PREGNANCY AND FOALING

How exciting – you are expecting a new addition to your herd! Time from conception to birth is a very long time and there are so many things to consider. This by no means is an exhaustive resource, but it's a good start. I always recommend an open and honest conversation with your veterinarian if you have any questions about your mare and foal.

All throughout pregnancy the mare should be observed regularly for changes in the mammary gland and vulva. Early udder development and dripping milk can imply a problem with the fetus or placenta. Any vulvar discharge, no matter how small, is abnormal and may indicate placentitis (inflammation of the placenta). If either of these clinical signs are detected, the mare should be evaluated immediately. If a Caslick's has been placed it should be removed 14 to 30 days prior to foaling. If possible, the vulva should be washed prior to foaling. Prior to foaling a well stocked kit should be prepared. It should include:

- Scissors
- Umbilical tape
- Umbilical dip
- Towels
- Bulb syringe
- Enema
- Thermometer
- Stethoscope
- Heat lamps
- Foal blanket
- Twine to tie up placenta
- Tail wrap for the mare

Mare gestation can have a large range of days. The average gestation time for a mare is 340 days, with a range of 330-365 days.

There are many tricks to predicting when your mare will foal. None of the "at home" tests are 100% accurate. A common method of predicting foaling is to look for "wax" at the end of each teat. Usually foaling will occur within 24 hours of this happening, however some mares do not produce wax, and some wax for many days before foaling. Other signs of impending (less than 48 hours) parturition include relaxation of the pelvic ligaments and elongation of the vulva. A commercial test known as Foal Alert, is sutured into your mares vulva and sends notifications to your phone or email when the magnetic seal breaks. You can have a few false alarms, but over all it is very accurate. You can see more information at https://foalert.com.

Another trick is to measure the mammary secretions from her udder once she starts to produce milk. You can use pool testing pH strips and water hardness strips. The water hardness strips measure the level of calcium in the mammary secretions. Normally this is fairly low, but as the mare approaches foaling the amount of calcium significantly increases. Once the level is >200 foaling should occur within 48 hours. A similar commercial test is available called Predict-A-Foal.

When measuring the pH of secretions you are looking for a reduction of pH from a level of approximately 7.4 to 6.4/6.2. When this happens foaling should occur within 12 hours. When using calcium/harness to help predict foaling a rise in this number to above 40mg/dl or 200ppm indicates foaling within 48 hours.

Mare Vaccination

Mares should be vaccinated before being bred. The minimum vaccination recommended is the "core" vaccines – tetanus, west nile virus, eastern equine encephalitis, western equine encephalitis a rabies. For most broodmares it is recommended that they get their core and "additional" vaccines. The additional options are equine influenza virus and equine rhinopneumonitis. Ideally this should be fully boosted (2 doses 3 weeks apart) before the mare is bred. All pregnant mares should receive equine herpes virus (EHV-1), also known as rhinopneumonitis, at the beginning of the fifth, seventh and ninth month of pregnancy to help prevent abortion. Thirty days prior to foaling the mare should be vaccinated for the most important diseases such as West Nile virus, Eastern/Western equine encephalitis, influenza and tetanus. This time frame is critical to allow the mare to generate a strong immune response that can then be passed into the colostrum (the first milk). Foals are born completely naive to their environment and do not receive any immunity across the placenta. This means that all of the protective antibodies that the foal will possess are obtained from the colostrum. This protection will last until the foal is between four to six months of age when the immune system is fully functional and can respond to vaccinations.

Mare Deworming

Mares should be dewormed with a broad spectrum anti-helminthic prior to being bred. Mares should be dewormed in the fall with a product that is safe to use during pregnancy. Please note that most products say "not safe for use in pregnant or lactating animals." There are products that are testing to be safe so please contact a veterinarian.

Two weeks before foaling the mare should be dewormed with a product such as safeguard, panacur or strongid T. On the day of foaling the mare should be dewormed with a product that contains ivermectin or moxidectin.

Delivery of the Foal

There are three stages to labour. The first stage (stage 1) can last up to 24 hours. The first stage of labour is under voluntary control of the mare and is characterized by repositioning of the fetus to a dorsosacral position and initial uterine contractions; it generally lasts a few hours, but it can be interrupted for hours to days. The mare can actually delay this stage of labour when she feels that she is not going to be safe to give birth. External signs of the first stage of labour include restlessness, sweating, pacing and raising the tail.

Stage 2 is the actual delivery of the foal. This stage is very quick. From the time the water bag breaks the foal should be delivered within 20 minutes. You should first see two feet then a head. When your mare begins to foal (water bag breaks) you should make sure that you begin timing the process. If you have waited 10 minutes without any progress call your veterinarian immediately. After 30 minutes of labour it is unlikely that the foal will survive, so time is of the essence. It is normal for the mare to lay down for some of this process and it is normal for the foal and mare to lay down once the foal is delivered. Often the foal will lay with its feet in the vagina of the mare. This is normal and should be allowed to happen. The umbilical cord will break when the mare stands up.

Stage 3 is the passage of the placenta. The placenta should be passed within 2 hours of foal delivery. When the placenta is passed it should be examined to ensure all of the placenta is present (https://youtu.be/KJIy25T_57c). If part the placenta remains in the uterus the mare will likely get sick and will need treatment. You should keep the placenta for your veterinarian to examine at the mare/foal exam if you do not feel comfortable assessing all parts. It is essential for you to keep the placenta for further examination if the foal is born sick or stillborn.

Though mares very rarely have issues foaling, things can, and do, go wrong with deliveries. Usually the issue lays with malpositioning (having a leg or head back). Sometimes it's a delayed delivery (longer than 20 minutes). Rarely premature placental separation occurs. Under normal conditions the water breaks and a stream of fluid is released. Normal delivery should proceed with the protrusion of a white sac from the vulva (amnion). If a red velvet structure is protruding from the vulva, immediately cut it with scissors and try to gently pull the foal. The red structure is the chorioallantois (also known as a "red bag") which did not rupture at the cervical star and the foal and whole placenta are being expelled at the same time. When the placenta detaches from the uterus in this manner, the foal is no longer receiving oxygen and can die quickly.

Mother-Foal Bond

The post-parturient mare starts interacting with her foal by nickering, very soon after birth, even before the foal is completely expelled. The maternal recognition of the newborn foal, called selective bonding, normally starts immediately after delivery and takes up to two to three days. It is normal for the post-parturient mare to be protective of her foal and keep herself between the baby and any perceived threat, including people and other horses the mare is otherwise familiar with. Remember that "milk letdown" produces a transient discomfort to which the mare may react. Once the mare has relaxed, and with repetitive nursing, this response disappears. The mare also may act aggressive for one to two days. Even a mare that normally has "good-manners" towards people may act aggressively. Close confinement often aggravates this behaviour. This can be easily avoided if the pair is kept in a large space.

Overall, mares have excellent maternal skills. Inadequate mothering behaviour is uncommon and estimated to occur in less than five percent of foalings. It occurs especially in first-time mothers, and it often becomes apparent soon after birth, however the abnormal behaviour may take a few days to be manifested. It is thought that true "poor mothering" behaviour may have a genetic predisposition. The five most common abnormal mothering behaviours are:

- Absence of bonding
- Fear of the newborn foal
- Overprotection
- Reluctance of nursing
- True foal rejection.

Fear of the newborn foal occurs when the mare does not recognize the foal as her own baby. Instead of the normal bonding behaviour, the mare tries to get away from her own foal, as if it is an intruder. The mare will eventually acclimate to her foal, but may not bond very well to this foal. This behaviour occurs more commonly in the first time mothers, and it is unlikely to be repeated in subsequent pregnancies.

Overprotection is defined as aggressively protecting the foal, to the point of being a dangerous not only to the people handling the mare but also to the foal. While rushing to get herself in front of her foal to protect it from a perceived threat, the mare may injure the baby by stepping on or crushing her own foal. Although the mare may appear to injure the foal, overprotection is quite distinct from deliberate attacks on the foal that occur with true rejection.

The First Day of Life

A healthy newborn foal is strong, responsive and very active. A number of things should be noted when you observe the newborn from a distance including the foal's attitude, willingness to nurse, awareness of the surroundings, the relationship with the mare, the ability to move around and the respiratory pattern. We all have heard that the foal is one of the most precocious newborns in the animal kingdom. In fact, the newborn foal is very active soon after birth and is able to keep up with its dam.

Foals should follow the parameters below to indicate that they are progressing normally. If the foal is struggling with any of these parameters, immediate veterinary attention is needed. Foals are very fragile and do not typically show signs of illness very well, so any indication that something is amiss is a reason for a visit. As long as everything has progressed normally then an exam at 24 hours of age is recommended. This exam will include both the mare and foal and should include blood testing on the foal to ensure adequate colostrum intake during the first day of life.

Signs of problems include not nursing often (make sure to check the udder), salivating excessively, grinding teeth, or showing signs of abdominal distension and pain (such as getting up and down, rolling on his back). Other signs include straining to defecate and urinate, limb abnormalities such as angular or flexural limb deformities and lameness. Well-being checkup of the newborn foal and a post-foaling check on the mare are very important. It is advisable to have your veterinarian check the newborn foal and the mare even if they look pretty good! Remember to save the placenta to be inspected by your veterinarian. Make sure the foal's blood is always checked for adequate transfer of maternal immunity.

Foal "Rules of Thumb" for a Healthy Foal

Foal should be:
Sitting up in 2 minutes
Have a suck reflex in 20 minutes
Stand within 1 hours
Nurse within 2 hours
Mare should pass placenta within 2 hours
Pass meconium (first poop) in 3 hours
Urinate within 8 -12 hours

The Importance of Colostrum

It is important for the foal to ingest the colostrum as soon as possible after standing. The suckle reflex begins at approximately 20 minutes after birth, and becomes stronger and stronger with time. Normal foals nurse every 30 minutes, and failure to suckle is the first sign of a neonatal problem.

The neonatal foal is able to mount an immune response at birth. However, their immune system is very inefficient to fight invasion of infectious organisms. Passive transfer of maternal antibodies via colostrum is the principal protection in the newborn foal. Failure of passive transfer of maternal immunoglobulins can occur with failure or delay to suckle, failure of the dam to produce good quality colostrum, and leakage of colostrum prior to parturition, and it is the single most important predisposing factor for development of life-threatening neonatal septicemia.

Good quality colostrum should be creamy, yellow and sticky. If inadequate passive transfer occurs, the foal should receive supplemental colostrum as soon as possible. Colostrum is the preferable source of passive immunity for the newborn foal because colostrum contains not only immunoglobulins (antibodies against microorganisms) but other important factors. The timing for oral administration of colostrum, or its substitute, is critical. If more than six to eight hours have elapsed since birth, adequate intestinal absorption of enterally administered colostrum is unlikely, and the intravenous administration of plasma will be required to provide passive transfer of immunoglobulins to the newborn foal.

Evaluation of passive transfer of colostral antibodies in the foal's blood should always be performed. It can be done as early as eight hours, but it is normally done between 12 to 24 hours after birth (ideally around 12 to 18 hours). If the level is not adequate, early detection of failure of passive transfer allows administration of colostrum within an optimal window of time.

Risks to the Young Foal

In order to ensure the best chance of you not losing your mare's foal due to neonatal diseases it is important to be able to anticipate and identify the risk factors associated with the most common problems of newborn foals. The three most common problems of the newborn foal are failure of passive transfer of maternal immunity, neonatal sepsis (generalized bacterial infection) and prolonged

birth asphyxia. They result in a number of serious, and often life-threatening, conditions. In fact, most disorders of the newborn result from high-risk pregnancies. Therefore, any condition that affects fetal development and maturity, delivery and the peripartum period may result in severe neonatal illness.

The factors associated with high-risk newborn foals and problems during the neonatal period can be divided into those associated with environmental conditions, maternal factors, delivery and foal factors. Certain environmental conditions predispose to neonatal illnesses, including unsanitary conditions, poor husbandry, exposure to new pathogens against which the mare has no immunity, and extreme environmental temperatures. If you are planning to send your mare to foal "out" somewhere else so she can be bred on the foal heat, make sure to evaluate the farm's environmental conditions carefully.

Foal Vital Signs Reference Values

	< 10 minutes	**< 12 hours**	**24 hours**
Heart Rate (beats/min)	60-70	100-200	80-100
Respiration Rate (breaths/min)	40-60	20-40	20-40
Temperature	37-39°C	37-39°C	37-39°C

Umbilical Care

The umbilical cord should be left intact for as long as possible, allowing the mare to break the connection when she stands up. This allows maximal transfer of blood from the mare to the foal. If the cord must be broken, do not use scissors but pull the cord apart while holding close to the foal's abdomen. The use of straight iodine on the umbilical stalk is contraindicated because it can cause severe scalding to the skin. Dilute iodine (ice-tea color) or a 1:2 solution of Chlorhexidine 2% can be used. Fill a 6 or 12 cc syringe case with the solution and hold it over the umbilical stalk for 30 seconds. Dipping the umbilicus one to two times a day for the first two days is adequate. Make sure to change the solution for rinsing after every use and clean the container well. Inspection of the umbilicus for purulent debris, sudden enlargement, bleeding or urine should be part of the daily routine.

Feeding young horses is a careful balancing act. The interplay between genetics, management, environment and nutrition is complex. While we can do nothing to affect the genetics of an individual, we can affect how those genetics are ultimately expressed.

The nutritional start a foal gets can have a profound effect on its health and soundness for the rest of its life. We can accelerate growth if we choose. However, research suggests that a balanced dietary approach, which supports no more than a moderate growth rate, is less likely to cause developmental problems.

Some conditions that have been associated with rapid growth rates include:

- Contracted tendons
- Epiphysitis
- Angular limb deformities
- Osteochondrosis

A Foals Diet

As early as 10 to 14 days of age, a foal may begin to show an interest in feed. By nibbling and sampling, the youngster learns to eat solid food. Its digestive system quickly adapts to the dietary changes. It is now recognized that coprophagy (eating of feces) is normal in the foal and may lead to "Foal Heat Diarrhea" as the intestinal microflora changes. This diarrhea was previously thought to result from hormonal changes in the milk but has been observed to occur with orphaned foals that have no exposure to maternal hormones.

It is essential the ration be properly balanced for vitamins and minerals. Deficits, excesses or imbalances of calcium, phosphorous, copper, zinc, selenium and vitamin E are of particular concern in the growing foal. Improper amounts or ratios can lead to skeletal problems.

Foal Vaccines

As long as the mare has been fully vaccinated against disease common in your area, the foal does not need to be vaccinated until 4-6 months of age. At this time, the foal should have a minimum of its "core" vaccines (tetanus, west nile virus, eastern equine encephalitis, western equine encephalitis and rabies). It can also be vaccinated against equine influenza, equine rhinopneumonitis and Streptococcus equi (strangles) at this time. This vaccine will need a booster shot and should be directed by your veterinarian. After this it is recommended to booster the vaccines once a year at minimum (more if the exposure rate is high).

Foal Deworming

Foals should start their deworming program at 2 months of age. They should be dewormed every 2 months with either safeguard, strongid T or panacur. This should continue until they are 12 months old, at which time they can be dewormed with a product containing ivermectin or moxidectin and praziquantel. Afterwards all deworming should be directed through fecal egg counts and consultation with a veterinarian.

Mare Gestation Calendar

This calendar can be used as an estimate of due date. It is based on an average of a 340 gestation in mares. Remember that normal gestation for a mare can range from 330 days to >365 days, so this list is not a guarantee.

Bred	Due	Bred	Due	Bred	Due
Jan 1	Dec 7	May 7	Apr 12	Sept 3	Aug 9
Jan 8	Dec 14	May 14	Apr 19	Sept 10	Aug 16
Jan 15	Dec 21	May 21	Apr 26	Sept 17	Aug 23
Jan 22	Dec 28	May 28	May 3	Sept 24	Aug 30
Jan 29	Jan 4	June 4	May 10	Oct 1	Sept 6
Feb 5	Jan 11	June 11	May 17	Oct 8	Sept 13
Feb 12	Jan 18	June 18	May 24	Oct 15	Sept 20
Feb 19	Jan 25	June 25	May 31	Oct 22	Sept 27
Feb 26	Feb 1	July 2	June 7	Oct 29	Oct 4
Mar 5	Feb 8	July 9	June 14	Nov 5	Oct 11
Mar 12	Feb 15	July 16	June 21	Nov 12	Oct 18
Mar 19	Feb 22	July 23	June 28	Nov 19	Oct 25
Mar 26	Feb 28	July 30	July 5	Nov 26	Nov 1
Apr 2	Mar 7	Aug 6	July 12	Dec 3	Nov 8
Apr 9	Mar 14	Aug 13	July 19	Dec 10	Nov 15
Apr 16	Mar 21	Aug 20	July 26	Dec 17	Nov 22
Apr 23	Mar 28	Aug 27	Aug 2	Dec 24	Nov 29
Apr 30	Apr 5			Dec 31	Dec 6