

**New
logo!!!**



**Orangutan Veterinary Advisory Group Workshop
July 24-28, 2016 Sabah, Malaysia**

2016 REPORT

Photos provided by OC/OVAG participants

Orangutan Conservancy Veterinary Workshop Orangutan logo courtesy Amy Burgess

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Prepared with organizing committee of the Orangutan Conservancy: R. Commitante, S. Unwin, R. Jaya, Y. Saraswati, F. Sulisty, C. Nente (Editors).

Orangutan Veterinary Advisory Group Workshop 2016 Report.

Copies of all the *Orangutan Veterinary Advisory Group (OVAG) Workshop Reports* can be found on the Orangutan Conservancy website, www.orangutan.com



Wearing our new OVAG headlamps provided by ABAXIS



Orangutan Veterinary Advisory Group Workshop July 24-28, 2016 Sabah, Malaysia

Participating Organizations:

Orangutan Conservancy, United States
Chester Zoo / NEZS, United Kingdom

ABAXIS Europe, Germany
Borneo Orangutan Survival Foundation, Indonesia
Center for Orangutan Protection (COP) Indonesia
Faculty of Veterinary Medicine, Gadjah Mada University, Jogjakarta, Indonesia
Fort Wayne Children's Zoo
Frankfurt Zoological Society/Jambi - Sumatra, Indonesia
Hutan, Sabah, Malaysia
Indonesian Veterinary Association (PDHI/IVMA)
International Animal Rescue, Indonesia (IAR)
Jejak Pulan (Vier Pfoeten Indonesia)
Journal of Zoo and Wildlife Medicine
Liverpool Veterinary School, United Kingdom
National Jewish Health Organization (NJH)
Orangutan Appeal, United Kingdom
Orangutan Foundation United Kingdom (OFUK) Central Kalimantan, Indonesia
Orangutan Foundation International (OFI)
Orangutan Information Center, Aceh, Sumatera, Indonesia
OVAID, United Kingdom
Royal Veterinary College, United Kingdom
Sabah Wildlife Department, Sabah, Malaysia
Sepilok Orangutan Center
Sintang Orangutan Center, West Kalimantan, Indonesia
Sumatran Orangutan Conservation Programme (SOCP), Medan, Indonesia
Sumatran Orangutan Conservation Programme, Jantho, Indonesia
Universiti Putra Malaysia, Malaysia
Vesswic

Supporting Organizations:



Orangutan Conservancy, United States

Chester Zoo/ NEZS, United Kingdom

The Orangutan Project (TOP) Australia

Fort Wayne Children's Zoo, United States

ABAXIS, Germany

HOSTED BY:

THE SABAH WILDLIFE DEPARTMENT, Sabah, Malaysia





**Orangutan Veterinary Advisory Group Workshop
July 24-28, 2016 Sabah, Malaysia**

2016 REPORT

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**Orangutan Veterinary Advisory Group Workshop
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Section 1

Executive Summary

For the first time, the Orangutan Veterinary Advisory Group (**OVAG**) held its annual workshop in Sabah, Malaysian Borneo in collaboration with the Sabah, Wildlife Department (SWD). Though our partnerships between Orangutan Conservancy (OC), Chester Zoo (CZ), and the Faculty of Veterinary Medicine Universitas Gadjah Mada (UGM), remain as strong as ever, it is important to maintain relationships in all orangutan range countries and we were delighted to accept SWD's invitation to hold our 8th annual workshop in Sabah. As fragmented forests are continuing to cause great damage to orangutan numbers in both Malaysia and Indonesia, our work as a collaborative, is more important and crucial than ever in preventing further fragmentation that could possibly bring the orangutan to extinction.

In an effort to further our unique group, you will have noticed our **new logo** featured on the cover page of this document. The initial design was by our own Ricko Laino Jaya with an assist by Emma Wood.

This year was very productive for our OVAG veterinarians. Siska and Winny went to England to intern with the Chester Zoo and work with the Liverpool Vet School. Ricko and Yenny went to the United States as guests of the Fort Wayne Children's Zoo and were even able to travel around a bit to other zoos and see some of the sights (as did Siska and Winny in England!). Anta is beginning the field work portion of her PhD with Murdoch University in Perth, Australia. Several of our vets will also be presenting at conferences throughout the year. Yenny went back to the U.S. to present at this year's IPS conference in Chicago, as did Agnes of BOSF. Ricko and Arga will present at conferences a little closer to home. In 2017, we hope to be able to send additional OVAG veterinarians to England and the U.S. again. We are truly becoming a global network – which is what we set out to do when we first started in 2009!

This year's workshop focus proved quite a challenge to us. The field of wildlife ophthalmology was introduced which was truly fascinating though difficult. Work continued on respiratory issues which seem to plague many orangutans in both zoos and sanctuaries (rehabilitation centers). We also had our first orthopedic sessions - all which were very informative. Another addition was the focus on behavior and even a bit of primate evolution and orangutan tooth eruption! Our workshops, as always, continue to gather together veterinary teams and wildlife staff working in Indonesia, Malaysia, and internationally to increase our individual and shared knowledge. Together, we hope to continue to build networks with local and foreign government entities, universities, field sites, rescue/rehabilitation/release centers, zoos, non-profit organizations, businesses and private parties to conserve, protect and increase awareness for the only great ape found indigenously outside of Africa.

Each year as we learn more, we grow more and build more networks and collaborations. We now have a Google Drive site dedicated to all things OVAG from 2009 so we can have all materials and presentations available to everyone at any time. There is also a dedicated OVAG Whatsapp group. Together, we can truly make a difference!

The 2016 OVAG Workshop was co-sponsored by the Orangutan Conservancy (USA), and Chester Zoo/ NEZS (United Kingdom). Thank you Chester Zoo for becoming a core ongoing funding supporter of OVAG!!! OVAG received additional funding support from The Orangutan Project (TOP – Australia), Fort Wayne Children's Zoo (USA), and Abaxis (Europe).

Raffaella Commitante, B.F.A., M.A., Ph.D. (Cantab)

Steve Unwin, B.Sc., B.V.Sc., Dipl ECZM, MRCVS

Ricko Laino Jaya, drh.

Yenny Saraswati, drh.

CitraKasih Nente, drh., MVS (Conservation Medicine)

Fransiska Sulisty, drh., MVS (Conservation Medicine)

Sumita Sugnaseelan, DVM (UPM), Ph.D. (Cantab)



**Orangutan Veterinary Advisory Group Workshop
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Budget

US DOLLAR

Air International	10,500.00
Air Domestic	1,000.00
Hotel	10,400.00
Ground travel	1, 500.00
Catering	200.00
T Shirts/Banners	400.00
Office Misc.	500.00
Veterinary Supplies	100.00
Veterinary Continuing Education Support	2,000.00
Veterinary Support: Presenting at Conferences	1,000.00
Bank Transfer Fees	100.00
Misc.	300.00
TOTAL	28,000.00



**Orangutan Veterinary Advisory Group Workshop
July 24-28, 2016 Sabah, Malaysia**

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Section 2

Letter of Invitation:



OC/OVAG 2016

Honorary Patrons:
Dr. Jane Goodall
Dr. Edward O. Wilson
Dr. Suwanna Gauntlett
Djamaludin
Suryohadikusumo

Advisers:
Dr. Tim Laman
Dr. Mark Leighton
Dr. Amory B. Lovins
Dr. Cheryl Knott
Lori Perkins
Dr. Herman Rijkssen
Dr. Anne Russon
Dr. Robert Shumaker
Dr. Willie Smits
Dr. Carel Van Schaik

Directors
Norm Rosen, Chair
Dr. Anne Russon
Dr. Rob Shumaker
Dr. Raffaella Commitante
Barbara Shaw
Juanita Kemp
Linda Keenan

**Director of Marketing
/ Development**

Thomas Mills

June 24, 2016

RE: Orangutan Conservancy / Orangutan Veterinary Advisory Group Workshop 2016

To Whom It May Concern:

This letter shall serve as an invitation to attend the Orangutan Veterinary Advisory Group (OVAG) Workshop 2016 sponsored by the Orangutan Conservancy (OC), a United States not-for-profit organization, Chester Zoo (a zoological park in The United Kingdom) and this year in collaboration with the Sabah Wildlife Department (SWD).

The workshop will be held in Sabah, Malaysia at the:
SOLUXE Hotel, Kota Kinabalu
One Place mall
Lorong Putat 3, 88200 Putatan
Kota Kinabalu, Sabah Malaysia +6 088 327 666

Contact information for OVAG:

Orangutan Conservancy: Raffaella Commitante (rcommitante@gmail.com).
Chester Zoo: Steve Unwin (s.unwin@chesterzoo.org).

Our eighth workshop, will continue the work we began in 2009 to improve ourselves and the care we give to orangutans. It will be held:

July 24-28
(Arrival: July 23 / Departure: July 29)

OC/OVAG and UGM would like to extend an invitation to the person/s listed below to attend this international workshop.

Sen Nathan

We thank you for your participation in allowing your staff to attend.

Respectfully,

Raffaella Commitante, PhD
Orangutan Conservancy/Orangutan Veterinary Advisory Group

Orangutan Conservancy / P.O. Box 513 / 5001 Wilshire Blvd. / #112
Los Angeles, CA 90036/USA / www.orangutan.com / info@orangutan.com

OVAG 2016 Agenda Soluxe Hotel, Kota Kinabalu, Sabah, Malaysia

TIME	7/23/2016 Saturday	Sunday 7/24	Monday 7/25	Tuesday 7/26	Wednesday 7/27	Thursday 7/28	Friday 7/29
7:00	Delegates arrival	Breakfast	Breakfast	Breakfast	Breakfast	Breakfast	Dele- gates depart
7:30							
8:00		Welcome: Ricko Jaya MC SU intro / RC intro SWD Director William Baya speech given by SN	Genetic and phenotypic characterization of Cystic Fibrosis airway disease in non-human primates (JT-C) YJ - Facilitator	Ophthalmology (AJ) PN - Facilitator	Back to Basics: Animal Health Programme Creation (SU)	Biosecurity Practical (SU)	
9:00		Short Videos: OVAG / GAVO Ice breaker (What does OVAG mean to you) OVAG Committee	Orangutan Respiratory disease (NL & JT-C)	Orthopaedics (MP) RJ-Facilitator	Orangutan Behavior (a beginning) (RC, CN)		
9:30							
10:00							
10:30		Break	Break	Break	Break	Break	
11:00							
11:30		Evolution (RC)	Orangutan Respiratory disease (NL & JT- C)	Orthopaedics (MP) RJ-Facilitator	Study Case - (4-5 delegates) Orangutan Dentition (FO) YJ-Facilitator	Biosecurity Practical Con't (SU)	
12:00							
12:30							
13:00		Lunch	Lunch	Lunch	Lunch	Lunch	
14:00				After lunch - vans to SWD			
14:30		Group discussion: Internationally recognized Wildlife Welfare Assessment (SU, SS)	Study case (4-5 Delegates) LB-Facilitator	SWD Field Lab Visit - Diagnostics/biosecurity (SWD) Orthopaedics Practical (MP) Ophthalmology (AJ) DR-Facilitator	Free Afternoon - Explore Kota Kinabalu	Second evaluation, Wrap up sessions - all (+ quiz results) (SU)	
15:00		Critically Endangered Orangutan Species Status / Population SN - Facilitator					
15:30						Break	
16:00		Break	Break				
16:30		Post release Health assessment (Group Discussion) - Cont'd IUCN Great Apes Health Best Practices (SU, CN- Facilitator)	OVAG Strategy OVAG Committee - Facilitators			Closing meeting After closing meeting, load on to BUS to Dinner	
17:00							
17:30							
18:00							
19:30		Dinner	Dinner/SKYPE with colleagues Uni of Birmingham Orangutan Biomechanics	Dinner		Conference Dinner - Courtesy of Sabah Tourism and SWD	
20:00							

Presenters:

SU: Dr. Steve Unwin
CN: drh. Citrakasih M. Nente
RC: Dr. Raffaella Commitante
NL: Dr. Nancy Lung

JT-C: Dr. Jennifer Lynn Taylor-Cousar
SS: Dr. Sumita Sugnaseelan
MP: Dr. Matthew Pead
AJ: Dr. Anna Jane Marlar
FO: Felicity Oram

Facilitators:

RJ: drh. Ricko Jaya
FS: drh. Fransiska Sulisty
YJ: drh. Yenny Jaya
CN: drh. Citrakasih M. Nente

DR: Dr. Diana Ramirez
LB: Dr. Laura Benedict
SN: Dr. Sen Nathan
PN: Dr. Pakeeyaraj Nagalingam

2016 Participant List

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2	Marc Ancranaz	marc.ancranaz@yahoo.com	Hutan
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10	Jerry Gumpil		SWD
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13	Soedarmanto Indarjulianto	indarjulianto@yahoo.com	UGM - Vice Dean
14	Benediktus Waluyo Jati	B.waluyojati@outlook.com	Sintang
15	Ricko Laino Jaya	rickojaya@orangutancentre.org	OIC / OVAG
16	Baerbel Khoehler	baerbelkhoehler@abaxis.de	ABAXIS
17	Nancy Lung	nancylung2@gmail.com	Journal of Zoo and Wildlife Medicine
18	Abdul Malik		SWD
19	Annajane (AJ) Marlar	ukeyevet@flash.net	Ophthalmologist
20	Caroline Martin	caroline.martin@iapwa.org	Independent
21	Rufina Matiu	sorclinic205@gmail.com	SWD
22	Pakeeyaraj Nagalingam	pakeeyaraj@gmail.com	SWD
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30	Suhairin Putra	wildliferescueunit@gmail.com	SWD
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32	bin Abdul Rashid		SWD
33	Hafiz Ukhwanur Riandhita	hafiz@orangutan.or.id	BOSF / Samboja
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35	Ruhaizam Ruslan	wildliferescueunit@gmail.com	SWD
36	Yenny Saraswati	yenny.jaya@gmail.com	SOCOP / OVAG
37	Reuben Sharma	reuben@upm.edu.my	UPM
38	Fransiska Sulisty	siska@orangutan.or.id	BOSF / OVAG
39	Sumita Sugnaseelan	sumi@upm.edu.my	UPM /OVAG
40	Maryos Vigouri Tandang	mariyos@orangutan.or.id	BOSF / Nyaru Menteng
41	Jennifer Taylor-Cousar	taylor-cousarJ@NJHealth.org	NJH
42	Steve Unwin	s.unwin@chesterzoo.org	Chester Zoo / OVAG
43	Muhammad Wahyu	vets_wildlife@yahoo.com	Vesswic
44	Andika Pandu Wibisono	pandu.wibisono@hotmail.com	SOCOP
45	Hery Wijayanto	herykh@ugm.ac.id	UGM
46	Wilfred Yuya	wildliferescueunit@gmail.com	SWD



Orangutan Veterinary Advisory Group Workshop July 24-28, 2016 Sabah, Malaysia

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Day One - July 24

Opening ceremonies – Ricko Jaya MC

Introduction: Steve Unwin

Beginning in 2009, OVAG was not begun to develop into a non-profit organization (NGO) but rather as a network of like-minded organizations and individuals working together to interact and collaborate towards orangutan conservation. Most of us that are veterinarians are here for training, others that are non-veterinarians are here for information and extended learning. But, whatever the reason: everyone works to their strengths. We have developed a research friendly environment but we have also made time to form friendships. We are all part of the same network, no one opinion is more valuable than another and we always respect each other.

Mission: One Health solutions in orangutan conservation medicine through empowerment of those working on the front lines.

There are four areas that OVAG as a network is working towards:

1. Capacity building: OVAG training for relevant diseases and conservation management on a global scale (changes in disease practices, etc.)
2. Evaluation and Welfare must be a part of what we do and OVAG can help in dealing with welfare issues, ethics, and euthanasia.
3. Research
4. Networking

OVAG Film – Produced by Steve Unwin

OVAG Film – Produced by Tom Mills (Orangutan Conservancy)

Welcome to the Land Below the Wind (Sabah) speech from Sabah Wildlife Department: given by Dr. Sen on behalf of the Director, William Baya

A very good morning to the Orangutan Veterinary Advisory Group's Steering Committee: 1. Dr Raffaella Commitante, Orangutan Conservancy, 2. Dr Steve Unwin, Chester Zoo, 3. Drh. Fransiska Sulisty, Borneo Orangutan Survival Foundation (BOSF), 4. Drh. Citrakasih Nente, Yayasan Jejak Pulang, 5. Drh. Ricko Jaya, Human Orangutan Conflict Response Unit (HOCRU), 6. Drh. Yenny Saraswati, Sumatran Orangutan Conservation Program (SOCP), 7. Dr Sumita Sugnaseelan, Universiti Putra Malaysia

Ladies and Gentlemen,

On behalf of the Sabah Wildlife Department I would like to warmly welcome all the participants here to Kota Kinabalu , Sabah. Thank you for finding time away from your busy schedule to be part of the Orangutan Veterinary Advisory Group Workshop 2016. Back in 2012, the Veterinary Faculty of University Putra Malaysia, Selangor had the pleasure of hosting the workshop and four years later here we are in Sabah with a much greater number of participants.

As a state with a native population of orangutans, Bornean orangutans are totally protected under Part 1 of Schedule 1; Section 25(1) of the Totally Protected Animals under the Wildlife Conservation Enactment (WCE) 1997. Any offence related to this species warrants a fine of RM50, 000.00 or an imprisonment of 5 years, or both. Most recently Bornean orangutans have been upgraded to “critically endangered” in the IUCN Red List.

This in no way undermines previous efforts done for the species but it is now a challenge for all of us to work harder for the better future for our furry cousins.

As of 2016, the rate of admission of orphaned orangutans here in Sepilok Orangutan Rehabilitation Centre has significantly reduced over the past 10 years. In fact, the center received no orphans last year. This shines positive ray of hope for the Bornean Orangutans and we are currently underway in conducting a state-wide wild orangutan population study here in Sabah. I strongly believe with increased enforcement and awareness efforts by the department supported by wonderful collaborations such as OVAG, the plight of orangutans would be cohesively addressed.

Even with years of experience working with the “man of the forests”, I agree that there is still much left to learn about these magnificent creatures. Therefore, OVAG is the best platform to share all of our valuable experiences and knowledge working with our orangutans.

We would like to thank the steering committee of OVAG for allowing us to be your collaborator for this year in organizing such a crucial workshop. It is indeed nothing short of an honor to be involved in this noble partnership.

The Sabah Wildlife Department very much supports and wishes to extend this collaboration into a solid network in the near future to protect our orangutans, be it Bornean or Sumatran. We are definitely looking forward to work more closely together with OVAG in the future.

Having said that, I would like to end my speech here. I sincerely hope that you will have both a productive and enjoyable time here in Sabah.

Thank You,

William Baya
Director, Sabah Wildlife Department

Gavo's journey (Film by Steve Unwin)

The Search For Siska Gavo Pt 2 (Film by Steve Unwin)

Ice Breaker: Meeting and sharing what we hope/expect from OVAG and what OVAG means to each of us as a group.



Ice Breaker Wrap Up:

What we can expect/hope...

Sharing knowledge honestly without discrimination

Strengthening relationships and networking and sisterhood

Promote better regulations and documentation for orangutan conservation

Tell everyone (not just in Malaysia) to have better forest for orangutans

To be able to share our experiences at the workshop with others

Share, collaborate and foster a new generation of conservationists

Identify projects' needs and address how to meet those needs

Get information on orangutan medicine (new techniques and procedures)

Find a way to gather information from all centers on orangutan medical information for documentation

Understanding health challenges faced by orangutans in Borneo and Sumatra particularly relating to respiratory diseases

Gather OVAG information in a more formal way towards a database development and publishing

What OVAG means:

OVAG is collaboration from all people who really care about the future of the orangutan

Knowing people who work with orangutan and working together

OVAG feels like home!

OVAG is an original resource for orangutan knowledge

OVAG is a family and a place to share and discuss, although we come from different backgrounds and different countries

OVAG is a network of people (veterinarians and non-veterinarians) working to save the orangutan

OVAG is a group of people who love orangutan and is determined to save orangutans without reservation – and do not expect anything in return other than saving the orangutan

OVAG is sincerity

OVAG is a group that collectively sees and works with many orangutans, so a group holding much knowledge – all together at one time

OVAG's voice can be heard worldwide by publishing

Quiz: For evaluation purposes (given to participants at the beginning and then again at the end of the workshop)



Overview of framework in dealing with issues of orangutan health : Steve Unwin

Abstract

Back to Basics: Preventative Health program

The goals of a preventative health program are to:

- prevent disease entering the site
 - maintain health of animals and people on site
 - prevent dissemination of disease to other institutions / release programs
- Importance
- Difficulty of diagnosis and treatment of overt disease
 - Often too late once show signs of overt disease
 - Difficulty in eliminating many organisms once established in the collection
 - General improvement of condition / performance of stock

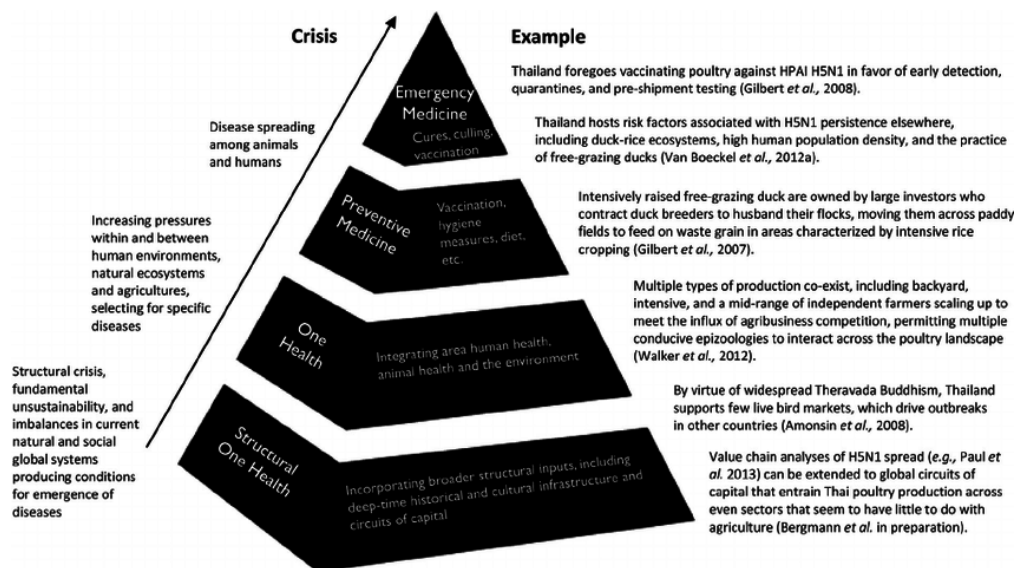
Using Chester Zoo as a worked example and template, and their own experiences, delegates will form location orientated groups to work through:

- a. Who are the decision makers
- b. What are the components of a successful program (guided). Compare this to what you do now
- c. How are you going to implement the program effectively (guided). Compare this to what you do now
- d. Why? Justify your decisions for c.

One Health Concept: investigating issues of disease across populations

One health refers to the collaborative efforts of multi-disciplines working locally, nationally and globally to attain optimal health for people, animals and our environment.

Review of One Health Pyramid



We tend to deal with the top end of the pyramid – we try as clinicians to do preventative medicine, improve diets etc., but there are increasing pressures from situations arising from human/animal interactions.

Structural One Health: looking at socioeconomic factors that can spread diseases between species. Much of the wildlife we look at regarding disease deals with human interactions. Most wildlife issues are in areas that have been modified by human activity and human culture – though we are not experts in culture, economics, etc., we still need to be aware of them and engage with people who do know those things.

Wildlife corridors: many such corridors have been set in protected forests where there is no human encroachment. However, most are in areas that work as buffers between areas of human habitation. Others are in human settlements and some of those are very close to intense human land sometimes including livestock.

As members of OVAG, there are areas that we work in which are: in wild areas, close to wild areas, in secondary forest near human use areas, close to human habitation, waterways, roads, and, palm oil plantations. The variety of areas we work within allows for much crossing between orangutans and humans (as well as other animals).

The reintroductions and translocations that many OVAG members engage in brings another arena for potential disease spread. Things that need to be considered: the presence of a wild population / the length of time wildlife are close to people / length of time in reintroduction centers: years sometimes decades, for translocations: sometimes less time (this needs to be properly assessed). What should be done? What about the orangutan population in the wild?

Our expertise is needed in areas where human interaction is high. Ex., In chimpanzee research areas, up until 2008, face masks were not used. Chimpanzee die offs were caused by infections they contracted from humans (mainly infections from the European researchers). Even though now there are places that explain disease risks, there is still contact and so the risks increase as well in transmitting diseases between non-human primate and human primates. As has been discussed previously, risk is the likelihood of something occurring and the consequence of that occurrence happening. Also, when you have an interaction that is ongoing (for a substantial length of time), time of exposure is also long.

Ex., If when translocating an orangutan, someone has TB, contact is brief and risk is low, but in areas of reintroduction where contact is longer, risk of transmission is higher.

As humans, we are hopeless at assessing risks. We are not typically good at assessment. Uncertainty makes us anxious. Therefore, good Risk Analysis makes us more confident in the decision making process. In everything we do, there is always a disease risk, and anything we can do to mitigate that will help.

Information on risk assessment:

<http://www.cbsg.org/content/iucn-manual-procedures-wildlife-disease-risk-analysis>

<https://portals.iucn.org/library/node/43386>

The six steps:

1. Problem description
2. Hazard identification
3. Risk Assessment
4. Risk management
5. Implementation & review
6. Risk communication

1. Principles - Big Concepts and Risky principles.
 - Understand the basic principles of disease ecology and 'One Health'.
 - Consider how to link these principles with the work you do each day to help provide you with disease management possibilities.
2. Principles - Disease Risk Analysis back to basics.
 - Understand what risk is and the ways risk analysis can help manage disease.
3. Practice - Risk Mitigation via Disease Risk Analysis.
 - Accurately identify the main pathogens of concern for your project.
 - Successfully utilize the tools and materials provided to produce a risk analysis process for your project, as the basis of a complete preventative health program.

Ex., If you have a health issue, think about who needs to be informed? Is it the water? Where does it come from? What is the cause? Get the information needed to prevent a crisis situation.

Discussion: Regular face masks are basically useless –stronger masks are needed (this was debated as stronger masks are expensive and sometimes difficult to get – but are they really needed or are regular face masks enough but wearing them properly may be more effective / In Sabah, workers have received health training and as a result they have really improved. They wear full personal protection equipment – even rangers wear masks and gloves. In the Wildlife Rescue Unit, they try to evaluate the different areas of contact. Especially when people go into the forest, they are working now on ways to give

information to the local communities....so giving training to all is crucial in dealing with disease and transmission / This information needs to be in the curriculum of certain universities on issues of bio security and needs focus throughout the workshop / Issues of bio security when conducting post mortems in the field and in centers is of concern... are respirators used by staff? How important is full clothing covering? Can this be enforced?

Primate Evolution (Crash Course in Evolution) - Raffaella Commitante

Abstract

While most of the Orangutan Veterinary Advisory Group (OVAG) workshops held annually focus on medical issues, it is important not only to understand the medical needs of orangutans but also to be able to have an understanding of their behavior and their general history. As not only is the understanding of behavior important, but also the orangutan's place in the great ape family as well as its place in evolution can be equally helpful. Many of the problems facing primates in general and great apes specifically are very similar across geographic locations. Gaining an evolutionary perspective allows us to better understand the behaviors of great apes that have evolved over time. This also allows for a better understanding of human-primate/non-human primate behaviors and interactions.

Tracing primate emergence through to human primate/great ape emergence and how that has manifested in overall behavior can be a useful tool in addition to medical skills and learning.

Having knowledge of human behavior and comparing it to non-human primate behavior (again specifically great apes) gives a much clearer picture of the orangutan, this in turn has implications for orangutan health.

Anthropology is a field that merges the understanding of human cultures with human health issues. We need to apply a similar methodology when dealing with our closest relatives, the great apes: merging our understanding of their culture (behaviors) with their medical needs.

Primates first begin to emerge from mammals anywhere from between about 75-100 million years ago (mya). Many varieties of mammal species developed because of the space made available with the extinction of the dinosaurs. But it is in the Paleocene, about 50 mya, that the primate group begins to flourish and truly separate from the rest of the mammals with their own set of unique characteristics. These early primates were small, many nocturnal (active at night) and had adapted to life in the trees. These early primates are now extinct, but they gave birth to ALL the primates we see today... including human primates.

Early human ancestors emerged from a group similar to chimpanzees but with something different happening with their skeletal structure. Early ancestors such as *Sahelanthropus tchadensis* dating to about 6 mya, and *Kenyanthropus platyops* dating to about 3.5 mya, showed some evidence of diverging away from great ape structure. These new body shapes were adapting to life back on the ground – while still being able to return to the trees if they needed to. The body changes were mostly due to adaptations for bipedalism and a larger brain (allowing us to evolve differently from the typical great ape). Once these early human ancestors began to adapt to life on the ground, they quickly gained advantages over other primates and expanded, continuing adaptations to their skeletal structure and eventually giving birth to the *Homo* lineage. Several *Homo* groups emerge about 2 million years ago (with *Homo habilis*, the first homo group). Beginning with *Homo erectus*, which moved into many areas outside of Africa, a *Homo* takeover begins that eventually adapts into the newest and most advanced group, *Homo sapiens sapiens*, which leaves Africa about 60,000 years ago and goes on to control the entire world.

Orangutan evolution:

The orangutan is the only great ape with a known fossil record that can be tracked (Whitfield, 2003). Possible ancestors include: *Lufengpithecus*, who is believed to have existed between 8 – 13 mya and quite possibly earlier (Chaimanee et al. (2003). *Sivapithecus*, existed during a similar time frame between 8.5 – 12.5 mya (Gibbons 2006, Kelley 2002). *Ouranopithecus*, existed from about 9.5-7.5 mya (Alba, et al. 2010, Begun 2005). *Khorapithecus piriyai*, existed from 9–6 mya (Chaimanee et al 2006). Some possible orangutan ancestors were quite large. *Gigantopithecus*, for example, was 3 meters tall and had quite a lengthy existence from 9 mya to as recent as 100,000 – 200,000 years ago. It is thought that *Gigantopithecus* was an ancestor of the modern day orangutan. There is history of an early *Pongo* lineage during the Pleistocene from about 2.6 mya to 11,700 years before the present time (Harrison et al 2014). *Pongo weidenreichi* is thought to be the earliest *pongo* of the *Gigantopithecus* line, from the early to middle Pleistocene in China and *Pongo*

hooijeri from the middle Pleistocene in Vietnam (Schwartz et al 1995). *Pongo javensis* of Java dates to the middle to late Pleistocene, with smaller dentition than modern day orangutans. *Pongo duboisi*, in Sumatra dates to the late

Pleistocene, and were larger than modern day orangutans. *Pongo palaeosumatrensis* and *Pongo devosi* were the smallest and also found in Sumatra during the late Pleistocene. *Pongo palaeosumatrensis* from Sibrambang could possibly be a sister taxon to both *Pongo pygmaeus* and *Pongo abelii*.

The *Pongo pygmaeus* and *Pongo abelii* genome split between 2.5 million years ago and 500,000 years ago, before becoming geographically isolated (Zhang, Ryder, Zhang, 2001). Others put the split between the two genomes at 400,000 years ago, with geographic separation occurring 21,000 years ago (Locke et al 2011).

Primate Characteristics:

Over time primates developed unique characteristics that today are shared by all primates (to a lesser or greater degree...depending on the primate)... even human primates. These characteristics are:

Grasping hands and feet / Sensitive pads at the tops of fingers and toes / Flat nails on most fingers and toes / Upright posture (most can walk bi-pedally) / Importance of vision (binocular/color) / Lessening sense of smell / Large brain for their body size

Some have unique characteristics that can be seen only in their own species such as: the prehensile tail of some monkeys that are found in the Americas; the small or missing thumb of tree swinging monkeys found both in the Americas and Asia; and others have even kept a few very early characteristics (nocturnal and a stronger sense of smell). Some are more adapted to eating insects; some are more adapted to eating fruit; and some are adapted to eating vegetation. But most primates eat from several of those food groups with a few eating everything, even meat!

There are two main primate categories:

Strepsirrhines (wet nosed primates) and *Haplorrhines* (dry nosed primates). The *strepsirrhine* group is composed of the lemurs, sifakas and aye-ayes of Madagascar; the galagos and pottos of Africa; and the lorises of Asia. The *haplorrhine* group consists of the monkeys of the Americas (Mexico, Central and South Americas); the monkeys and great apes of Africa; and the monkeys and apes (great and small) of Asia.

Today, there are over 600 species and subspecies of non-human primates. Most are threatened, endangered or critically endangered. Both species of orangutans are now classified as critically endangered (International Union for Conservation of Nature, 2016). Non-human primates are facing difficulties because of one primate in particular, the recent arrival, *Homo sapiens sapiens*.

Discussion: *Floresiensis* – what do we really know about this group? What are possible adaptations going forward for orangutans? What do we really know about orangutan behaviors? What about dentition? What is the orangutan way? Do we really know? In centers orangutans are kept in chimpanzee type groups and in zoos they are typically placed in gorilla type groups, while not duplicating a wild situation, they seem to adapt very well to social living (typical of primates).

Animal Welfare: Steve Unwin

Abstract

Introduction to Welfare assessments

Welfare is important to all those who work with wildlife. The session introduces multiple templates from various organizations (BIAZA, Brookfield Zoo, Twycross Zoo, The Deep Aquarium). Chester Zoo and EAZA are also working on a new internet based assessment process that will take the best of previous assessments into a single, taxa based process that aims to be useful AND used. It is felt this will be applicable in most OVAG situations as well, as well as discussions about the possibilities.

There have been many different ways presented when trying to make better decisions for animals regarding their welfare. The EAZA (European Association of Zoos and Aquaria) are working on an assessment process to be able to make positive changes in the welfare of animals in human care:

1. Better assessment of the enclosure or area of an animal as well as the animals' interaction in that area.
2. Create a generic welfare assessment form – to be used for daily assessment of any species; create a web-based welfare rating system....get list from Steve (qualitative) very basic because when it is too specific people will not buy in and do it – can become species specific so begin with a general assessment and then segue into more species specific questions and assessments
3. Focusing on behaviors regarding movement

Captive Wildlife Welfare Assessment: Current Trends and Measures for Improvement: Sumita Sugnaseelan

Abstract

Zoo accreditation and captive animal welfare have become issues of critical concern for zoological facilities worldwide. In South-east Asia, many establishments have become the focus of attention and their roles as centers of education and conservation have been questioned. As such, there is a driving need for standards to be established in areas of animal husbandry, enclosure design and animal welfare. In Peninsular Malaysia, the establishment of guidelines on zoo management is of national concern and thus, the Wildlife Conservation Act 2010 was gazetted to govern the conservation, utilization, trade and welfare of captive wild animals in Malaysia.

Malaysia's Wildlife Conservation Act 2010 (Act 716) has been put in place to supersede previous laws governing conservation, utilization, trade and welfare of captive wild animals in the country Malaysia's The Act is an improvement on the laws protecting wildlife with more local species listed in Appendix 1 (Protected), and a considerable number shifted from Appendix 1 to Appendix 2 (Totally protected). It also includes a provision for the management, husbandry and welfare of zoo animals. This was latter supplemented with a Federal Government Gazette of the Wildlife Conservation (Operation of Zoo) Regulations 2012 that was designed to ensure local zoos attain and practice animal welfare standards, ensure zoos organize and manage collection records, and assist zoos to identify areas for improvement.

While many zoo operators have portrayed their genuine concern for the improvement of the welfare of wild animals held at their facilities, many are held back with constraints of space and budget. As such, audits were carried out at most of the major establishments to evaluate the current situation and recommendations have been issued on how these obstacles may be overcome within a reasonable period of transition time. An audit team (headed by Drs. Sumita Sugnaseelan and Reuben Sharma) was established by the Ministry of Natural Resources and Environment (NRE) Malaysia to conduct assessment on zoo management and animal welfare in line with the requirement for the zoos to be awarded an annually renewable operator's license. The criteria used in assessment of zoos in Peninsular Malaysia encompassed 34 focal areas categorized under:

- General legal compliance
- Collection management and records
- Animal welfare, health and disease management
- Enclosure design and enrichment
- Staff competence and continuing education
- Involvement in conservation and education
- Biosecurity and safety
- Waste management

The first phase of the process involved large mammals and primates, with emphasis on providing a suitable physical, physiological and psychological environment, provision of a suitable diet, and timely veterinary care. Specific issues highlighted include the refurbishment and upgrading of the enclosures to address space requirements of outdoor exhibits and indoor night stalls, provision of suitable furniture, substrate and enrichment according to the needs of the species, redesigning the feeding regime and diet, improvement in overall sanitation of the enclosures, management of husbandry and medical records, designing prophylaxis and prevention programs, improvement of waste management, mandatory

protocols for quarantine and disease monitoring, and the employment of either a permanent or named consultant veterinary surgeon. The second phase will cater for small mammals, birds and herpetofauna.

The audit team also noted seven common challenges faced by the zoo operators, namely inadequate space for expansion, budget constraints, varying levels of staff experience & competence, inadequate waste management & biosecurity, erratic record keeping & data management, poor knowledge of animal nutrition, and disease management (when there was no on-site permanent veterinarians).

At present, there are no internationally accepted criteria or guidelines for zoo animal management and welfare. The requirements for many species are still unknown, and there remains a paucity of information on proper social groupings, enclosure design, nutrition, and physiological requirements. These challenges can be addressed with continuous sound scientific research on the specific needs of the various species in their captive environment. However, it is envisaged that such a program, although laden with many challenges, will ensure the gradual improvement in the welfare standards of captive wild animals in the country.

Criteria for Assessment of Zoos: (there is finally a conference on welfare assessment), presented in the 2012 workshop in Bologna.

General legal compliance / Management and Staff / Records and Management / Conservation and Education / Safety and Biosecurity / Animal Husbandry / Enclosure design / Animal welfare and Enrichment / Bio Hazard and Waste Management / Records & Data Management / Development of a scoring system

Most items above are currently qualitative and we need to work quantitatively in order to learn and be effective.

Improvements of zoos:

Most zoos in Malaysia do not have a veterinarian on site; as a result there is no continuity. Each zoo needs a zoo veterinarian or at the very least a consultant that belongs to an organization that is reliable.

There needs to be a structure in place that zoos can easily follow.

Using food as enrichment is not beneficial / Requirements for many species are still unknown.

An assessment criterion has been drafted by American, European, and Australian Zoos. They have a document for the establishment of welfare standards which was proposed at the International Society for Zoo Animal Welfare (presented at the International Conference on Diseases of Zoo and Wild Animals) in Italy 2013. The European Association of Zoo and Wildlife Veterinarians (EAZWV) addressed the aspects of welfare and husbandry of captive wildlife. The draft was internationally accepted as standards for management of captive wild animals

Group Discussion: *Is anything happening in Indonesia that is similar? Global Federation of Animal Sanctuaries – what standards are they using? Currently every facility has its own standard operating procedures, there is no continuity. No one wants to share or collate this information. In Europe and America they are trying to develop something that could work worldwide, but then again it may not. At least it is a starting point. In order for zoos in Malaysia to operate they need an annual assessment that is universal, but now, different assessments are used. Time is needed to be able to development such an assessment format. It is important to create something that is useful to start allowing each facility to develop from that.*

Self-introduction of participants session



Orangutan Species Status / Population Group Discussion: Sen Nathan, facilitator

Discussion focused on the IUCN status of all orangutans being critically endangered and the population status.

Sabah/Sarawak population: Statewide survey in 2001 stated that there are 11,000 to 13,000 orangutans. 60% of orangutans in those regions live outside of protected area. Today, 75% live outside of protected areas. Sepilok is the oldest orangutan rehabilitation center in the world. While here have been no orangutans brought to the center for two years, the orangutan population is still decreasing. The reduction in the population may not be the same island wide. In Sabah it is not because of forest clearing or habitat loss but may be more due to fragmentation. This has caused small pockets of populations typically living in poor quality forest, and spending more time on the ground. This then creates issues with melioidosis (an infectious disease caused by bacterium). The orangutan immune system may have never evolved to deal with these new organisms (especially those found in water). Other issues: more disease, more forest fragmentation. There will soon be a statewide survey on orangutan populations. Ex., In the Kinabatangan, there has been a reduction in population (Marc Ancranaz). In over 75 years we have lost 82% of original Bornean orangutan population. In Sabah, many orangutans have been lost due to habitat destruction and hunting, and though that no longer occurs, we are still losing orangutans. In 20 years we have lost 40% of the population in Sabah. Small fragmented populations are dying off due to poor reproduction and orangutans leaving the forested areas to eat plantations foods. Hunting in Kalimantan (Indonesian Borneo) is still occurring, along with mining, etc. So, more fragmented populations can be expected, but in Kalimantan, there may still be time to keep the forests connected. Between Sabah and Sarawak (Malaysian Borneo), 90% of orangutans are gone. It may not necessarily mean the population is going extinct, but, we are continuing to lose numbers of orangutans - population wide.

In Sumatra, they say the population is double what they thought – but it could be the methods used as there is still a lot of hunting and deforestation. This makes orangutans more exposed to human population. In the next 5 to 10 years we will be facing the same issue of continuing fragmented areas. The orangutan population in Sumatera is currently put at 11,000. However, researches still feel that overall number is going down though they may have found new populations where they never looked before (because orangutans would not typically be found there) hence the changing number counts. More important than numbers is the trend...which is downward. The trend in Borneo shows about 80,000 orangutans throughout the island. This number increase has to do with new areas being explored. No one really knows the exact number. Some still feel the numbers are much lower than the 80,000 number as density numbers have built in errors so an absolute number is not trackable nor is it really important. What is important is that the trend is still indicating loss of individuals; also people still shoot or kill orangutans in Sabah because of orangutans becoming crop raiders and eating plantation plants. Interestingly, even though around converted forest areas, such as the plantations, orangutans are surviving and breeding (most likely due to feeding on many of the plantation foods). Orangutans in these areas are in permanent groups and not transient populations. But due to the proximity to humans, they often need to be translocated. As orangutans can survive in plantation areas, it may be better to leave them there rather than translocate them as there are broader implications to translocations. Orangutans can even survive in palm oil plantation, and as long as no one shoots them, they can survive. It may not be a viable population, but, it may not be necessary to move them out of the areas they are adapting to. Also, we may not know as much about orangutans as we think as they appear to be very adaptable. The problem is that in plantations there are many migrant workers who may have disease issues that can be transmitted to orangutans, which in turn can reduce the orangutan population. Translocations can be considered if orangutans are coming into contact with a less than healthy human population. With macaques the risks are even greater as they are very adapted to heavily populated human areas. Recently there was an orangutan in a plantation near the roadside, SWD were called in to translocate it. SWD made the choice to leave it and it went back to the forest on its own. Trying to translocate it would have necessitated darting, and as it was very high up in the tree darting could have caused injuries. Therefore translocations need not be the first step. There needs to be proper protocol so that each case can be evaluated before the decision to translocate. We need a better scoring system to decide if an orangutan really needs to be translocated.

The behavior of the local people needs to be considered as well. Some people are farmers and they hate the orangutans because they feel orangutans can be very destructive. There are areas where people like orangutans because they can 'sell' the orangutan as a tourist attraction. Better legislation is also needed. However, if there is no enforcement, legislation does not mean much. Sometimes waiting for government may not be practical. Sometimes we must take the initiative and act on our own. When pushing government policy, it helps to have scientific backing.

What is the current trend in receiving orphaned orangutans?

In Sabah, it has improved as less orangutans are coming into centers. Things are different in Kalimantan and Sumatran. In Sumatran, there are still lots of babies coming into centers. Since January 2016, 17 babies have arrived at SOCP. Is this number the same in the past? Yes, as typically they kill the mother and sell the baby. Humans are continuing to cut all the big trees thus fragmenting the area. In Sepilok, why are orphans not coming in? Are the females not reproducing or is the situation better? If the females are not reproducing then there would be no babies. Orangutans are still reproducing, but then what is the cause? The trend of orangutan loss seems to follow the trend of habitat loss. The number of orphans that come in can be matched with the opening of forested areas for plantation or logging. Right now in Sabah, the conflict seems to be more with elephants and translocations rather than orangutans.

Maybe we should move away from nest surveys? There are those developing better ways to estimate orangutan population as they are typically based on nest counts and not actual individuals. As there are inaccurate surveys, it might be more apt to focus on what is happening rather than actual estimated numbers. Do we need more accurate data? Yes! Nest counts may not be enough. In Nyaru Menteng (NM), sixteen orangutans arrived in 2014, in 2015 twenty-one arrived, and up to April 2016, fourteen arrived. These were all confiscated orphans below five years of age. In West Kalimantan, the forest fires in 2015 brought seventeen babies into International Animal Rescue (IAR). Since January 2016, six have come in, and the forest fire season has not even begun. In Ketapang, deforestation is a big problem with conversion to oil palm plantations. It is becoming more and more difficult to find good forest. Babies still are sold as pets, and some villagers hunt orangutan. In East Kalimantan, Samboja Lestari has received three babies thus far in 2016. Last year the number was higher. Sometimes it is not about the numbers coming in at specific times but whether they are found.

In observing wild orangutans in Kinabatangan, females with a young baby will leave their young behind for hours as they go into the plantations to feed. They hide their babies. Since it was first built in 2007, NM staff always asks where a baby was found. Typically the story is not believed as to how they 'found' the infant. But in NM, they are seeing that mothers park their babies as they forage for food. It could be possible that someone found the baby rather than that the mother was killed to get the baby. As is what usually occurs with orangutan mothers living close to plantation areas. As orangutans adapted to new environments, we need to be open to their plasticity. Orangutan females may park their babies in order to protect them, keeping them from harm as they try to find food in a new landscape.

Management of Orangutan Post Release Assessment – Citrakasih Nente, facilitator

Five release sites presented information last year:

Orangutan Foundation, United Kingdom (OFUK): Lamandau – 5 sites – 150 released since 1999. 60 are still being monitored and 60 infants have been born in 16 years.

Jantho, Aceh (Sumatran Orangutan Conservation Program – SOCP) – 70 orangutans were released in 4 years into good forest. Early surveys found no wild orangutans in the area prompting the question as to why if forest is so good. Health issues: diarrhea, malaria and respiratory diseases. A veterinarian is onsite.

Jambi – SOCP released 164 orangutans in Bukit Tiga Puluh. There have been 23 deaths, there is no data on 29 individuals, but there have been six births and 81 have good data that have been collected on their movements. A veterinarian is onsite here as well. Health issues: difficulty with orangutans adapting to the wild, not building nests, and inability to find forest foods. Because of these issues, four orangutans remain in cages.

Borneo orangutan Survival Foundation (BOSF) has released 135 orangutans in Batikap. Three babies have been born and carrying capacity has been reached. BOSF is currently looking for another release site. There is no veterinarian on site, but, there are regular visits from NM veterinarians. Orangutans seem to need three months to adapt to the area. Health issues: raiding of observer/researcher camps and the nearby village is exposing them to the human population.

Orangutan Foundation International (OFI) – In the Seruyan Wildlife reserve 106 orangutans have been released. In Tanjung Putting, 80 orangutans have been released. Health issues: injuries and un-releasable orangutans. This has necessitated discussions about a sanctuary for those that cannot survive in the wild.

Overview of discussion from last year's OVAG – there are still some issues with a protocol for release sites but many are beginning to implement protocols.

Case Study: Pandu, Jantho Veterinarian

Manual/Protocol: The veterinarian is responsible for released orangutans and those in the adaptation cages. The veterinarian also coordinates with the manager about orangutan health status post release

Visual PE

1. Document activity of orangutans in adaption cage
2. Check appetite
3. Check appearance - from Body Score Condition
4. Conduct simple lab examination, take fecal sample. Three days after arrival, initiate wet prep (direct and flotation), if there are parasites such as helminths, protozoa. If 3 out of 5 slides show prevalence, then treatment should be started. If prevalence is just on 1 or 2 slides and there are no clinical signs, then no need for treatment. Urine samples are taken each week to look at SG, pH, etc., using strip test.

Calculate total food in adaptation cage, then monitor behavior in adaptation cage, do they recognize and eat jungle food like fruits, termites? Can they make a nest from vegetation provided by keeper? If not infectious, can they be kept in adaptation cage? If infectious, orangutans must be moved (possibly using anesthetics), if so, only a veterinarian can deal with that regarding process and drug usage. Orangutan is not left alone until fully recovered. Veterinarian checks 10 days per month – certain behaviors are looked for in orangutans in the forest – things that must be checked: making nest, actively browsing for food, decrease in Body Score Condition, any visible wounds, and any movement problems.

Discussion: Have issues of treating intestinal parasites come up at OVAG? When do we treat parasites and when do we not treat? What is a healthy load? At Jantho, they do have protocol for when veterinarian should intervene. Visual checks are conducted, especially regarding an orangutan's activity. But, if condition is poor, they try to see if they can help. Protocols can be different between centers; however this session is about what assessments are happening in a field setting. Later discussions can focus on what are the recommended guidelines from the IUCN regarding health assessment post release.

Veterinarian Protocol at BOSF : Fransiska Sulisty

(BOSF Veterinary Manual Ch. 1.5 Medical Post Release Monitoring): Sharing a few parts of the vet manual that was just finished by BOSF– a guideline for population health management and medical procedures and lab diagnostics – all participant veterinarians should review the manual. It is posted on the Google Drive site for OVAG and it is in Bahasa Indonesia.

The following is a summary of ch 1.5: Management Procedures and Lab Diagnostics:

Ideally, there should be a veterinarian on site at all times. If this is not possible, then there should regular visits every two weeks (remaining for at least 2 to 4 weeks to do observe orangutans) and there should be some overlap between when a new vet arrives so information can be shared and properly updated. If the orangutans are newly released, more intensive monitoring will be needed.

Routine:

Daily meeting with camp coordinator/deciding which orangutans to follow and prioritize based on PRM behavior data/doing observations/taking samples/performing interventions if needed

Veterinarian is responsible for: drug inventory at the camp; and submitting a report at the end of every visit. The report would cover the following activities: if any orangutans are found, record of condition, treatment given, etc.; and record of any samples taken and analyzed. The veterinarian also acts as an emergency paramedic for the staff at camp. It should be

made clear beforehand that the veterinarian is not authorized to neither manage the camp nor monitor the staff (unless expressly asked to do so).

Medical Intervention:

The veterinarian (vet/s) must intervene for health problems relating to the release process or transportation, such as, animals in bad condition (if there is doubt too poor prognosis). Thorough medical checkups and sample collection must always be done whenever there is the opportunity to do so, especially when immobilizing an orangutan.

Types of intervention: Intensive observation and treatment in the forest/bringing an orangutan to a temporary treatment cage next to the monitoring camp/sending the orangutan back to rehabilitation center/euthanasia.

Intervention for non-medical issues: The vets also have duties regarding conflict mitigation and dealings with the local people.

Types of mitigation: when an orangutan is constantly raiding or is engaged in disturbing behavior in and around monitoring camp or local people's settlement, it should be immobilized and moved to a different location.

All orangutans needing to be returned to rehabilitation center must undergo appropriate rehabilitation stages and have their behavior monitored and analyzed before they can be considered for re-release or if they need to be prepared for permanent sanctuary.

This report was prepared as more of a concept rather than a step by step manual, but all vets should know what to do when in a release site.

Case Study: Noel and Kent in BOSF release site Keje Seven, Hafiz, BOSF

Noel arrived in Wanariset (BOSF KalTim) in 2002 when he was one year old and released in the forest in ?. In November of 2014, he was taken back to the center in Samboja Lestari as he was found in the local village area where he stole things. The local people threatened to kill Noel so the decision was made to bring him back to the center. Noel died in July 2015 after intensive treatment for typhoid fever and orchitis (inflammation of one or both of the testicles). He also tested positive for *Brucella* sp. It was also found that he had ingested rubber while at center (from enrichment) that ruptured.

Kent arrived at two years old in 1999 and was released in 2014. They found him on the ground in the release forest very thin with external wounds which were infested with maggots. There was no vet on duty at the time, so the staff put him on fluid therapy and cleaned his wounds. He was brought to the on-site habituation cage for continuous treatment. After two weeks, he was taken back to Samboja Lestari. At the center his wounds were cleaned, he continued to receive fluid therapy, along with injections, gel for his topical wounds, and more drugs. He has recovered and he is scheduled for the next release to return to Keje Seven.

IUCN Guidelines for best practices group discussion:

Quick Introduction of the guidelines:

One of the questions: during release program – when should you intervene, or what circumstances should you intervene?

This has been in discussion for almost 10 years. The IUCN Best Practices reviews guidelines for disease control for animals in the wild or those that may be released into the wild. All the authors are veterinarians, but the audience are managers and/or protected area authorities. It is also very Africa heavy as most of the authors work in Africa. Most of the data comes out of Africa, very little comes out of SE Asia. The focus of the document is disease prevention. It looks at the team involved in any particular area and ways to decrease risk, (including how people behave in the forest), being properly prepared (via the DRA), and the move of pathogens between different populations. The document reviews these items in great detail.

Discussion: When should you intervene? How was decision made to intervene in BOSF? In Noel's case, intervention was driven by human orangutan conflict, as Noel had been moved back to the same location seven times but kept returning to the village. There was an in depth discussion about Noel's situation and the decision was made to return him to Samboja Lestari. There was some discussion as to whether he should have been left to die in the forest or if it was best to bring him back to the center. In the Bukit Lawang case, the orangutan kept getting closer and closer to people so the decision was made to take him back to the center. He was brought to a different forest (Jantho). There he is doing better and never goes near people and is even becoming a dominant male. Regarding BOSF, why was the release site so close to a human village? Response: finding a proper release site is difficult in East Kalimantan.

Has anyone else had to intervene? In 2012, a female was released from Sepilok Rehabilitation Center in Sabah, and collectively it was decided she be brought to the forest cage where she was eating and drinking well. On the third day, she began to go off food and liquids. The vet was called in and they returned her to Sepilok where she was given treatment. She stayed there for two to three months. In October, they released her back to the forest with another female and she is now quite independent and has given birth. Because the numbers have been decreasing in Sabah, they can release small groups and can monitor them more closely because the numbers are small. It seems that if knowledge of the individuals that have been reintroduced is high, then it is easier to monitor their health and behavior.

Recommendations in the guidelines: (and would they have made a difference?):

Guidelines can be found on the OVAG Google Drive and also at:

<https://portals.iucn.org/library/sites/library/files/documents/SSC-OP-056.pdf>

Was there an outside entity that monitored actions of vet team? BOSF has several external consultants that were asked about intervention. In NM, a big male, though not dominant, was monitored. He looked thin and it was hard for him to find food. He stayed in one nest for a few days, and was then taken to the camp for monitoring and treatment. He was treated for two weeks in the release forest (there were not many resources in forest)). He was given food and there was evidence of constipation. He was given a mixture of soap and water to try to make him have a bowel movement. There was some active strongyloides, and when they tried to move him he would get breathless. He was treated but after two weeks, he died. The 2nd intervention involved Cindy and her baby. She stayed near to the camp with the baby in order to be near the people there. One of the staff tried to catch her so she could be moved away from the camp. Staff was able to check the baby and it was very warm. The infant tested positive for malaria and both mother and child were placed in a cage for monitoring. When infant tested negative, they were both moved far into the forest. In another case, a female was found in the forest very weak and the baby she carried earlier was no longer with her. She was not eating and was staying near the forest cage. She was taken back to camp and given generic treatment along with milk and food; after which she was taken back to the release area and monitored. However, even though she was taken far from camp, she found her way back. Another case involved a big unmanageable male. He tested positive for strongyloides, was given milk and fruit, and then released back to the forest. In all, 10 out of 180 orangutans have needed some kind of intervention.

These guidelines are for released great apes and they are only guidelines. There is no firm document that needs to be followed step by step. Each location has its own challenges. Tabin Forest Reserve in Sabah, for example, is very large and there is 24 hour staff. In the beginning the situation was not good as the orangutans were not able to adapt to the area. All experiences give us the opportunity to write our own standard operating procedures (SOPs) that work specifically for each location. Things such as deworming may need to be done more often in youngsters, etc. All centers have learned, have modified and have developed their own SOPs. Centers can now act faster to make sure things go smoothly. Remember, they are guidelines.

The reasons the guidelines took so long to write is because they are worded very carefully but they are just still guidelines. Whether they are followed closely or not, there must be some kind of plan in place to deal with intervention. These are not rules but guidelines and suggestions, and at the end of the day, the responsibility of what is done is on the project itself to develop the proper protocol for the orangutans in their care. Therefore, when you are creating or updating your own plan, the guide could be used to make sure you do not miss anything or just be used as a check list. These are just suggestions.

Screening of volunteers, workers, or anyone:

In Sepilok, there are only some places where the public can go. The viewing platform is about 20 meters from the orangutans, so there is no contact. There are orangutans that do occasionally walk on the platform, but that contact is minimized though contact has occurred. In the nursery, the visitors are in a building with glass so no contact is possible at all. Perhaps they may allow visitors with masks. Some believe there should not be any tourists allowed in rehabilitation centers. However, centers are used for education as well. How are other centers dealing with human contact with orangutans? Bukit Lawang where there is some contact with tourists is an independent location where SOCP can make suggestions, as there is a wild population there. Difficult to monitor as orangutans there are free ranging and visitors can go in the national park. While they have procedures to minimize contact, there is still very close contact between visitors and orangutans. There are private tour operators that take tourists into the area and National Park Staff often cannot control what operators do with their visitors. SOCP is trying to stop the interaction, but it is difficult to train the guides due to the fact that they get money to bring people close to orangutans. When SOCP intervenes in medical issues and takes an orangutan back to their center, they often try not to return it back to Bukit Lawang. How is the relationship between orangutan NGOs and government departments? Normally, there is a good relationship with the government, but, there are local people involved as well as the guides. Much work needs to be done with the local people so they understand the situation. Is there support from government? In Indonesia, nothing can be done without the cooperation of the Ministry of Forestry. If working in Indonesia, you must build a good relationship with them in order to get things done. In the small villages, the concern is mostly on the community. If the community wants it, then it is done, regardless of the pressure from either the government or the NGO. Oftentimes, NGO resources are put more towards the community rather than wildlife. Sometimes tourism can be a real problem. When looking at the mountain gorillas, they get 10,000 people each year visiting them. If a tourist is ill, they are not allowed up the mountain. The visitor's money is forfeited. The fear is that if visitors are required to wear masks, they will not pay to come. Visitors are not guaranteed they will see gorillas, but, they are sometimes allowed to get too close. While typical masks do work to prevent transmission of diseases, they are not that expensive. However, at least in people, to prevent viral transfer (not TB), it just needs to be fitted properly (over the nose and behind the ears). Macaques have a higher infection rate for TB, which can then be transmitted to other species. Sepilok gets 150,000 visitors per year comprised of 50% Malaysians and 50% foreigners.

Post it Wall: Any issues can be asked about or mentioned there. Request was made for a centralized list of needed supplies. Siska will be point person on this.



Day Two - July 25

Respiratory Illnesses: Jennifer Taylor-Cousar

Abstract

Genetic and phenotypic characterization of CF airway disease in non-human primates

Gram negative rod infection, bronchiectasis and chronic sinus drainage characterize the respiratory syndrome that is present in approximately 20-40% of captive orangutans. These symptoms are also observed in the human disease, Cystic Fibrosis (CF). Despite response to pulmonary therapies used in CF (Stringer et al, J Zoo Wildl Med. 2016; 47:347-50), respiratory disease in this critically endangered population leads to extensive morbidity and early mortality. Although originally thought to be related to environmental conditions/exposures, a recent evaluation of predisposing factors demonstrated that diseased animals were more often genetically related to animals with respiratory disease (93%) than to healthy animals (54%). Based on the fact that orangutans share 97% of their genome with humans, and the similarities of orangutan respiratory signs and symptoms to those seen in CF pulmonary disease, we hypothesized that the phenotype in orangutans may be caused by mutations in the Cystic Fibrosis Transmembrane Regulator (CFTR) gene.

An Orangutan SSP (Species Survival Plan) supported research study is ongoing to determine if mutations in the CFTR gene are associated with chronic sinopulmonary disease in orangutans. This study would potentially identify the cause of respiratory disease in orangutans. Such information could be used to guide the use of therapies and breeding decisions in the orangutan population.

Chronic respiratory disease in captive orangutans is the most common cause of death and is the number one concern in American and European zoos and accounts for about 16% of adult mortality in the U.S. population. Why? Is it a drainage problem? Is there contamination in air sac? Examples of upper and lower airway diseases are: sinusitis, air sacculitis, pneumonia, and bronchiectasis. These types of respiratory illnesses occurs in approximately 20%-40% of captive orangutans. There have also been recent data which may include wild orangutan populations.

In situ, the problem seems to be more of an issue in Borneo, with males being more at risk. Some factors for this may be: exposure to human pathogens, overcrowding with fecal contamination of the environment, stress-related immunosuppression, and altered airway flora related to chronic antibiotic use.

Symptoms of Sinopulmonary Disease: cough, dyspnea, lethargy, nasal drainage, halitosis, anorexia, and pyrexia.

Signs of Air Sacculitis: induration, air sac distension, palpation of fluid collection, purulent drainage (GNR infection- *P. aeruginosa*, *E. coli*, *K. pneumoniae*, *Alcaligenes sp.*, *Enterobacter sp.*; Mixed infection- *S. pneumoniae*, *S. aureus*).

Signs of Upper Airway Disease

- Sinusitis



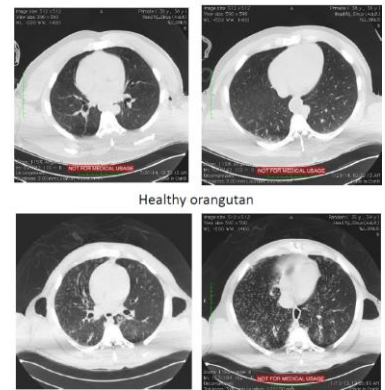
Healthy orangutan

Orangutan with chronic respiratory disease



Signs of Lower Airway Disease

- Acute inflammation
- Bronchiectasis



Healthy orangutan

Orangutan with chronic respiratory disease

In Ct scans, you want to see black space and if disease is present, white pus is seen.

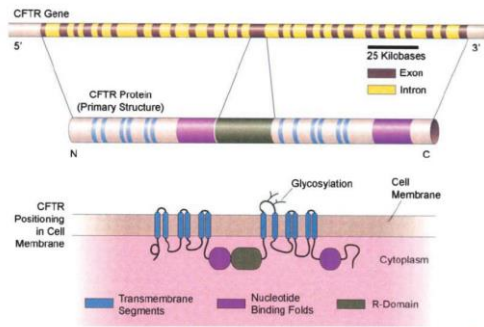
For lower airway disease, the airway should not be seen clearly. Image is more black than white. Treatment should be inhaled steroids, antibiotics or oral, through a nebulizer.

Sinus surgery link: <http://www.aalborgzoo.dk/nyhedsarkiv/to-orangutanger-fra-aalborg-zoo-blev-i-loerdags-op.aspx>

Anatomy of humans and orangutans is very similar and varies in the upper respiratory tract only. The lower tract is virtually the same.

Cystic Fibrosis is caused by a defect in the gene (CFTR) which basically causes the dehydrating of the airways because the chloride channel is not working. This allows bacteria to get in and the body cannot eject it; secretions become very thick and airways get blocked.

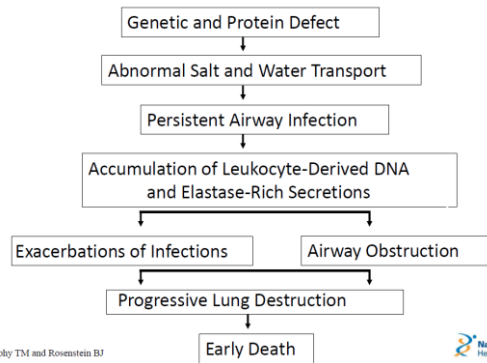
Cystic Fibrosis Transmembrane Regulator (CFTR) Gene



Am J Respir Crit Care Med. Vol 168, pp 918-931, 2003

National Jewish Health

Pathophysiology of CF



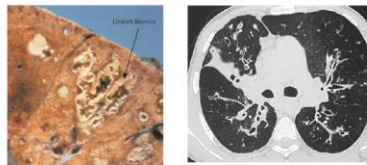
Murphy TM and Rosenstein BJ

National Jewish Health

Respiratory Manifestations

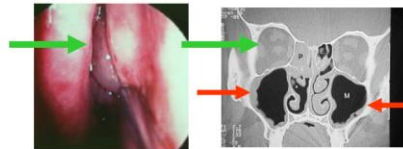
Pulmonary infections

- Cough
- Sputum production
- Chest pain
- Airway reactivity



Sinus disease

- Nasal polyps
- Chronic sinusitis

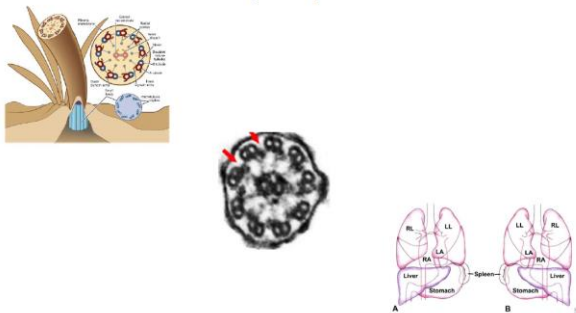


National Jewish Health

If airway scans show too white, the infection level is up. The pancreas also does not work properly and an obstruction in gut can occur as well. Treatment is providing good nutrition as well as medication for assistance in coughing.

Evaluation of cilia:

Primary Ciliary Dyskinesia (PCD)



Am J Respir Crit Care Med 2013; 913-922; charliebroadway.blogspot.com

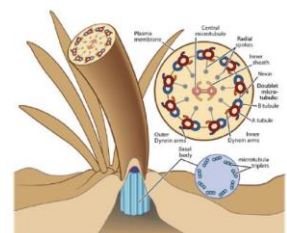
National Jewish Health

Normal and Abnormal Cilia

Different types of motile cilia have different function

- Respiratory tract: mucociliary clearance
- Embryogenesis: rotary motion to direct laterality of organs

- Abnormal cilia have stiff, uncoordinated and/or ineffective ciliary beat

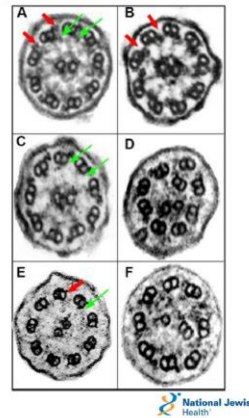


Am J Respir Crit Care Med 2013; 913-922

National Jewish Health

Diagnostic Evaluation of Cilia

- Ciliary ultrastructure
 - Obtain at times of stability
 - Requires processing and review at specialized center
 - Up to 30% of patients with PCD have normal or near normal ciliary ultrastructure



PCD – if cilia do not move properly then bacteria cannot be removed properly. There are 33 different genes for PCD that can be affected (inherited as a double recessive).

Clinical manifestations are:

Sinus disease: daily nasal congestion and chronic sinusitis. Chronic/recurrent otitis media: temporary/permanent hearing loss. Pulmonary disease: neonatal respiratory distress, persistent daily wet cough, sputum production, lower airway infections, such as *H. influenza*, *S. aureus*, *S. pneumoniae*, and intermittent *P. aeruginosa*. Situs inversus and infertility.

Suggesting therapy is difficult as there are no validated PCD-specific therapies nor are there any standardized therapies. Some suggestions: airway clearance/antibiotics to control the infection/anti-inflammatory therapy/vaccinations.

Discussion: Was it the *CFTR* gene? It is the gene that produces cystic fibrosis. Samples for the studies were acquired from various zoos to see if the *CFTR* gene was abnormal. The DNA analysis of the history of orangutans in zoos is ongoing. Twenty zoos have contributed blood for the study and gene sequencing has been completed on 39 orangutans. So far there is DNA samples of 51 orangutans. Nasal cells can be checked to see if they secrete chloride which could be an indicator.

If genes can be identified, then we can better manage the illness. Ideally, once the study is complete in the U.S., the information can be shared hopefully allowing for in country studies. Respiratory problems seem to occur more in orangutans and less in other great apes. Does inbreeding have an impact? Yes, as there is what is called a founder effect, where a specific gene can be more common within a closed population. Environmental factors: assumption was that it is related to husbandry such as issues associated with overcrowding. This is an easy assumption to make but difficult to study accurately as husbandry practices change making it difficult to track. As other great apes do not get such a high rate of respiratory issues, orangutans might be more susceptible to poor husbandry. However, that may not necessarily be the cause, as humans are exposed to many things as well environmentally and it does not have the same impact. In rehabilitation centers, many orangutans have gastro intestinal problems. It is common for zoo vets to liaise with human doctors, rehabilitation centers can do the same (which they do quite often). Respiratory ailments are common but it is not always known that it is a chronic condition or that it may be genetic.

Orangutan Respiratory Disease Complex: Nancy Lung

With orangutan respiratory ailments, the focus is often on the throat sac. Sometimes this focus causes the sinuses and other things to be ignored. In the U.S., 26 zoos have Bornean orangutans, 28 have Sumatran orangutans, and 23 have hybrids for a total of 77. Respiratory disease in orangutans has a huge impact which is not seen in other great apes. Respiratory ailments cause the loss of males from the ages of 9 to 15, when they should be entering breeding mode. Some orangutans have chronic respiratory disease for years accompanied with constant treatment and is very disruptive, as well as being a drain on resources (which includes medication as well as labor costs).

From 1980 to 2008, 15.6% of orangutans were dead due to respiratory illness. In 2012, 38% of zoos were managing orangutans with chronic respiratory disease. There is a medical database on orangutans that is available through Nancy Lung and/or Joe Smith (of Fort Wayne Children's Zoo, an OVAG sponsor). Several papers have also recently been published

concerning orangutan respiratory disease. A paper written by Lawson focused on 14 orangutans over a two year period. Symptoms were all focused on the throat sac with no sinus information reported.

The main point is to not treat the sinuses etc., as separate systems. The upper respiratory includes the sinuses, the larynx and the air sacs. The lower includes the trachea and the lungs. We should all feel confident in using human respiratory information as a guide. When sinuses get inflamed, the passages get narrower and narrower (due to the swelling of the membranes). It seems clear that sinusitis is underdiagnosed. The difficulty is in how one differentiates a cold from sinusitis. It is an important distinction as sinusitis can be a precursor to chronic infections.

Positioning for an x-ray is important. The chin should be tilted, the jaw should be upward at about 45 degrees in order to get an accurate picture of the sinuses (called a water view). Positioning is crucial! Our dream...everyone having a CT scanner!

All five of the great apes have air sacs, but, they are not near as extensive as they are in orangutans. Most common in males, but females can have issues as well as young males. A healthy air sac should be nice and flat making it easy to tell when it fills up. It is important to note the difference between fluid and air in the sac. Palpating the throat sac helps to determine which it is. Air sac issues are the most commonly reported, not because they are so common but because they are the easiest to see; so, they are reported most often. Pockets of pus can get stuck anywhere along the air sac as it is connected to the throat, also under the arms and behind the neck. Antibiotics alone are not going to get into the pus but they can control the consequences of the infection.

Protecting the lower airways: closing off the ostia works in the short term, but does not work long term. There is a new technique where by the ostia is closed more efficiently by using the sterno-hyoid muscle to tack it down. Also, a process called marsupialization (sewing the mucosa) allows for a few weeks of drainage. Another process is resection (partial or complete) which is difficult in adult males but does seem to work in sub-adult males. If orangutans do have a throat sac infection, they should not be released.

What kind of illnesses do vets see: bacterial, a few viral, fungal (many viruses mimic this), strep throat and allergies. Many lower tract infections are undiagnosed: pneumonia – 31% (most common in zoos)/bronchiectasis – 24%, and many more. TB is most common in centers...maybe not! Flu virus in U.S. zoos seems to cycle through all great apes except orangutans. Treatment for respiratory ailments work only if you have an accurate diagnosis as you may be treating the wrong illness in the wrong way. Some treatments include: Injectable drugs, oral drugs and nebulization. Type of treatment can depend on cost, behaviors of orangutans, management, etc. For example, nebulization needs to get to the lower airway, and the respiratory tract needs to be looked at from all aspects.

Further details of this presentation will be posted on the OVAG Google Drive

Discussion: *at BOSF there are many cases of air sacculitis, should not they be released? For males, if they have gone two years without an episode they can still be assessed for releases. In females, if they have gone 1.5 years without an episode, they can be considered as well. This is difficult to know if they have not relapsed as they could have sub clinical disease, but if they are symptom free it should be okay to release them. One controversial approach is to take a diagnostic aspirant and see if there is anything there but the risk is that you may allow something in that was not there previously, so a bit risky. Good approach is to set criteria, and then have a flow chart to monitor each individual.*

Interpretation of Thoracic Radiographs- Jennifer Taylor-Cousar

There are four major positions for thoracic radiography:

- 1) PA (Posterior/Anterior which involves rotation of the patient)
- 2) Lateral position - standing upright—this will allow you to see the heart
- 3) AP Use when patients is debilitated, immobilized
- 4). Lateral Decubitus Position

Under exposure of radiograph: cardiac shows opaque. Over exposure: ? A systematic approach works best: for bony framework: rib, sternum, spine, shoulder, clavicles; for soft tissue: breast shadow, axillae, tissue alongside of breasts, lung fields and hila: hilum (pulmonary artery), lungs, and blood vessels. Lung anatomy : trachea, carina, right and left pulmonary bronchi. For reference on chest x-rays : RLL (Right Lower Lung), RUL(Right Upper Lung), LUL (Left Upper Lung), LLL (Lateral Left Lung), diaphragm and pleural surfaces, mediastinum and heart : heart size on PA, right side and left Side, Mediastinum : trachea looks midline, abdomen and neck : abdomen (gastric bubble, air under diaphragm).

Silhouette sign/ Air bronchogram/Consolidation, ex: atelectasis: most associated with linear increased density due to volume loss/Pneumonia/Pleural effusion: approx. 100-200 ml /Pneumothorax: air without lung markings in the apices/ Pulmonary edema/Lung Mass: lesion with sharp edges/TB: cavitary opacity in RUL, focal consolidation.

Further details of this presentation will be posted on the OVAG Google Drive

Discussion: *is the mediastinum complete or not? This could be dubious because mediastinum of some species can be complete or not complete. A problem is that most centers do not have a digital x-ray - SOCP has does have digital x-ray capabilities.*

Group Case Study Session – Nancy Lung

Participants divided into five groups for the session on respiratory issues with work presented to the entire group.

Group 1 – Jati presented group's work on a respiratory case scenario.

Group 2 – Pur/Ade presented group's work on air sacculitis scenario.

Group 3 – Pandu presented group's work on a respiratory case scenario.

Group 4 – Pakee presented group's work on fungal pneumonia scenario.

Group 5 – Laura presented group's work on a respiratory case scenario.

Discussion: *What are centers facing regarding strongyloides? The young die from this in zoos. Zoos need to be more conscientious regarding this issue. When using fecal specimens, you need to get proper Beriman sedimentation as it can be there for years and you will never know. We do not know what the trigger is for migration*

Case Studies Presentation Evaluation Session with Panel (Steve, Rueben, Nancy: Feedback) – Laura Facilitator

1. Primary Kidney Amyloidosis Disease – Andhani, SOCP, Jambi

A nine year old Sumatran male "Ugo" with BCS 2 had poor survival skills. After one month they found him dead with no clinical signs. In January of 2012, he had a good appetite and good body movements. He was tracked then lost in afternoon. The next day he was found in good condition and was given fruit with soy milk and honey. The next day, Ugo was found dead with no abnormality on body surface.

A necropsy was done: He had rough pale skin, signs of dehydration, sunken eyes, normal lymph nodes, mucus membranes were pale, no fracture or wound; normal situs viscera, lung normal, some foamy liquid from lung, Ptechie found on gastric mucous (60%); liver enlarged, with dark color, left kidney was smaller than right kidney and was harder. Spleen was normal. A lung sample was sent to lab for pathology – histopathology: Pulmonary congestion and Edema pulmonon, Ptechie and protozoa in gastric mucous (but protozoa is not fatal), enough fat deposit in liver, amyloid deposit and necrosis of liver, amyloid in kidney. Cause of death: amyloid, Uremia, brain damage causing sudden death. Heart was also sent for analysis to lab but lab did not send result, but communicated that kidney sample was sufficient for diagnosis on cause of death.

Q and A: *Is there pre-release protocol? Orangutan is monitored for skills for finding food, nest building, etc. Health screening (all orangutans go through protocols from SOCP).*

2. Septicemia: female Sumatran orangutan – Pandu, SOCP, Jantho

Sachi, an eight year old female weighing 16 kgs was found with 2 open wounds in her neck from a former abscess and abdominal gas. On January 2 of 2016, she was found with tousled hair and skin turgor. In June of 2016, she had loss of appetite, licks on skin, and suspected abscess with pus. Pus was extracted twice, the wounds were deep and wide, and were stitched. Drainage was applied. The two wounds were close to each other and by afternoon seemed in good condition. Cage was changed, then her condition slowly declined. She was treated with meds, then on November 1 she began vomiting a watery liquid, then she stopped breathing. The necropsy revealed macroscopic lesion filled with pus, gas in intestine, gall bladder was thick and darkened, and there was an abnormal shape to kidney.

Pathology: material sent to Bogor lab but still could not determine what or who caused wounds.

Q and A: *do you normally do a pre anesthetic screening? Sachi was released because he could make a nest, and find fruit on his own. Does chronic infection lead to fibrosis of the liver? He was negative for malaria. It is difficult to find a lab in Jantho so everything needs to be sent to Medan, as the site has very few resources (keeping samples cold, etc.,). A leech was found in his nose, relevant?*

3. Jati – Sintang

4. Spleenitis, Pneumonia and Hepatomegaly in female *Pongo pyg. pyg.*) – Inul

15 year old Inul went from a cage to the Forest School. In July she was weak, not active, had loss of appetite and had a fever. She was given medication and vitamins. A week later her condition worsened; she had the same symptoms but had pain upon swallow and a swollen neck. Lymphadenitis was diagnosed and she was treated with antibiotics and penicillin. Minor surgery was performed because the swelling got bigger. More medications were given. This particular condition has been seen before in orangutan Digo. He had swelling on lymph nodes, was given medication along with surgery and he recovered, then after 5 months his symptoms returned; he was treated and he again, recovered.

But Inul was still listless even after treatment, and after her surgery she still did not want to eat. She was then put on an IV for 2 days, but neck swelling began to get bigger. A second surgery was planned, but she died before that could happen. Lab work found an excess of pus in the lymph nodes and many pustules were found on the enlarged spleen. The thymus was also filled with pus. There is now a third orangutan with the same symptoms.

Q and A: *Did you do an acid stain on granules? Could it have been TB? Meliodosis? They are far from resources. There is a good chance it is Meliodosis but do not ignore TB possibility. It is more likely to be bacterial than viral (Inul was dead within 3 weeks). A gram stain should show if it is meliodosis. There might be something prevalent in the forest school, so perhaps there is a need for stronger bio security measures. Meliodosis is in soil and water, outbreaks can occur after heavy rains. All wounds need to be cleaned and free of infections. With fevers of unknown origin, the key is to start treatment quickly. Sabah is notorious for meliodosis outbreaks and they are sure it is not malaria. Amoxicillin in combination with other drugs has worked in Sabah.*

Panel Discussion:

Steve: *We are all guilty of ignoring the following:*

1. *Use large type and large clear diagrams – if they cannot be enlarged either do not use them or explain them very well.*
2. *Use few words per slide (15-20 words); do not read off slide as it is difficult to listen and read the same words. Always face the audience.*
3. *Use pictures and/or some kind of images – your audience will understand what you are saying better.*
4. *Make sure spelling and grammar is correct – you can speak in Bahasa and have presentation in English or vice versa.*
5. *Structure the talk: S O A P (Subjective (what you are told), Objective (what you do see), Analysis, and Plan - what is the most important thing to impart?*
6. *Explain why you chose the treatments you chose over others – even if it was the only thing available – be clear –*
7. *Put your name (and your organization if there is one) on the title slide.*

Good cover slides / good photos– use them often and freely / good eye contact / facing audience /

Donations of Speedy Breedy machines donated OVAID.



This machine is a Microbial Respirometer for water contamination tests that can culture many things. Looks at how microbes behave in a variety of settings and comes with its own protocols, but, they can be adapted to specific situations. Ex. Ecoli can be detected in 10 hours. It is small and strong, easy to use, easy to carry to the field, and can use a 12 or 24 volt battery. It can be very fast (salmonella 12 hours; other bacteria 44 hours). You can run two samples at the same time as there are two chambers. Disadvantages: cannot type species, not compatible with MAC, cannot reuse the container. It should not replace a laboratory. Once it begins, it shuts off on its own and one button turns it on. You need different specialized chamber for each microbe – chambers have 6 month expiry date – can be purchased in Jakarta or carried in as a donation.

c.chelsom-pill@bactest.com contact with screen shot and they reply quickly to any questions you may have.

OVAID has already donated four machines to SOCP, IAR, BOSF NM, and BOSF SL.

OVAG Strategy Meeting: Things discussed – poster sessions, abstracts, annual support fee, education.

Day three – July 26

Ophthalmology - AJ Marlar

Question posed by AJ Marlar: How many vets see eye problems in orangutans? Many veterinarians do see eye issues but feel uncomfortable dealing with and discussing those issues. Marlar's aim is to teach the techniques which will give orangutan veterinarians the confidence needed when dealing with eye issues.

Reviewing eye anatomy / Understanding terminology

Approach the eye as if it is just a piece of equipment, like a camera. The optic nerve at the rear of the eye is the conduit which takes information to the brain. Working on the eye can be front to back or outside in, it is not really important which - just that you do it the same way and in the same order. One is less likely to make errors or miss things in that way.

Ocular pathology – the eye is removed and placed in formalin, and then it is put in paraffin. When hardened it can be sliced into thin layers for analysis.

Because the eye orbit is encased and surrounded by bone – it leaves very little room for changes. The eye is easily pushed forward as there is no room when there are tumors, abscesses, expanding lesions, etc.

Human primates have a better lateral gaze, where in non-human primates the gaze is a bit more limited.

Things to consider: Eye movements/ The eye lid / Pigmentation is an adaptation for protection / The tarsal plate (you need to be aware of this as if it is not reconstructed properly there may be irritation problems) / Be particularly aware of prominent brow ridge as it can get in the way/Approach the eye ventrally or laterally because of the brow bone/There are differences when thinking of eye issues with youngsters and adults. Infants are much more sensitive and the eyes are more prominent. In adults, the eyes are more embedded in the face/Tear film – needs supplemental lubrication during surgery/Mucous layer is closest to the cornea/ Orangutans have Bowman's membrane (a unique structure) so cornea

erosion is defined as deterioration of the epithelium but not Bowman's membrane. If there is pain there is typically a lesion in the cornea.

Limbus – describing lesions can be more accurate if the eye is divided. The superior inferior nasal temporal axial peripheral is proper vocabulary.

What is the cornea? It contains vessels, contains pigment, it can scar, etc.

How do we describe lesions? It is important because if you can describe lesions, then you can get better assistance from others.

Orangutans have a Schlemm's canal – it removes fluid from the anterior chamber produced by the ciliary body. It allows for some resistance to glaucoma or perhaps it is just not reported.

Lens: the nucleus is the oldest part of the lens, then the cortex. The capsule is the newer part of the lens. There are optical changes that occur with aging.

Cataract: where is the pupil? If you can see the pupil around the clouding then it is most likely cataract. If you cannot see the pupil, then it may be a lesion issue. If when you shine a light and you can see the light, then it is probably not cataract.

Retina and Choroid: choroid is under the retina and that is where lesions may start. Primates have a very dense area of cones (macula) so if there is a lesion in that area it will impact the individual more. The fovea is right in the center of the macula.

Further details on this presentation will be posted on OVAG Google Drive

Orthopedics - Matthew Pead

Exercises: designed to make veterinarians think about the different kinds of fracture repairs.

Question posed by Pead: What do you want to know more about fixing?

1. Older orangutans with fractured at proximal femur
2. Open radius/ulna
3. Fractured closed digits and/or multi bones
4. Closed fracture of femur in juvenile orangutans
5. Proximal humerus shoulder – commuted/luxation
6. Rib fracture, clavicle
7. Broken mandible – slightly different issues
8. Pelvic fracture
9. Flat bladed closed scapula

Some fractures have highly technical solutions – others can be left alone.

AO Surgery Reference – AO Foundation is a human reference system but as orangutans are so closely related, it is very useful (there is an app as well) and it is free. All that is needed is a Wi-Fi connection, but there are things that you may be tempted to do but are out of reach but it does give lots of assistance. Most field vets will not be able to do some of the techniques described in the system.

It allows you to pick and choose what is best for your situation, but the system assumes you have access to a fully equipped trauma center, which is not the case in most orangutan care centers.

As this system is used by ALL orthopedics, you can send an email referring to the site and you will be better able to get assistance as you will be speaking the same AO Foundation language. They are a worldwide charity that trains surgeons, vets etc.

Part of the problem with orthopedics is that everyone wants to be a builder. Best to think a bit more general; think about a bone as it is meant to work and how can to get as close to that as possible when it needs to be repaired.

Think about clinical, mechanical, and biological issues.

Animals have great fracture flexibility; therefore you can leave some alone. The less we can interfere to get the best effect is the best way forward and a much more balanced approach is needed. The goal is to control the position of the fractured bone... too much movement will not gain a decent union.

The aim is to facilitate bone healing. Nothing will heal unless the bone heals. An implant can be inserted, but if the limb is overused– it will break. There must be good union and healing of the bone. There is a race between bone healing and metal work breaking.

In the middle of the bone, there is bending that can occur, and fractures can easily occur there. This makes much more force that needs stabilization. At the end of the bone there are much smaller forces. If a fracture runs into the joint, then it is not about stability and the problem is more severe.

If there is a fracture on the shaft, there are four fracture fixation systems. Is it external (cast, splint) or is it a fracture? Fractures need some kind of stabilizing mechanism.

Repairs: Interlocking nails are going through the bone through the plate and through the bone again. This gives more rotational stability which is more of a problem in great apes as they have a high degree of rotational ability. This is common usage (using nails) but for the average person, 10 nails are needed. For orangutans, you need systems that are flexible and interlocking nails are not very flexible. They need to be able to pronate and supinate – you have to be careful that you do not limit that ability.

Using plating kits and screws is not achievable. It is too difficult as there is a steep curve in terms of expertise and equipment. It is an extremely technical procedure and if not used properly more damage can be done. Good plating systems are kit intensive which is not practical, but they are the best ones to use in wildlife as you can put it in and then you are done –while it is the best solution it is very expensive.

There are some less technical solutions – an external fixator can work because it is cheap and easily trainable.

At end of bone we can use smaller implants

Salter classification – easy to find on internet – (useful due to similarity between humans and orangutans)

The two pieces need to be put together very perfectly in fractures – you need fixation to generate compression and you need that for healing. If you cannot do open surgery then you will know that the movement will be compromised.

Youngsters – heal more quickly!

Open fractures rely on how well you deal with it as a wound. The earlier you get to it the better. The aseptic technique: get it as clean as possible, treat it as a wound within 8 hours. Every open fracture is going to be contaminated and those contaminants need to be removed quickly. Think about: open or closed/contaminated or infected.

Fractures involving gunshot wounds need aggressive wound management/early fixation/do not look in healthy tissue for gun fragments/loss of tissue and loss of bone. Air rifle shots often bounce off the bone so do not go digging for a pellet as the damage in the looking is much worse.

Further details about this presentation will be posted on OVAG Google Drive

Group Breakout Session

Several scenarios involving various wounds and treatments.

Ophthalmology (con't.) – AJ Marlar

Reviewing proper use of a slit lamp: get close until the structure you want to use is in focus. When using a slit lamp, you are the one who moves until image comes into focus. You open the eye lid or have someone else hold the lid open. A 40 diopter lens is best which can work with a small pupil.

The light beam allows you to see what could be going wrong and what steps should be taken. If scarring occurs, light cannot get through.

All eye issues can cause visual loss except for conjunctivitis – yet it is the most common.

The number one challenge is drug delivery. What antibiotics are appropriate and how to get them to the patient. Topical usage? Sometimes, that is the treatment needed, but try to put eye drops every three hours. There are some formulations of drugs such as a multi drug. Perhaps using Oral doxycycline?

Elephant eye – infiltrate with edema but edema is not the problem, the inflammation is. A floristine stain will tell you if you are through the epithelium of the cornea. What single test is going to give you the most information – cytology! Scrape and stain and look for bacteria then what type of antibiotic to choose. What you should be really concerned about is fungus – fungus likes wet, warm and dark areas and they can form lesions.

All aging primates will eventually deal with perilimbal corneal opacity – a lesion deposit of cholesterol, no treatment is necessary.

You must be able to describe what you see in order to get assistance in treatment options.

Birds and humans do not form as many scars as other animals. If cornea looks thicker, then it could be corneal edema – if there is erosion, the tears can get in from the front.

CRIF: Closed Reduction and Fixation

Further details about this presentation will be posted on OVAG Google Drive

SWD Field Lab Visit / Fracture and Ophthalmology Practicals



Day Four – July 27

DRA – Preventative Health Plan and Bio Security - Steve Unwin

Question posed by Unwin: What diseases have you seen in the past few years?

Malaria / Salmonella/Diarrhea/Ballantidium/Infectious meningitis/Fungal skin infection/EHP (Elephant herpes virus)

Last year Steve Unwin was called in to Hutan to look at an outbreak in humans that was being blamed on the project, but the outbreak was human-born.

To illustrate how easy it is to pass a disease on, Unwin placed glitter on his palms and then shook hands and hugged people spreading the glitter. The glitter represented 4 kinds of bacteria. Three were harmless but the green glitter was not and was quickly spread about the room.

Goals:

Prevent disease from entering an animal population.

Maintain health of animals (including humans).

Prevent dissemination of disease to other institutions or release programs. Monitor all materials coming in, going out etc.

Importance:

There are diseases you cannot see and when animals start showing signs of a disease, it is often too late. It is difficult to eliminate dangerous organisms once they have become established in your facility.

If the individuals in your care can be kept healthy, it will help their overall welfare.

Improvements must be science/evidence based.

Should highlight data gaps.

Assess cost-benefits.

Improve communications/understanding compliance.

What questions should we ask?

This all requires teamwork across the organization.

Problems: animal selection (often facilities do not have a choice)/need quarantine and biosecurity procedures/health screening and routine preventative treatments/quarterly husbandry health and welfare: all which needs to be reviewed periodically.

Each center will be different in terms of diseases based on the animals and how many it has of each.

Who makes the decision of which animals come in? Who controls what animals go out? Are systems in place for the health of those being moved in whatever direction? What is the decision making process?

History of animals: is there any? Often in centers that information is lacking, so biosecurity needs to be even more vigilant as there is no previous history available to use as a guide.

Often in centers one person does all which makes things very difficult.

At Chester Zoo, there is a vet team, a quarantine officer, a food coordinator, the curators (they control the keepers), which involves good teamwork in order that all sections operate properly to meet the aims set above. The quarantine area at Chester is carefully monitored so that they do not infect others in the rest of the building or the rest of the facility.

Chester Zoo is interested in various pathogens - but from a government perspective, they are only really interested in Avian bird flu – which is why it is important to maintain a good relationship with the government.

Monitoring of health and welfare of the population starts with the keepers (technicians, etc,) and monitoring their work load allows for better control and overwork which can cause errors.

For health screenings, though vets take the lead, the keepers are relied on to do many things such as collecting samples etc. They could be of great use to assist the often overloaded vet staff at the zoo.

There is a quarterly husbandry and health and welfare audit. An outside entity evaluates Chester Zoo. The team then reviews the report to see where they can improve. This makes it easier to assess trends as data becomes second nature and easier to access when needed.

Things to consider:

Who? How? What? Why?

Discussion:

Who crunches the data at Chester? There is person assigned for that but all assist in imputing it. Not saying that centers need a three month review, but there should be some system in place that assesses successes and failures. We need some centers to volunteer leading discussions on diseases in their center.

Biosecurity and Disease Risk Mitigation Part 1 – Steve Unwin

Concept Introduction:

The glitter example: as a way to better illustrate transfer of pathogens can happen quite easily.

How do you avoid the green ones when they are mixed with other colors?

Wash your hands? But how do you get that through to others who do not really understand? Especially from a contact perspective. Hand shaking is much more problematic than a peck on the cheek as our hands are much dirtier as they come in contact with many more germs.

The link needs to be made clear between the health of the animals and what is needed by all and understood by all – especially by those that are not trained in health issues.

Definitions:

Pathogen – an organism that causes disease (Hazard)

Infection: When a pathogen invades a host - human or animal. (Likelihood)

Disease: the clinical signs seen of that pathogen infection – the bodies reaction to the pathogen (Consequence)

Biosecurity: A set of management and physical measures designed to reduce the risk of introduction, establishment and spread of disease to from and within a population.(Mitigation)

Even though we all work in a variety of areas, we still need to manage the impact we make when we are there – you cannot take humans out of the equation – they are part of the biodiversity.

Bio Diversity is Us – (designed for people who do not have information)

<https://www.biodiversityisus.org/>

All employees need to be aware of at least the basics of possible pathogen spread.

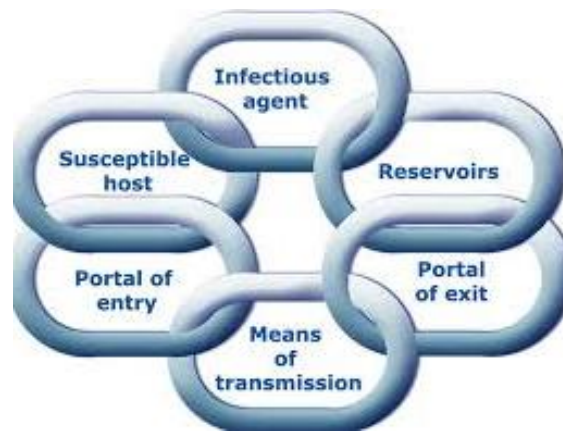
Also, you cannot just look at the threat within your species but also what other species are around that both animals and humans may come into contact with as these need to be considered as well.

Try to get people that are not medically trained to look at health and disease in a different way.

Soil and water sources need to be explained regarding diseases.

What are all these different risk factors? When speaking to uninformed people, using images helps, not just talking at them.

Chain of infection :



As a vet, you may not be the only one that needs to understand disease transmission.

Breaking the chain of infection:

If the system breaks down for whatever reason and if everyone understands, they can assist in bio security if they have a basic understanding.

Use images and videos freely available on the internet to assist you in making others understand.

Great air borne images illustrate this very well.

When engaging in airline travel, it is best to wait two weeks before you come into contact with animals/people etc.

Fecal/oral: are humans being careful? Are they aware where animal mouths and hands have been? What animals that may be carrying anything are close by?

Direct contact body fluid/vector/fomite / Things can easily penetrate skin.

Decreasing disease transmission – is a good thing!

Practical Hazard (pathogen) reduction

Good occupational hygiene / good environmental hygiene and design

CDC hand washing video <https://www.cdc.gov/handwashing/videos.html>

The importance of quarantine: some have an incubation period or symptoms are latent, clinical signs may not appear. Quarantine helps by giving at least a 30 day period where 'things' will have the opportunity to manifest themselves.

If you try to impose biosecurity measures on those that have not been involved in any way into the plan or do not understand, then those biosecurity measures are likely to fail.

Do you have dedicated tools for specific and different areas? Are there clear places for things to be put? Are measures being taken to make sure people are not spreading anything? Uniform/clothing washing? – uniform's do not leave center but are washed on site? What is being contaminated? Clothes? Trousers? All clothing? Boots? Etc.

Biosecurity and Disease Risk Mitigation Part 2 – Steve Unwin

4 volunteers to lead group breakout session:

Yenny / Pakee / Ayu / Popo

UNIT: what is your unit?

FLOW: CCPs, Mitigating measures, Physical, Diagnostics, Surveillance (What do you do not and why did it fail)

REPORT: Documentation, Contingency plan, Emergency Response, Educating and training personnel (is this working?)

CONTROL: Supervision, Governance/Legal, Financial, Social (who makes the decisions)

In the past we have been veterinary based – this time we need to have things be much more basic so all employees can understand and truly be involved.

Orangutan to Orangutan (Evolution and Care) – Citrakasih Nente and Raffaella Commitante

“In terms of evolution, the orangutan genome is quite special among great apes in that it has been extraordinarily stable over the past 15 million years” Richard K. Wilson, PhD...The Genome Institute.

As recent as 10,000 years ago, orangutans were one a very widespread group ranging from China, to Viet Nam and even on Java. Today, we have two species living only on the islands of Borneo and Sumatra. Though the debate is ongoing as to whether there are two separate species or one main species with multiple sub species, what we do know is that it is likely that all current orangutan populations stem from the Sumatran orangutan as they have the most genetic diversity (Schwartz, Vu, Nguyen, Le and Tattersall 1995).

Though much is made of the similarity between humans and both chimpanzees and bonobos, orangutans are also very similar to humans and these similarities can be used when dealing with welfare and care issues of orangutans. Orangutans are often called the “thinking ape” (Parker, Mitchell, Miles 2004).

Rather than react quickly to certain situations orangutans like to take the time to think things through - very similar to many humans. Similarities in behaviors can be seen not only with humans but with many long-lived and large-bodied animals with slight differences being seen depending upon different environmental conditions (Krützen, Willems, van Schaik 2011).

Given the similarities, we should feel comfortable using human behaviors as a guide to great ape (orangutan) behavior. As humans, we know when other humans feel unhappy, or are in pain or are comfortable – especially if we know them well or have spent time with them. We know the expressions that accompany many human emotions and reactions to outside stimuli.

One of the biggest differences between most great apes (including humans) and orangutans is the issue of sociality. Typically, orangutans are perceived as solitary...a word that really does not describe their social system adequately. The full definition of solitary (from the Meriam Webster Dictionary) reads as follows:

1 a : being, living, or going alone or without companions b : saddened by isolation 2: unfrequented, desolate 3 a : taken, passed, or performed without companions b : keeping a prisoner apart from others 4: being at once single and isolated 5 a : occurring singly and not as part of a group or cluster b : not gregarious, colonial, social, or compound

Though orangutans may not fit the typical pattern for what we may call social, they do not truly fit the typical pattern for being solitary either. The young can be very social and need others around them as that is how they learn. This is very much a primate advantage for survival – we all learn by watching others. In the primate (and animal) world – this is typically referred to as social learning (Coussi-Korbel & Fragaszy 1995). Different social situations and conditions can affect an individual’s ability to learn, and what it is they are trying to learn. For orangutans, this may mean being aware of who they are spending time with, if they are learning and what they are learning. Especially for orangutans in centers, this can be very important. Even more so if they are being considered for release.

Assessment for release has been a very difficult challenge. Have release candidates learned the skills needed to survive without human intervention? What behaviors and indicators do we use with humans? When do we know children are

ready to go off on their own? When are they able to negotiate their environment as individuals? What signs do we look for? What behaviors?

Health / Confidence / Ability to find food / Ability to find safe places / Ability to find others / Ability to support themselves / Ability to recognize danger

It may be possible to use the same parameters for when evaluating orangutan preparedness as well as when orangutans are struggling. This may seem Anthropomorphic, but as primates trying to understand and evaluate other primates this may not apply. Again, back to the Meriam Webster Dictionary which defines Anthropomorphic as:

1. described or thought of as being like human beings in appearance, behavior, etc. 2. considering animals, objects, etc., as having human qualities

Great apes do have similarities in appearances (yes, there are differences too) and great apes do have human qualities or rather we have similarities in appearance to great apes as well as similar great ape qualities. Commitante proposes a new term and definition when dealing with primates: Primatomorphic

1. described or thought of as being like primates in appearance, behavior, etc. 2. considering animals, objects, etc., as having primate qualities

When we can view all primates through the same behavioral window...we may have a better chance of saving them – as we are in a sense saving ourselves.

Suggestions for OVAG 2017:

Venomous emergency care – for both orangutans and humans.

Forensic Course – for examining finding dead orangutans in the field and any clues that could assist diagnosis.

More focus on sinusitis - can it be simply diagnosed? – thick pus, drainage at back of throat from the sinuses – x-rays help but it is hard – it is very common – better off assuming it is there than not – and antibiotics may not fix it – but you can catch it early so that sinuses can drain and then antibiotics can be effective – what would justify surgery?

Date for OVAG 2017 July 23-27

Future recommendations: Increase members of WHATSAPP OVAG. Give OVAG members access to Google Drive to upload all OVAG documents since 2009.

Study Case Sessions

Differential Diagnoses: Meningitis, Encephalitis, Malaria - Maryos: BOSF NM

Treatment: Tramadol, Diazepam, Omeprazole INS cover malaria, Ceftriaxone, ATS 150 IU, Propofol, Dexamethasone

Prognosis: poor, 1st clinical signs show on January 2016, next day looks normal. 2nd clinical day, 21 April..

Postmortum (Necropsy) finding:

- Brain damage on right cerebrum (like porridge)
- Hemorrhagic mucous of GI
- Fat tissue in peritoneum cavity
- Lab result: malaria test negative (14 Jan, 1st clinical sign showed up), 24 March white blood cell increased, but overall the blood chemistry showed normal
- Urinalysis result
- Brain culture: negative

Discussion:

Clinical signs needs 3 months gap from 1st clinical signs to 2nd CS. Brain checkup – difficult –not enough equipment/tools Diagnose and treatment—blind treatment. Was there a renal function test? Were there symptoms like phobia of light? One case in SOCP, recovery from meningitis but had permanent impact on the brain, such as blindness. Doing a spinal exam revealed high protein, perhaps ask human doctor to conduct the test. Another case, Rahul, using various AB but was a long process to recovery from meningitis, also had permanent damage, now he is still in the cage because of poor locomotion. He is under acupuncture treatment now. This orangutan was smuggled into a human hospital to do the test. Could not perform the MRI because the orangutan had a microchip. It is okay to do an MRI on microchipping animal, no effect. They used Diazepam and instead of sleeping, the orangutan (featured in presentation) was awake. Maybe it is worth it to do/get training on giving neurological exams. What is the primary cause of meningitis? Is it viral, bacterial? The cause is viral, but the symptoms are caused by bacteria. Streptococcus, zoonosis found in humans in Papua.

Case Studies

Sarcoptic Mange in Borneo Orangutan “Giet” - Ayu Budi Handayani

In 2015 a male orangutan ‘Giet’ was brought to IAR center. He was 5 months old and weighed 2.5 kg. Background history : arrived Aug 2015. He was bought for 400 IDR and kept for 5 months in a cardboard box. He was only given condensed milk, and had skin problem 5 days before being confiscated by IAR.

Anamneses: hyperkeratosis, diffuse cutaneous inflammation, bloated

Diagnosis: fecal examination, skin scraping (positive mange)

Blood screen: Anemia

Treatment: ivermectin, amoxiclav, methylprednisolone, paracetamol, IV fluid therapy, coconut oil, physiotherapy, diet improvement.

Result: after 2 days of treatment much of the skin crust sloughed off. Inflammation around the eyes was significantly reduced. He was given coconut oil 3 times a day to avoid dry skin that can cause itchiness.

At the end of August, the skin scraping was repeated as well as the ivermectin. In September the skin scrape was again repeated with a negative result. He began to eat well and his upper incisors began growing. There continued to be some moderate scratching but new hair started growing. By end of September Giet had complete recovery and was placed with others at the center.

Discussion A& Q:

Sarcoptic mange is a highly contagious zoonosis skin disease. There are many mentioned many stray dogs in the area. Is there any program from government for these street dogs? IAR is beginning a program on managing street dogs

Husbandry Management in SOCP – Dewi Chandra

Cages: Emergency, Isolation, Male facility, Permanent, Baby house (5-8 orangutans), Baby Socialization (1 cage), Socialization (3 cages).

Cage Facilities: Platform, place for food, solid floor, grillwork, enrichment. Aim : to allow orangutans to express natural behaviors.

Maintenance procedures for the cages: Disinfection: benzaclin, rodalon, bayclin, chlorine, bromquate (only for food, footbath and hands) / Clean up time / Re-painting

Nutrition: Type of food: Calories: bananas / Vitamins: fruit / Fiber: vegetables / Protein: tempe / Water

Enrichment: Leaves, food, playing ground

Requirements: safe, fun and creative, based on purpose of enrichment

Aim: Stimulate natural skills / Keeping them busy and entertained

Health Data:

In 2015, there was a high degree of bacteria because of contamination of water source. There was also some evidence of trauma in new arrivals. Around the area near SOCP there were no plantations, but in 2015, a plantation appeared. This created new villages, and they used the same water, contaminating it. Now, SOCP created a new well to prevent the contamination.

Discussion A & Q: *When food was placed in a high tire, how was it cleaned? There is a ladder outside going up to the tire for cleaning. Other cage 'furniture' is also cleaned from outside the top of the cages. Steve Unwin provided information about enclosure designing tools from the University of Birmingham.*

Dentition – Felicity Oram

Deciduous teeth emergence – mixed and permanent tooth emergence and permanent teeth, paired with aspects of degraded habitat use in orangutans. Also a visit was made to SOCP to put a wild orangutan perspective on following and monitoring released orangutans.

Most orangutans ranging on their own usually have permanent teeth. However, little has been documented on orangutan dentition. Even zoos are data deficient on tooth emergence. Most dental tooth charts are based on already deceased individuals. It has been assumed that tooth emergence occurs faster in captive orangutans. The deficient data is due to the fact that there is a clear history of orangutans in zoos and so there is no need to look at teeth. But there is there a value to understanding tooth emergence. Teeth are important tools for orangutans, especially as they need to learn to eat wild foods. Wild orangutans have a long dependency on mothers and they need the right teeth in place in order to survive. Because they eat a wide variety of vegetation, some of which is quite difficult to get through, they need their teeth. Orangutans have the same amount of 20 deciduous teeth as humans have. In wild orangutans tooth emergence is difficult to access. Once youngsters move a bit away from their mother, it is a bit easier to see what is happening inside their mouths. It would be very useful to have information about tooth emergence especially in centers where there is no birth history. Oram will be providing a follow up on tooth emergence.

Free afternoon – to allow OVAG participants to explore the city.

Day Five – July 28

Film from last year's behind the scene highlights.

Case Study

Elephant endotheliotropic herpesviruses (EEHV) outbreak - Pakeeyaraj Nagalingam, SWD

Biosecurity issues: Since the beginning of 2016, multiple elephants have been found alone (as many as 8) without a herd. They were very dehydrated. One was about 3 years old and had facial swelling. Initially it was thought an insect bite, but then he went off his feed and was found dead the next day. In the post mortem, EEHV was suspected. EEHV had not been reported before in Borneo. A blood analysis was then done on the 7 others. Treatment was begun on all as a preventive measure. One of the 7 also began showing facial swelling. Anti-viral and fluid therapy was given but he collapsed later that night and died. Post mortem findings were very similar to the first causality. The rest of the elephants were then monitored more closely. There was a meeting with both elephant and orangutan staff so that everyone was well aware of the issue. The presentation to the group summarized other cases of EEHV found in the SE Asian area. It explained what EEHV is, what the present plan was, and also shared the post mortem findings. Proper sample collection was explained and what could be done in order to contain the outbreak. Also discussed was the storing and freezing of samples. The take home message is that the whole team was included and involved as information was shared between all.

The impact: awareness, compliance, preparedness. The entire staff understood the issue, and they were willing to follow the protocols, making them overall better prepared to sound the alert quickly if they saw something new or different with the elephants. PCR was done and confirmed as EEHV 1A. Currently all elephants are on anti-virals and virgin coconut oil was added to their diet. They plan to present this as well as publish since these are the first cases on Borneo. If the above handling of the outbreak was not done, mortality would have been higher. As this was the first case in this part of the world, it had to be reported as far up as the Government Ministry of the Environment and new protocol was outlined. The hygiene protocol included daily disinfection of enclosure, and special forms for monitoring.

Discussion

This was an excellent example of what to do when dealing with a disease outbreak – the SWD team are in contact with others outside the country at zoos for assistance. EEHV is a big problem with elephants in zoos around the world. Blood samples are taken daily at Chester Zoo. It is hard to grow the virus in media to learn more about it but efforts are being made to develop an effective vaccine which is most likely years away. Chester has 9 adults in their herd and they have babies fairly regularly. It is possible that the wrong anti-viral is being used, but this is difficult to discern if you cannot grow the culture. There have been cases in Indonesian Borneo since 2012, all were captive (those that were born) but in the adults, the mother was from the wild. Content of mother's milk could be at issue. African dietary needs are different from Asian elephants.

Break out Group Session - to prevent a disease outbreak in the future

Each group had a lap top, paper and a team leader. Teams must work together to determine the unit of investigation to prevent a disease outbreak. Teams worked through the flow section, then the report section as well as how you will train and educate others, and then the control section (government and or private issues, who needs to know or be made aware etc.), who needs to be informed and the need to make sure all understand the process and protocols established.

Team Leaders: Yenny – SOCP / Ayu – IAR / Pakee – Sepilok / Popo – OFI

Discussion from Group Session

Is there a concern for ZIKA? There has been a case in Singapore, a similar case as West Nile which is always a concern. There should be more concern about entry and exit points of disease and how are they transferred and possible transmission rates – how is it spread? The aim is to break the point of transmission.

Documenting diversity of orangutan parasites – Reuben Sharma

Sharma asked the group to take the year to collect documentation on prevalence, treatment methods, and post mortems regarding parasites. Sharma also volunteered to do site visits to assist. Also, are drugs effective? This information can be put in a booklet so everyone working with orangutans can have access. This might be able to be set up through WHATSAPP to collect information on prevalence, age group, to create a parasite manual or atlas. Yenny will take point and form a parasite email group to come up with a protocol to get this going. The following people volunteered to assist from their centers: Ayu – IAR, Yenny – SOCP, Siska – BOSF, Popo – OFI, COP – Ade, Jati – Sintyang, Dewi – JP, Andhani – Jambi, Pakee – Sepilok, Ricko – OIC, and Wawan for OFUK will be contacted.

Publishing Session - Nancy Lung, Journal of Zoo and Wildlife Medicine

The Journal of Zoo and Wildlife Medicine is the official medical journal for Europe, American and the rest of the world. Last year 42 submissions came in from the Asia region. This journal serves what we do globally not just in the U.S. It costs only \$10 per year to be a member. OVAG members were able to sign up with Lung during the meeting.

Group discussion on expired medications – why?

SLEP – Shelf Life Extension Program: looks at actual shelf life compared to the expiration date. 84% of the drugs work for 57 months after the expiration date which means they are still effective 4 or 5 years after the posted expiration date. Storage, however, is a more important issue. Temperature, humidity, UV exposure all need to be considered. Tablets and powders are more stable, but vitamins may degrade faster if exposed to too much light. We should not be afraid of using expired drugs. The military and FDA (Food and Drug Administration of the U.S.) understand shelf life but others (like zoos) are not allowed to use out of date drugs (as you get penalized by USDA) so often zoos will donate drugs that they cannot use but are still perfectly fine – so it is possible to get drugs that cannot be used in America but are still effective. When you crush drugs to make them easier to digest (to put in juice, or anything similar) it needs to be used fairly quickly or kept in refrigeration.

Contact for AJ Marlar – compeyvet@hotmail.com whatsapp number (+ 1 214 417 5119)

Nancy Lung – nancylung2@gmail.com whatsapp (+ 1 817 692 9049)

Ophthalmology wrap up - AJ Marlar

Question posed by Marlar: What is the biggest reason stopping you from doing eye exams or treating eye cases?

How to use the equipment / How to describe what you see / Actually having the equipment / More practice to feel confident / Need Partners to assist / Pharmaceuticals and treatment / When to use which treatments

Do we need an Eye Group? If anyone would like to learn more about the eye contact AJ Marlar directly.

Things to keep in mind: For Ophthalmology drugs you do need to pay attention to expiration dates. Never put anything in the eye, the only thing is a betadine solution near the eye. Some ointments need to be rinsed off. Tear production drops for several days after anesthesia, so keeping eye moist is important (use artificial tears). If vets send pictures of orangutans with health issues, Marlar and Lung may be able to get items needed for free.

Orthopedic Session 2 - Matthew Pead

Group was given fractures to look at and treat.

Model 1 – was unstable – most fractures you will see will be unstable. Tibial fracture was mid shaft so best to use two people pulling the fracture into place (no surgery needed).

Model 2 – complicated fracture on tibia and fibula – this may need an external stabilizer – multiple fragments need to be arranged so vet is thinking while others are pulling and twisting to get bones back into place.

Model 3 – open fracture – treating the wound is needed. A lubricating gel placed on the wound (especially if you need to clean up the area (cut hair, etc. which helps prevent more outside product from getting in the wound)). Everyone knew they needed to flush it but you need to think about pressure as too much may damage the tissue. Use a 21 or 19 gauge needle to flush the wound. You can flush as hard as you want and you will never generate too much pressure – 1 or 2 liters of saline works best for flushing.

Pain: fractures need something, analgesia, as they will heal better if the patient is comfortable. Though it is difficult to hold a consultation with an orangutan, pain medications still need to be applied.

Femoral fracture – this is different as it is a weight bearing bone and it is a very difficult bone to get stable. Very little information is out there about this as casting or bandaging will probably make it worse. In Juvenile orangutans it is best to give them pain meds, and keep them in a restricted environment. They should heal, however, the bone may not heal perfectly but it will be functional. If you need fixation, then you need to entertain using locked nails and plaiting which may be difficult so external fixation may be best – the femur is a place where you can use an external fixator.

Mandibular fracture – you can use external fixator.

Pelvic Fractures – can be treated conservatively – need to understand neurology, urination, and defecation. It can be very painful and there can be lots of blood loss. Pelvic canal needs to be really examined.

Scapula fracture – conservative treatment – where on the scapula? Glenoid cavity is difficult but the rest of the scapula is not. The acromial process can be complicated. There is to be expected some disruption in the upper forearm. In humans, the whole arm will be put into a stable position, which might be difficult to do with orangutans.

Radius and Ulna fracture – radiograph both ends of the bone, this will cause disturbance on the humerus. Plates and screws can be used but not in severely opened fractures and an external fixator can be used. A cast or splint can also be used but should be above the elbow and to the first crease in the palm which allows the patient to keep their digits mobile.

Proximal humerus fracture or dislocation

Digital fracture – many can be stabilized with simple splinting. Pick a position where the damage is and line the digits up. If it keeps mal-alignment, there are some simple, not expensive splints available. But an orangutan can take it apart so it might be useful to build a more solid mold, but, you are putting a weapon in the hands of an orangutan.

Most fractures will heal quickly if they are in the right place. You can use internal fixation on digital injuries, if you need to and if injury is severe.

Ribs/clavicle – make sure chest is not punctured – very painful. Check for a pneumothorax and pain meds are needed for as long as you can administer them. When there are multiple fractures and the chest stops working, flail the chest (very difficult). Most clavicles will heal quite well. Always check the sternal junction of the clavicle and make sure it has not been misplaced as it can threaten the chest wall.

Useful websites:

www.veterinary-instrumentation.co.uk Useful place to find instruments with lots of videos and pictures.

www.aofoundation.org for fracture and diagnosis and treatment planning.



Quiz 2 - administered and feedback form turned in.

Committee Comments:

1. Reminder to submit parasite data to Yenny/Reuben.
2. Presentations, as well as case studies need to be taken more seriously and ALL abstracts need to be submitted before the start of the 2017 workshop (even for case studies). All presentations need to be professionally put together and edited carefully.
3. All presentations need to be given to both Raffaella and Steve before the end of the workshop. Not having presentations slows the progress of putting our annual report together.
4. Siska will contact everyone about compiling a needed supplies list.
4. OVAG 2017 will be held from July 23 – July 27 in Jogjakarta.





**Orangutan Veterinary Advisory Group Workshop
July 24-28, 2016 Sabah, Malaysia**

2016 REPORT



Section 4

Evaluation

	Question	Answer	Pre workshop (0) as a %	Post workshop (0) as a %	Pre workshop (1/2 mark) as a %	Post workshop (1/2 mark) as a %	Pre workshop (full mark) as a %	Post workshop (full mark) as a %	Improved, worsened, no change	Significant difference?
1	The main cause of death in malaria is due to:	C Anaemia	69	65	8	4	23	31	Worsened	Marks are significantly worse. Not covered this year, suggest should be a standing topic
2	Rhabditiform (L1) larvae of <i>Strongyloides</i> species can be distinguished from Hookworm species larvae by:	A Strongyloides larvae have a pointed posterior end	75	88	0	4	25	8	Worsened	Marks are significantly worse. Not covered this year, suggest should be a standing topic
3	Dientamoeba fragilis may be diagnosed by examining	D A Giemsa/Field's stained smear	75	69	3	4	22	27	Worsened	Marks are significantly worse. Not covered this year, suggest should be a standing topic
4	Define 'biosecurity'	Similar to: Protocols designed to reduce the risk of pathogen transmission	39	12	17	19	44	69	Improved	All these covered in the biosecurity workshop which also generated good discussion
5	Which of the following are components of a disease or pathogen contingency plan?	THEY ALL ARE A. A list of people and organisations to contact in a disease outbreak, and why they must be contacted. B. Biosecurity protocols C. Methods of disease transmission and management strategies to reduce transmission D. A map of your facility E. background information on the disease of concern	50	26	3	12	47	62	Improved	All these covered in the biosecurity workshop which also generated good discussion
6	List ways pathogens and disease can be transmitted. (as many as you can).	Faecal-oral, direct contact, Aerosol, indirect (soil/ water/vector), body fluids	25	7	17	8	58	85	Improved	All these covered in the biosecurity workshop which also generated good discussion
7	For each answer to question 6, describe one way of how you can break that transmission	Hygiene (hand washing), PPE, etc.	33	23	25	19	42	58	Improved	All these covered in the biosecurity workshop which also generated good discussion
8	Define disease risk	Similar to: Disease Risk is the likelihood of the occurrence and the magnitude of the consequences (severity) of a pathogen entering a population – for this you need a vulnerable population and the possibility of exposure, to a particular pathogen.	53	23	42	27	5	50	Improved	Covered briefly in workshop but big improvement in full mark attainment

	Question	Answer	Pre workshop (0) as a %	Post workshop (0) as a %	Pre workshop (1/2 mark) as a %	Post workshop (1/2 mark) as a %	Pre workshop (full mark) as a %	Post workshop (full mark) as a %	Improved, worsened, no change	Significant difference?
9	What does epidemiology study	Epidemiology is the study of disease in populations. Makes trends, allows spread prediction and allows management. Wildlife spread to human/ domestic and vice versa. Transboundary spread etc.	58	58	25	4	17	38	No change slight worsening	Not covered specifically this year. Despite improvement in correct answer , those that actually answered success dropped
10	Which of the following are essential in the treatment of open fractures?	A and B - they would have to present a rationale for C. D and E could be used but are not essential	64	69	22	4	14	27	No change	New topic for 2016
11	Which of the following fracture repair systems can provide stability against all of the forces acting on a comminuted (multi-fragment) mid diaphyseal radius and ulna fracture?	B and D for sure, C under the right circumstances A and E should not really be used on their own	75	77	19	19	6	4	No change	New topic for 2017
12	If/ when tuberculosis affects the eye, what kinds of lesions might we expect to see>	Mtb can affect most structures of the eye as either primary (no other systemic lesions) or secondary (from hematogenous spread or extension ex. sinus). Granulomatous lesions are expected. The most common lesion for intraocular Tb is uveitis (anterior or posterior or choroidal granulomas) from hematogenous spread. Other lesions include keratitis, conjunctival ulcerations or nodules, orbital masses.	85	57	12	31	3	12	Improved	New topic for 2018
13	In 1 sentence, suggest when it is reasonable to consider euthanasia of an orangutan.	Open answers	44	42	0	0	56	58	No change	Those willing to discuss this topic remained consistent
14	Can you list 4-5 causes of redevye? Of these causes, which one is NOT sight threatening?	a) Uveitis b) Glaucoma c) Keratitis d) Conjunctivitis e) Episcleritis The only one of these that which lacks potential to be sight threatening is d) conjunctivitis	69	54	25	8	6	38	Improved	New topic for 2018

Question	Answer	Pre workshop (0) as a %	Post workshop (0) as a %	Pre workshop (1/2 mark) as a %	Post workshop (1/2 mark) as a %	Pre workshop (full mark) as a %	Post workshop (full mark) as a %	Improved, worsened, no change	Significant difference?	
15	List AT LEAST 3 other ways to investigate pathogens in the living individual.	At least 3 to get a mark	53	54	25	0	22	46	Improved	Increase in correct answers that may have been picked up in biosecurity workshop
16	List the following types of investigative studies in order of result reliability, with the most reliable first	C. Systematic review, E. Meta-analysis, D. Randomized control trial, A. Cohort Studies, G. Case series, F. Single Case report, B. Expert Opinions, textbooks, personal experience and the internet	83	73	14	23	3	4	No change	Need to review this in future years. Still poor understanding of scientific rigor.
17	What are the top 5 sources of information you would make use of when faced with a medical issue you need to investigate	Open Answers	53	43	14	15	33	42	No change	Those willing to discuss this topic remained consistent
18	For each of the following diagnostics, state whether the test is looking for the Mycobacteria itself, or for the body reaction to it	A: TST body reaction B: 454 Sequencing Organism C: Statpak body reaction D: Paralens organism E. MAPIA organism F. Culture organism	67	50	25	27	8	23	Improved	Not taught this year. Potential assistance within delegates
19	(a) List the reasons for putting samples in formalin when doing a post mortem (b) List sampling methods other than 'in formalin' during a post mortem	Photos to histology. Bonus points if mention multiple aliquots.	39	31	44	15	17	54	Improved	Not taught this year. Potential assistance within delegates
20	A. How should you test for Tuberculosis? B. Provide a differential diagnosis list for other pathogens with similar clinical signs to TB.	As many modalities as possible – culture and PCR currently most recommended. Other respiratory pathogens and chronic causes of weight loss.	39	27	30	19	31	54	Improved	Not taught this year. Potential assistance within delegates

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
New Knowledge: Did I gain useful knowledge?	26	7			
New Ideas: Did I gain new ideas that will improve the way I do my job?	22	9	2		
Applying the learning: Will I use the information?	15	17	1		
Applying the learning: Have I been shown how to impart this knowledge to colleagues and managers?	15	12	6		
Effect on results: Do I think the ideas and information provided at this workshop will improve the way I do my job?	22	10	1		
Effect on results: Do I think the ideas and information provided at this workshop will improve the health of the animals under my care?	18	11	4		

Best things comments	Responses from organizers
Practicals and also new colleagues and network to share my cases x2	
Networking. Great cases, great presentations x5	
Meeting other delegates. Having perspective of vets with so much orangutan experience. (x2)	
Materials and presenters great	
Best thing of OVAG is I can share my problem/ case. Everyone will come and help. So many experiences from other vets that I get from this workshop	
Sharing of new information and problems faced at other centers (x3)	
Community; Viewpoint of the rehab rescue center - cross discipline wild-rehab hardly ever interact!; I enjoy it also because fellows who are working in a practical way with orangutans and conflict	
Great practical sessions and learning from other orangutan centers. Feels like coming home.	
Obtain the most up to date information directly from the expert.	
The orthopaedic workshop was awesome	
Always new topics to learn or practice	
Practicals and disease management	
As an outsider looking for ways to contribute OVAG has promised a source for collaboration and collective learning that is truly remarkable. The support the delegates give to each other and to the teachers is the most productive part of OVAG achieving its goals.	
Loved the biosecurity simulation	
Loved the whole conference	
One of the most collaborative and enjoyable workshops ever attended x2	
Ophthalmology!	

Things to improve comments	Organizer response
Increase time for study case practicals so everyone can try more than once	
Increase time for practical training (x9)	Taken on board and this will be expanded in 2017
More conference time outside	
Consistency in person following the workshop? It should be same person each year	So long as there is good crossover of information within organizations not sure we agree with this point
Potential for practical training at specific centers following OVAG?	Yes. We are investigating this and have already done this with IPHP in 2014
Time management of sessions needs improvement. More focus and time on case studies and presentations from range country vets then visiting vet experts tailor their presentations from these - I.E eye sessions, then might be more useful for both sides?	We totally agree, but we had almost no feedback from delegates before the workshop to be able to make this happen, despite asking numerous times. However, we were able to follow up on things on the last day.
Extend to 7 days	This might be tricky with people's time commitments as it is already 7 days with travel. Will discuss in 2017
I will use the knowledge in class to improve the students to be ready to become conservationists.	
Maybe AV tutorials could be helpful in describing some medical difficulties	This is something that could be filmed during the workshop and then posted online
Hands-on activities seem to be the most useful. Perhaps do one intense training per year? For example 2 full days of training and practice applying K-Es and doing ophthalmic procedures. 3-4 hours is a good introduction. The next step is advanced training to build capacity	Good idea. We would hope that UGM would help with this through Summer School possibilities
Highlight to international speakers the limitations of centers before presentations	
Improve professionalism of case study presentations	

How will I use the information I have gained comments	
I will try to apply my learning by improving biosecurity and starting to check eyes on physical examination	
I have a better understanding of conservation efforts of how best I can help. Vet perspective of disease in wild orangutans helps in my thinking of research questions in captive orangutans	
Re-digest first all the information and apply any most likely relatable with my daily work.	
I will make summary from OVAG and teach some important things to the staff. But I will take it short and in their 'bahasa' so they can know this	
Broadens my horizons and understanding. Really great collaboration and communication across countries and disciplines	
Case by case and need to share more with management other vets and specialists (x7)	
All information will be changing my paradigm?? Related communication??? And spirit to develop our project.	
To reduce disease spread in my center	
Will adapt gathered information to improve and review SOPs in my center	
As an outsider wanting to contribute and now having first-hand knowledge of the needs of the centers and their staff I feel that I can make targeted contributions that will have a direct input on patient outcome and professional capacity building.	
Much of the material is applicable across species so I can still implement even though I am no longer working with orangutans.	
I am hoping to have a career with primates, especially orangutans and the knowledge I have gained has allowed me to remain current following a year away from the primate world	
Develop a better curriculum; actively start fundraising for equipment; try to develop partners for coordinated training	