equisul-SDT is the equine veterinarian's go-to antibiotic of choice, especially when the

> treatment of lower respiratory tract infections caused by susceptible strain of Streptococcus equi subsp. Zooepidemicus are indicated.



Altren



Regu-Mate is a Registered Trademark of Merck Animal Health EQUISUL-SDT & Altren are Registered Trademarks of Aurora Pharmaceutical, Inc.

aurorapharmaceutical.com

Foal Health



A happy, healthy foal is the goal of each of thousands of matings every year

times. The affected limb was unknown in five cases.

"Three horses developed calcinosis circumscripta lesions adjacent to the physis, which were removed successfully," researchers found. "No radiographic abnormalities associated with the surgery site were detected on yearling prepurchase radiographs. There were no differences in sales and racing performance data between treated horses and maternal controls.

"Hemiepiphysiodesis is a safe and effective treatment for metacarpophalangeal varus deformities in foals. No negative effect on sales or racing performance was identified. This technique avoids risks, costs, and the need for second surgery associated with an orthopedic implant. The surgeon should be aware of the potential for development of a calcinosis circumscripta lesion with this technique."

In addition to being sound of hoof and limb, another key element of foal health involves seeing them safely through any potential bouts of diarrhea. In November 2022, the *Journal of Veterinary Internal Medicine* examined this issue in the study "Enterococcus durans infection and diarrhea in Thoroughbred foals."

"Diarrhea remains an important cause

of morbidity and mortality in neonatal foals, and correct identification of etiologic agents is essential for effective disease management," explained researchers. "Identification of pathogens that can cause diarrhea in foals is an important element for disease risk management at both animal and farm levels."

Researchers performed a prospective observational study in order to examine the association between diarrhea and detection of *enterococcus durans* or other enteropathogens in 59 neonatal foals and their dams on a single Kentucky breeding farm from January-May of 2010. The selected farm was used because of an outbreak of foal diarrhea the previous year.

The horses involved were tested for *E. durans* and other enteropathogens during the 10 days after foaling, and researchers found seven of the foals developed diarrhea.

"The frequency of foals with E. durans infection was higher in foals with diarrhea 5/7 (71%), compared to foals without diarrhea 0/51 (0%)," researchers concluded. "Detection of E. durans in foals was associated with detection of E. durans in broodmares; in 2/7 (29%) foals with diarrhea, the two broodmares tested positive for E. durans, and, in 51/51 (100%)

foals without diarrhea, all broodmares tested negative to *E. durans*. Based on the spatial and temporal distribution of foals with diarrhea, five of six additional cases of diarrhea were attributed to lateral transmission of *E. durans* infection.

The first 35 foals in the study did not develop diarrhea. The first foal to present with diarrhea was diagnosed two days after foaling. Five additional cases were diagnosed in the same barn, all within three to 12 days later. The remaining case occurred in a different barn two days after foaling.

"This study provides new epidemiologic evidence that detection of *E. durans* is associated with diarrhea in foals," concluded researchers. "A strength of this investigation is that both foals with and without diarrhea were targeted for detection of enteropathogens within 10 days of birth. In foals with diarrhea, fecal samples were collected and tested at the onset of clinical signs, as well as from their respective broodmares. The inclusion of foals without diarrhea as a comparison group offers epidemiologic evidence that *E. durans* was associated with diarrhea in study foals.

"The first case of diarrhea in foals tested negative to *E. durans*, but its broodmare tested positive to *E. durans*," said researchers. "It is possible that this case had a false negative culture result of *E. durans*. It is also possible the source of infection was its broodmare, which tested positive to *E. durans*, or environmental contamination with that pathogen."

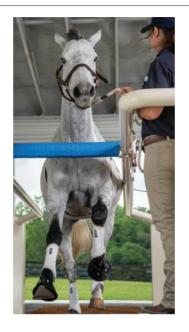
Genetics also plays a key role in a foal's viability as a racehorse. In October 2022, the *Equine Veterinary Journal* published "Prevalence of the RAPGEF5 c.2624C>A and PLOD1 c.2032G>A variants associated with equine familial isolated hypoparathyroidism and fragile foal syndrome in the U.S. Thoroughbred population (1988-2019)."

"Equine familial isolated hypoparathyroidism and fragile foal syndrome are both fatal recessive conditions reported in Thoroughbred foals," explained re-

World Leaders in Equine Nutrition

Rentucky Equine Research is an international equine nutrition, research, and consultation company serving horse owners and the feed industry. For 35 years, Kentucky Equine Research has worked to advance the industry's knowledge of equine nutrition and exercise physiology, apply that knowledge to produce healthier, more athletic horses, and support the nutritional care of all horses throughout their life.

The quantity of published research derived from studies conducted at Kentucky Equine Research rivals that of leading universities. In addition to its own research, the company also collaborates with prominent figures to develop and patent products and diagnostic techniques that target specific problems in horses of all ages and uses.





World Leaders In Equine Nutrition

Using these research studies as a foundation, KER Targeted Nutrition supplements were developed to support special equine dietary needs. The range of products addresses commonplace conditions like obesity and gastrointestinal health as well as complex problems like tying-up and bone demineralization. Backed by science and preferred by veterinarians, KER products are designed with one goal in mind: to optimize the health of your horse. Kentucky Equine Research also offers specialty feeds to address specific needs and management challenges.



HEALTH ZONE

Foal Health

searchers. "The causal variants for EFIH and FFS were recently reported."

A population allele frequency study was used to estimate the frequency of the EFIH and FFS variant alleles in the United States Thoroughbred population between 1988 and 2019 with the objective of determining whether these are recent mutations or are increasing in frequency because of current breeding practices.

Researchers genotyped genomic DNA from hair and serum samples for the EFIH and FFS. A total of 728 samples were from birth years 1988-2000 while 1,059 were from 2001-2019. Collectively, they spanned across seven geographical regions of the U.S. Data showed EFIH and FFS allele frequencies were not significantly different between the two time points.



Improved scientific understanding of horses' development can improve the lives of foals

"The EFIH and FFS variants are present at low frequency in the United States Thoroughbred population but are not recent mutations," researchers concluded. "There is no evidence to support changes in allele frequency over time. However, given the closed studbook and breeding practices, continued monitoring of breed allele frequencies and genetic testing are

recommended to avoid the mating of carriers and production of affected foals."

A happy, healthy foal is the ultimate goal of each of the thousands of matings planned every year. While making it to the races is never guaranteed, chances can be improved the more both common and uncommon issues are scientifically understood.

