

GUIDELINES FOR COMPREHENSIVE ELEPHANT HEALTH MONITORING PROGRAM

July 2003

Routine health monitoring should be performed on all elephants on an annual 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 (complete "Individual Annual Elephant Medical Survey" form and send to SSP Veterinary Advisor – will be available in 2003).
3. Complete physical exam by a veterinarian familiar with elephant health problems. This should include a review of all systems.
4. Body weight – actual or estimated using body measurements (1); information should be recorded at least semiannually.
5. Blood collection
 - a. Complete blood count (CBC), serum chemistry panel, fibrinogen, serum protein electrophoresis
 - b. Serologic (ELISA) +/- PCR test for elephant herpesvirus – contact Drs. Laura Richman or Richard Montali (2).
 - c. Bank 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 SSP serum bank.
6. Serum progesterone assays in females – Serial samples should be collected weekly on an ongoing basis to evaluate estrus cycles. Assays can be performed at National Zoo, Indianapolis Zoo, or Dickerson Park Zoo. See attached protocol for specific submission instructions (Indianapolis Zoo) or contact specific institutions (Dr. Janine Brown - CRC (National Zoo), Dr. Dennis Schmitt - S.M.S.U. (Dickerson Park Zoo)).

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.* Since *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 culture - refer to the current USDA Guidelines for the Control of Tuberculosis in Elephants (3). Protocol can be accessed on the USDA website: www.aphis.usda.gov/ac/TBGuidelines2003.pdf. At this time, annual trunk wash cultures are the only required test, however collection of other samples for research is strongly encouraged.
 - a. Samples for cultures must be collected under the direct supervision of a licensed veterinarian.
 - b. Three trunk wash samples should be collected on separate days, ideally within a 7 day period. Trunk swabs are no longer acceptable.
 - c. All samples should be frozen immediately after collection and shipped frozen.
 - d. Ship by overnight express to NVSL (or other laboratory facility offering comparable procedures). Request mycobacterial culture with speciation (use VS Form 10-4 submission form for NVSL).

9. Vaccinations
 - a. Tetanus toxoid *- annual vaccination with a commercial equine product is recommended. Follow label instructions for product use (usually 1 ml IM). Data are insufficient at this time to determine adequate protective vaccine doses and titers.
 - b. Rabies vaccine* - vaccination 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 (M. Miller, pers. comm.). Annual vaccination is recommended. Data are insufficient at this time to determine adequate protective vaccine doses and titers.

* Both tetanus and rabies have been reported to occur in elephants (4, 5).

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 (6). Antibodies to leptospirosis have been detected in both Asian and African elephants (7, 8). 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. Reproductive tract examination – whenever feasible, a complete reproductive examination should be conducted which includes transrectal ultrasound, semen collection and 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 (9). A high prevalence of uterine leiomyomas has been observed in captive Asian elephants and could be detected via transrectal ultrasound (10). 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; progesterins/LH in females) assessments performed.
3. Urinalysis – fluid and sediment evaluation of clean voided sample; +/- microbial culture.
4. Foot radiographs – baseline radiographs of all feet are strongly recommended; see Gage for description of technique (11). It may be appropriate to annually monitor selected elephants (i.e., those that have a history of chronic foot problems).
5. Ancillary diagnostic tests for tuberculosis – ELISA, etc. recommended for data gathering; see Guidelines for the Control of Tuberculosis in Elephants for current recommendations (3).
6. 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

Disney's Animal Kingdom-Dept. of Vet. Services

1200 N. Savannah Circle West

Bay Lake, FL 32830

(407) 939-7316; email: Michele.Miller@disney.com

REFERENCES

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3. Guidelines for the Control of Tuberculosis in Elephants.
Available on the Internet: www.aphis.usda.gov/ac/TBGuidelines2003.pdf
For regulatory questions, contact: Dr. Denise Sofranko
USDA, APHIS, Animal Care
1629 Blue Spruce Drive, Suite 204
Ft. Collins, CO 80524-2013
Voice Mail (703) 812-6682; FAX: (505) 293-7466
Email: Denise.M.Sofranko@aphis.usda.gov
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APPENDIX

Dr. Laura Richman
(301) 253-8723
Email: lkrichma@aol.com

*Elephant SSP Pathology Advisor
Dr. Richard Montali
Head, Dept. of Pathology
Smithsonian National Zoo
3001 Connecticut Ave.
Washington, D.C. 20008-2598
(202) 673-4869 FAX: (202) 673-4660
Email: rmontali@nzp.si.edu

Dr. Janine Brown
Conservation and Research Center
1500 Remount Rd.
Front Royal, VA 22630
(540) 635-6586 FAX: (540) 635-6506
Email: jbrown@crc.si.edu

Indianapolis Zoo Veterinary Hospital
1200 W. Washington St.
Indianapolis, IN 46222
(317) 630-2090 FAX: (317) 630 5154
Contact: Julie Hutt, CVT

*Elephant SSP Reproductive Advisor
Dr. Dennis Schmitt
SMSU – Agriculture Dept.
217 Karl's Hall
901 South National Ave.
Springfield, MO 65804
(417) 836-5091 FAX: (417) 836-6979
Email: dennisschmitt@smsu.edu

National Veterinary Services Laboratories (NVSL)
Dr. Janet Payeur
1800 Dayton Rd.
Ames, IA 50011
(515) 663-7676 or 663-7548 FAX: (515) 663-7315
Email: Janet.B.Payeur@usda.gov

For Leptospiral and WNV titers, contact:
Cornell University, College of Veterinary Medicine
Diagnostic Lab
Upper Tower Rd.
Ithaca, NY 14853
(607)253-3900

TB ELISA (UC-Davis) – Dr. Scott Larsen
(916) 264-8808
Email: slarsen@ucdavis.edu

*Elephant SSP Veterinary Advisor
Dr. Michele Miller
Disney's Animal Kingdom
Dept. of Veterinary Services
P.O. Box 10,000
Lake Buena Vista, FL 32830-1000
(407) 939-7316; FAX: (407) 938-1909
Email: Michele.Miller@disney.com

7/18/03

INDIANAPOLIS ZOO
African Elephant Progesterone Assay Submission Protocol

The Indianapolis Zoo offers solid-phase radioimmunoassay for the direct, quantitative measurement of serum progesterone in African Elephants.

COLLECTION:

The progesterone assay may be run on serum or plasma (collected in either EDTA or heparinized blood tubes). While the assay manufacturer found virtually no measurable difference in hormone detection between serum and plasma, most institutions submit serum for testing. Manufacturer testing has also shown results to be unaffected by bilirubinemia or hemolysis. If possible, it is recommended that the serum or plasma be separated from red cells within 30 to 40 minutes of collection.

NOTE: Some types of centrifuges tend to heat the blood tubes as they spin. It has not been determined if this heating of the serum or plasma damages the proteins of the different hormones, but it could possibly affect the measured results. In cases where this is a concern, some institutions have chosen to let serum tubes sit overnight (refrigerated) before spinning. This allows the blood to fully clot, red cells to settle out from the serum and thereby requiring only three or four minutes to centrifuge the next day. While this technique may be helpful for various types of hormone assays, it may render the serum unsuitable for standard chemistry analysis. Regardless of the processing technique used; if serial hormone levels are to be monitored, maintaining a consistent protocol is of primary importance.

STORAGE AND SUBMISSION:

Serum or plasma should be stored and shipped in polypropylene cryovials which can withstand ultra-low freezing and are less likely to break during shipping. Glass tubes or vials are not suitable for test submission. Prior to submission, specimens may be kept refrigerated at 2-8 degrees celsius for up to seven days, frozen at -20 degrees C for two months or at -80 degrees C in an ultra-low freezer indefinitely. Attempts should be made to avoid repeated thawing and freezing of the sample. For test submission, each vial needs to be labeled with the animal's ID and date collected. A list should accompany the vials itemizing the number of vials shipped, animal ID number(s), and dates of collection.

All sample submissions need to be prearranged with the Indianapolis Zoo's Veterinary Technician prior to shipping. Samples should be packed on standard ice packs and shipped for next morning delivery. Shipping on dry ice is acceptable, but not necessary.

Please do not ship for Saturday or Sunday delivery.

TESTING AND REPORTING:

Requested submission volume for progesterone assay - **1.0 ml per sample** (minimum testable volume - 0.3 ml)

The extra serum or plasma is requested for submission in the case that repeat analysis is necessary for verification. Unused sample volumes will be kept for a period of two weeks after results have been reported to the submitting institution to allow for additional assay requests. If no further analysis is requested, leftover samples will be disposed of. No returns of samples will be possible.

Maximum turnaround time for assay results is 14 days. Most results will be available 7 days after receipt of samples. Results will be reported by fax with a hard copy being mailed (if desired). Phone results may be arranged by special request.

All collection information and hormone assay results remain the sole property of the submitting institution and will not be used by or shared with any other facility (including the Indianapolis Zoo) without the expressed written consent of the submitting institution.

Ship to: Indianapolis Zoo Veterinary Hospital
1200 W. Washington Street
Indianapolis, IN 46222
(317) 630-2090

Contact Person: Julie Hutt, C.V.T
Phone: (317) 630-2090
fax: (317) 630-5154
e-mail: jhutt@mail.indyzoo.com

COST: Assays will be billed at cost. Our current cost of running the progesterone assay is approximately \$5.00 per sample.

PAYMENT: The submitting institution will be billed with payment due within 30 days.

**PLEASE MAKE ALL CHECKS PAYABLE TO:
INDIANAPOLIS ZOO ELEPHANT CONSERVATION FUND**