

Highlights from the Orangutan SSP 2012 Health Survey and 2012 Health Workshop

22 August 2012

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Goals

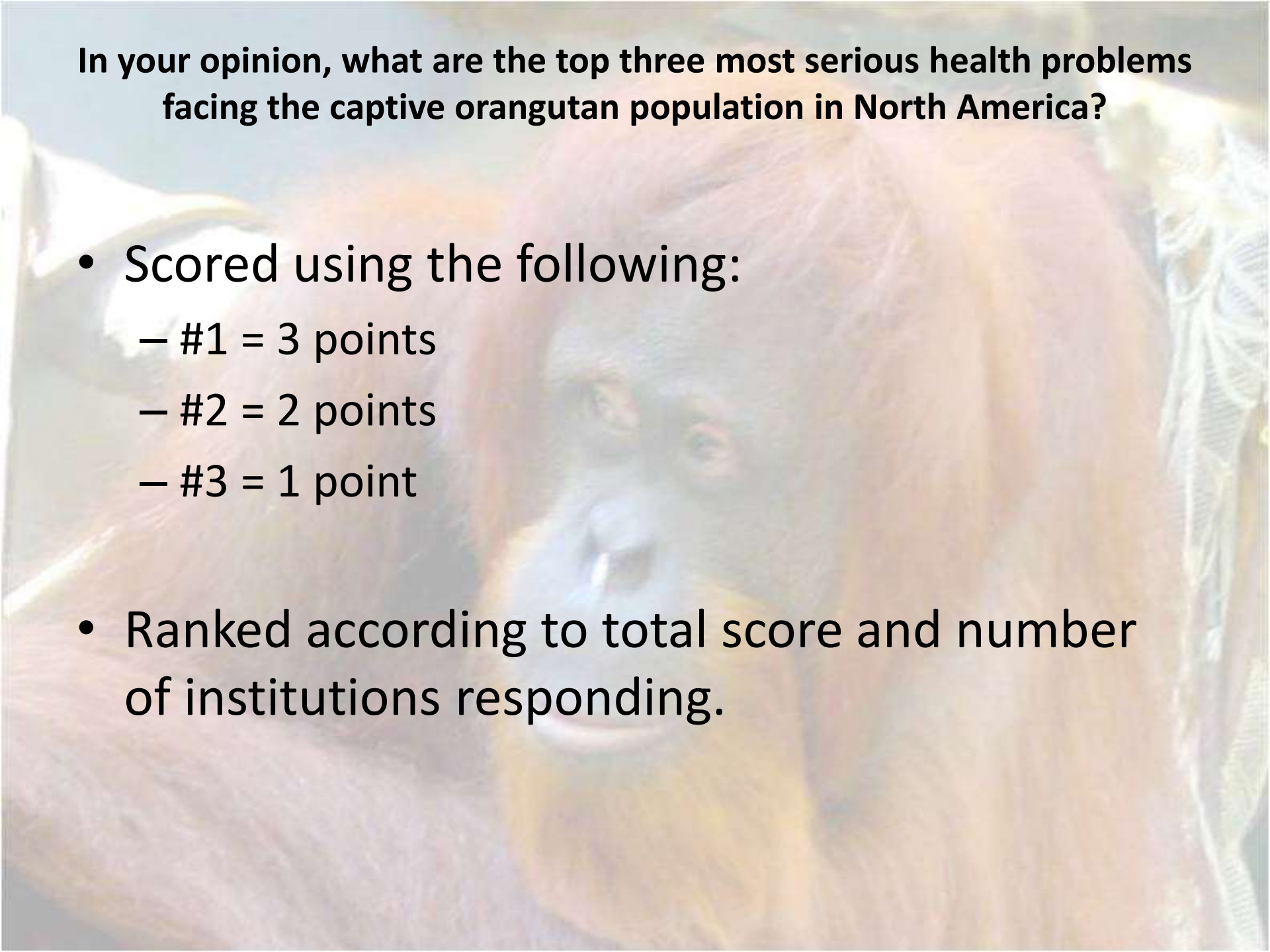
- Intended as a wide-casting net to identify the areas of greatest concern
- More in-depth followup needed
- Questions focus on last 10 years
- Results focus on % of institutions, not % of orangutans (i.e. not incidence/prevalence)

Excellent Response Rate

- 45 of 55 orangutan holding institutions responded (81.8%)
- Special thanks to Kim Westbrook for assistance with followup.

Responding Institutions

- Albuquerque Biological Park
- Audubon Zoo
- Birmingham Zoo
- Busch Gardens Tampa Bay
- Cameron Park Zoo
- Chahinkapa Zoo
- Cheyenne Mountain Zoo
- Cincinnati Zoo and Botanical Garden
- Cleveland Metroparks Zoo
- Columbus Zoo and Aquarium
- Como Zoo and Conservatory
- Denver Zoological Gardens
- El Paso Zoo
- Fort Wayne Children's Zoo
- Fort Worth Zoo
- Gladys Porter Zoo
- Henry Vilas Zoo
- Honolulu Zoo
- Houston Zoo
- Indianapolis Zoological Society
- Jackson Zoological Park
- Little Rock Zoo
- Los Angeles Zoo and Botanical Gardens
- Louisville Zoological Garden
- Memphis Zoo
- Miami Metrozoo
- Milwaukee County Zoological Gardens
- Oklahoma City Zoological Park
- Omaha's Henry Doorly Zoo
- Philadelphia Zoo
- Phoenix Zoo
- Racine Zoological Gardens
- Rolling Hills Wildlife Adventure
- Sacramento Zoo
- San Diego Zoo
- Sedgwick County Zoo
- Seneca Park Zoo
- St Louis Zoo
- Toledo Zoological Gardens
- Topeka Zoo
- Toronto Zoo
- Utah's Hogle Zoo
- Virginia Zoological Park
- Woodland Park Zoo
- Zoo Atlanta



In your opinion, what are the top three most serious health problems facing the captive orangutan population in North America?

- Scored using the following:
 - #1 = 3 points
 - #2 = 2 points
 - #3 = 1 point
- Ranked according to total score and number of institutions responding.

In your opinion, what are the top three most serious health problems facing the captive orangutan population in North America?

Condition	Score	# of Institutions
Respiratory Infections	83	31
Heart Disease	41	21
Obesity	41	20
GI Conditions	11	7
Tuberculosis/TB testing	5	3
Zoonotic/Infectious Disease	5	3
Renal Disease	5	2
Trauma	5	2
Dental Disease	4	3
Repro Disease	4	3
Maternal Neglect	3	3
Husbandry	3	1
Osteoarthritis	2	2
Anesthesia	2	1
Diabetes	2	1
Neoplasia	2	1
Allergies	1	1
Geriatric Disease	1	1
Slow Repro Time	1	1
Strongyloides	1	1

How often are routine health evaluations conducted?

Frequency of Exams	# of Institutions	% of Institutions
Annual	5	11.11%
q18 mos	1	2.22%
Every other year	6	13.33%
q2-3y	4	8.89%
q3-5y	5	11.11%
q5y	1	2.22%
influenced by infants	1	2.22%
Opportunistically	22	48.89%

How often are routine health evaluations conducted?

Frequency of Exams	# of Institutions	% of Institutions
3 years or less	16	35.56%
More than 3 years	6	13.33%
Irregular	23	51.11%

- **Reasons for irregularity:**
 - Insufficient staffing
 - Lack of institutional support
 - Focus on operant conditioning

Which of the following are part of your routine orangutan health evaluations?

Procedure	# of Institutions	% of Institutions	Procedure	# of Institutions	% of Institutions
CBC	44	97.78%	Abdominal Radiographs	22	48.89%
Chemistry Panel	44	97.78%	Thyroid Testing	21	46.67%
Dental Prophylaxis	40	88.89%	Lipid Panel	18	40.00%
TB screening	40	88.89%	Abdominal Ultrasonography	17	37.78%
Vaccination	37	82.22%	Pelvic Exam (females)	14	31.11%
Ophtho Exam	34	75.56%	Urine Prot:creat ratio	10	22.22%
Thoracic Radiographs	33	73.33%	Bronchial Wash	8	17.78%
Fecal culture	32	71.11%	Thoracic Ultrasonography	8	17.78%
Urinalysis	29	64.44%	CT Scan	2	4.44%
Echo	28	62.22%	Retinal Exam w/ Dilation	2	4.44%
EKG	26	57.78%	Other	12	26.67%
Viral Serology	26	57.78%			

How often are routine fecal exams conducted?

Fecal Frequency	# of Institutions	% of Institutions
Annual	7	15.56%
2x/year	27	60.00%
3x/year	2	4.44%
4x/year	6	13.33%
Opportunistically	2	4.44%
Did not answer	1	2.22%

Which of the following methods are used?

Methods Used	# of Institutions	% of Institutions
Direct	41	91.11%
Flotation	36	80.00%
Centrifugation	17	37.78%
Sedimentation	4	8.89%
Special Stains	6	13.33%
Other	3	6.67%

- **Special Stains:** Iodine (4), Acid Fast (2), Diff Kwik (2), Gram's (1), Trichrome (1)
- **Other tests:** Baermann's (1)

Which of the following parasites have been identified in the past 10 years?

Which parasites do you believe contribute to clinical disease in your orangutans?

Parasite	Identified	% Identified	Clinical	% Clinical	% Clinical of Identified
Balantidium coli	32	71.11%	14	31.11%	43.75%
Strongyloides sp.	12	26.67%	4	8.89%	33.33%
Entamoeba coli	10	22.22%	3	6.67%	30.00%
Giardia sp.	7	15.56%	4	8.89%	57.14%
Coccidia	4	8.89%	0	0.00%	0.00%
Oxyurids	2	4.44%	0	0.00%	0.00%
Cryptosporidium sp.	0	0.00%	0	0.00%	0.00%
Other	21	46.67%	5	11.11%	23.81%

- **Other Parasites:** Trichomonas 7 (1); Flagellates 3 (0); Amoeba 1 (0); Baylisascaris 1 (1); Blastocystis 1 (0); Capillaria 1 (0); E. hartmanii 1 (0); Strongyle 1 (0); Trichuris 1 (1)

Do you perform routine parasite prophylaxis in your orangutan collection?

Answer	# Institutions	% of Institutions
Yes	14	31.11%
No	29	64.44%
Did not answer	2	4.44%

- **Prophylactic Treatments:**

- Albendazole annually: 1
- Albendazole q3wks: 1
- Fenbendazole q3mo: 1
- Ivermectin during exams: 1
- Ivermectin q1mo: 6
- Ivermectin quarterly/metronidazole q6mo: 1
- Ivermectin/Strongid/Fenbendazole rotated monthly: 1
- Pyrantel q2mo: 1
- Pyrantel q3mo: 1

If all animals were readily available at all times (ideal), which vaccines would be part of your routine preventive health program? Which vaccines do you regularly administer and at what age, given limitations of access to your orangutans?

Vaccine	Administer Ideally	% of Institutions (ideal)	Administer Regularly	% of Institutions (regular)
Tetanus toxoid	29	64.44%	32	71.11%
Rabies	22	48.89%	24	53.33%
DPT	23	51.11%	13	28.89%
MMR	23	51.11%	12	26.67%
Polio	22	48.89%	12	26.67%
Influenza	13	28.89%	11	24.44%
Pneumococcus	15	33.33%	8	17.78%
Haemophilus influenza	12	26.67%	6	13.33%
Hepatitis B	13	28.89%	3	6.67%
Hepatitis A	7	15.56%	2	4.44%
Varicella	6	13.33%	2	4.44%
WNV	1	2.22%	1	2.22%
Other	3	6.67%	2	4.44%

- **Other Vaccines:** Rotavirus (2); EMCV (1)

How many of your animals are trained for the following behaviors (enter the number of animals)?

Behavior	# Institutions in progress	% Institutions in progress	# Individuals in progress	# Institutions completed	% Institutions Completed	# Individuals completed
IM Injection	17	37.78%	32	32	71.11%	100
Throat Sac Manipulation	8	17.78%	16	27	60.00%	67
Abdominal Ultrasound	7	15.56%	12	13	28.89%	21
Nebulization	3	6.67%	4	11	24.44%	17
Blood collection	16	35.56%	35	10	22.22%	21
Cardiac Ultrasound	7	15.56%	21	2	4.44%	5
Blood Pressure	4	8.89%	7	2	4.44%	2
Other	1	2.22%	3	6	13.33%	17

- **Other Behaviors:** present body parts (7); open mouth (5); weights (3); urination (2); Acapella (1); Chest rads (1); nail trim (1); forehead temp (1); limb rads (1); nasal swab (1); rectal temp (1); throat sac drainage (1)

Have you diagnosed any of the following reproductive health issues in your collection in the past 10 years?

Reproductive Tract Diseases	# of Institutions	% of Institutions
Dysmenorrhea	5	11.1%
Endometriosis	4	8.9%
Uterine Leiomyoma	3	6.7%
Infertility	2	4.4%
Menopause	2	4.4%
Vaginitis	2	4.4%
Endometritis	2	4.4%
Mammary Neoplasia	1	2.2%
Ovarian Cyst	1	2.2%
Uterine Cyst	1	2.2%
Uterine Neoplasia	1	2.2%
Benign Prostatic Hypertrophy	0	0.0%
Cervical Neoplasia	0	0.0%
Mastitis	0	0.0%
Ovarian Neoplasia	0	0.0%
Prostatic Neoplasia	0	0.0%
Prostatitis	0	0.0%
Testicular Infection	0	0.0%
Testicular Neoplasia	0	0.0%
Other Reproductive Diseases	4	8.9%

- **Other Repro Diseases:** peri-ovarian abscess (1); irregular cycling (1); repro-related aggression (1); cervical cyst (1)

Have you managed the following pregnancy-related health problems in your orangutans in the past 10 years?

Pregnancy-related Diseases	# Institutions	% of Institutions
Maternal Neglect	6	13.3%
Dystocia	6	13.3%
Birth Defects	3	6.7%
Poor milk production	3	6.7%
Parturition Mortality	2	4.4%
Prematurity	2	4.4%
Stillbirth	2	4.4%
Abortion	1	2.2%
Placentitis	1	2.2%
Placenta abruptus	0	0.0%
Placenta previa	0	0.0%
Pregnancy Toxemia	0	0.0%
Pregnancy-induced Diabetes	0	0.0%
Other Pregnancy Diseases	4	8.9%

- **Other pregnancy-related Diseases:** maternal inexperience (1); retained placenta (1); inappropriate nursing position (1); “morning sickness” (1)

In the past 10 years have you diagnosed cardiac disease antemortem?

Answer	# of Institutions	% of Institutions
Yes	7	15.56%
No	35	77.78%
Did not answer	3	6.67%

In the past 10 years, have you diagnosed any of the following?

Other Cardiac Diseases	# of Institutions	% of Institutions
Thromboembolic Disease	3	6.67%
Hypertension	0	0.00%

Which of the following tests are included in your cardiac evaluations for screening?

Which are included for diagnosis of suspect cases?

Diagnostic Test	# Institutions-- -Screening	% Institutions-- Screening	# Institutions-- Suspect	% Institutions-- Suspect
Thoracic Radiographs	N/A	N/A	N/A	N/A
Auscultation	35	77.78%	18	40.00%
Echocardiography	31	68.89%	18	40.00%
EKG	27	60.00%	17	37.78%
BNP	11	24.44%	10	22.22%
C-reactive Protein	8	17.78%	6	13.33%
Troponin	4	8.89%	7	15.56%
Awake Blood Pressure	2	4.44%	2	4.44%
Other	1	2.22%	1	2.22%

In the past 10 years have you diagnosed any of the following in your orangutans?

Respiratory Disease	# Institutions	% Institutions
Throat Sac Infection	19	42.22%
Pneumonia	14	31.11%
Sinusitis	14	31.11%
Bronchiectasis/chronic bronchitis	11	24.44%
Allergies	7	15.56%
COPD	4	8.89%
Other	1	2.22%

- **Other Respiratory Diseases:** seasonal colds (1)



Have you managed and are you currently managing any orangutans with chronic respiratory disease that need ongoing long-term therapy?

Answer	# of Institutions	% of Institutions
Yes	17	37.78%
No	22	48.89%
Did not answer	6	13.33%

Have you managed throat sac disease by the following surgical methods?

Surgical Procedure	# of Institutions	% of Institutions
Marsupialization	14	31.11%
Partial throat sac removal	4	8.89%
Complete throat sac removal	3	6.67%
Ostia Closure	3	6.67%
Other	1	2.22%

- **Other surgical method:** periodic drainage (1)

Which of the following tests do you perform when screening for respiratory disease?

Which tests are used for diagnosis of suspected respiratory disease?

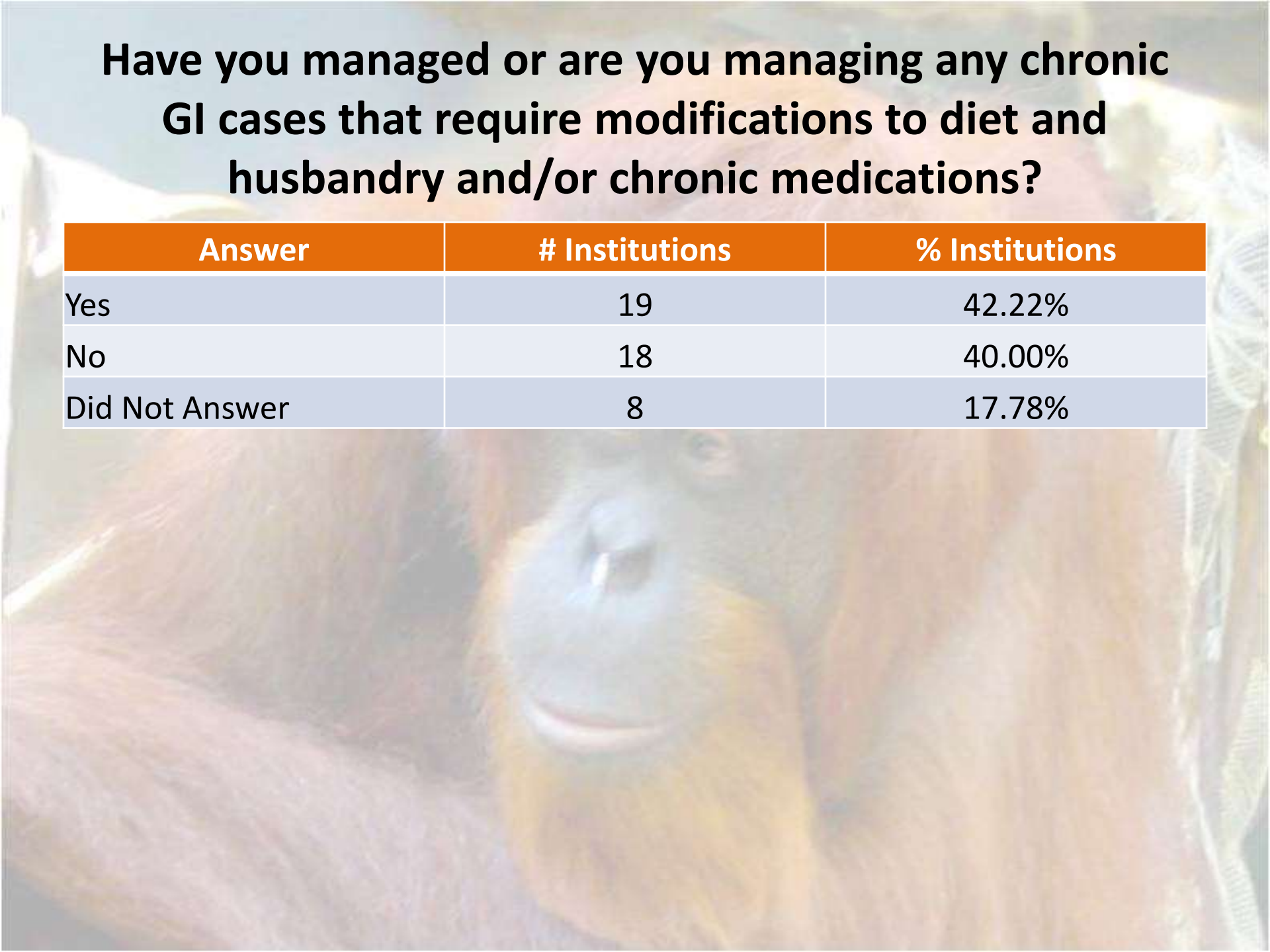
Respiratory Testing	Institutions-- Screen	% Institutions-- Screen	Institutions-- Suspect	% Institutions-- Suspect
Thoracic Radiographs	N/A	N/A	N/A	N/A
Throat Sac Culture	7	15.56%	26	57.78%
BAL/TTW	1	2.22%	21	46.67%
Bronchoscopy	1	2.22%	21	46.67%
Nasal Culture	10	22.22%	19	42.22%
Skull Radiographs	7	15.56%	14	31.11%
Thoracic CT	2	4.44%	11	24.44%
Head CT	2	4.44%	8	17.78%
Allergy Serum Testing	0	0.00%	6	13.33%
Allergy Skin Testing	0	0.00%	3	6.67%
Other	0	0.00%	1	2.22%

- **Other respiratory tests:** rhinoscopy (1)

Have you diagnosed any of the following GI problems in your orangutans in the last 10 years?

Gastrointestinal Disease	# Institutions	% Institutions
Acute Diarrhea	26	57.78%
Constipation	16	35.56%
Chronic Diarrhea	13	28.89%
Chronic Regurgitation	8	17.78%
Appendicitis	2	4.44%
Abdominal Abscesses	1	2.22%
GI Neoplasia	0	0.00%
Hepatobiliary Disease	0	0.00%
Pancreatic Disease	0	0.00%
Other	3	6.67%

- **Other GI Diseases:** Campylobacter jejuni (1); foreign body ingestion (1); hemorrhoids (1)



Have you managed or are you managing any chronic GI cases that require modifications to diet and husbandry and/or chronic medications?

Answer	# Institutions	% Institutions
Yes	19	42.22%
No	18	40.00%
Did Not Answer	8	17.78%

Have you diagnosed any of the following in the past 10 years?

Other Diseases	# Institutions	% Institutions
Obesity	21	46.67%
Osteoarthritis	12	26.67%
Chronic Renal Disease	6	13.33%
Acute Renal Disease	2	4.44%
Diabetes	1	2.22%

In the past 10 years have you diagnosed any of the following ocular diseases?

Ocular Disease	# Institutions	% Institutions
Cataracts	2	4.44%
Progressive Vision Loss	1	2.22%
Glaucoma	0	0.00%
Other	3	6.67%

- **Other ocular diseases:** lenticular sclerosis (1); myopia (1); strabismus (1)

Do you engage any of the following human or veterinary specialty consultants in the medical management of your orangutans?

Consultants	# Institutions--Total	% Institutions--Total
Cardiologist	35	77.78%
Dentist	33	73.33%
Ob/Gyn	31	68.89%
Ultrasonographer	27	60.00%
Anesthesiologist	20	44.44%
Radiologist	19	42.22%
Ophthalmologist	19	42.22%
Surgeon	18	40.00%
Pulmonologist	15	33.33%
Pediatrician	14	31.11%
Infectious Dis Specialist	12	26.67%
Pharmacist	11	24.44%
Otolaryngologist	5	11.11%
Allergist	3	6.67%
Other	3	6.67%



International Orangutan Health Workshop



ONE WORLD,
ONE HEALTH

Fort Worth Zoo, USA, 2012

Orangutan Health Workshop

brought to you by...



Smithsonian
National Zoological Park

Orangutan Health Workshop

brought to you by...



Audubon Nature Institute
Celebrating the Wonders of Nature



Orangutan Health Workshop

- May 18-20, 2012
- Hosted by Fort Worth Zoo
- Facilitated by Dr. Onnie Byers, Chair of the Conservation Breeding Specialist Group (CBSG)

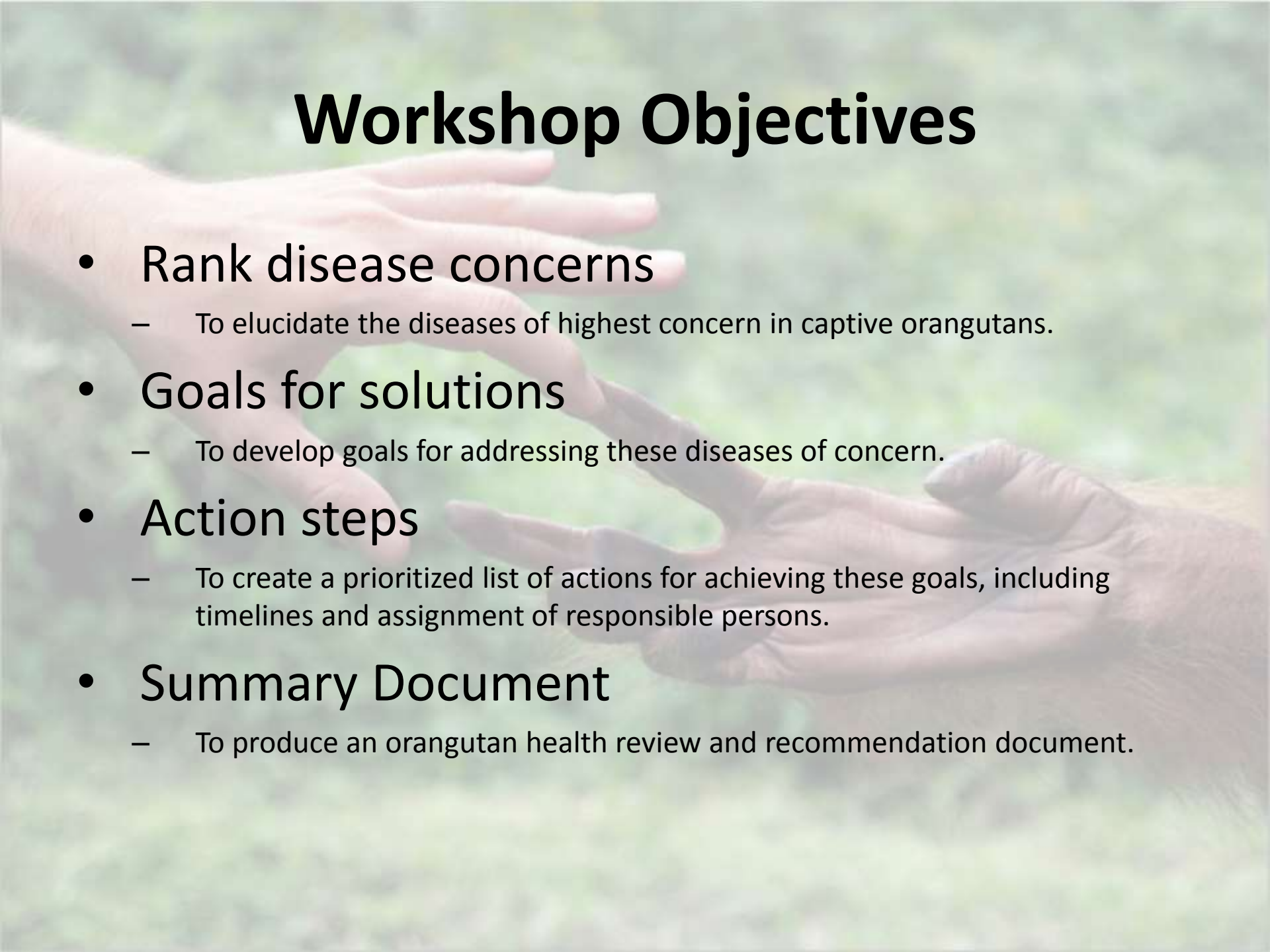


Workshop Objectives

- **Networking**
 - To bring together essential stakeholders and subject matter experts to increase communication and collaboration.
- **Compare issues between populations**
 - To better understand and learn from the similarities and differences in the health challenges and health management strategies between the North American, range country, and European orangutan populations.



Workshop Objectives

The background of the slide features a soft-focus image of two hands, one human and one orangutan, reaching towards each other. The human hand is on the left, and the orangutan hand is on the right. The background is a lush, green, out-of-focus natural setting.

- **Rank disease concerns**
 - To elucidate the diseases of highest concern in captive orangutans.
- **Goals for solutions**
 - To develop goals for addressing these diseases of concern.
- **Action steps**
 - To create a prioritized list of actions for achieving these goals, including timelines and assignment of responsible persons.
- **Summary Document**
 - To produce an orangutan health review and recommendation document.

Attendees

- 45 attendees total
- Veterinarians
 - Clinical zoo vets
 - Epidemiologists
 - Pathologists
 - Specialists
- Zoo Specialists
 - Husbandry
 - Nutrition
 - Contraception
- Human Medical Specialists
 - Cardiologists
 - Pulmonologists
 - Allergists
 - Surgeons
 - Pharmacists
 - Radiologists
 - Gastroenterologists
 - Ob/Gyns

Attendees

- European zoo vets via Skype
- Adi Irawan from IAR-Ketapang





Working Groups

- Cardiovascular
- Respiratory
- Gastrointestinal
- Reproductive



Process

- State the **problem**
- Identify **goals** to address the problem
- Define **action steps** to complete the goal
- Identify **responsible party** to complete the action steps
- Prioritize goals as a group



Prioritized Goals

- **#1 (11 votes): Analyze data collected on orangutan cardiovascular disease to establish reference ranges.**
 - Great Ape Heart Project
 - Species-specific cardiology advisors
 - Use work done with gorillas as a model plan



www.greatapeheartproject.org



Prioritized Goals

- #2 (10 votes): **Creation of recommended respiratory system standards**
 - Standardize definitions
 - Physical exam and diagnostic protocols
 - Necropsy protocol
 - Establish training priorities for medical management
 - Pre-shipment evaluations

Prioritized Goals

- #3 (tied 9 votes): **Create a network of respiratory system consultation resources and support**
 - Identify imaging centers for each institution
 - Create a database of consulting specialists
 - Identify means of communication



Prioritized Goals

- #3 (tied 9 votes): **Define normal body condition and obesity in orangutans**
 - Survey existing population (weights, measurements, BCS, photos)
 - Revise necropsy protocol to include fat measurements
 - Ultrasound measurement of subcutaneous fat
 - Develop metrics to make body condition assessments (from the above data)

Prioritized Goals

- **#5 (8 votes): Improve recommendations for practical diets to meet orangutan nutritional intake**
 - Requires additional research on wild orangutan nutrition and ways to achieve similar results in captivity

Prioritized Goals

- **#6 (tied 6 votes): Improve diagnostic protocols for intestinal parasites (with priority on strongyloidiasis and balantidium)**
 - Literature review and develop best practice testing protocols
 - Identify laboratories for serologic or PCR testing
 - Compile data from all institutions and compare sensitivity and specificity of methods

Prioritized Goals

- #6 (tied 6 votes): **Create a library of respiratory system therapeutic options.**
 - Utilize experts to identify treatment options
 - Identify standards of care for humans
 - Survey what has and hasn't worked



Prioritized Goals

- #6 (tied 6 votes): **Find ways to reduce causes of conception failure.**
 - Identify and communicate cases of suspected conception failure (i.e. failed breeding rec's)
 - Develop a decision tree for how each conception failure case should be handled (diagnostics and treatments)

Prioritized Goals

- #9 (tied 5 votes): **Collect and centralize information on repro cycles such as: average estrus time, fecundity, inter-birth interval, estrus detection methods.**
 - Collate document library of published literature on reproductive cycles in orangutans
 - Identify gaps in knowledge

Prioritized Goals

- **#9 (tied 5 votes): Identify labs that have the willingness and capability to process NHP GI samples; lobby diagnostic labs to take NHP samples.**
 - Survey who has had success with which labs
 - Consult with APV group
 - Work through AAZV Infectious Disease Committee
 - Identify commercial labs to “target”

Prioritized Goals

- **#11 (4 votes): Improve management of chronic diarrhea.**
 - Develop a definition of chronic diarrhea
 - Develop protocols for diagnosing chronic diarrheas
 - Define treatment regimens and make recommendations.
 - Request that names and medical records be shared with SSP vets

Prioritized Goals

- **Two votes each:**
 - Develop a standard protocol to identify an individual's reproductive cyclicality
 - Develop a standardized practical method to determine date of conception, pregnancy detection, estimate parturition date, detect pregnancy loss
 - Develop recommendations for prevention and treatment of obesity

Prioritized Goals

- **Two votes each:**
 - Improve knowledge of orangutan physiology and metabolism
 - Improve awareness and compliance with current recommended orangutan diet
 - Current cardiac cases: identify animals of interest (genetically valuable)

Prioritized Goals

- **One vote each:**

- Identify whether menopause occurs in females or not, because it affects breeding recommendations
- Determine reversibility of contraception methods
- Identify causes and ways to prevent maternal neglect
- Creation of a centralized respiratory system database

Prioritized Goals

- **One vote each:**
 - Future research and publications regarding respiratory issues
 - Develop treatment protocols for intestinal parasites (w/ emphasis on strongyloidiasis and balantidium)
 - Improve knowledge of serum nutrient normals in wild orangutans
 - Establish orangutan cardiovascular info resource

How can you help?

- Work on specific goals
- Participation in SSP-endorsed research projects (e.g. GAHP)
- Funding
- Compliance with health recommendations
- Keep SSP updated on health issues

A human hand on the left and a sloth's hand on the right are reaching towards each other, with the sloth's hand being significantly larger and darker in color. The background is a soft, out-of-focus green. The word "QUESTIONS?" is written in bold black text across the center of the image.

QUESTIONS?