

Embryo Transfer – A Summary

Equine embryo transfer has become a useful tool in the horse breeder’s arsenal. Common uses include:

1. Obtaining more than one foal per year out of top producing mares;
2. Production of foals from mares in training or showing;
3. Production of foals from late-foaling mares, leaving them open over the winter for an early start the following spring;
4. Production of foals from mares with problems that prevent pregnancy, pregnancy maintenance, or foaling;
5. Production of foals from some otherwise barren mares.



Whether embryo recovery and transfer takes place at an embryo transfer facility or the embryo is recovered on the farm and shipped to the embryo transfer facility, the initial process is similar. During the breeding process the mares are examined daily to accurately determine the day of ovulation. Seven to eight days after ovulation a catheter is inserted into the donor mare’s uterus. The uterus is sequentially flushed with several liters of a special electrolyte/nutrient solution. The solution is passed through a filter from which the embryo is recovered using a microscopic search. After recovery and evaluation, the embryo is washed to remove any contaminants, placed in a nutrient media, and either inserted through the cervix and into the uterus of a specially prepared recipient mare, or shipped to an embryo transfer facility. The first pregnancy checks are usually 5 and 7 days after transfer, which would be days 12 and 14 after ovulation.



Success rates for embryo transfer can be measured for two facets of the procedure: 1. Embryo recovery from the donor mare; 2. Establishment of pregnancy in the recipient mare. Embryo recovery is usually the rate-limiting step in equine embryo transfer. Recovery rates will vary with the individual mare’s fertility; young mares can have very high rates, typically around 80% per cycle. Older mares with history of infertility, as a group, will have recovery rates around 30% per cycle. Individuals within these groups will have higher or lower recovery rates.

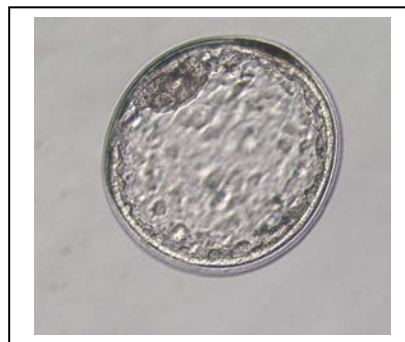
Once the embryo is recovered, one can expect a pregnancy success rate of approximately 80% at 14 days, with about a 10% rate of pregnancy loss following that time. Pregnancy rates for transported embryos are slightly lower than for on-site transfer.

Transfer Success 1998-2018

| In Clinic | | Pregnancy/transfer | % Pregnant |
|-------------------|------------|--------------------|------------|
| | Grade 1 &2 | 2,696/3,187 | 84.6% |
| | Grade 3 | 97/149 | 65.1% |
| Total In Clinic | | 2,793/3,336 | 83.7% |
| Transported | | | |
| | Grade 1 &2 | 2,795/3,351 | 83.4% |
| | Grade 3 | 187/357 | 52.3% |
| Total Transported | | 2,982/3714 | 80.3% |
| Overall Total | | 5,777/7065 | 81.8% |

2019 Embryo Transfer Program

The Equine Medical Services, Inc. embryo transfer program has two primary options: 1. You can bring your mare to our facility for us to manage the entire breeding and transfer process, or 2. You can have your mare bred and flushed at another facility and ship the embryo to Equine Medical Services for transfer. Fees vary somewhat between programs, but some common terms should be noted. The recipient mares are provided by Equine Medical Services, and are leased to the owner once they are 30 days in foal. These mares are to be returned to Equine Medical Services within 6 months after foaling. There is a live foal guarantee after the recipient mare is 30 days pregnant, the owner will receive a \$2,000 credit towards future embryo transfer services if the recipient loses the pregnancy. There is an annual enrollment fee for each program. This fee is for each donor mare, is non-transferable, non-refundable, and good for the calendar year 2019 only. If foals from a donor mare will belong to different owners, it is less expensive if they are handled through one account, although if billing to different owners is desired, each owner will be required to fill out a contract and pay a nomination fee.



Standard In-House Program

The standard program has an annual enrollment fee of \$1,800 for the year 2019. This fee is designed to pay for routine ultrasound examination, artificial insemination, and embryo recovery and transfer, as well as to cover the expense of having a recipient mare waiting for an embryo. Stallion fees, transportation of

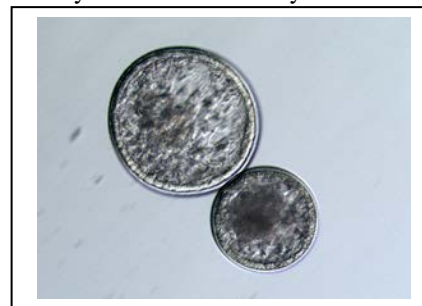


semen, registration, blood typing, etc. are the responsibility of the owner. Board fees for the donor mares vary with accommodations. Paddock board (with 3-4 other horses) is \$19.25 per day, stall board is \$19.25 per day, and mare and foal board is \$20.75 per day. Once the recipient mare reaches 30 days gestation with a viable pregnancy, the owner leases her for \$3,200 or \$3,800 for draft horse embryos. Board and care of the recipient mare are the responsibility of the owner, who is encouraged to pick her up at this time. Board for the recipient mare starting at 30 days is \$14.00 per day, from 60-90 days \$15.75 per day, and after 90 days of gestation recipient board will be \$20.00 per day.

Transfer of Transported Embryos

Transporting and transferring embryos successfully requires good communication between the individuals breeding and flushing the mare and the transfer facility. Competent, experienced individuals should be sought. It is important that we be informed the day of ovulation so that a suitable recipient mare may be prepared. If ovulation occurs on a weekend it is OK to notify us on Monday. We receive embryos 24 hours a day, 7 days a week so weekend flushes are expected. We would also appreciate a call to report the results of the flush as soon as possible, positive or negative. One should also plan ahead for mode of transportation of the embryo to our facility.

The transported embryo transfer program has an annual enrollment fee of \$1,000. This fee is to cover the expense of having a recipient mare ready for your embryo during months from February through November of 2019 and is a one-time fee for the year per donor mare, not per embryo. It is most desirable for the veterinarian performing the flush to be set up to provide embryo transport media on site, but we can provide it via Federal Express for \$50 plus shipping. Once the recipient mare reaches 30 days gestation she is leased for \$2,900, or \$3,500 for draft embryos. The owner is encouraged to pick her up at this time, and is responsible for board (at \$14.00/day) and care from the time of lease. Board increases at 60 days of gestation to \$15.75/day and at 90 days to \$20.00/day.



2019
Embryo Transfer Contract
for Transported Embryos

This Contract made on _____, 20____, by and between **Equine Medical Services, Inc.**, a Missouri Corporation, hereinafter called "**EMS**", and _____, hereinafter called "**Owner**", both of whom are hereinafter called the "**Parties**".

Recitals:

EMS is in the business of equine embryo transfer.
Owner desires to enter a contract with EMS for such services.
Therefore, the Parties agree as follows:

1. During the calendar year 2019, Owner will attempt to have an embryo(s) recovered from its mare, the "Donor Mare", named _____, and shipped to EMS. EMS shall evaluate the embryo, and if apparently healthy, insert the embryo(s) into the uterus of suitable "Recipient Mare(s)", prepared and owned by EMS.

2. Upon the signing of this Contract, Owner shall pay to EMS a \$1,000.00 non-refundable (under any circumstances) annual enrollment fee. Said fee shall be considered payment for **only** the following services: Recipient Mare preparation, embryo evaluation, processing, and transfer, ultrasound pregnancy detection and Recipient Mare maintenance until 30 days gestation. The nomination fee is not transferable to another "Donor Mare" and will be good from February 1, through December 1, 2019 regardless of the number or lack of embryos produced. The nomination fee for this "Donor Mare" is not transferable to another owner. Owner is responsible for, and agrees to pay for veterinary expenses of the recipient mare after 30 days of gestation.

3. Upon each Recipient Mare reaching 30 days of gestation with a viable pregnancy, Owner shall pay to EMS \$2,900.00.* EMS shall start charging boarding fees for the Recipient Mare after she reaches 30 days of gestation, at the rate of \$14.00 per day. The Owner may, and is encouraged to, transport the Recipient Mare any time after she reaches 30 days of gestation. Without prior arrangement, board for recipient mares after 60 days of gestation will be charged at the rate of \$15.75 per day and after 90 days of gestation board will be \$20.00 per day.

*The recipient lease fee for draft horse embryos is \$3,500.

4. Owner shall return each Recipient Mare to EMS in good health within 6 months following foaling. If Owner is unable to so-return the Recipient Mare due to the death of the mare, Owner agrees to pay EMS \$1,350.00 (\$2,500 if the Recipient Mare is a draft or draft cross mare), and to supply EMS with a letter from the examining veterinarian stating findings at the time of the death of the Recipient Mare. If Owner fails to return the Recipient Mare for any other reason Owner agrees to pay EMS \$2,500 (\$4,500 if the Recipient Mare is a draft or draft cross mare).

5. It is expected that each Recipient Mare will deliver a live foal (defined for this purpose as able to stand and nurse within 24 hours after birth). If a Recipient Mare loses the pregnancy after 30 days of gestation, the Owner will receive \$2,000 credit towards future embryo transfer services. The recipient mare must be returned and a letter from the examining veterinarian stating findings at the time of loss must be presented for the credit to be issued. No credit will be issued if the loss is due to an inherited genetic defect such as lethal white syndrome.

6. EMS recommends to Owner that Owner insure the Recipient Mare(s) and the embryo(s) against all losses and risks of any kind, nature and description. Owner shall indemnify and hold EMS harmless with respect to said losses and risks.

7. All notices required by this Contract shall be given as follows: if to EMS, then, Equine Medical

Services, Inc., 5851 Deer Park Road, Columbia, MO 65201-9751; if to Owner, then the address shown at Owner's signature.

8. Owner understands and agrees that EMS is not responsible for the expense of transporting embryos or containers. Further Owner understands and agrees that EMS is not responsible for registration or blood-typing of the resultant foal. In addition, if embryo transport media is required to transport an embryo, EMS can provide it via FedEx delivery at a cost of \$50 plus shipping with prepayment by credit card.

9. Owner understands and agrees that many factors impact upon successful embryo recovery and/or implantation and that although EMS shall use its best efforts to perform the services required by this Contract, EMS does not guarantee success of the procedures. If a transfer does not result in a pregnancy, Owner's damages shall be limited to EMS's continuing obligation to complete the same subject to the following limitations (all at the Owner's sole expense and risk):

If by December 1, 2019, Owner is unable to recover an embryo from the Donor Mare or a pregnancy fails to result from transfer of an embryo into a Recipient Mare, EMS or Owner shall have the right to declare this Contract terminated. In such an event, Owner shall pay to EMS all sums due under this Contract. Thereafter the Parties shall have no further obligations to one another.

10. Owner agrees to contact EMS on the first day of the Donor Mare's heat and on the day of ovulation so that a suitable recipient mare can be prepared. Owner also agrees to advise EMS on the proposed method and time of delivery of the embryo and if multiple ovulations are detected. Owner agrees to contact EMS on the day of embryo recovery and advise EMS of the results regardless of the success or failure of embryo recovery.

11. Owner agrees to place a valid credit card on file with EMS for payment of the fees in this contract.

12. EMS reserves the right to refuse or suspend service when the Owner's account is past due.

12. It is specifically understood and agreed between the Parties that prior to the transporting of the Recipient Mare(s) from EMS, all charges for services rendered in this Contract shall be paid in full. Further, by filing this Contract along with a detailed itemization of the unpaid charges owed to EMS by Owner, EMS shall have a possessory lien on the Recipient Mare(s) and the fetus.

13. With regard to the transportation of the Recipient Mare(s), all risk of loss shall be borne by Owner and all transportation expenses shall be paid by Owner. Three business days notice must be provided to EMS by Owner prior to discharge of the Recipient Mare(s) to allow for processing of mares and paperwork. All Recipient Mare(s) shall be picked up and delivered during regular business hours. Owner agrees to pay EMS \$75 for each delivery or pick up not during regular business hours.

14. For all purposes, this Contract shall be deemed to be negotiated, made and signed in Boone County, Missouri and the laws of Missouri shall control. At EMS's election, any litigation regarding the Contract shall occur in Boone County, Missouri.

15. This Contract is the final and complete agreement of the Parties and there are no other terms of the Parties in agreement other than those contained in this document.

16. This Contract shall be binding upon the Parties and their respective heirs, personal representatives, successors and assigns.

As Evidence of this Contract, the Parties have signed and dated this Contract as indicated below.

Owner's Signature

Authorized Representative of EMS

Dated: _____ Dated: _____

Owner's Address _____

Owner's Telephone _____ e-mail _____

M/C, Visa, or Discover _____ exp. date _____ CVV# _____
(No American Express)
Name on Credit Card _____

Credit Card Billing Address _____

Billing Address (if different than above): _____

Mare name _____

Breed _____ Age _____

Height _____ Weight _____

Person to contact with questions or pregnancy status of recipients: _____

Telephone _____ e-mail _____

Veterinarian performing flush _____ Telephone _____

Preparation

Proper preparation can make any job easier and more successful. Over the years we have found several suggestions that help facilitate the embryo transfer process. We hope you look this list over and make the following preparations:

In-House Embryo Transfer Program

1. We would like you to contact the manager of the stallion to which you intend to breed before bringing the mare. This will allow you to provide us with the proper phone numbers and contacts for ordering semen as well as scheduling of collection days. You should also finalize any breeding arrangements with the stallion manager at this time.
2. Contact your breed registry to make sure you will be complying with their requirements for eventual registry of the resulting foal. Some registries require a permit before the embryo is transferred.
3. We ask that all mares come with leather halters to decrease the chance of injury.
4. We ask that you do not leave a lead rope, blankets, etc.
5. Mares should arrive with a coggins test taken in the current calendar year, if not we will draw one after arrival.
6. Mares that arrive for early breeding (before April 1) should be under lights for at least 8 weeks prior to the planned breeding.
7. We ask that you complete the Broodmare Admission sheet to provide us with a written record of recent vaccinations and dewormings so they do not have to be repeated, and an indication of any special care the mare may require.
8. We would like all non-maiden mares to arrive with clean cultures.
9. Please give us as much notice as possible before bringing your mare so we can be sure to have adequate accommodations for her. Stabling is on a first-come first-serve basis. We are continually expanding our facilities but they do have a fixed capacity. It is impossible to make a reservation and guarantee stall availability at any given point in the future, as predicting when mares will leave is very difficult. Occasionally mares may have to be put on a short waiting list, which we run through relatively quickly. Regardless, good communication regarding mare arrivals is very important. Paddock board is only available between March 15 and September 15.
10. Please give us at least **3 business days notice** before picking up recipient mares so that we may have them processed and ready for you. In addition to paperwork this frequently involves transporting them from one of our outlying farms. Notification that is too short may make proper transportation and processing impossible. **Remember that we require full payment by the time of discharge.**
11. We like to keep mare owners well informed but we generally have over 100 donor mares here at a time and have found that giving a daily play-by-play update to multiple clients is difficult. We welcome your call and the receptionists will try to update you as much as possible with information entered in the medical records. If you require more information Dr. Foss, Dr. Ortis, Dr. Loncar or breeding manager Patty Williams can return your call, although we've found e-mail to be quite effective. You can e-mail us at equinemedical@aol.com.

Shipped Embryos

1. All arrangements with EMS (including contract and payment) should be made before breeding the donor mare.
2. Contact your breed registry to make sure you will be complying with their requirements for eventual registry of the resulting foal. Some registries require a permit before the embryo is transferred.
3. Communicate with your veterinarian to make sure he/she is prepared for this process.
4. Contact EMS and have your contract submitted before you start breeding your donor mare and contact us again as soon as she ovulates. This will allow us to manipulate and distribute recipient mares appropriately. Failure to notify us in a timely manner may prevent us from having a recipient mare ready for your embryo.
5. Determine if your veterinarian has access to shipping media (we use Ham's F-10 gassed in 5% carbon dioxide with added serum and antibiotics although Vigro, Syngro, or Emcare holding media work well if the embryo is to be shipped by air). If not, we can provide it via FedEx for \$50 plus shipping, but only with payment by credit card. The pH of the Ham's F-10 is buffered by carbon dioxide, which can diffuse out rather quickly. It should be used within 4-5 days of preparation and kept tightly sealed. This means that fresh media is required for each subsequent embryo flush attempt. Syngro can be kept on the shelf and Vigro or Emcare holding media can be kept in the refrigerator until needed but may not be quite as supportive for the embryo if the embryo is to be shipped FedEx.
6. Make shipping arrangements for your embryo early. We prefer that the embryo be shipped via air counter to counter if possible, although embryos collected **late in the day** and shipped via FedEx can also do well. The less time an embryo is out of a mare the better it will be. The embryo can be flown to St. Louis (STL) and a courier can bring the embryo to Equine Medical Services. The courier requires an additional fee. We receive embryos 24 hours a day, 7 days a week, but if at all possible we'd appreciate the arrival of the embryo at a reasonable time of day. Please note that embryos do not arrive at EMS by courier until approximately 3 hours after they arrive in St. Louis.
7. Please **call us as soon as the flush is complete, regardless of the outcome.** If an embryo is recovered this will allow you to tell us of shipping arrangements and air bill numbers so that we may be prepared for its arrival. If an embryo is not recovered this will prevent us from worrying that communication lines have broken down and calling around to determine if an embryo has been shipped.
8. Please give us at least **3 business days notice** before picking up recipient mares so that we may have them processed and ready for you. In addition to paperwork this frequently involves transporting them from one of our outlying farms. Notification that is too short may make proper transportation impossible. **Remember that we require full payment by the time of discharge.**

Communication

As stated above, we don't make daily play-by-play telephone calls for each mare, strictly due to the number of donors and recipients involved. We will call you when we have questions, when we think we need to reassess plans, when plans have been completed, when we have a newly established pregnancy, and if a pregnancy is lost. Please feel free to check in with us as you see necessary and let us know if you have any special communication requests.

If you require more information Dr. Foss, Dr. Ortis, Dr. Loncar, or breeding manager Patty Williams can return your call, although we've found e-mail to be quite effective. You can e-mail us at equinemedical@aol.com.