

Birth Management Plan - Orangutan

General Species Reference Information

Pregnancy

Orangutan cycle will be tracked through daily urine collection and Hemastix. Labial swelling is considered the most obvious sign of pregnancy and is generally apparent 2-4 weeks after conception. Usually around the same time, nipples may start to enlarge as well. Gestation is 245 +/- 12 days (~33-36 weeks). Some common changes during pregnancy are loss of appetite, lethargy, and personality changes. During the later stages of pregnancy some orangutans are noted to have constipation, increased agitation, and fewer social interactions. Lactation and self-nursing can start up to 90 days before parturition.

Diet changes are not usually needed until after birth when the mother starts to breast feed. The pregnant female's weight should be monitored regularly to assure her diet is adequate.

More common pregnancy problems, such as hypocalcaemia, anemia and placenta placement can typically be identified through prenatal ultrasounds and routine blood work to check hematology/serum chemistry status.

Signs of Potential Pregnancy Complications Previously Observed in Orangutans (Taken from Fresno Chaffee Zoo):

OBSERVATIONS:	POSSIBLE PROBLEMS:
Bloody vaginal discharge (especially large quantities observed late in pregnancy)	Placenta previa or placenta abruption
Signs of labor that last more than 6 hours	Dystocia or placenta abruption
Thick, creamy, odiferous, or discolored vaginal discharge	Uterine infection
Lethargy or anorexia that lasts for more than 6 hours, missing a meal	Pregnancy toxemia

Table 1 (Wells et al, 1990)

Parturition (Taken from SSP Husbandry Manual):

Reports on the duration of labor vary from 25 minutes to 4 hours depending on the health and reproductive status of the female, as well as the number of offspring she is carrying (although twinning is rare). The labor process is generally comprised of three stages. During the first stage, the female shows signs of discomfort, her activity level increases, and a clear vaginal discharge may be observed. The second phase constitutes the actual birthing process; the frequency of the contraction increases, the female may lie down (dorsally or ventrally), and the infant is expelled in a head-first orientation. The umbilicus is usually severed by the female with her teeth. The umbilicus must be carefully monitored in relation to the infant's body to ensure it does not constrict the infant's body in any way. Finally, during stage three, the placenta is passed. This may occur immediately or as late as several hours after parturition, it is not unusual for the female or other members of the orangutan group to eat the placenta. Any placenta tissue that is not consumed and easily retrievable should be collected by staff

wearing gloves and placed in a plastic bag that is double bagged. The placenta will be given to veterinary staff for examination. Minor vaginal bleeding or continued contractions may be observed for up to several days after the birth. (Sodaro et al, 2006). As long as the amounts are small and the discharge is not abnormally odiferous or discolored, and the animal acts healthy, this is usually normal.

Mothers generally clean the mucus from the infant's face immediately following parturition, usually with either their fingers or by suckling. Sexual behavior may also be exhibited by the female towards her neonate, such as "dorsal-dorsal mounting, oral-genital inspection and manipulation and insertion of fingers into anal-genital areas" (Sodaro et al, 2006; Maple, 1980).

Newborn infants are typically wet and appear small in size. Infant birth weights vary considerably, ranging from 1420 grams to 2040 grams (3.12 to 4.49 pounds) with an average of 1720 grams (3.78 pounds). They have minimal body fat at parturition, so "the rib cage is prominent and the abdomen may appear sunken" (Sodaro et al, 2006). Passage through the birth canal may cause the infant's head to initially appear slightly misshapen (Sodaro et al, 2006). The first bowel movement is usually composed of meconium, a thick, dark stool produced *in utero*. Once the infant begins nursing, the stool becomes softer and pale yellow.

Lactation and Nursing (Taken from SSP Husbandry Manual):

Before birth, milk production, and even milk expression (called "milk let down") can occur. Self-nursing during pregnancy and after birth is frequent and does not usually indicate a medical problem. Milk is present immediately after birth but breast tissue may not appear full or engorged for a few days. Colostrum (the first milk, which contains essential immunoglobulins for protection against disease) as well as milk is typically thin and watery in appearance.

Nursing bouts are normally frequent and of short duration. Suckling usually occurs within four to six hours after birth. Occasionally up to two days will pass before nursing takes place. The decision to remove the infant from its mother should be based on the physical condition and behavior of both the infant and the mother.

Diet and Supplementation during Lactation (Taken from Topeka Zoo):

During lactation energy needs double or triple. It is essential that adequate levels of total calcium, with a ratio of at least two parts calcium: one part phosphorus, be provided throughout lactation. Post-parturition, diet may need to be raised due to the increased energy demands of nursing. The SSP manual suggests following the recommendation for human females by increasing the new mother's diet by 500 kcal/day during the first six months of lactation if the female is healthy and has not put on an excess amount of weight during her pregnancy. It is imperative that the mother receives adequate concentration of vitamin D, calcium, and phosphorus for milk production and other biological needs. Fortunately, the requirements are typically met through commercially produced primate biscuits which are a normal part of captive diets. Additionally, an oral supplement with any standard human prenatal vitamin is recommended during pregnancy and lactation.

Plan:

Pre- Partum Preparations (once pregnancy has been confirmed)

Medical Monitoring

- Monthly prenatal ultrasounds by veterinarians/keeper staff.
- Regular body weight checks.
- Daily prenatal vitamin (BID).
- Keepers will also monitor food consumption, medication consumption and overall demeanor on a daily basis.

Nutrition/Dietary Changes

According to the nutrition chapter of the Orangutan SSP Husbandry Manual, no dietary changes are required for females during the first trimester of pregnancy other than the implementation of a prenatal vitamin regimen. Caloric increases can be made during the second and third trimesters (by 300-350 kcal/day) but isn't necessarily required due to the relatively small size of the fetus. It is more important to ensure that the pregnant female maintains a healthy weight and does not develop risk complications due to obesity.

Training

- Establish and train a list of maternal behaviors.
 - Pick up/Bring object (baby) to mesh, Present/rotate object (baby) to mesh, gentle touch, leave it.
- Use positive reinforcement to encourage good maternal behavior.
- Continue to work with pregnant female and vet staff on voluntary abdominal ultrasounds.
- Continue to work with pregnant female on blood draw.
- Continue to work with pregnant female on shifting reliably on and off of exhibit areas.

3 Months Prior:

Staff Assignments

Ape Team:

- Review and update (if needed) birth management plan.
- Review list of maternal behaviors for pregnant female and any possible surrogates may need to know.
- Review system for pre-and post-partum observations and record keeping.
- Review list of items that may be needed during the process for management and vet staff to obtain.
- Maintain open communication with management and vet staff throughout the process.

Management Staff:

- Review and approve all aspects of the birth management plan.
- Provide support for all aspects of keeper staff activities.
- Obtain items that are needed for the process.

Vet Team:

- Provide medical support and service as well as nutritional advice for all aspects of the pregnancy and birth.
- Order and prepare all supplies needed for possible intervention/hand rearing.

1 Month Prior:

Equipment and Supplies

- All equipment and supplies will be collected 30 days prior to parturition. (See Supplies/Equipment list).
- Reposition/locate (if needed) the holding camera for overnight viewing of the room most likely to be used for parturition.

Birth Watch

The Ape team will begin to increase the frequency of observation for the pregnant female (throughout the day) approximately three weeks prior to the estimated date of parturition. The team will be looking for possible signs of labor (see below) and after hours observations will be done via the internet. Any incidents/concerns should be reported to Curator and/or Manager.

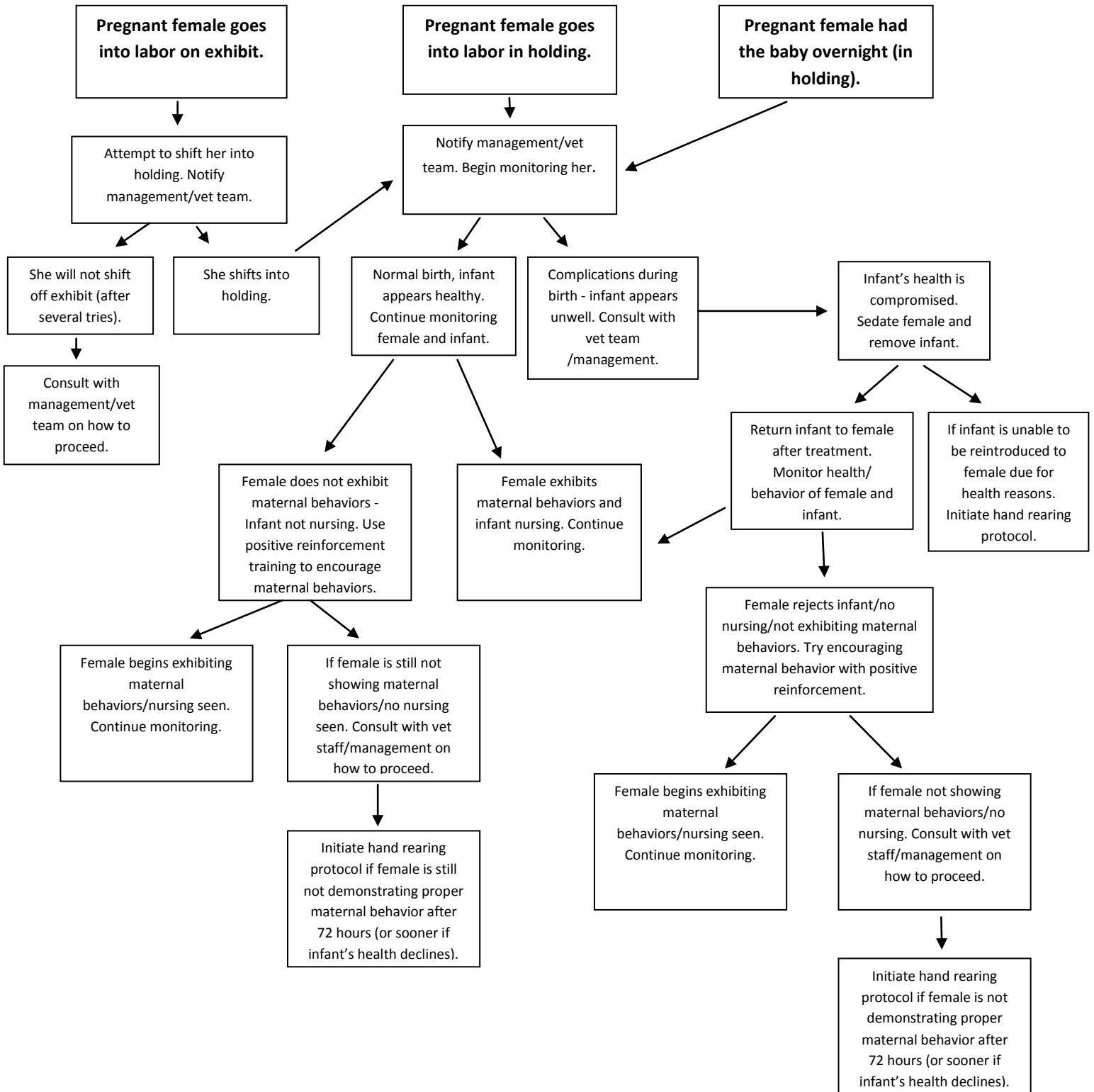
No room modifications needed and pregnant female will continue to be allowed choices to shift onto exhibit each day.

If labor occurs during normal working hours, an around-the-clock birth watch will begin and appropriate staff will be scheduled for shifts. Once labor is confirmed all support staff will be notified by the Curator or his designate.

***Possible Signs of Labor:**

- Clear vaginal discharge
- Water breaking
- Restlessness/Increased level of activity
- Pacing
- Signs of discomfort
- Change in willingness to shift
- Squatting/straining
- Visible abdominal contractions
- Clenching hands/feet in response to contractions

Labor/Birth Possibilities



Managers, Vet team and Ape team will meet at 24, 48 and 72 hours regardless of the situation to discuss options

The health of the infant and female will be the ultimate factor in deciding what course of action to take
Time of Labor

If she goes into labor on exhibit:

- Ape team will notify Curator, Manager, Vet team, GC, Zoo Director and COO.
- Ape team will give her the choice to shift into holding and separate her from conspecifics.
 - Preference would be to have her give birth in room #4; however the decision will ultimately be based on her behavior and choice (of location and/or with any other conspecifics).
- The other orangutans will have access into holding in order to allow them to observe the birthing process, unless their behaviors are disruptive or stressful for her.
- Equipment for emergency intervention will be readied (vet staff).
- Traffic through the orangutan holding area will be restricted at this time so as not to disrupt or distract the orangutans.
- An appointed team member will begin videotaping labor.

If she goes into labor in holding:

- Ape team will notify Curator, Manager, Vet team, GC, Zoo Director and COO.
- The other orangutans will have access into holding in order to allow them to observe the birthing process, unless their behaviors are disruptive or stressful for her.
- Traffic through the orangutan holding area will be restricted at this time so as not to disrupt or distract the orangutans.
- An appointed team member will begin videotaping labor.

Assessing the Condition of the Infant

- If the infant is strong and alert, a continuous watch (24/7) will be done by the ape team to determine the infant is healthy and nursing regularly (minimum of 5 days).
- If the infant looks compromised in any way, vet team will be notified and management, vet team and ape team will assess the situation and determine a course of action.
 - Signs an infant may be in trouble:
 - Difficulty breathing
 - Not clinging well
 - Riding low on her body
 - Unable to hold its head upright
 - Slowly opening and closing its eyes/Eyes glazed in appearance
 - Apparent skin folds, which indicate dehydration
 - Generally looking weak
 - Excessive crying which indicates inadequate milk intake
 - Loss of ability to suckle properly during nursing (infant fails to move jaws while on nipple)
- If the infant is born dead (and is confirmed dead by vet team), we will continue to observe her to make sure she passes the placenta and is not physically compromised. We will not try to remove the infant away from her if she is carrying it but will continue to observe her. If she does lay the infant down, we will attempt to shift her into an adjacent room and then remove the dead infant.

Parturition- Related Protocols:

1. If the infant is strong and alert no additional action will be taken (aside from continual observations by keeper staff for a minimum of 5 days). While maintaining continuous observation, ape team should note time and duration of all nursing bouts.
 - Note if the infant is latched on well.
 - Infant jaw movements and a rhythmic pattern of suckling are indicators of nursing.
 - Nursing may also be accompanied by audible sucking sounds by the infant.
2. If female is not nursing the infant but the condition of the infant remains stable (and she is not harming the infant), it can remain in holding with her under constant supervision through the first night. The situation will be reevaluated in the morning by management, ape team and vet team.
3. If nursing has not occurred by morning, maternal training techniques will be used to encourage her to nurse the infant and/or allow us to supplemental feed it.
4. Although we will have to use physical condition and behavior as determinants, initial intent will be to wait about 72 hours post-partum (LPZ protocol) before considering removal of the infant from the female, if nursing has not been seen. Management, ape team and vet team will meet regularly during this timeframe to evaluate the situation and determine future course of action.
5. If the infant's condition appears to deteriorate at any time, a determination will be made by veterinary and management staff as to whether or not the infant needs to be examined. If sedation is required we will encourage the infant to nurse from the females breast (while she is under sedation) if possible. If not, we will attempt to bottle feed and ensure that the infant receives colostrums or fluids as needed.
6. If the infant's condition seems to improve after feeding we will put the infant back in holding with the female and continue to observe and document. Management, ape team and vet team will meet to re-evaluate the situation.
7. If at any time the female becomes aggressive to the infant and begins to injure it we will remove the infant.
8. If the female is not carrying the infant we will encourage her to pick it up with training techniques. A determination will be made by veterinary and management staff as to whether or not the infant needs to be examined. Floor temperatures will be monitored and adjusted as necessary.

One important thing to remember at all times is that the condition of the infant and the behavior of the mother should determine the course of action in almost all cases.

Post- Partum Management Plan

Daily Meeting

Daily meeting will occur between the vet and ape team (senior management) each day tentatively at 8:30. This meeting could take place by phone if needed. The meeting will last until the overnight birth watch is completed but could continue as needed at the discretion of the curator and VP of Veterinary Science.

Dietary Changes

Post-parturition, her diet will need to be raised due to the increased energy demands of nursing. The SSP manual suggests following the recommendation for human females by increasing the new mother's diet by 500 kcal/day during the first six months of lactation if the female is healthy and has not put on an excess amount of weight during her pregnancy. It is imperative that Sirih receives adequate concentrations of vitamin D, calcium, and phosphorus for milk production and other biological needs.

Fortunately, these requirements are typically met through commercially produced primate biscuits which are a normal part of her current diet. Ape team will notify the nutrition, if the female is a picky eater and does not consume her biscuits on a regular basis. Ape team will consult with the zoo's nutritionist to formulate an alternative option if needed.

Introductions and Reintroduction

Introductions will occur as the orangutans indicate that they are comfortable and ready to be introduced to each other. Our eventual goal would be to re establish all original/current social interactions prior to parturition.

Hand-Rearing Infant

Hand rearing will only be performed as a temporary solution in the event that she does not initially display appropriate maternal skills and the condition of the infant is (or will soon be) compromised. The infant will receive 24/7 constant contact and care. The infant will then be reintroduced to either her or an appropriate surrogate, depending on the situation. The infant should be removed if any of the following conditions arise:

- If female is aggressive towards the infant.
- If female does not clear the infant's face (nose and mouth) of mucous-this should occur immediately after parturition.
- The infant is unable to nurse for whatever reason for more than 72 hours.
- The infant is left on the floor and there is concern of hypothermia.
- The infant appears critically ill: if it is limp, unable to cling, or blue/grey in color.
- If female develops medical complications.

The veterinary staff will need to evaluate the medical state of the infant in order to determine the immediate course of action. Special care should be taken to limit the infant's exposure to disease, so the number of humans it has contact with should be kept as small as possible. Should short term infant care become necessary, selected IOC and vet team will be initial care givers. More staff will be added as necessary. Protective equipment (gloves, face masks, clean scrubs) will be worn by staff when in close proximity to the infant to prevent transmission of germs and illnesses. IOC staff will follow the protocols set forth by the Orangutan SSP Husbandry Manual's "Hand Rearing" chapter.

Nutrition

In the event that keeper staff needs to assist in the care of the infant, SSP recommends an initial solution of 5% dextrose or an oral electrolyte solution (Pedialyte) until a stable sucking reflex is established (usually during the first few feedings). This solution will help prevent any accidental

inhalation of the formula while adjusting to the bottle and nipple. The milk formula (or breast milk) should be diluted with dextrose, an electrolyte solution or distilled water, when first introduced to the infants diet and increased gradually, to prevent digestive upsets.

Infants initially can be offered formula or breast milk at a ratio of 20 – 25% of their body weight divided by the number of feedings, or feedings should approximate 100ml formula/kg body weight/day (24 hours), increasing to about 200ml/kg/day by the 3rd week; or 120 kcal/kg body weight /day (24 hours). The percentage amounts need to be monitored and adjusted based on the infant's acceptance, hunger level and weight gains. Care should be taken not to overfeed as this can cause gastric distention, vomiting and aspiration. On average the infant should be accepting full strength formula within 4-7 days. Neonates require feedings at 2-3 hour intervals or on demand.

As the infant matures, the frequency of feedings can be reduced as the amount fed per meal and the overall total increases. Positioning of the infant during feedings should approximate natural positioning and burping should be encouraged during and after feeding.

Human infant formulas are recommended. The most commonly used are Similac, Enfamil and SMA. Prosobee and Isomil, both soy based formulas, have been used for infants suspected of having allergies to milk based protein or lactose. Human infant bottles with preemie or regular nipples are recommended and should be sterilized before use.

A vitamin supplement may be added to the formula after 2 weeks of age. Formula with added iron can cause constipation.

If Intervention Becomes Necessary

1. Sedate her and allow the infant to nurse as she recovers from sedation.
2. Remove the infant for temporary care while encouraging her interest in the infant and giving her a chance to rest. Utilize her established training to allow the infant to feed from her through the mesh and evaluate the possibility of a reintroduction as soon as possible.
3. Remove the infant for hand rearing. The infant will receive 24/7 constant care, including someone to continually carry the infant. Begin working with the infant to take a bottle through the cage front. Train female to allow us to feed the infant through the cage front. This may take several months of hand rearing and infant training prior to reintroduction.
4. Consider Knobi as a potential surrogate. (This is another female who has never had her own offspring, but showed great interest in caring for hybrid male Rocky when he was introduced to her as a 3.5 year old.)
5. Consider other females as possible surrogates if attempt with Knobi is unsuccessful.
6. Send the infant to another institution for surrogate rearing.

Labor/Birth Notification List

Any incidents/concerns witnessed by the birth watch members should be reported to David Hagan and/or Jodie Baker.

David Hagan will inform Jodie Baker.

Jodie Baker will inform Rob and Norah.

Norah will inform the other executive staff members.

Karen will coordinate notification of the Communications team.

	Office	Cell
Dr. Rob Shumaker	2182	
David Hagan	2092	
Jodie Baker	5167	
Norah Fletchall	5158	
Keepers		
Lisa Smith		
Michelle Shaw		
Stacie Beckett		
Austin Paul		
Torri Bickel		
Mary Dzinbinski		
Vet Staff		
Dr. Jeff Proudfoot	2057	
Dr. Michelle Bowman	2065	
Dr. Melissa Sama	5138	
Dr. Rebekah Riedel	2079	
Jennifer Niederlander	5163	
Megan Duncan	5163	
Abigail Rosenblum	5163	
Pete Petersen	3259	
Dr. Jason Williams	2090	
Chas Weber	2053	
Dominic LaRosa	2075	

Supplies/Equipment Needed

- Incubator
- Heat pad
- Scrubs/gowns
- Masks/gloves
- Bottles (4oz and 8oz)
- Nipples (various sizes)
- Bottle sterilizer
- Bottle brush
- Blankets/Sheets/Towels
- Infant Thermometer
- Infant Stethoscope
- Formula (Similac Advance, Isomil, Enfamil, SMA or Prosobee)
- Simethicone (anti gas drops)
- Pedialyte
- Glucose water (D5W)
- Sterile water
- Infant vitamins (if prescribed by DVMs)
- Alcohol swabs
- Measuring cups/spoons
- Infant scale
- Faux fur vest/ some kind of material for infant to cling to
- Stuffed orangutan/animals for infant to cling to