

GUIDELINES FOR COMPREHENSIVE ELEPHANT HEALTH MONITORING PROGRAM

January 2012

Routine health monitoring should be performed on all elephants on an ongoing basis. Animals should be trained to permit sampling and examination. The following protocol advises that specific baseline laboratory tests be performed for the purpose of evaluating current health status. Additional tests are recommended to increase baseline information on other diseases to determine their significance to elephant health. The final decision for specific procedures should be made by the institutional animal care and veterinary staff based on individual circumstances. For additional information, refer to the Elephant Husbandry Manual, AZA Standards for Elephant Management and Care, and the AAZV Preventive Medicine Recommendations. Additionally, it is recommended that the veterinarian review the behavioral profile of the individual animals with elephant management staff on a regular basis.

Minimum Database:

1. Signalment - age, sex, origin, studbook#, ISIS#; picture of individual (as viewed from the front and sides) should be included in the permanent record.
2. Anamnesis - summary of information regarding health screens, medical problems, diagnostic test results, and treatment over the previous year.
3. Complete physical exam by a veterinarian familiar with elephant health problems. This should include a review of all systems.
4. Body weight – actual weight should be recorded at least annually.
5. Blood collection
 - a. Complete blood count (CBC), serum chemistry panel, fibrinogen, serum protein electrophoresis
 - b. See Elephant Endotheliotropic Herpesvirus Research and Tissue Protocol for current recommendations (http://www.aazv.org/associations/6442/files/EEHV_research_tissue_protocol_9_10.pdf) (1).
 - c. Bank a minimum of 10-20 ml serum (duplicate sample for SSP serum bank) – all banked samples should be labeled with species, studbook #, age, sex, and date collected. Use submission form for serum samples sent to the SSP serum bank (maintained at Palm Beach Zoo).
6. Serum progesterone analysis in females – Serial samples should be collected weekly on an ongoing basis to evaluate estrous cycles (2). Assays can be performed at the

National Zoo's Conservation & Research Center. Contact Dr. Janine Brown - CRC (National Zoo), for submission instructions (see protocol below).

7. Fecal analyses

- a. Parasite screen - Fecal samples should be collected at least semiannually; direct, flotation, and sedimentation should be performed on every sample to detect intestinal parasitism.
- b. Enteric pathogen screen - Aerobic culture of feces for enteric pathogens should include special media for the detection of *Salmonella spp.* Because *Salmonella* organisms may be shed intermittently, at least 3-5 fecal cultures should be performed (may be done on consecutive days) on an annual basis.

8. TB cultures and serological testing - refer to the current USDA Guidelines for the Control of Tuberculosis in Elephants (3). Protocol can be accessed at:

http://www.aphis.usda.gov/animal_welfare/index.shtml

9. Vaccinations

- Tetanus toxoid *- vaccination with a commercial equine product is recommended at least every 2-3 years. Follow label instructions for product use (usually 1 ml IM). Recent data indicate that younger elephants may not develop as high titers as older animals (6).
- Rabies vaccine* - current vaccination (within 12 months) with a commercial killed rabies product approved for horses should be considered if the animal resides or will be traveling to an endemic area. Follow label instructions for product use (usually 2 ml IM). Vaccination with Imrab 3[®] has induced detectable titers to rabies virus in African elephants (5). Biannual vaccination is recommended. Data are insufficient at this time to determine adequate protective vaccine doses and titers.
- Leptospirosis vaccine* - recent cases of Leptospirosis in elephants have been documented. Although insufficient information is available at this time, current vaccination (within 12 months) with a commercial killed multivalent vaccine product approved for domestic large animals should be considered if there is evidence of potential for exposure. Follow label instructions for product use.
- West Nile Virus vaccine - insufficient information is available at the time of this writing to recommend vaccination of elephants with the commercial equine WNV vaccine. Some institutions have elected to vaccinate following recommendations for horses. If the receiving institution requests that the elephant is vaccinated, pre- and post-vaccination titers should be measured and submitted to Cornell (contact the SSP Veterinary Advisor for more information).

* Tetanus, rabies, and leptospirosis have been reported to occur in elephants (6, 7).

Additional Preventive Health Recommendations:

1. Serological screening for EMC (encephalomyocarditis virus), leptospirosis (multiple serovars), and WNV (West Nile Virus). Although these tests are not species-specific and have not been validated for elephants, they may detect cross-reactive antibodies in exposed animals. The presence of antibodies does not necessarily denote infection/disease. Encephalomyocarditis virus may cause clinical disease and death in elephants (8). Antibodies to leptospirosis have been detected in both Asian and African elephants (9, 10). At the time of this writing, EMC serologic testing was not available. Insufficient data is available at this time to determine the significance of WNV antibodies in elephants; it is important to include the history of exposure and vaccination to WNV when interpreting results.
2. Serum vitamin E \pm D levels – submit heparinized plasma to Michigan State University (13).
3. Reproductive tract examination – whenever feasible, a complete reproductive examination should be conducted which includes transrectal ultrasound, semen collection and analysis, serum collection (weekly best, or bi-weekly to monthly) for testosterone analysis, cytology and microbial cultures of the lower urogenital tract (to be screened for bacteria, Chlamydia, protozoa, and Herpesvirus). Herpesvirus has been identified in biopsies of vaginal lymphoid patches in an African elephant (2). A high prevalence of uterine leiomyomas has been observed in captive Asian elephants and could be detected via transrectal ultrasound (11). Since both of these conditions have potentially significant effects on reproduction, a careful evaluation is warranted if the animal is being considered for breeding. All elephants (male and female) over the age of 5 years should have both ultrasound and hormonal (testosterone in males; progestins/LH in females) assessments performed.
4. Urinalysis – fluid and sediment evaluation of clean voided sample; +/- microbial culture.
5. Foot radiographs – baseline radiographs of all feet are strongly recommended; see Gage for description of technique (12). It may be appropriate to annually monitor selected elephants (i.e., those that have a history of chronic foot problems).
6. Ancillary diagnostic tests for tuberculosis –see Guidelines for the Control of Tuberculosis in Elephants 2008 for current recommendations (4).
7. Other vaccination regimens will depend on regional requirements and exposure risks (consider vaccination for equine encephalitis viruses, Clostridial diseases, Leptospirosis). Insufficient information is available at this time to provide a recommendation for West Nile Virus vaccination of elephants. Contact the SSP veterinary advisor for current information.

Elephant Serum Bank Submission Form

Institution/owner: _____
Submitter: _____
Address: _____
Tel: _____ Fax: _____ Email: _____

Animal Information

Asian [] African [] ISIS# _____ Studbook # _____
Name _____ Age: _____ [] actual [] estimate
Sex: [] male [] female

SAMPLE COLLECTION INFORMATION

Date of sample collection: _____ Time of collection : _____
Site of sample collection: [] ear vein [] leg vein [] other: _____
Health status of animal: [] normal [] abnormal
Fasted: [] no [] yes – how long _____
Weight _____ [] actual [] estimated
Type of restraint: [] manual [] anesthetized/sedated [] behavioral control
Temperament of animal: [] calm [] active [] excited

Type of blood collection tube:

- [] no anticoagulant (red-top)
- [] EDTA (purple)
- [] heparin (green)
- [] other: _____

- Sample handling: [] separation of plasma/serum by centrifugation
(check all that apply) [] stored as whole blood
[] frozen plasma/serum
[] other – describe _____

TB EXPOSURE STATUS

- [] Known infected animal
- [] Known exposure to culture positive source within the past 12 months
- [] Known exposure to a culture positive source within the past 1-5 years
- [] No know exposure to a culture positive source in the last 5 years

TREATMENT INFORMATION

Is elephant currently receiving any medication or under treatment? [] yes [] no

If yes, please list drugs and doses: _____

Time between blood collection and last treatment: _____

Ship samples overnight frozen with shipping box marked “PLACE IN FREEZER UPON ARRIVAL”

Send completed form with samples to:

Dr. Michele Miller
Palm Beach Zoo, 1301 Summit Blvd, West Palm Beach, FL 33405
W: (561) 833-7130 ext 224; Cell: (561) 727-9630; Fax: (561) 833-7135; email:
mmiller@palmbeachzoo.org

SERUM COLLECTION PROTOCOL FOR MONITORING REPRODUCTIVE ACTIVITY IN ELEPHANTS

Janine L. Brown, PhD
Elephant SSP Reproductive Advisor
Endocrine Research Laboratory

Females

- Blood samples should be collected once weekly (bi-weekly if weekly is not possible) to establish if females exhibit normal ovarian cycles (e.g., estrous cyclicity). **Note:** the Elephant SSP requires that females between 8 and 35 years of age be hormonally assessed, and recommends that all elephants be monitored throughout their lifespan.

Males

- Blood samples should be collected weekly (bi-weekly or monthly if weekly is not possible) to assess testicular steroidogenic activity. **Note:** the Elephant SSP recommends that elephant bulls be monitored throughout their adult lifespan.

Sample collection and shipment

- For best results, allow blood to clot for ~1 hour at room temperature, or for ~2 hours at refrigerator temperature. Avoid exposing blood to ambient temperatures for longer than 3 hours (blood cells can metabolize progesterone and affect results). Plasma (collected in either EDTA or heparinized tubes) can also be analyzed, although serum is preferred.
- Centrifuge blood (~1000 x g for 10-15 min) and decant serum into a polypropylene vial (best sizes, 12 x 75 mm or 12 x 55 mm) with a tight-fitting cap that pushes or screws on and is flush with the tube (i.e., cap doesn't hang over the side of the tube). We recommend tubes with a frosted writing space and caps from the Sarstedt company (1-800-257-5101). The catalogue number for the tubes is 62.526.003 PP, and for the push caps is 65.809. Smaller tubes are okay, but do not use ones that exceed a 5-ml capacity. Information on the tube should include: animal name, date (mo/day/year), and facility name or abbreviation. Please provide a minimum 1 ml of serum for each sample. Store frozen (-15°C or colder).
- Ship samples in a styrofoam container with dry ice or cold packs. We will return box and any shipping materials. Use an overnight express courier (e.g., DHL or FedEx) and ship only on Mon, Tues or Wed. Never ship on Fri or before a government holiday.
- Include in the shipment a written request as to what hormone analyses are required. If you need results immediately (emergencies only, please), let us know in the paperwork you provide. If you will be requesting Prolactin or LH (or any other protein hormone), call a week in advance so that we can schedule an iodination.
- Address samples to: Nicole Presley, Smithsonian Conservation Biology Institute, 1500 Remount Rd., Front Royal, VA 22630. Please notify us when samples are shipped (540-635-0050; presleyn@si.edu).
- We will issue an invoice at the time data are sent. Please make checks payable to: Conservation & Research Center Foundation, c/o Janine Brown.

- For our records, please provide the studbook number, name and age of your elephant(s) and the specific hormone tests you want performed. If you have any questions, please contact Dr. Janine Brown: phone (540) 635-6586, fax (540) 635-6506, email brownjan@si.edu. Lab hours are 8:00 am-5:00 pm est.

REFERENCES

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APPENDIX

*Elephant SSP Veterinary Advisor

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For Vit E analysis, contact:
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Animal Health Diagnostic Laboratory
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For Leptospiral and WNV titers, contact:
Cornell University
College of Veterinary Medicine
Diagnostic Lab
Upper Tower Rd.
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For EMC titers, contact:
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