ORANGUTAN CONSERVANCY

ORANGUTAN VETERINARY ADVISORY GROUP WORKSHOP 2013 REPORT

Design by: drh. Winny Pramesyswari

Photos provided by Darmawan and Intan Citraningputri (veterinary students from IPB), Steve Unwin and Raffaella Commitante
Orangutan Conservancy Veterinary Workshop logo courtesy Amy Burgess

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R. Commitante, S. Unwin (Editors). Orangutan Conservancy (OC). 2013.
Orangutan Conservancy 2013 Orangutan Veterinary Advisory Group Workshop Report.

Additional copies of the *Orangutan Conservancy 2013 Veterinary Advisory Group Workshop Report* and previous years' reports can be ordered through the Orangutan Conservancy, P.O. Box 513, 5001Wilshire Blvd., #112, Los Angeles, California, 90036, USA., or go to our website at www.orangutan.com

Orangutan Conservancy 2013 Orangutan Veterinary Advisory Group (OVAG) Workshop

June 24-28, 2013

Asliqewan / Faculty of Veterinary Medicine of IPB (FKH IPB), Bogor, Jawa, Indonesia

Participating Organizations:

Orangutan Conservancy, United States
Chester Zoo / NEZS, United Kingdom
Liverpool School of Tropical Medicine, United Kingdom
Asliqewan / IVMA (Indonesian Veterinarians Association)
Faculty of Veterinary Medicine of IPB, Bogor, Jawa, Indonesia
Putra University, Kuala Lampur, Malaysia
Sumatran Orangutan Conservation Programme (SOCP), Medan, Indonesia
Borneo Orangutan Survival Foundation, Nyaru Menteng, Palangkaraya, Central Kalimantan, Indonesia
Borneo Orangutan Survival Foundation, Samboja Lestari, Samboja, East Kalimantan, Indonesia
Orangutan Foundation International (OFI), Kalimantan, Indonesia
Gadjah Mada University, Jogyjakarta, Indonesia
International Animal Rescue, Indonesia
ABAXIS Europe, Germany
Jogja Orang Utan Center, Jogjakarta, Indonesia
Frankfurt Zoological Society/Jambi SOCP Orangutan Release Site, Sumatra, Indonesia
Hutan KOCP (Kinabatangan Orangutan Conservation Program)
Vier Pfoten, Austria
University of Kent, U.K., Hutan Project
Royal Veterinary College, London
APP, Netherlands
Orangutan Appeal, UK
Center for Orangutan Protection (COP), Indonesia
Vesswic, Sumatera, Indonesia
Orangutan Information Center, Aceh, Sumatera, Indonesia
Eijkman Oxford Clinical Research Unit

Supporting Organizations:

Orangutan Conservancy, United States
Sea World and Busch Gardens Conservation Fund
Chester Zoo/ NEZS, United Kingdom
ABAXIS, Germany
International Primate Society
Fort Wayne Children's Zoo

Hosted by:

Asliqewan / Faculty of Veterinary Medicine of IPB (FKH IPB), Bogor, Jawa, Indonesia

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Section 1

Executive Summary

The Orangutan Conservancy/Orangutan Veterinary Advisory Group has now reached its fifth year of collaboration. We hope, in the future, to continue to promote collaboration and training between veterinarians and staff working with orangutans in Indonesia, Malaysia and the international community; as well as beginning to promote our group on a larger scale both *in situ* and internationally. As has been stated previously, veterinarians and staff that have joined our group over the years, collectively care for the largest captive population of orangutans in the world. They continue to face difficult challenges, and continue to find themselves short of medicine, equipment, money, space, support staff and time.

The dedicated men and women working toward orangutan conservation do not lack for skill; or commitment. And that is why the Orangutan Conservancy is committed to continuing to stage the Orangutan Conservancy /Orangutan Veterinary Advisory Group (OC/OVAG) Workshops. In 2013, the annual workshop was held in Bogor, Java, Indonesia from June 24 – 28. The workshop series, which was inaugurated in 2009 in Borneo, gathers together the veterinary teams and staff that work on the frontlines of the orangutan conservation crisis, and gives them a rare opportunity to share and hone skills, discuss issues and ideas, and renew friendships that could someday mean the difference between life and death for endangered apes in Southeast Asia.

Orangutans continue to be in severe crisis. The only great apes found in Asia, their natural range is limited to the islands of Borneo and Sumatra, and their rainforest homes are continuing to disappear at alarming rates. With loss of forest due to oil palm conversion, coal production, and of course logging (just to list a few), more than 80 percent of the orangutans' habitat has been destroyed over the last 20 years, and new estimates show that approximately only **40,000** orangutans are thought to exist. Currently, experts believe that orangutans may become extinct in the wild within 25 years! Add to that decline the continuing pet trade and human encroachment and we have the potential loss of a valuable species.

As a result of the intense pressures listed above, an extremely large number of orphaned orangutans exist in rehabilitation centers across Borneo and Sumatra. These orangutans – which number approximately 1,600 – arrive bearing a host of physical and emotional wounds, and require intense veterinary care to recover. As these orangutans make their way towards release (if possible), veterinarians in the field are under more pressure than ever to ensure that the orangutans in their care have the best possible chances for survival and are free of disease.

The orangutans that are judged fit to return to the wild will be reintroduced after a long, complex process, but an overwhelming majority will continue to reside in the rehabilitation centers.

The 2013 OC /OVAG Workshop focused on the issues relating to orangutan releases (primarily health issues regarding pre and post released individuals), continuing aspects of captive orangutan care, focusing on cardiac care, parasites, surgery, welfare issues and nutrition.

The 2013 OC /OVAG Workshop was sponsored by the Orangutan Conservancy, a substantial grant from the Sea World and Busch Gardens Conservation Fund, Abaxis (Europe), the International Primate Society, Fort Worth Children's Zoo and Chester Zoo/ NEZS, United Kingdom.

The OC 2013 Orangutan Veterinary Advisory Group Workshop included 42 participants from the orangutan rescue and rehabilitation centers in Indonesia and Malaysia, along with experts, facilitators, and veterinary volunteers and workers from the United States, the United Kingdom, Indonesia, Malaysia, and Holland. The OC 2013 Orangutan Veterinary Advisory Group Workshop was designed and facilitated by Dr. Steve Unwin of the Chester Zoo, in partnership with Dr. Raffaella Commitante of OC, the same team that helped create the format from its inception in 2009.

The workshop took the form of presentations, practical demonstrations and roundtable discussions, breakout sessions , and for the first time, delegate facilitators. In future, delegates will become even more involved in the organization and facilitation of our workshops. Toward that end, we have formed an OC/OVAG committee. The new committee members are: Steve Unwin, Raffaella Commitante, Anta Rosetyadewi, Fransiska Sulistyo, and Sumita Sugnaseelan.

During the 2013 OC/OVAG Veterinary Workshop, veterinarians presented case studies of problems with orangutans that had already been released but needed various forms of medical care. In small groups, they worked through possible scenarios and solutions. They attended lectures given by IPB staff, practiced suturing (on kitchen sponges!) and worked with a cardiologist using a portable ultrasound machine. Throughout the week, they continue to establish and build friendships and alliances that strengthen the orangutan conservation community as a whole. These friendships and alliances are carried over through the entire year. Participants stay in touch and contact each other frequently regarding issues they share as well as contacting outside experts who have now become their friends.

An interesting new development is that we are beginning to become known as a 'go to' organization. Last year, when there was a difficult health article published, the government went to one of our members to discuss it. With the support of OC/OVAG, the article was able to be researched and proved questionable. The publisher issued a statement to that effect. We are also growing in our collaborations with state agencies. We were approached by the Indonesian Veterinary Medical Association (IVMA) to work together to become part of a special veterinary license rating of orangutan specialist to OC/OVAG members from Indonesia. Our workshops might also become part of an education credit.

Some important ongoing workshop outputs that we would like to point out are, one, that the facilitators were once again impressed with the quality of veterinary work presented by delegates, and the knowledge displayed in all aspects of orangutan husbandry and health care. There is thus a commitment by OVAG delegates to publish case studies and other work in peer reviewed journals. A special session on scientific writing is being prepared for next year to assist with this. Tow, that the new OVAG committee will work on an Online Resource Centre. This will form the basis of material for post graduate training possibilities being discussed with the vet schools. Three, that even though the material created by the delegates from the breakout group sessions were for a learning exercise only, they will provide a good foundation, in combination with material produced by PASA, for veterinary guidelines for Great Ape reintroduction. This work is currently being collated.

The OC/OVAG Workshops continue to help build a community of veterinary healthcare experts that stands strongest when it stands together.

Raffaella Commitante, B.F.A., M.A., PhD
Steve Unwin, B.Sc., B.V.Sc., M.R.C.V.S


Steve Unwin


Anta Rosetyadewi


Fransiska Sulistyo


Sumita Sugnaseelan


Raffaella Commitante

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Feedback from delegates

Best things (with responses in red):

- Expert tuition, specialist knowledge that would be difficult to ever learn from books or on your own
- The friendliness and openness of the group leaves the feeling of knowing you have a group of people you call upon for expert advice at any time. A true sense of no longer being in isolation.
- Broad spectrum of subjects
- Parasitology and ultrasonography -excellent practical sessions
- Professional attitudes but extremely welcoming and friendly
- The opportunity to share information without pressure and to network (x6)
- Sharing of basic scientific techniques (x3)
- Sharing the information from other NGO's is fantastic. Nutrition is the coolest thing!
- Nutrition (x2) and reintroduction material
- Surgery and ultrasonography (x2)
- Very great interactive discussions (x4)
- Great to split into groups according to where our strengths lie (research, communication, etc.).
- This is my first time to attend OC/ OVAG and as a new vet I have got so much information that I can implement at my site, since I am the only vet there.
- Case studies – very interesting cases, however most of the presentations are just showing and sharing. Would be great to have some cases to be consulted by the group. This is a very good point and there is usually a mixture of cases that could be applied to other situations and cases that are asking for assistance- this year there were more of the former. The distribution list is also used for the latter throughout the year.
- Role play (reintroduction) – I think was the most important session, however people were getting tired. Yes there was not enough time for discussion, and we will rectify this for next time.
- The best vet workshop I have ever followed, even though I do not work anymore with orangutan (still useful).
- Even veterinary material was very interesting as it helps us to understand more what we observe in wild orangutans.
- Learned something new in every workshop. Practice good for skill improvement.
- Ethics section very good (x2) – please can we expand this. Yes we will
- Parasitology quiz – getting things wrong is a great incentive to read up and improve in a topic.

- The fact that the delegates new more than some of the speakers (and were open to discussion and correction)

Things to improve (with responses in red):

- Difficult to pre-assess but the relevance depth and practicality of the host university lectures could have been more useful (x3)
- Documenting the results of the discussion during the workshop to be implemented in each center as a contribution from OVAG. Delegates hold in theirr hand that document. Notes are followed up with management and delegates if appropriate, and are reviewed each year.
- Maybe require every NGO to give a presentation next year (x3). We do try to encourage this. Next year we will be doing an exercise where we will ask each center to write up a case report and present it, and together as a group we will help with standard setting for potential publication.
- Layout of meeting room – maybe more space?
- Okay to continue into the night, but request start at 0830 not 0800.
- More days! More practice hours.
- Suggest use of an interpreter (x2). We have done this in the past, and found it best to do bilingual sessions at the delegate's request rather than throughout. We will improve how we do this.
- More practicals in diagnostic techniques – ex. ELISA, PCR. Being planned for next year
- Please turn this into a curriculum so all vets can benefit. We are in discussions with IVMA and several universities to explore possibilities for this.
- Nutritional intake of wild orangutans for next year (Suggest Mark Harrison as guest speaker). Good idea – this was last covered in 2009, so we are due for new input.

How will I use the information I have gained?

- To pass on knowledge to students, management and staff (x8)
- To improve 'best practice' in a government run tourist center
- To write protocols for as many eventualities as possible
- To improve the rehabilitation process (x3)
- To review quarantine of babies to a shorter period using risk analysis for a better outcome of rehabilitants (x5).
- Practical ideas in each subject have been uplifted and will be used in my rehab center immediately e.g parasitology – SOP's for lab (x4), nutrition – the timing/ quantity of feeding will be adjusted, contraception – considering for wild macaque population, reassessment of risk analysis and disease control in the centre.
- I will apply it towards future work in conservation and rehabilitation/ relocation involvement. I have gained a huge amount of knowledge from inspiring people and will use that learning to develop future ideas.
- Gained a broader view of orangutans in range countries to build a better community of people working together to secure a future that includes free ranging orangutans in Indonesia and Malaysia
- Break down the walls between rehabilitation centers and wild OU research.
- I also learned how to present ideas to an audience in a different but constructive way.

Comments

- Excellent workshop- appreciate that a huge amount of time and effort has gone into organizing this. Congratulations and thank you to everyone (x2)

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Workshop Budget

ITEM	**UNIT COST**	**TOTAL**
Airfare (International)	$ 2,000 x 4	$8,000
Airfare (Domestic)	$ 300 x 30	$9,000
Accommodation - Bogor	$ 50 x 40 x 6 nights	$12,000
Ground Transportation	$ various	$800
Expenses	$ various	$3,000
TOTAL		**$32,800**

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Section 2

Official Letter of Invitation

Orangutan Conservancy

Dedicated to the Conservation of
Orangutans and their Rainforest Homes

June 1, 2013

TO WHOM IT MAY CONCERN

RE: Orangutan Conservancy / Orangutan Veterinary Advisory Group Workshop 2013
Orangutan Conservancy / Lokakarya Kommunitas Dokter Herwan Orangutan 2013

This letter shall serve as an invitation to attend the Orangutan Conservancy/Orangutan Veterinary Advisory Group (OC/OVAG) Workshop 2013 sponsored by the Orangutan Conservancy (OC), a United States not-for-profit organization, with cooperation from Chester Zoo (a zoological park in The United Kingdom) and co-organized by Asliqewan and the Faculty of Veterinary Medicine of IPB
(FKH IPB).

The workshop will be held at Faculty of Veterinary Medicine, IPB, Bogor and the Salak Boutique, The Heritage Hotel, Bogor. Contact information for OC/OVAG: Raffaella Commitante (rcommitante@gmail.com). Contact information for Chester Zoo: Steve Unwin (s.unwin@chesterzoo.org). Contact information for Bogor: Winny Pramesywari (win.pramesywari@gmail.com), Zulfi Arsan (zulfiarsan@gmail.com), and Andriansyah (pongodri@yahoo.com).

This, our fifth workshop, will continue to bring together experts working closely with orangutans in Indonesia and Malaysia and in the international community to allow for the sharing of information and expertise, and the creation of long lasting friendships and contacts. It will be held:

June 24 – June 28, 2013
(arrival on the 23rd and departure on the 29th)

OC would like to extend an invitation to the person/s listed below to attend this important workshop.

Steve Unwin

We thank you for your participation in allowing your staff to attend.
Travel expenses for the workshop and accommodation will be paid for by the Orangutan Conservancy during the length of the workshop for the person/s above. Accommodation information will be sent directly to participants.

Respectfully,

Raffaella Commitante, PhD
Director, Orangutan Conservancy/Orangutan Veterinary Advisory Group

Orangutan Conservancy / P.O. Box 513 / 5001 Wilshire Blvd. / #11

Los Angeles, CA 90036/USA / www.orangutan.com / info@orangutan.com

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AGENDA

Sunday June 23

Delegate Arrival

Monday June 24 – At Hotel

8:00 Welcome to participants by Raffaella Commitante, Steve Unwin
Opening Ceremony: Zulfi Arsan, Asliqewan

9:00 Ice Breaker – zooming into your world – ALL

10:00 Review of evaluation session – Steve Unwin, Wendi Bailey

10:30 Orangutan translocation part 1 – Session Chair: Steve Unwin

11:00 Post release monitoring and release from a field perspective – Hutan, KOCP

12:30 Lunch/casual discussions

13:30 Orangutan translocation part 2 – Session chair: Winny Pramesyswari

15:30 Break/casual discussions

15:45 OVAG veterinary strategy meeting – Session Chair: Anta Rosetyadewi

19:00 Dinner

Tuesday, June 25 – At Hotel

8:00 Orangutan translocation part 3 – Steve Unwin

10:00 Case studies and group discussion part 1

10:30 Break/casual discussions

11:00 Case studies and group discussion part 2

13:00 Lunch/casual discussions

14:00 Reintroduction/translocation scenarios – break out groups

18:00 Contraception discussion/Round Table – Hester, AAP

19:00 Dinner/Discussions

Wednesday, June 26 – at IPB

8:00 Theory of Endoparasite infection – lecturer: Dr Risa Tiuria

9:00 Review of new requirements for veterinarians in Indonesia – Zulfi

10:30 Break/casual discussions

11:00 Endoparasites as disease vectors – lecturer: Dr Upik Kesumawati Hadi

12:30 Lunch/casual discussions

13:30 Wet Lab part 1 – endo and echto parasites – Wendi Bailey

17:00 Transport back to hotel

19:00 Dinner

Thursday, June 27 – at IPB

8:00 Orangutan nutrition – lecturer: Dr Agus Lelana

10:00 Suture and surgical techniques – lecturer: Dr. Gunanti

10:30 Break/casual discussions

11:00 Surgical practical

12:00 Wet Lab part 2 – diagnostics and lab accreditation protocols – Wendi Bailey

13:00 Lunch/casual discussions

14:00 Introduction to cardiology and ultrasonography – Aimee Drane

13:00 Wet lab – Ultrasonography – Aimee Drane

17:30 Transport back to hotel

18:30 Ethics and wildlife – discussion/round table – Steve Unwin

19:00 Dinner/video evening

Friday, June 28 – at hotel

08:00 Group photo

08:30 Primate Anesthesia in rehab centers and the field – Steve Unwin
10:00 Wet Labs follow up – Wendi Bailey and Aimee Drane

11:00 Prayer time/lunch

14:00 Break out groups – reporting back
"Clinical mop-ups"
Review of animal requirements and protocols for veterinary training

18:00 Presentation of certificates and Gavo II

19:00 Workshop closing dinner at Bumbu Desa

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Delegate Contact list

		email	Affiliation
1	Dr. Raffaella Commitante	rcommitante@gmail.com	Orangutan Conservancy
2	Steve Unwin (veterinarian)	s.unwin@chesterzoo.org	Chester Zoo
3	Dr. Wendi Bailey	jwbailey@liverpool.ac.uk	Liverpool School of Tropical Medicine
4	Aimee Drane	adrane@cardiffmet.ac.uk	Cardiologist
5	drh. Anta Rosetyadewi	antarosetyadewi@yahoo.com	Universitas Gaja Madah
6	drh. Winny Pramesywari	win.pramesywari@gmail.com	Independent Vet
7	drh. Zulfi Arsan	zulfiarsan@gmail.com	Asliqewan
8	drh. Andriansyah Suhaery	pongodri@yahoo.com	Asliqewan
9	Dr. drh. Hery Wijayanto	herykh@ugm.ac.id	Universitas Gaja Madah
10	Dr. drh. Tri Wahyu Pangestiningsih		Universitas Gaja Madah
11	drh. Ricko Jaya	rickojaya@gmail.com	Orangutan Information Centre
12	drh. Meriam Sirupang	msirupang@gmail.com	Independent vet
14	drh.Yenny Saraswati Jaya	yenny.jaya@gmail.com	Sumatran Orangutan Conservation Program
15	drh. Fransiska Sulistyo	sulistyo.fransiska@gmail.com	Independent vet
16	drh. Anhar Lubis	vets_wildlife@yahoo.com	Vesswic (Sumatra)
17	Joost Philippa	joost.philippa@gmail.com	Eijkman Oxford Clinical Research Unit
18	drh. Winda Titi Pratiwi	wynd4_tp@yahoo.com	Independent
19	Felicity Oram	opticon@earthlink.net	Kinabatangan Hutan Project
20	Mislin Elahan	emislin@yahoo.com	Kinabatangan Hutan Project
22	Nigel Hicks (veterinarian)	nigvet@aol.com	Orangutan Appeal UK

23	Sara Hicks (vet nurse)	"	Orangutan Appeal UK
24	drh. Imam Arifin	imam@cop.or.id	Centre for Orangutan Protection (COP)
25	Hester van Bolhuis	hestervanbolhuis@hotmail.com	APP (Sanctuary for Exotic Animals)
26	Sarah Jayne Edwards	sjedwards@rvc.ac.uk	Royal Vet College London
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38	drh. Citrakasih Nente	citrakasih@gmail.com	Vier Pfoten
39	drh. Popowati	iccaros@yahoo.com	Orangutan Foundation International
40	Rosalie Dench (veterinarian)	rosalie.dench@gmail.com	Independent vet

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Section 3

PROCEEDINGS – Are available electronically with all presentations and teaching materials on request. Complete proceedings are always given to each delegate on a pen drive at the end of the workshop as well as being made available via the OC/OVAG drop box.

Day 1 (June 24)

Introduction and welcome from Steve Unwin and Raffaella Commitante (lead coordinators/facilitators)

Reminder to delegates to review the website: http://ae.imcode.com about ethics: all participants took the quiz for discussion later in the week.

Raffaella introduced Pak Zulfi Arsen, chairperson of Asliqewan, the wildlife section of IVMA (Indonesian Vet Association) who officially opened the meeting.

Viewing of videos created by Steve Unwin: OC/OVAG workshop history and PASA's 2013 Workshop in Limbe.

Ice Breaker: Zoom Project – each participant was given a laminated portion of a larger picture – the aim of the exercise was to describe verbally each portion of the picture and then find its placement among the other portions as each portion revealed the 'zoomed' complete picture. In this exercise, as sometimes occurs in life, one, the end and the beginning were clear – but the middle was a bit muddled!!!! Two, sometimes, trying to find one's place in the 'big picture' can be a challenge.

Administration of quiz for delegate evaluation…

1. **Risk, disease and the world we live in – Steve Unwin**

The world we live in – risk factors for pathogen spread

Discussed were the One Health concept, disease risk, and translocations / reintroductions. This brought up the question, What exactly is an animal translocation? Moving any individual from one area to another. Review Text – Reintroduction Biology: Integrating Science and Management pp 1-32 (Ewen et al 2012).

Review of hazard identification – Great Ape Pathogens –
Recent research has revealed that TB has been found in wild chimpanzees – further research needs to be done to determine if it is a 'wild' strain or if there was a point of transmission from other animals or humans.

In addition to regular workshop materials, each delegate received the OIE training manual, surgical tutorial, CBSG/ OIE Manual of Procedures for Wildlife Disease Risk Analysis (a digital copy of this book, which is not primate specific but is still a good source for wildlife reintroduction and translocation issues).

The world we live in – con't.

One of the biggest challenges we currently face is over population. Since 1950, modern humans have consumed more resources than what was used up in all of previous history! Much of the problem is due to the misappropriation of resources. The real concern is lack of fresh water. Water will be the real factor in resource power as we move into the future. Another part of the equation is the issue of climate change. The climate is definitely changing; there is no doubt about that. The main climate change molecule is methane. As economic development continues to increase along with the world's population, so will use of diminishing resources worldwide. As human populations rise, species extinctions will also rise. Also, due to over population, conflicts between humans and wildlife needs will continue to increase. These conflicts contribute to pathogen spread and disease outbreaks as humans come into more contact with each other and with wildlife.

Video by Nathan Wolfe – Disease outbreaks and Mapping disease video from Nathan Wolfe's 2009 TED talk

Video covers contact by people with wild animals, causing possible blood transfer, (especially regarding the bush meat trade). Wolfe maintains that bush meat hunters are not the core issue – poverty is the real issue. Due to the increasing human – wildlife contact, pathogens need to be identified before they make their way into blood banks, sexual networks, airplanes etc.

A link has been established to assist monitoring viruses, the Global Viral Network: www.globalviral.org – a field based global surveillance program. A similar program is run by Ecohealth alliance in South East Asia.

Due to the extreme level of contact between humans and great apes; hazards to consider are numerous.
The 'take home messages' from Disease Aspects of Reintroduction are (Ewen et al 2012):

- Hazards can hit at several points along the reintroduction pathway
- Some hazards are unknown and difficult to detect at outset of reintroduction
- It may be years before a disease outbreak is discovered from a previous reintroduction
- Decisions made by disease risk analysis are not easily deciphered

It is therefore imperative that information from people on the ground be strongly considered in decision making.

The One Health Concept is an attempt to increase emphasis on adaptive risk assessment and mitigation witheffective risk communication. TRUST between professionals is a key factor here. http://www.onehealthinitiative.com
One Health looks to combine resources between: Medic / Veterinary / Ecological / Social Media / Anthropology/ Economics/ Communications.

The OIE (www.oie.int) operate an online database (WAHID) that details animal disease outbreaks as reported by each Government. It is an interesting resource. The site also highlights who your local OIE representatives are. Whenever a disease outbreak occurs it should go through the OIE network whose perspective is that of wildlife being a threat to humans. It is most often through a more human perspective that action occurs, as human life is always seen as more valuable than wildlife. But what is the value of wildlife? Wildlife has value in a variety of sectors:

Economic/Cultural/Aesthetic/Ecological/Environmental

Regarding human emerging infectious diseases (wildlife to human), there are 1407 infectious pathogens – 58% of which are zoonotic. Therefore, in emerging infectious diseases, wildlife is a big component. Human and wildlife interactions, livestock and wildlife interactions, wildlife management actions and climatic events all shape the manner in which diseases occur. There is an individual effect, a population effect, and an ecosystem effect.

What are some pathogens? And why are we concerned about them? Group discussion

Infectious:

1. TB (virus not a pathogen)
2. Hepatitis
3. Strongyloides
4. Plasmodium
5. Salmonella
6. HIV (which has yet to be found in orangutans, but is this a retrovirus we should be worried about?)

Noninfectious:

1. Malnutrition
2. Trauma

Concern:

TB: Confirmed zoonosis/human health concern
HepB: Important because it is political
Strongyloides: Highly infectious and fatal if overload
Plasmodium: Highly contagious and can definitely be fatal for humans and in some orangutans
Salmonella and Shigella: Confirmed zoonosis/cause of clinical disease

Source - Transmission - host: Disease risk mitigation concentrates on reducing transmission from source to host
Transmission of infectious pathogens - Routes (aerosol: sputum can stay in the air for several hours)
Close Contact: Skin to skin/aerosol/secretions/excretions/sexual/carcasses
Environmental Contamination: Air borne/water borne/food borne/fomites/transport/ host

Intermediate Hosts:

Intermediate Hosts: Obligate/ facultative/ What are vectors?
Water / Urine /Fecal: basic contact

There is a web of infection that occurs when dealing with wildlife and human contact. To assist in dealing with these issues, the following Articles are available to all delegates:
Clinical pathology/Emergency medicine: malnourishment/ Parasitology/Peer reviewed materials on disease and reintroduction/ Disease focus/Guidelines and reports/IUCN guidelines, Human wildlife conflicts, actions plans, outbreak materials, literature about pathogens in orangutans, TB in wild chimps, updated version of past case studies.

2. **Back from the field –Wild orangutan research - Felicity Oram and Mislin Elahan (Sabah Wildlife Department)**

Felicity and Mislin both work in the Kinabatangan region of Sabah in Malaysia. Their researchers took a trip to Jambi (orangutan release site in Sumatra) and learned many things about releases and what is actually being done regarding reintroductions as well as sharing information about wild release sites. From their 'wild' perspective, some recommendations to improve orangutan reintroductions are:

Reintroduced orangutans need better nest building skills, what they perceived at the release site were not sufficient. They may know how to make a nest with leaves but they do not always understand the structure – they need to learn that. Branches need to be provided not just leaves, as well as more innovative ways to get them to learn structure. Perhaps providing branches from laran trees (which wild orangutans use) to practice with. Perhaps building an incomplete nest frame? In this way, orangutans can practice in order to learn to make structures that actually hold their weight. More must be done to keep orangutans off the ground. These orangutans must gain knowledge of fall back foods, not just plantation fruits, but wild foods as well. Better monitoring techniques with a better knowledge of what are normal wild orangutan behaviors.

Teeth are often used to estimate orangutan age, however there is little data available confirming permanent tooth eruption raising concerns of misinterpretation and over estimating of age of animals between 4 and 12. Current research using zoo housed orangutans and observations from the field is underway to confirm this.

The biggest problem of course is that center orangutans grow up without a mother.

Key elements: (from wild Sumatran orangutan data)
Locomotor competence is reached by 2- 3 years
Nutritional competence is reached by 3 years
Foraging time equals their mother's when young no longer share a nest
Total weaning occurs at about 7 years
Ranging independence occurs between 9-11 years of age, where typically, orangutans begin to change very rapidly
Wild orangutans are primed by one on one learning – more so than what is seen in humans
Wild orangutans do not leave their mother until they are about 8 years old
If opportunities occur, they do socialize with conspecifics
Wild orangutans rest in a nest for 10 hours each day

Rehabilitated (or center) orangutans seem to know they need to rest and collect leaves but they appear not to understand where would be best, certainly not on the ground. While it is true that sub species Morio seems to spend more time on the ground, it is not a safe place (clouded leopards) and is a very high risk. The safest place for a young orangutan to be is in the trees, wild orangutans know this. Center orangutans remain vulnerable to people due to years of contact. Wild orangutans are innovative in building nests in a variety of places (oil palm, small trees) but center orangutans seem to lack that ability. Any form of skill building is a tall order without a mother to learn things from.

Moving rehabilitated orangutans in ground transport may not be optimum. They need to learn not just to go up on the trees but to move in the trees. In Jambi, ropes are hung for orangutans to allow them to leave their forest cages and travel up to trees to get to the forest location without needed to touch the ground. A swift clear message should be given to keep young orangutans off the ground – this may seem harsh but they do need to learn to stay off the ground. A harsh voice or banging on the trees can be used to get them to stay up in the trees. This 'harshness' must be tempered with TLC as youngsters also need emotional support as they learn.

Rehabilitated orangutans also need to learn about natural hard to process food items and should be introduced to wild foods whenever possible. Learning about how to open forest foods is a progressive process, they learn nothing from pre-cut foods; also, too many human generated foods can be misleading to an orangutan. They would benefit more from orangutan key species such as fichus, which fruits 4 times a year and contains many sub species found throughout both Borneo and Sumatra; many species of ginger and canarium. Orangutans consume more vegetation than previously thought and leaves are a big part of their diet. Wild orangutans consume about 40% of ripe fruit, 25% of young leaves, various unripe fruits, and vines which can contain fruits, flowers and leaves. Other multiple food choices are found kayu malam (night wood) with edible fruits and leaves from this species of tree. Chewing cambium is a good source for water. Termites are also a good food source found in the forest.

Post release monitoring is a key aspect of rehabilitated orangutan survival. It must be determined if they are finding food successfully. Proper distance needs to be maintained when monitoring rehabilitated orangutans as they have a long history of being around humans. A good distance might be 10-15 meters away and out of their direct line of sight. Monitors should not call the orangutans by their 'name' and contact must never be initiated.

Radio tracking is a limited method as you may know where an individual is, but not their condition.

The following data are collected when following wild orangutans:
Feeding, resting, moving, social play, when out of sight, distance between focal and others, use of environment and feeding ecology, tree and plant species they are feeding on, tree species they are moving through, position in canopy

As always, allowing the individual to decide direction with no interference

A good resource for data collection: http://www.aim.uzh.ch/Research/orangutannetwork/FieldGuidlines.html

Wild female orangutans in the Kinabatangan Research area spend 37% of their time resting and 46% of their time feeding. If females have been undisturbed by any human presence, those percentages change to 30% resting and 50% feeding. Wild male orangutans spend 58.45% of their time resting and 27.43 % of their time feeding.

At Kinabatangan they also found that if orangutans were followed for more than 10 days, their behavior sometimes changed.

For young, the years between 3.5 -4 are key times for learning while still nursing though youngsters are supplementing more with their own food finds. Key growth time for orangutans is between 9 – 11 years when they really start to change and grow – males begin to develop at a much faster rate than females (regarding body changes). This is another area where confirmation of permanent tooth eruption as an indication of age will help with juvenile reliance on parent and feeding strategy analysis.

Summary points:

1. Nest building with leaves and branches to learn weaving
2. Keeping off the ground –arboreal travel as much as possible
3. Adaptation – not only fruit but leaves as well fall back wild foods
4. Release monitoring – data collection, distance follows
5. Follow normal development –growth spurt between 9-11years

Questions from delegates:

Nigel: How long do we monitor with follows? Is there a minimum time?

Mislin and Filicity response: It really depends on individual and phenology of release site

Steve: What is carrying capacity of the area? We are currently data deficient, so we will need to get enough data to determine how long released orangutans need to be followed. How long until they mate? How are the babies surviving? It can be years of following before sufficient data can be collected and we must keep in mind that there will never be 100% survival. Use of radio tracking will allow you to determine movement, and if there is no movement, you can get to the body in time to try to determine cause of death. What is community involvement? What has been done to habituate people to the presence of orangutans in their area (pre and post release)?

Sumita: How do you try not to be seen?

Felicity response: Following yet trying to appear as if they are not being followed.

Sumita: Activity budgets can be tricky as they can be subjective.

Steve: How did you figure your activity budgets?

Felicity response: The activity is based on what was observed over a period of 10 years over which these patterns emerged

Sumita: That brings us back to how long we follow, perhaps 10years is needed before we see patterns that can give us sufficient information

Andri: Were activity budgets configured by age?

Felicity and Mislin response: No age distinction was made

Winny: Orangutans often cannot survive because they cannot get enough food, how much time do they need to spend feeding to remain healthy?

Felicity response: Females need to spend about 50% of their time eating, if they are doing well; if they spend less, there may be a problem. It can also depend on the individual. Mothers with babies feed longer; unflanged males are different from flanged males, etc. In wild orangutans, feeding times are judged based on the amount of follows. If an individual feeds less than expected based on sex and age class, then follows are stopped or become less frequent.

Sumita: At what age is it correct to release an orangutan?

Felicity response: It really needs individual assessment

General comments:

What is the definition of feeding? Orangutans may be foraging but not eating appropriately and they may not be getting enough nutrition for the same amount of time spent feeding as wild orangutans.

It is tricky but there are definitions for feeding that are used across field sites to avoid misinformation and confusion.

3. Reintroduction Process from a veterinarian perspective – Chaired by Winny Pramesywari

Reports from OFI, BOS, SOCP

Introduction – Winny Pramesywari (who until recently worked with Peter Pratje, at Jambi Nationl Park, Sumatra)

What is the main role of veterinarian in a reintroduction Project?
What should we do when a released orangutan gets ill?
There is still an important role for vets even after orangutans are released. Periodic assessment is needed on released orangutan health to ensure survival and to ensure they are living well in the wild.
Perhaps by sharing information across the three sites (managed by OFI BOS and SOCP), we can learn more about the issues that affect released orangutans and the vets that continue to care for them.

Since the first releases in 2002 in Jambi, much has been learned. Changes have been made throughout the years to increase what we know and what is best for orangutan survival. Peter Pratje produced a booklet for workers to follow so that all information collected at each site is consistent and that proper monitoring occurs.

Before we can assess the role of vets in the post release process, we must first understand the purpose of reintroduction, which is to release orangutans back to the wild with the needed skills to survive. Orangutans can fail if they do not have good skills, if they cannot find food, and if they cannot climb well. They can die without that knowledge.

Stages: Adjustment to new environment
Adaptation training (forest schools)

Release to the wild

The above stages must be assessed properly. Orangutans should be released during the fruiting season, so that when the dry season comes, they are better prepared.

Forest schools are only practical with young orangutans as they will stay with workers, whereas older orangutans are unpredictable and can easily get away from workers. It is also easier to train young orangutans as older orangutans are already set in their ways and it can be difficult for them to be taught new things. Orangutans need to be shown how to eat forest foods, and they need to learn how to make nests and when and where to rest.

Vet's role:

Sanitation of cages – are they really clean?
Prevent stress as much as possible which helps them avoid disease
Diet management – if they are not stressed and have a good diet, there is less disease (at Jambi site, there have been no diseases for 2 ½ years)
Routine health exams and deworming every 3 months

Cages: are cleaned three times a day– wet method (disinfectant) twice, dry method (dry sweep) once. The type of disinfectant is changed every three days; fungus can adapt to disinfectants and still grow. Technicians wears masks, gloves, boots, and coveralls. If there is fungus present, a deep sanitation is applied as needed.

Stress prevention: Using observation, change orangutan cage mates if needed. Separate more submissive individuals from dominant individuals, separate males from females. Sometimes adult females may be grouped with young orphans as they can mother them. Keep smart orangutans with less smart individuals so they can learn.

Enrichment and evaluation of enrichment: Is it effective? If not, change it! Does it occupy their time while in the cage? Vet's should not only prevent disease but also think about dealing with orangutan stress. At Jambi, enrichment is given 4 times a day mixing both natural and artificial forms. In the afternoon, they are given leaves to use as nesting material.

Diet management: 90% fruits and 10% protein (this does not include enrichment items). Focus on energy with fiber and protein. Food is supplied 5 times per day at Jambi. A food allometric scale is used to determine the amount of food each individual receives.

Health Examination and Deworming: Fecal parasites and urine analysis are conducted every 3 months. Deworming is done every 3 months. Technicians working with orangutans are tested for TB, Hep A, B, and C and are vaccinated for Hep A and B. Vaccine administration needs to have proper protocols set.

Release into the wild: Routine monitoring, length of time for monitoring depends on skills. High activity level (45% or more for foraging and feeding) is a good sign. If they are able to access 50% of fruits, can build and sleep in a nest and are not sleeping on the ground, are all good indicators.

Vet role: Health exam and final deworming prior to releases (these can be continued post release is possible).
Vets should ensure that orangutans are acquiring sufficient foods. If not, food support may be needed. Vets can also assess body condition. Jambi uses a body score chart. Orangutans might need to be infused if body condition is very poor. BCS (Body Chart Score) ratings: 1 (poorest) through 5 (best).

Adult male	3100 – 3400 kcals per day
Adult female	1800-1900 kcal per day
Female with Young	2300-2400 kcal per day

Basic energy requirements	1000 kcal per day
When sick	1300 per day (sweet potato, corn, fleshy fruits, 2 boiled eggs)

Discussion:

Steve: Those needing supplemental food, are they not feeding or not eating?

Winny response: They are not finding enough food.

Steve: Why?

Winny response: There is no food around, but even when there is food around, they seem not to be capable of eating it or opening it.

Yenny : Some orangutans have been in centers too long, they do not know what are good foods to eat. We do not provide extra food for released orangutans but do for those still in our center.

Steve: It is very different in chimp releases. Chimps go through 6 years of 'training', but chimps learn from each other as they have a more socialized structure whereas orangutans, though they are capable of socializing, typically do not do as much as other great apes.

Vet role at OFI reintroductions - Popowati (Desa Pasir Pangalang Bun)

Desa Pasir has been operating since 1998 as a rehab center with 332 orangutans (2013). New arrivals go to quarantine, then to a forest school, the quarantine for daily care and then release. Vets have an important role making sure that orangutans are suitable for reintroduction and are healthy.

New arrivals: Are subject to 30 days of quarantine with general a checkup done within 24-48 hours of arrival. Body measurements and weight are recorded. Blood is collected. Fecal, urine, Hep B, TB, and malaria are tested for. Hair samples are taken.

Routine: General health checks, 3 month deworming schedule with different medications, blood work, body weight check 1st of the month, daily activity check and health check, maintaining medical records, treatments, radiography, surgery, daily medical treatments, and necropsies.

Prerelease: same as new arrivals, microchip ID (if not previously implanted)
Release site: On call only. If an orangutan is sick, it can be caged in the forest and treatment is attempted.

A big problem with released orangutans is fighting among the males. Kusazi, a famous male from Camp Leakey is now dead because of fighting.

Rescue and translocation: Ketamine HCL, Medetomidine HCL or dex-medetomidine, for immobilization are administered sometimes under very difficult conditions. General checks are tried to be done on site. If translocated orangutans are healthy, they are moved to another site. They do not come into the center.

Discussion:

Anta: Why are you collecting hair samples?

Popo response: We are not doing anything, just collecting and storing.

Anta: Blood is better than hair samples for DNA analysis; maybe you should not use hair, but blood instead.

Maryos: We (at BOS) collect hair as well as blood.

Steve: For sub species analysis, hair is better to use than hair used for genetics.

Steve: Why do you use zylozine?

Popo response: Rehabs get sick with ketamine; anesthetics are difficult because along the way they need to keep administering them and that can cause problems in the long term.

Steve: What about post release monitoring?

Popo response: It is done but not by the vet. I believe they collect activity budget, feeding and resting data. They follow released orangutans until they make their own nests for 10 days in a row. Many of the orangutans follow the researchers back to camp. They try to scare them away. The ones that follow researchers back are about 9 to 10 years old and have recently been released. Researchers have tried to lead them to the National Park area, but they still go back to the center or to the camp. Some orangutans are released, take off and are never seen again.

Reintroduction: Agus Irwanto (BOS- Samboja Lestari)

Reintroduction pathway: Quarantine, then if healthy they are moved with the regular population.

New arrivals: Physical is performed: blood check, chip is implanted, general exam, laboratory check, TB, fecal examination, Hep B, malaria, routine hematology then into quarantine area. X-rays are taken for TB test as well as a tracheal wash. A daily health check occurs, a monthly fecal exam, strongyloides is checked for load along with other parasites. Release preparation can then begin.

Other tasks: Sanitation and hygiene; nutrition, animal husbandry, collaborations with behavior team to evaluate groupings, welfare issues (especially for young babies as they need mothering, ex. Komeng was born with TB and mother died from the disease, he still needed maternal care); continual checking of status of release candidates for TBC, parasites, salmonella, shigella, malaria, and collection of nail, hair and blood samples.

Post release monitoring: Health checks based on changes in behavior reported by monitoring team. If there are any changes, the vet is sent for and he/she will follow the individual in order to evaluate the situation. Vets carry a simple tool kit into the field.

Discussion:

Zulfi: The difference between the centers seems to be regular de-worming? What do the other centers think about that?

Yenny: If fecals in release area reveal worms, they give the orangutans medicine for de-worming, but if the load is small, they will leave them alone.

Winny: While they are in cages, they will de-worm, if worms are present in fecals, meds are given. Released orangutans in Jambi do not come to the ground often so they do not have an overabundance of parasites. Sometimes plantation foods bought to feed orangutans can give them parasites. In the forest they have natural foods that have not been handled by humans.

Popo: During quarantine and in the center, de-worming is done but once orangutans have been released, no.

Nigel: In Sepilok, the orangutans get de-wormed every month. In the actual release site, it is very rare to de-worm as they are not spending time on the ground. Early releases did see heavy loads which may have been due to over use of meds before release making the worms resistant and more virulent in over medicated individuals.

Yenny: In SOCP, we collect urine for key tones, for use in reproduction and nutrition evaluation. If malnutrition is high, no key tones can be found…useful to collect urine to see what the issue is….this is ongoing research.

Steve: Has anyone done a specific gravity on urine which used to check the ability of kidney function?

Collectively: No.

4. **KIVNAS 2012 12th National Veterinary Scientific Conference of Indonesian Veterinary Medical Association (IVMA) – Anta Rosetyadewi (Universitas Gadjah Mada)**

(Last year in KL, we were informed of the KIVNAS (or IVMA in English) conference and Anta R. gave a presentation about OC/ OVAG. OC/OVAG was invited by Andri who was representing IVMA in KL. Several OVAG members presented and many attended.)

Anta presented for the group about how we all greatly believe that we are getting so many benefits from our OVAG meetings, and that we want to spread those benefits to other wildlife veterinarians, as the challenges are many and similar. Orangutan vets share many challenges with other wildlife vets. Anta's focus of her presentation was the importance of collaboration, comparing now to when orangutan vets were operating alone. Now, with the OC/OVAG collaboration, it has eased the burdens shared by all, because we have friends all over the world we can trust – and that gives us the confidence to get better and improve. Other wildlife vets should feel that way to too and use our organization as an example. She shared the serious aspects of the learning collaboration but also the fun we all have together. There were many positive comments from many of the vets attending the conference. They told Anta that they hoped they could build something similar within their own focus species. Anta wanted them to realize that they have knowledge, that they are smart and are equal to vets that are from outside Indonesia. Local vets often feel inferior, scared and shy. In telling the story of our group's progress, especially in the beginning, where we also were shy, and how each year we grow and get stronger. Anta also stressed that OC/OVAG vets are not doing this for themselves but for the orangutans. Rachmad, Winny, and Nyaru Menteng vets also presented their work at the conference (all OC/OVAG members).

5. **Afternoon agenda – moderated by Anta Rosetyadewi**

This time was set aside to discuss several issues important to OC/OVAG and to encourage discussion about those issues.

i. Matters arising from last year: should there be a more formal internal structure to OC/OVAG? Do we need one? Is it necessary?

Collectively we all felt this would be a good idea. Several people were nominated to be part of this committee. The following individuals are now the OC/OVAG Committee:

Anta Rosetyadewi
Fransiska Sulistyo
Sumita Sugnaseelan
Steve Unwin
Raffaella Commitante

Other discussion points: The committee should always include someone that still works with orangutans. Zoo vets need to be more involved. Orangutan vets currently working may not be able to contribute much to committee work as their work load is usually so heavy.

ii. Ebola issue

This has been a hot topic in Indonesia because of a paper that was published about ebola being found in an orangutan in Indonesia. The paper had several authors and was titled: Seriological evidence of ebola virus infection in Indonesian Orangutan. The Indonesian Ministry called many people together to discuss this paper. The aim of getting people together was to hear from the author (s) to get an explanation as this paper has understandably caused much concern. Since its publication, many people have contacted the ministry about the presence of ebola (a very frightening, highly infectious disease, causing deaths in animals and humans). The Ministry felt that if what was written about Indonesian orangutans was true, how could the Ministry not know about it? The lead author Dr. Nidom explained how he did his research. Many comments were made after his presentation. For those that have been working with orangutans for many years, it was easy to see the errors in the paper. Dr. Nidom went on to state something contradicting what he wrote in the paper and then he admitted that the samples used came from BOS Samboja Lestari and BOS Nyaru menteng from the mid 2000's. The samples were sent to him for analysis and he then used those same samples to look for other things without permission. He looked at poor and recombinant DNA. He had done many things with the samples that he was not authorized to do. Everyone agreed there was a serious breach of ethics. The Ministry of Forestry decided that the samples should be confiscated and they were just before 12/2012. The samples are currently being stored in the office of PSSP (with Dr. Imung). This is as far as they have come. The orangutans **did not** actually have ebola. What was found was the presence of a fela virus which is a family of virus that includes ebola but they did not find ebola.

Drh Anta Rosetyadewi was consulted by the Ministry about the issue and she contacted her network within OC/OVAG, including Steve Unwin. Steve called several people to get more information. The article was published in Plus One where the peer review is done after publication. Upon being contacted, the editor of Plus One added an expression of concern at the top of the on line journal article.

During the meeting, it was learned from this incident that the government did not really have any reference for orangutan cases. As a result, Anta was able to push OC/OVAG's wealth of cumulative knowledge and how that knowledge could be of help to the government. They now have Anta's name and number as well as awareness about the existence of OC/OVAG.

This sort of thing could happen again, as ethics in use of samples is a difficult thing to control. When articles are published, it is up to the editor to be certain that the material is scientifically sound and valid.

This kind of negative press, should affect the success of the journal. Which hopefully will make it more difficult for errors in publishing to made in the future.

Andri also has had experience with his own samples being used without his knowledge. A lab he sent samples to found new species of parasites and published the information without the knowledge of Andri who collected the samples. This case is still being debated.

iii. BAUV attack on OC/OVAG

At last year's KL workshop macaques were used in a surgery exercise. The uses of the macaques in this exercise followed all proper protocols and were macaques already designated as having to be euthanized (after scrutinized review by veterinary authorities) and in no way were euthanized specifically for our workshop. An email was sent to many people participating in OVAG condemning the use of those macaques. Steve read the email aloud, as well as his response where he explained very thoroughly exactly what led to the use of these macaques.

Discussion:

Zulfi: They (IVMA) had received similar emails. Zufi wanted to know that we would not be using animals again, we are not. That was a unique situation where the workshop just happened to be held at the facility at the same time the macaques were being euthanized, and instead of burning the carcasses as is the norm, we were allowed to use them for an exercise before burning.

Sumita: UPM were the organizers yet they were never notified, why is that? Sumita stated that under no circumstances would macaques be euthanized for no reason. She is very willing to discuss things within our 'family', but if people choose to go outside instead of ask within is hurtful to our family. This issue was further discussed at the round table (later in the session). The newspaper article referenced in the email contained false information. Sumita also contacted the author of the article and was told he got his information third hand and it was never verified.

No one from the BAUV group or any others from that connection ever contacted UGM, the institution that was directly involved with the incident. They would have been the first people to contact before sending emails out to all and sundry about this issue. Sumita agreed to be the contact person should any more emails come in about this.

iv. Evaluation and skills

Funders need to know what progress occurs with OC/OVAG workshops. Are they effective? The effectiveness and success (yes, even failures) of the workshops can then be published. Assessing improvement is important for donors. Delegate evaluations are equally valuable in assessing any success and failures.

Assessing undergrad vet curriculums for wildlife medicine/conservation medicine… is this something that could be a possibility?

Discussion:
Anta: Adding something to university curriculums might be difficult, but an alternative is to have the student unions such as a wildlife study group become involved. There may be a way to make a collaboration with a student activity rather than through the school curriculum.

Yenny: As the Zurich University liaison, there may be a way to make a program for training vet students once a year. This might be a possibility. Yenny has had experience with working with poorly trained students who did the wrong procedures on an orangutan and it died as a result. Students do need better training….many people want to help but they do not have proper training.

Zulfi: Yes, it is very hard to approach a university, but we can approach it through student organizations.

Sumita: All organizations must have a wildlife vet, which is a government regulation. There are many regulations and assessments that can be used. Of the two vet schools in Malaysia, UPM has 35 years of experience, and UPM has wildlife medicine and wildlife conservation courses available in their vet program.

Zulfi: The problem with vet studies in Indonesia is that they are still mixed with livestock study. From the government point of view livestock vets translate as money, wildlife vets do not really generate money. If we could get all vets to understand the concept of wildlife medicine then we can begin from there.

Felicity: Don't all vet programs have a livestock component?

Steve: All vet programs should have a (domestic) livestock component, but will vary between country and university. Undergraduate wildlife medicine courses as part of basic vet curriculum are extremely rare.

v. Budget considerations as we move into the future – Raffaella Commitante

As we are now in our 5th year, our group continues to grow in numbers as well as in recognition. We are definitely growing in many ways, but our budget remains the same! In order to be more efficient with our limited funding, we as a group need to take ownership of limited funds. Raffaella proposed the following:

Each NGO/Orangutan Organization can send 1 person to the workshops to be fully funded by OC/OVAG. Should they decide to send 2 persons, OC/OVAG will fund the accommodation for both delegates, and the NGO/Orangutan Organization will fund the flights for the 2 delegates. If the NGO/Orangutan Organization wants to send more than 2 persons, then that can be discussed separately to reach a mutually agreeable solution.

Independent Indonesian and Malaysian vets should find their own funding for their own flights, but OC/OVAG will pay for accommodation. However, should any of our independent vets not be able to find funding, **PLEASE** contact Raffaella, as she may be able to find funding. Independent vets should show that they are in some way still involved or contributing to orangutan health/welfare/conservation.

Independent foreign vets or interested persons will continue to fund themselves for both flights and accommodation.

Something to also consider beginning in 2014 is an OC/OVAG Workshop registration fee of 500,000 rupiah (or equivalent currency conversion) per person payable by all delegates regardless of funding. Is this reasonable?

All persons attending the workshop are responsible for bringing a digital storage device for workshop materials to be transferred to. A lap top for note taking or transferring information is also useful.
In the past 5 years, our workshops have been held in different cities within orangutan range countries. While this has been a wonderful way to share locations and field sites with others, it does sometimes increase costs and logistics because of the unpredictability of condition in each city. Raffaella would like a permanent home city for OC/OVAG workshops in the future. The city chosen was Jogjakarta in permanent collaboration with UGM. This was accepted, with the proviso that should a university or group want to host and contribute monetarily (as UPM most graciously did in 2012), then we will have the freedom to go elsewhere occasionally if funding permits.

vi. Feedback from the Orangutan Reintroduction Workshop, Bogor, April 2013 – Citrakasih Nente (Vier Pfoten**)**

The workshop report is in the OVAG digital package. ARCUS and FORINA put this workshop together to discuss various the structures of reintroductions due to the high costs.

First goal: To get a commitment from all centers to contribute relevant information and data. Currently, data were hoarded rather than shared. Sharing allows for a better way to evaluate releases.

Second goal: To define the key outcomes of reintroduction and data analysis.

Third Goal: To discuss post release monitoring regarding that there are no standards for data collection and monitoring should be done for as long as possible.

Fourth Goal: To formulate recommendations for the future regarding release sites and what is to be done with unreleasable orangutans?

A commitment agreement was signed by all participants to go along with the points put forth in the meeting.

Citra felt that the most interesting result was the commitment agreement; especially the willingness to share data. Serge Wich volunteered to organize and analyze the data across sites.

As for the vet role, there are lists of the key variables in each center: Vets are the first persons to handle the orangutans, so they need to get as much information as possible about each individual. Vets have much knowledge to contribute to the Rank of Meta analyses (see digital copy), but time was not allotted for veterinary issues discussion.

David Lukas (PASA) was also at the meeting. In September of 2013, chimp, bonobo, gorilla and orangutan decision makers will be invited to discuss whether reintroductions should even be done. Most facilities with attending vets at OVAG 2013 will have representation at that meeting.

The first such meeting (alluded to in the above paragraph) was held in 2006 by JGI, CBSG, IUSN SSP PSG.
Everyone agreed to standards for reintroductions and a higher quality of care as custodians of primates in order to achieve better welfare.

vii. Overview of African reintroduction programs - Steve Unwin

Gambia, chimps in 1966
Gorillas in the 1990's
Help Congo, 37 chimps reintroduced: 35% survival rate
PPG, 51 gorillas reintroduced: 97% survival rate

Since 2007:
Guinea reinforcement, 12 chimps in 2008
DRC, 9 Bonobos released in 2009
CCRG and JGI/HELP, new collaborations

Success factors: pre and post release / Long term investment / Interactions between other release groups needs to be monitored / Not just monitoring focal species but also protecting the forest

Can reintroduction be used as conservation too? Yes, if it is done properly. You may never release an ape, but by following a program you have already assisted wild populations, thereby contributing to conservation.

Even though release numbers are not high, the presence of releases helped save apes in the area. For example,

・Sierra Leone, chimp census (PHVA) helped support the SL Government in habitat protection efforts.

・Uganda PES program

・Captive breeding of gorillas to supplement wild populations

・New monitoring methodologies

At the 2012 Nairobi PASA reintroduction meeting, it was decided that there are more orphans, increasing populations in sanctuaries and resource constraints that are undermining animal welfare standards.

Major issues: Land use change / Tangled objectives / acknowledged that we still cannot tell a coherent story about the impact of reintroductions, hence the need to gather all great ape reintroduction decision makers together at the **Great Ape Reintroduction Workshop, September 14-18 2013 (U.K.)** (mentioned previously)

Workshop objectives:

1. To share information on recent reintroduction efforts, relevant workshops and other relevant issues
2. To identify the current and emerging issues facing great ape reintroduction;
3. To develop collaboratively a shared, long term vision for great ape reintroduction integrating species conservation, welfare, ecosystem impacts, and other relevant concepts;
4. To agree on the components required to deliver the agreed vision;
5. To identify goals for addressing each vision component, and actions for implementation of priority goals;
6. To define success for conservation and welfare reintroductions for each species;
7. To integrate the vision component into a draft framework to guide great ape reintroduction efforts;
8. To develop and commit to a data-sharing agreement so that optimal reintroduction tools, methods, and predictors of success can be readily identified and shared;
9. To establish a great ape reintroduction Community of Practice to ensure implementation of workshop actions and to serve as a resource for others.

The task is to come up with a vision to guide reintroduction efforts. CBSG is facilitating the meeting. Participants are to prepare their involvement before the meeting so time is not wasted.

Day 2 (June 25)

6. Multiple Pathogen Based Topics – moderated by Steve Unwin

Hepatitis B – what are the parameters?

Typical serological patterns of acute and chronic HBV infection (adapted from Dienstag and Isselbacher, 2001 and Hollinger and Liang, 2001).

Classification	HBsAg (what we test for at CZ)	Anti-HBs	Anti-HBc[1]	HBeAg[2]	Anti-HBe[3]
Never Exposed	-	-	-	-	-
High infectivity chronic carrier	+	-	+	+	-
Low infectivity chronic carrier	+	-	+	-	+
Current acute infection	+	-	+	+/-	+/-
Vaccine Immunity[4]	-	+	-	-	-
Past exposure (exposure immunity)	-	+	+	-	+/-

Further information is in the digital package to help with Hepatitis diagnostics.

The nutrition material provided by Dr. Andrea Figgett is also included in the digital package, along with several articles on nutrition, supplemental feeding, etc. What are requirements? Much of the information included in this file was given to participants in 2011.

Suggestion of creating an OC/OVAG drop box for papers provided throughout the workshops.

PASA has created a resource library by subject and Steve will follow that model. The newly formed committee will work on this.

What are viruses that affect orangutans and what are they tested for?

Anta: Orangutans are only tested for what might be present. It is difficult to test for viruses when you have no previous reason to search for them.

Human Viruses cause declines of endangered great apes

[1] As HBcAg is not present in commercial vaccines, the presence of anti-HBc in serum is indicative of actual infection rather than vaccine induced immunity.

[2] HBeAg in serum of carriers constitutes the replicative phase of infection and is indicative of a high relative infectivity, coinciding with high circulating concentrations of HBV DNA. May persist indefinitely.

[3] Seroconversion of carriers from HbeAg to anti-HBe is associated with conversion to the non replicative phase and a low relative infectivity.

[4] HBsAb > 10 mIU/mL considered protective in humans

TABLE 1. Viral diversity described for African wild great apes

Viral family/genus	Tested species[a]	Positive species	Closest human counterpart	Cross-species transmission	Possible recombination/ reassortment	Mode of transmission[b]	Transmission/ directionality[c]	Veterinary relevance	Medical relevance	Reference[d]
Adenoviridae/ Mastadenovirus	Ptv, Pts, Gg, Gb	Ptv, Pts, Gg, Gb	HAdV-A to F	Yes	Yes	Faecal–oral, respiratory	Ape to human, human to ape	Unknown	Yes	[24,54]
Anelloviridae/ Alphatorquevirus	Pts	Pts	TTV	Yes	Yes	Sexual, blood	–	Unknown	Unknown	[55]
Circoviridae/Circovirus	Ptt, Pts	Ptt, Pts	Not found in humans[e]	Yes	Yes	Faecal–oral	None	Unknown	Unknown	[56]
Cyclovirus	Ptt, Pts	Pts	*Cyclovirus* 7, 13-16	Yes	Yes	Unknown	None	Unknown	Unknown	[56]
Filoviridae/Ebolavirus	Ptt, Gg	Ptt, Gg	EBOV	Yes	Yes	Body fluids, blood	Ape to human	Yes	Yes	[10,57]
Hepadnaviridae/ Orthohepadnavirus	Pte, Ptt, Pts, Gg	Pte, Ptt, Pts, Gg	HBV	Yes	Yes	Sexual, blood–blood	Human to ape	Unknown	Yes	[58,59]
Herpesviridae/ Lymphocryptovirus	Ptv, Ptt, Gg	Ptv, Ptt, Gg	EBV	Yes	Unknown	Contact, saliva	None	Unknown	Yes	[60]
Cytomegalovirus	Ptv, Gg	Ptv, Gg	HCMV	Yes	Unknown	Contact, urine, saliva	None	Unknown	Yes	[45]
Paramyxoviridae/ Metapneumovirus	Ptv, Pts, Gb	Ptv, Pts, Gb	HMPV	Yes	No	Respiratory droplets	Human to ape	Yes	Yes	[19,39]
Pneumovirus	Ptv	Ptv	HRSV	Yes	No	Respiratory droplets	Human to ape	Yes	Yes	[19]
Parvoviridae/Bocavirus	Ptt, Gg	Ptt, Gg	HBoV	Yes	Yes	Faecal–oral	None	Unknown	Unknown	[61]
Picornaviridae/ Enterovirus	Ptt, Gg	Ptt	EV70, EV76	Yes	Yes	Respiratory, oral droplets	Unknown	Unknown	Yes	[62]
Polyomaviridae/ Polyomavirus	Ptv, Pts, Gg	Ptv, Pts, Gg	MCPV	Unknown	Yes	Unknown	None	Unknown	Yes	[63,64]
Retroviridae/Lentivirus	Ptv, Pte, Ptt, Pts, Pp, Gg	Pte, Ptt, Pts, Gg	HIV-1	Yes	Yes	Sexual, blood–blood	Ape to human	Yes	Yes	[8,65]
Deltaretrovirus	Ptv	Ptv	HTLV-1	Yes	Unclear	Sexual, maternal–neonatal	Ape to human	Unknown	Yes	[36]
Spumavirus (SFV)	Ptv, Pte, Ptt, Pts, Pp, Gg	Ptv, Pte, Ptt, Pts, Pp, Gg	Not found in humans	Yes	Yes	Blood–blood, biting	Ape to human	Unknown	Unknown	[50]
Unassigned (ChiSCV)	Ptt, Pts	Ptt, Pts	ND	ND	Unknown	Unknown	None	Unknown	Unknown	[66]

ChiSCV, Chimpanzee stool-associated circular virus; EBOV, Ebola virus; EBV, Epstein–Barr virus; EV, enterovirus; Gb, *Gorilla beringei*; Gg, *Gorilla gorilla*; HAdV, human adenovirus; HBoV, human bocavirus; HBV, hepatitis B virus; HCMV, human cytomegalovirus; HIV, human immunodeficiency virus; HMPV, human metapneumovirus; HRSV, human respiratory syncytial virus; HTLV, human T-cell lymphotropic virus; MCPV, Merkel cell polyomavirus; ND, not determined; Pp, *Pan paniscus*; Pte, *Pan troglodytes elliot*i; Pts, *Pan troglodytes schweinfurthii*; Ptt, *Pan troglodytes troglodytes*; Ptv, *Pan troglodytes verus*; SFV, simian foamy virus; TTV, transfusion-transmitted virus; Unknown, either not tested or situation not clear.

[a]Tests might have consisted of family-level tests. For example, viruses belonging to the family *Circoviridae* were all identified with the same PCR system. No cross-check for the absence of cydoviruses with a specific system was performed.

[b]Classical modes of transmission are given according to viralzone.expasy.org; all viruses may also be transmitted during the butchering of infected great apes.

[c]Evidence was based on the following: (i) differences in prevalence in humans and great apes infected with closely related viruses unambiguously pointed at one being the reservoir for the infection of the other; (ii) genetic diversities of great ape (or human) strains were fully encompassed within those of human (or great ape) strains; (iii) recombinant forms of great ape and human strains were detected (where viruses exhibit host specificity). Co-speciation patterns within the course of hominid evolution were not considered.

[d]Only a few selected references per viral genus are given; either recent, comprehensive reviews or the most recent article published in the field. This table should not be considered to be comprehensive.

[e]Circoviruses are found in humans but are thought to derive from pig (*Sus scrofa*) meat consumption.

Calvignac-Spencer et al 2012.

Table 1 – Cases of death among wild gorilla and chimpanzees

Year	Disease	Species/no. of dead apes	Country	Source	References
From 1968 on	Polio (s), respiratory and gastro-intestinal diseases	Chimpanzee	Tanzania	Possibly humans	Goodall (1983)
1988	Measles (s)	Gorilla/6	Rwanda	Possibly humans	Ferber (2000)
1992	Ebola (s)	Chimpanzee/8	Côte d'Ivoire	Unknown	Formenty et al. (1999)
1994	Ebola (1p, 11s)	Chimpanzee/12	Côte d'Ivoire	Possibly red colobus and other sources?	Formenty et al. (1999), Le Guenno et al. (1999), and Wyers et al. (1999)
1996	Ebola (p)	Chimpanzee/1	Gabon	Unknown, secondary transmission from chimpanzees to humans	Georges et al. (1999)
1996	Respiratory disease (s)	Chimpanzee/11	Gombe/Tanzania	Possibly humans	Ferber (2000)
1996	Scabies (p)	Gorilla	Different areas	Possibly humans	Kalema-Zikusoka et al. (2002)
1993–2003	Ebola (p)	Gorilla, Chimpanzee, Humans	Gabon, Republic of Congo	Unknown	Walsh et al. (2003), Leroy et al. (2004), and Rouquet et al. (2005)
2001/2002	Anthrax (p)	Chimpanzee/6	Côte d'Ivoire	Unknown	Leendertz et al. (2004a)
2004/2005	Anthrax (p)	Chimpanzee/3 Gorilla/1	Cameroon	Unknown	Leendertz et al. (submitted for publication)

Pathogens: (s) = suspected and (p) = proven to be responsible for the disease observed.

Leendertz et al 2006

Bacteria: many non-lethal

Lethal: anthrax (and new mutations), TB, *S. pneumonia*, *P. multocida*. Meliodosis

New papers:

TB found in wild chimps (Cote d'Ivoire) - single finding in a single chimp (Coscolla *et al.* EID. 2013)

Source: Human? Livestock? Wildlife? Native to chimps?

The type is similar to human TB, but there is not enough information to know for certain that humans were the source. May be a wildlife source, but needs further investigation. It is being called Chimpanzee bacillus for now.

Parasites confirmed in apes that may be of concern

Protozoa:

- Plasmodium - Blood
- Cryptosporidium sp. - GIT
- Giardia sp. - GIT
- Troglodytella sp. – GIT
- Dientamoeba fragilis- GIT

Cestoda:

- Beretiella sp.

Trematoda:

- Dicrocoelium sp.

Nematoda:

- Strongyloides fuelleborni
- Ternidens deminutus
- Oesophagostomum stephanostomum
- Oesophagostomum spp.
- Necator americanus
- Necator spp.
- Tricuris sp.
- Capillaria sp.
- Enterobius sp.

Discussion: What do you think?

Drug Resistant Human Staphylococcus aureus, what are the consequences?

Drug – resistance is an issue in itself. Data taken from chimps that were in areas that chimps would never be released (non-range states). This is a concern as no one is really searching for this. Vets might be a big cause of this as a possible point of contagion. In people, it is lethal, but there is no evidence either way yet for the implication for great apes which is the case any time any human based bacteria are allowed to infiltrate a wildlife population.

Effects of epidemic diseases on the distribution of bonobos

This article is odd because neither author is a vet, nor do either have any medical knowledge; nor did they ask about this disease issue of wildlife vets. It might be true but evidence does not point to that.

Lesson here: Reading articles needs to be approached with a very critical perspective. Just because it is published, does not mean that it is correct.

Felicity: Brought up a good point about sharing data with an outside course (as was signed off on in the reintroduction workshop in April). Turning over data and sharing are fine, but stay involved as someone may interpret your data differently and not bother to ask for your input.

Wild Great Apes as sentinels and sources of infectious – should we spend money on investigations on pathogens when we do not know whether they are present or not?

But is this wise? We need to collate as a group what is known about diseases in wild orangutans so we have that information.

Are there any field teams in Indonesia tasked with looking for disease in wild orangutan? No!

This is why we need to collate data on this issue so we can decide whether this may be a good idea.

7. **Sampling: Steve Unwin (refer to digital media for all material)**

Tissue sampling:
Frozen – (eg. Liquid nitrogen) – cold must be maintained and or in *RNAlater*
Advantages: cold chain can be interrupted for some time
Disadvantages: expensive
Always prepare several aliquots

Analyses – mainly PCR (viruses, bacteria, parasites) 10% buffered formalin – but formulin can destroy DNA

Which centers have *RNAlater*? SOCP and NM only. It is expensive but useful. *RNAlater* can be found in Indonesia.

8. **Review of Pathology/Post Mortems(see digital resources)**

Last year, extensive post mortems were conducted. What is the best way to do a post mortem?
Be thorough / Be consistent / Sample as many organs as possible but beware of autolysis: If a full PM is not possible, blood rich organs for preference - spleen, lung. liver, lympnodes, heart

Swab samples: dry swabs

Fecal samples: PCR – liquid nitrogen, *RNAlater,* formulin (10%), ethanol, SAF

Who has set up a bacterial lab on site? Only BOS Nyaru Menteng has set up such a lab. How is it quality controlled? Do you trust the results?

Wendi Bailey spoke on quality control: be certain you are confident of results. Where are samples plated? Is the room routinely swabbed to see if there is any cross contaminated?

Who routinely takes urine samples for analysis? A paper is in the Works for the use of fecal samples to test for TB (urine proved too difficult).

Fruit wadges: give them something to chew and have them give the wadge back to you
Giving orangutans cambium: they will chew it and spit out the wadge which can be used for testing for respiratory viruses and bacteria.

Where is analysis done? Mix of onsite and out sourcing.

There are ways of doing analyses in the forest – DNA extraction

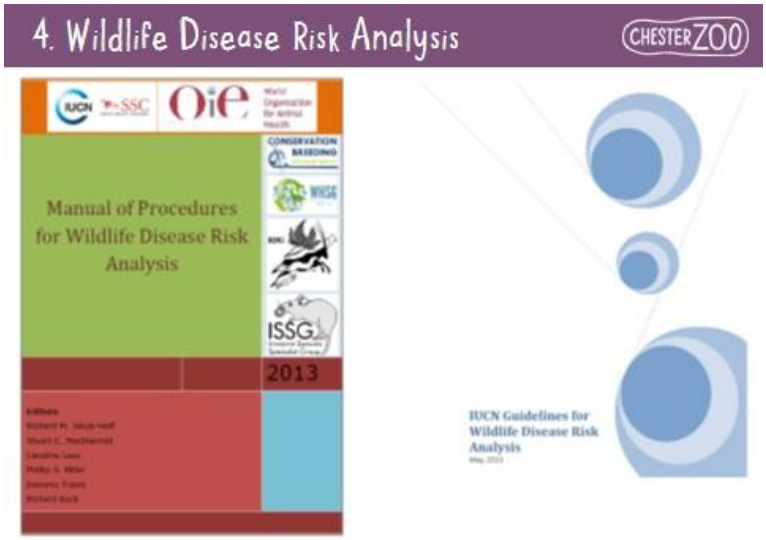
Many foreign labs will not handle actual samples of possible infected product. Solution is to extract the DNA and send that out for analysis. Saliva, washing up liquid, ice cold vodka is all that is needed to extract DNA in a field setting.

Overall, OVAG members do not have good necropsy skills. This will be worked on this year and in workshops to come to improve these skills.

9. Disease Risk Analysis Review

CBSG Disease Risk Analysis toolkit and beginners guide to RT PCR is included in the digital package. Field DNA extraction and PCR will be a focus of the next workshop.

IUCN Manual of Procedures for Wildlife Disease risk Analysis – also part of digital package.



Finding a methodical way to prevent disease hazards – especially for reintroduction and translocations.

1. Describe the problem
2. Identify the hazards
3. Risk assessment
4. Risk management
5. Implementation and review
6. Communicate at each stage!!!!!

Risk: Likelihood and consequence
Risk analysis: Inject science into protocols
Disease: Pathogenic agent, host, environment
You need the above three components to get a disease!

The initial human reaction is to be subjective. As scientists, we need to be objective. If you know what the likelihood and risks are, you are better prepared to act objectively.

Objectivity
Proportionality
Acceptable risk
Precautionary principle – if you are data deficient, then it makes sense to be more cautious – if consequences appear bad, err on the side of caution!
Assumptions

Why is risk analysis necessary?
Science based / succession planning / communication / data gaps / cost benefit

Risk analysis is a tool to provide evidence for decision making under uncertainty.

There is growing issue of foreign people getting too close to apes. An Image was shown of two foreign women holding baby chimps. This counters the message we are trying to get across. From a disease perspective, there is no justification for having foreign volunteers handle infants.

Tourist/wildlife contact: most tourists are not tested for disease. Campylobacter bacteria have been transferred from tourists to gorillas. Tourists come from all over the world and most are fresh off a plane. They often get very close causing an opportunity for possible disease transmission. Rubbish left behind by tourists is an additional problem.

Minimizing the risk while animals are still in captivity:

Pest control / correct animal handling / pre-import health screening / quarantine

Rats could be carrying Leptospirosis. Can this be harmful to orangutans? It is in humans. It is unknown, but could be undiagnosed.

ENCB: have we looked for it? No. We need to keep rodent problem under control. Rodent damage to food supplies in addition to disease transfer.

If you cannot do pre-import screening – heighten the import of quarantine procedures

Good occupational hygiene
Good environmental hygiene and design
20-30 seconds are good for hand washing

DRA recap:
Visual representation of plans
Identify relationships not immediately obvious
Identify critical control points for management
Identify areas of uncertainty
Management tool:
-release program
-animal translocation
-animal center operations
-disease focus
-area focus (risk analysis of a particular area or a particular disease)

- Step 1. Tell the story
- Step 2. Define the question(s) - Identify and define potential problems
- Step 3. Map the pathway - Completely outline the general pathway
- Step 4. Potential Hazard Identification
- Step 5. Create List of Hazards
- Step 6. Define specific question/policy/scenario
- Step 7. Build the model/ ID Critical control points
- Step 8. Perform Qualitative Assessment
- Step 9. (If required) Perform Quantitative Assessment
- Step 10. Describe uncertainty.

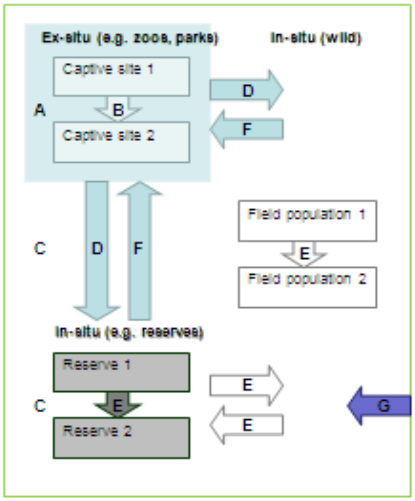
Disease Risk Assessment Tool (DRAT) for wildlife translocation

This will be available October 2013.

Questions in Disease Risk Assessment (DRA)

CHESTER ZOO

Scenario guide



Questions

GENERAL
- What is an acceptable disease risk?
- How do I determine what an acceptable disease risk is for my scenario?
- How do I describe a problem adequately?
- What diagnostic test shall I use? How many individuals should I test?
- Is there an unacceptable disease risk to the viability of my wildlife populatio
- How do I identify the relevant hazards/factors?
- How will management action X change disease risk in species Y?
- How do I do a cost/benefit analysis?
- How do I communicate the results of my DRA?
- How do I set up a surveillance/screening programme?
- How do I conduct an outbreak investigation?
- When should I consult an expert? How do I find one?

A **Ex-situ wildlife management/surveillance/research**
- Is there an unacceptable risk of disease transmission between species?
- Is there an unacceptable zoonotic threat to humans from captive animals?

B **Captive to captive translocation of wildlife**
- Is there an unacceptable disease risk during translocation?

C **In-situ wildlife management/surveillance/research**
- Is there an unacceptable domestic animal disease threat to wildlife?
- Is my trapping/sampling causing an unacceptable disease risk to wildlife?
- How many animals should I sample for effective disease surveillance?
- Is wildlife a reservoir for a disease threat to humans or domestic animals?
- Is there an introduced disease reservoir of concern to wildlife?
- Will environmental change X cause a change in disease risk to species Y?

D/E **Captive to wild / wild to wild translocations or reintroductions**
- Will disease impact animals during the translocation process?
- Will the translocation introduce a disease risk to wild populations
- Is there disease at the receiving site that could impact introduced animals?

F **Wild to captive translocation of wildlife**
- Will disease impact animals during the translocation process?
- Is there a risk of disease introduction to a captive facility?

G **Externally sourced biosecurity threats to wildlife**
- Are there threatening sources of disease incursion to wildlife?
- How should I manage a source of disease incursion to wildlife?
- What is the risk of a pandemic to biodiversity?
- What is the risk of anthropogenic spread of a parasite/pathogen?

4. Wildlife Disease Risk Analysis

CHESTER ZOO

Tools	Qualitative	Quantitative	PD	HI	RA	RM	RC	Suitable for situations with: Little technical expertise	Few Financial Resources	Few data
1. DRAT	■		■		■	■		■	■	■
2. Stella		■	■		■	■				
3. Vensim		■	■		■	■			■	
4. DRA Worksheet	■		■	■	■	■	■	■	■	
5. Paired Ranking	■			■				■	■	■
6. Screening Test Selection	■	■		■				■	■	■
7. Test Interpretation	■	■		■				■	■	■
8. Graphical Models	■	■		■		■	■	■	■	
9. Decision Trees	■	■		■		■	■	■	■	
10. Influence Diagrams		■		■		■	■	■	■	
11. Fault Trees	■	■		■		■	■	■	■	Where used qualitatively
12. Scenario Trees	■	■		■		■	■		■	Where used qualitatively
13. CMap	■			■	■	■		■	■	■
14. GIS		■		■	■	■	■			
15. OIE Handbook	■	■		■	■	■	■		■	■
16. Monte Carlo Modelling		■			■					■
17. @ Risk		■			■				■	■
18.OUTBREAK		■			■				■	

4. Wildlife Disease Risk Analysis

CHESTER ZOO

Tools	Qualitative	Quantitative	PD	HI	RA	RM	RC	Suitable for situations with: Little technical expertise	Few Financial Resources	Few data
19. PopTools		■			■				■	■
20. Expert Elicitation		■			■					■
21. Sample size calculator		■			■	■			■	
22. Netica		■			■	■			■	■
23. Precision Tree		■			■	■				
24. Vortex		■			■	■			■	
25. RAMAS		■			■	■				
26. RC Plan Template	■						■	■	■	■

Types of hazards – Source hazards Transport hazards, Carrier hazards, Population hazards, Destination hazards: Things may be present in resident population making new releases ill (this last often forgotten about in releases).

Yenny has a group of orangutans from one location who have white pustules. Perhaps it could be chicken pox as one person working there that was interviewed had it. Discussed issue with a human doctor. A few orangutans tested positive at this location (which is a tourist destination). Yenny used DAR .

10. Group Work: break out groups – all delegates

Breaking out into teams with each team taking on a specific role in the reintroduction process, and results discussed on final day.

The Groups:

Team 1 – The Researchers – Review of literature of diseases and reintroductions. What might be problems? Include output a chart of literature review and your own experiences.

Team 2 – The Communicators – If there is a breakout, how is the communication going to flow? Include output chart in the form of a decision tree and communication chart. Who contacts whom? What are the steps? Include a list of relative contacts and a press release for damage control.

Team 3 – The Reintroduction Assessors – Talks to teams 1 and 2. Include output chart that outlines the steps from quarantine to release.

Team 4 – The Outside Vested Group – A group of people who will make teams 1,2, and 3 miserable!

Further discussion of digital documents given to delegates – Steve Unwin

Primate Necropsy: There is much information for delegates on necropsy – with slides

It is important to update information and keep track of lessons learned.

All delegates should read all the information in their digital package. Information on orangutans specifically should be checked for any needed updates from information previously worked on in past workshops.

11. Case Studies

Case Study 1 - Yenny Jaya (SOCP)

Ruptured achilles tendon in an orangutan

A wild young male orangutan became trapped in a planation. He was about 5 years old and 19 kg. The villagers tried to capture him, but they did not know how to deal with an orangutan. There was a big open wound on his foot (inflicted by villagers). When vets arrived on the scene, the orangutan was stabilized, the bleeding was controlled and he was then transported to the SOCP clinic. Upon examination, blood was found in the urine. The wound was caused by a rope that had been tied around the ankle and pulled tight – cutting all around the ankle. The wound was allowed to close on its own after checking for infection, as suturing did not work. After skin healed, they dealt with the achilles tendon. It was thought the tendon was only ruptured but it was broken, so they took a tendon from the femur and transplanted it into the achilles tendon. Then new tendon needed to be twisted with thread for added strength and then sutured into the space of the broken tendon. It was sewed into place then the skin was closed and a cast was placed to protect the wound and limit movement from below the hip to the ankle. A small brace was created – very innovative! It took three months before the orangutan could use the leg. He was then released back into the wild.

Case Study 2 - Yumni Khairina Ghassani – Jambi Release Site (Frankfurt Zoological Society)

Displaced Femur Fracture

A female orangutan about 8 years old, weighing 22 kgs fell from a tree (12 meters). Her right leg was unusable with a lot of swelling. Radiographed showed a clear break on the right femur. Drh Yenny of SOCP was contacted. A pain killer was given and surgery was performed. A wire was used to hold the two endsof the bone together to allow proper healing. A nail was fixed to the inside of the hollow part of the bone. The bone marrow inside the femur was removed in order to insert the wire into the bone and re-form the bone at the break. A plate was screwed to the bone to keep it in place. The wound was then closed using staples. The staples were removed by the orangutan, but healing well. She began using it a bit 18 days after surgery and the bone was continuing to heal. After a month, the wound was completely healed. She is starting to use the leg more and more and is currently in a cape with enrichment as she continues to be observed. As soon as she has full mobility of her leg, she will be sent back to Jambi.

Yenny: The first attempt at insertion, the wire was too thin, so that is why we used the pin and the plate to reinforce and strengthen the area of the break.

Unorthodox but efficient! An example of having to think outside the box when you are in field conditions sometimes without proper equipment or supplies

Case Study 3 - Joost Phillipa (Eijkman Oxford Clinical Research Unit)

Air sacculitis cases observed at BOS Nyaru Menteng (NM) from Jan 1 2010– Dec 31 2011

Intrinsic factors: age, gender, body weight
Extrinsic factors: month, rainfall, months in cage

At NM orangutans are separated into groups. Some groups have forest access, some do not.
There were during the study, 62 cases of air saccultis in 43 patients with an annual incidence rate of 5.1%
Air sacculitis accounts for 4.6% of all veterinary cases, a relatively big problem.

Clinical signs: fever and upper respiratory symptoms as well as nasal discharge, however, most do not show clinical signs – except fever. It seems to occur in mainly low body weight groups.
Males – high body weight trends / Females – low body weight trends

This case is in preparation for publication.

12. **Breaking out into working groups 1 - 2 – 3** for continued work presented Friday June 28 (final day)


Reporting back after grouping for any problems: Group 2 chose TB to address and they should meet with Team 1. Team 3 needs information from Teams 1 and 2. If any teams finish early, they can assist other teams with their tasks.

13. Discussion Round Table – Contraception – Hester van Bolhuis (APP, Netherlands)

Work with SOCP and APP – methods of contraception/zoo animal contraception (European Zoos)

What is the use of contraception? For population control, stability in groups, modification of inappropriate behavior, and therapeutic (uterine health issues).

Choosing the correct method: The method chosen should be effective and safe.

Important questions to consider:
At what age should contraception be considered? What are the possible effects on behaviors? Is it easy to use and administer? Is it readily available? Is it expensive or cheap? Is it reversible?
Methods and questions can change throughout the life of the individual.

Reversibility: When a live birth, after treatment has stopped, occurs.
Incomplete reversibility: Breeding is recommended but no birth occurs.

Methods of population control:

Separate the sexes / Surgical procedures (permanent) / Vasectomy (reversible) / Tubal ligation / Hysterectomy / Salpingectomy / Castration / Spay / Ovariectomy

Chemical contraception: Reversible
Synthetic steroid hormones / Progestogens: Stop fertilization by the thickening of cervical mucus / disrupt gamete transport / disrupt implantation. Can cause mood irritability (in chimps and gorillas), some sexual swelling and menstruation may occur. No negative effects, no interference with pregnancy/parturition, safe for lactating females.
Not recommended for use on pre- pubertal and juveniles as long term effects are not known
Side effects: weight gain, might fail in obese animals, and may cause endometriosis and similar issues
May interact with other drugs which would decrease effectiveness

Recommended dose: I pill daily for orangutans, gibbons 1/2 pill . Care should be taken with orangutans, as they may take the pill but not swallow it!

Oestrogen/progestogen combinations: Various are used on non-human primates
Some side effects: May interfere with milk production thereby affecting the infant (lack of data on youngsters)
Better for obese apes – recommend using the lowest dosage possible

Implants:
MGA (melengestrol acetate)– is not available in EU
Etonogestrel 69 mg (Implanon® or Nexplanon®) 1 rod 3 years.
Levonorgestrel: Norplant® (36mg/rod, 6 rods-5yrs), Jadelle® (75mg/rod, 2 rods-3yrs)
Implanted under the skin, near armpit – but it can be dug out by primates

Injections last for 2to 3 months or longer: DeoProvera® medroxyprogesterone acetate

GnRH Agonists –
Deslorelin acetate: suppresses pituitary – gonadal axis
Initially stimulates the reproductive system for about 3 weeks (animals need to be separated)
Or, use another form during this 3 week period, like megestrol acetate tablets 7 days before and 8 days after
Can be used in males to reduce aggression – suppresses testosterone (higher doses are required for this)
Might cause abortion if given during pregnancy – can affect future fertility
Problems and side effects: Weight gain and loss of secondary sexual characteristics
It is a new drug with little data on great ape useage

US data from WCC: 250 successfully implanted animals = 16 apes
Reversal identified in 10 animals
It is important not to cut or break the implant – not designed to be extracted
Apes might need 2 implants

Development of a European contraception database as it is important to share information on successes and failures.
EGZAC zoo and wildlife vets, managers and researchers, population managers will contribute to the database.

An MOU with AZA WCC and EGZAC is needed: website is www.egzac.org
At the site, there are product recommendation, taxon recommendations, and a contraception discussion forum.

Even though OVAG vets are not in Europe, they can still access the website to get information and contact the group about what is and can be done in a field setting. There are many helpful interactive links and forms.

Many of the rehab center vets use contraceptives. Most contraceptives come from the government. Dosage should be considered using the weight of the animal.

Orangutan considerations:

Long interbirth intervals / Secondary dimorphisms / Mothers and sons / Absence of sexual swelling in females / Male group problem when they are 10-12 years old / Reversibility / Very difficult to remove (so are not overly used) / There are some failures

Because of overcrowding in centers there is often grouping with males that can cause aggression. There are data on orangutans that can be found on the EGZAC website. If you register on the website, you can ask questions and you will get an official replies/advice.

Data on use of contraceptives on other primates:

Species	Product	# individuals	# reversals	# with breeding recommendations	BC failures
Macaca fascicularis	Implanon	67	0	7	0
	MGA implant	3	0	0	0
Macaca nemestrina	Depo-Provera	1	0	0	0
	Implanon	12	0	0	0
	MGA implant	1	0	0	0
	Norplant	3	0	0	0
	Suprelorin	2	0	0	0
Macaca nigra	Birth Control Pill	1	0	0	0
	Depo-Provera	3	0	0	0
	Implanon	9	0	0	0
	MGA implant	27	1	0	0
	Norplant	1	0	0	0
	Suprelorin	4	0	0	0
Macaca tonkeana	MGA implant	6	0	0	0
Presbytes		0	0	0	0
Nasalis		0	0	0	0
Trachypithecus auratus	Depo-Provera	1	0	0	0
	Implanon	5	0	0	0
	MGA implant	12	0	1	0
	Suprelorin	1	0	0	0
	Tardak	1	0	0	0
Trachypithecus cristatus	Depo-Provera	4	0	0	0
	MGA implant	28	5	0	1
	Norplant	2	0	0	1
Trachypithecus francoisi	Birth Control Pill	4	0	0	2
	Depo-Provera	15	2	0	0
	Implanon	3	0	0	0
	MGA implant	35	12	2	1
	MGA Liquid	2	0	0	0
	Norplant	1	0	0	1
	Suprelorin	5	0	0	0
Trachypithecus obscurus	Depo-Provera	5	0	0	0
	Implanon	3	0	0	0
	MGA implant	27	2	0	0
Hylobates agilis	Implanon	1	0	0	0
	MGA implant	6	0	0	0
	Norplant	1	0	0	0
Hylobates gabriellae	Birth Control Pill	1	0	0	0
	Depo-Provera	1	0	0	0
	MGA implant	1	0	0	1

Hylobates lar	Birth Control Pill	8	0	0	0
	Depo-Provera	4	0	0	0
	Implanon	1	0	0	0
	MGA implant	77	14	1	1
	Norplant	1	0	0	0
	Suprelorin	1	0	0	0
Hylobates leucogenys	Birth Control Pill	6	3	1	0
	Depo-Provera	8	1	0	0
	Implanon	2	0	0	0
	Megace	1	0	0	0
	Megestrol	1	1	0	0
	MGA implant	27	4	3	1
	Suprelorin	4	0	0	0
Hylobates muelleri	MGA implant	5	0	0	0
Hylobates pileatus	Implanon	1	0	0	0
	Norplant	1	0	0	0
	Suprelorin	1	0	0	0
Hylobates syndactylus	Birth Control Pill	10	0	0	1
	Delvosteron	1	0	0	0
	Depo-Provera	11	3	0	0
	Implanon	3	0	0	1
	Megace	1	0	0	0
	MGA implant	59	16	4	1
	Norplant	2	0	0	0
	Norplant II	1	0	0	0
	Ovaban	1	0	0	0
	Suprelorin	2	0	0	0
Nomascus gabriellae	Depo-Provera	1	0	0	0
	MGA implant	4	0	0	0
Nomascus leocygenys	MGA implant	1	0	0	0
	MGA Liquid	1	1	0	0
Symphalangus syndactylus	Birth Control Pill	1	0	0	1
	Depo-Provera	1	0	0	0
	MGA implant	2	0	0	0

A good book on contraceptives: Wildlife Contraception Issues, Methods, and Applications edited by Cheryl S. Asa and Ingrid J. Porton, published by John Hopkins.

Day 3 (June 26) at IPB

14. Lecture by Dr. Risa Tiuria (IPB faculty member) Basic parasitology overview

15. New regulations for Indonesian veterinarians – Zulfi Arsan (Alsiqewan and KIVNAS/IVMA)

Veterinarians must now show to IVMA that they are continuing their education by going to conferences and meetings. OC/OVAG workshops fit into this new mandate very well. The workshops fit so well because not only are they contributing towards continuing education, but they add an extra value in that they are international and conducted in English, which will enable OC/OVAG vets to get more points than other in country conferences. The point value of our workshops will be determined in the near future.

16. Lecture by Dr Upik Kesumawati Hadi (IPB faculty member) Endoparasites as Disease Vectors

17. Parasitology Wet Lab - Wendi Bailey

Several work stations with fresh fecals provided by IPB were set up to allow vets to try to find and identify parasites. Drh Popwati and drh Yenny assisted Wendi at the various stations.

Day 4 (June 27) at IPB

Meeting with Dean of the Veterinary Faculty, Dr. Srihadi Agungpriono with Raffaella, Steve, Anta, Zulfi and Andri, to discuss the creation of a special orangutan designation for orangutan vets. The OC/OVAG workshops will feature broadly in the qualifications needed for such a designation. The dean is also president of the Southeast Asian Vet Association. A collaboration with UGM, IPB and UPM could help to create these qualifications.

18. Lecture by Dr. Agus Lelana (IPB faculty member) Orangutan Nutrition

This lecture generated much discussion about orangutan needs regarding nutrition: what is known, what is still unknown and what is misinformation. Discussion between Dr Agus and OVAG delegates continued via email after the workshop.

19. Lecture by Dr. Gunanti (IPB faculty member) Surgery

Review of surgical techniques followed by the viewing and exercise using a French Suture Step-by-Step Tutorial provided by Steve Unwin. (Tutorial is included in the digital package).

All IPB lecturers were presented with a conference bag as a thank you after their lectures.

Afternoon Session:

20. Cardiology Practical – Aimee Drane

The use and skills needed using a portable echocardiogram machine.


After cardiology practical, delegates continued on with the wet lab with Wendi.

Evening Session:

21. Ethics Round Table - All

Discussion of on line ethics quiz taken by all contestants and use of animals at http://ae.imcode.com website

The various views found on the website were discussed. There is a 12 questions (multiple choice) quiz that creates a profile of the person taking the quiz. Various scenarios regarding animal welfare were presented for discussion.

Sumita: Regarding last year's workshop, UPM is involved in translocating macaques, but they do not publicize it and though we may not like it, animals are used in educational institutions that train veterinarians and/or human doctors. It is harmful to target one veterinary university without getting the correct information. No one ever contacted UPM to see what their protocols were before launching an attack on OC/OVAG. The macaques euthanized were those that were ill and in poor condition and could not be re-located. After being euthanized, the bodies are normally incinerated. The university decided to use the bodies for education before being incinerated. That is the only reason why the post mortem session was set up. No animals were killed for the workshop. If there are any further questions, all emails should be referred to Reuben or Sumita of UPM.

OC/OVAG and its delegates do not in any way condone the use of primates in any form of testing or harmful use.

There will be an expanded welfare session next year.

Distribution of Evaluation of Workshop by Delegates (results in Section 4)

Wrapping up the day:

Citra and Siska clarified percentages given by Dr. Agus in his lecture earlier in the day. He mentioned in his talk numbers regarding TB and Hep B in Kalimantan. His numbers were 60% TB and 30% Hep B. There are in fact, 19% of orangutans in Kalimantan centers that have TB and 8% that have Hep B. Perhaps the higher numbers, especially regarding Hep B may have been before it was found that there were two strains found in orangutans, a human strain and an orangutan strain. Also, he made a statement about the Taiwan 10 that were returned to Indonesia years ago. He said that one of the orangutans bit 4 students (there was a demonstration at the time) who then contracted Hep B from the orangutan –such an incident was never recorded or reported.

Day 5 (June 28)

Breakout group session work – continued work for presentation and discussion with all

Group Photo Session

22. **Presentation of GAVO II to co-organizer: Winny Pramesywari**

In appreciation for all the hard work Winny did in organizing the pre-preparation for this year's workshop!

23. **Breakout group (covering various scenarios) Reporting back – Teams 1, 2, 3**

(OU = orangutan)

Delegate Challenge Team 1 – THE RESEARCHERS. Organized/ material provided by Steve Unwin. Team led by Joost Phillipa.

Collate information on pathogens found in wild orangutans in chart form using the material provided digitally.

Ex. Viral family/tested, species/positive, species/closest human counterpart/cross species transmission/possible recombination/mode of transmission/vet role/medical relevance/reference

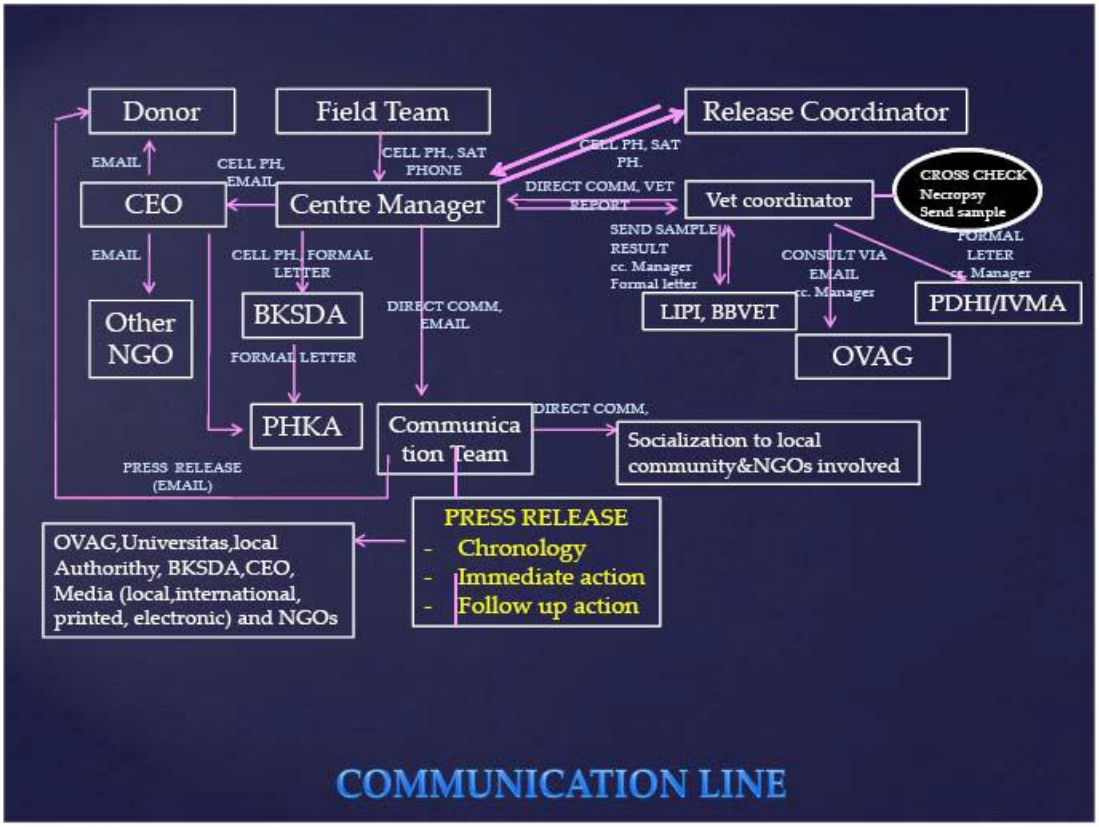
Ex. Cases of death among wild gorillas and chimps- what infections have been proved to cause the death of chimps and gorillas?

Year/Disease/Species/number of dead apes/Country/Source/Ref

Include orangutan viruses, both lethal and non-lethal. This will be used as a resource for the other delegate challenges.

	antibody	antigen	Sumatra	Borneo	wild	Not wild	Mode of transmission	veterinary relevance	Medical Relevance	Closest human counterpart	Cross-species transmission	Reference
VIRUS												
Coxsackie B-4	yes	no	no	yes	yes	yes	direct contact	Unknown	yes	Coxsackie B-4		Kilbourn 2003
Dengue	yes	no	no	yes	yes	yes	vector	Yes	Yes	Dengue		Kilbourn 2003
Ebola virus	yes	no	no	yes	no	yes	direct contact	yes	yes	EBOV Zaire	yes	Nidom et al 2014
Ebola virus	yes	no	no	yes	no	yes	direct contact	yes	yes	EBOV Sudan	yes	Nidom et al 2015
Ebola virus	yes	no	no	yes	no	yes	direct contact	yes	yes	EBOV Cote d'Ivoire	yes	Nidom et al 2014
Ebola virus	yes	no	no	yes	no	yes	direct contact	yes	yes	EBOV Bundibugyo	yes	Nidom et al 2015
Ebstein-Barr	yes	no	no	yes	yes	yes	direct contact	yes	Yes	Ebstein-Barr		Kilbourn 2003
EBV (gammaherpesvirus)	yes	no	no	yes	no	yes	oral secretion	Yes	Yes	lymphocryptovirus (LCV)	Unknown	Sulaiman, 2004
Foamy virus	yes	no	no	yes	yes	yes	direct contact	yes	yes	HFV	yes	Kilbourn 2003
HBV	yes	no	no	yes	no	no	blood, body fluid	yes	yes	HBV	Unknown	
Herpesvirus	yes	no	no	yes	no	no	body fluid	yes	Yes	HSV2	Unknown	Warren, 2001
HTLV	yes	no	no	yes	no	no	blood, body fluid	No	yes	HTLV	Unknown	Warren, 2001
Japanese Encephalitis	yes	no	no	yes	yes	yes	vector	Unknown	Yes	Japanese Encephalitis		Kilbourn 2003
Langat virus	yes	no	no	yes	no	yes	vector	Unknown	yes	Langat virus		Kilbourn 2003
Marburg virus	yes	no	no	yes	no	yes	direct contact	yes	yes	Marburg virus	yes (not orangutan)	Nidom et al 2016
Mumps	yes	no	no	yes	yes	yes	direct contact	Unknown	Yes	Mumps		Kilbourn 2003
Parainfluenza 3	yes	no	no	yes	no	yes	aerosol	Unknown	Yes	Parainfluenza 3		Kilbourn 2003
Picornavirus (HAV)	yes	no	yes	yes	no	no	Faeco-oral	Unknown	Yes	HAV	Unknown	Warren, 2001
Polyomavirus	yes	no	yes	yes	yes	yes	Unknown	Unknown	Yes	JC Virus, BK Virus, MCPV	Unknown	Groenewoud et al.2009
Respiratory Syncytial Virus	yes	no	no	yes	yes	yes	aerosol	Unknown	Yes	Respiratory Syncytial Virus		Kilbourn 2003
Rotavirus SA11	yes	no	no	yes	yes	yes	Faeco-oral, direct	Unknown	Yes	Rotavirus SA11		Kilbourn 2003
Sindbis virus	yes	no	no	yes	yes	no	vector	Unknown	Yes	Sindbis virus		Kilbourn 2003
SRV	yes	no	no	yes	no	no		Unknown	Yes	SRV	Unknown	Warren, 2001
Tembusu virus	yes	no	no	yes	yes	yes	vector	Unknown	Yes	Tembusu virus		Kilbourn 2003
Zika virus	yes	no	no	yes	yes	yes	vector	Unknown	Yes	Zika virus		Kilbourn 2003
PARASITE												
Balantidium coli	no	yes	no	yes	yes	no	Faeco-oral	Unknown	Unknown	NO	Unknown	Kuze et al, 2010
Baylisascaris procyonis	yes	no	no	no	no	yes	Faeco-oral, direct	yes	yes	Baylisascaris procyonis	yes	Hanley, 2006
Chilomastix mesnili	no	yes	no	yes	yes	no	Faeco-oral	Unknown	Unknown	NO	Unknown	Kuze et al, 2010
Chilomastix sp	no	yes	yes	no	yes	yes	Faeco-oral	Unknown	No	Same		Mul 2007
Dicrocoeliidae sp	no	yes	yes	no	no	yes	Faeco-oral	yes	yes			Mul 2007
Dientamoeba fragilis	no	yes	yes	no	yes	no	Faeco-oral	yes	yes			Foitova 2006
Endolimax nana	no	yes	yes	no	yes	no	Faeco-oral	yes	yes			Foitova 2006
Entamoeba coli	no	yes	yes	no	yes	no	Faeco-oral	no	no			Foitova 2006
Entamoeba coli	no	yes	no	yes	yes	no	Faeco-oral	no	no	NO	Unknown	Kuze et al, 2010
Entamoeba hartmani	no	yes	yes	no	yes	no	Faeco-oral	no	no			Foitova 2006
Entamoeba histolytica	no	yes	yes	no	yes	no	Faeco-oral	Yes	Yes	Same	Yes	Foitova 2006
Entamoeba sp	no	yes	yes	no	yes	yes	Faeco-oral			Same		Mul 2007
Enterobius sp	no	yes	yes	no	yes	yes	Faeco-oral			Same	Yes	Mul 2007
Giardia	no	yes	yes	no	no	yes	Faeco-oral	yes	yes	Same	Yes	Mul 2007
Iodamoeba buetschlii	no	yes	yes	no	yes	no	Faeco-oral	no	no			Foitova 2006
Isospora arctopitheci	no	yes	yes	no	yes	no	Faeco-oral	yes	Unknown			Foitova 2006
Lingertrema reesilli	no	yes	yes	no	yes	no	Faeco-oral	unknown	unknown			Foitova 2006
Mammomonogamus laryngeus	yes	no	yes	no	no	yes	oro-faecal	yes	yes	Mammomonogamus laryngeus	yes	Foitova, 2008
Mammomonogamus sp	no	yes	yes	no	yes	yes	Faeco-oral					Mul 2007
Oesophagostomum sp	no	yes	yes	no	yes	no	Faeco-oral					Foitova 2006
Pongobius sp.	no	yes	no	yes	yes	no	Faeco-oral	Unknown	Unknown	No	Unknown	Kuze et al, 2010
Plasmodium cynomolgi	no	yes	no	yes	yes	no	vector	Unknown	Unknown	No	Unknown	Singh 2009
Plasmodium pitheci	no	yes	no	yes	yes	no	vector	Unknown	Unknown	No	Unknown	Reid et all, 2006
Plasmodium silvaticum	no	yes	no	yes	yes	no	vector	Unknown	Unknown	NO	Unknown	Reid et all, 2006
Plasmodium sp	no	yes	no	yes	yes	yes	vector			Same		Kilbourn 2003
Plasmodium vivax	no	yes	no	yes	yes	no	vector	Unknown	Yes	plasmodium vivax	Unknown	Singh 2009
Platynosomum fastosum	no	yes	yes	no	yes	no	Faeco-oral	yes	no			Foitova 2006
Spirurida sp	no	yes	yes	no	yes	yes	Faeco-oral					Mul 2007
Strongylida sp	no	yes	yes	no	yes	yes	Faeco-oral					Mul 2007
Strongyloides fuelleborni	no	yes	no	yes	yes	no	Faeco-oral	Yes	Unknown	NO	Unknown	Kuze et al, 2010
Strongyloides sp	no	yes	yes	yes	yes	yes	Faeco-oral	Yes		Same	Yes	Mul 2007
Trichomonas	no	yes	yes	no	yes	no	Faeco-oral					Foitova 2006
Trichostrongylus sp	no	yes	yes	no	yes	no	Faeco-oral					Foitova 2006
Trichuris sp	no	yes	yes	yes	yes	yes	Faeco-oral	Yes	Yes	Same	Yes	Mul 2007
Trichuris trichiura	no	yes	yes	no	yes	no	Faeco-oral					Foitova 2006
Troglodytella abrassarti	no	yes	yes	no	yes	no	Faeco-oral					Foitova 2006
BACTERIA												
Burkholderia pseudomallei	no	yes	no	yes	no	yes						Kilbourn 2003
E. coli	no	yes	yes	yes	no	yes	direct contact	yes	yes	E. coli	yes	Zimmerman et al, 2011
Escherichia coli	no	yes	no	yes	no	yes	direct contact			Same		Kilbourn 2003
Francisella tularensis type A	no	yes	no	yes	no	yes	aerosol	yes	yes	Francisella tularensis type B	yes	Katz-Riley et al 2009
Klebsiella pneumonia	no	yes	no	yes	no	yes	aerosol borne	Yes	Unknown	No	Unknown	Lawson, 2006
Klebsiella pneumoniae	no	yes	yes	yes	no	yes	direct contact	yes	yes	Klebsiella pneumoniae	yes	Zimmerman et al, 2011
Klebsiella sp	no	yes	no	yes	no	yes		yes		Same		Kilbourn 2003
Leptospira interrogans australis	yes	no	no	yes	yes	no	direct contact	yes	yes			Kilbourn 2003
Leptospira interrogans autumnalis	yes	no	no	yes	yes	no	direct contact	yes	yes			Kilbourn 2003
Leptospira interrogans ballum	yes	no	no	yes	yes	no	direct contact	yes	yes			Kilbourn 2003
Leptospira interrogans bratislava	yes	no	no	yes	yes	no	direct contact	yes	yes			Kilbourn 2003
Leptospira interrogans grippotyphosa	yes	no	no	yes	yes	no	direct contact	yes	yes			Kilbourn 2003
Leptospira interrogans hardjo	yes	no	no	yes	yes	no	direct contact	yes	yes			Kilbourn 2003
Leptospira interrogans icterohaem	yes	no	no	yes	yes	no	direct contact	Yes	Yes			Kilbourn 2003
Leptospira interrogans pyrogenes	yes	no	no	yes	yes	no	direct contact	Yes	Yes			Kilbourn 2003
Leptospira interrogans sadonbing	yes	no	no	yes	yes	no	direct contact	Yes	Yes			Kilbourn 2003
Leptospira interrogans sejroe	yes	no	no	yes	yes	no	direct contact	Yes	Yes			Kilbourn 2003
Leptospira interrogans sewajbak	yes	no	no	yes	yes	no	direct contact	Yes	Yes			Kilbourn 2003
Leptospira interrogans wolffi	yes	no	no	yes	yes	no	direct contact	Yes	Yes			Kilbourn 2003
M.tb complex	yes	no	yes	yes	Unknown	yes	Aerosol	Yes	Yes	M.tuberculosis	Yes	Warren, 2001
Mycobacteria tuberculosis	no	yes	no	yes	no	yes	aerosol	yes	yes	Mycobacterium tuberculosis	yes	Kelsoe et al, 1980
Mycobacteria tuberculosis	no	yes	no	yes	yes	yes	aerosol	yes	yes	Mycobacterium tuberculosis		Kilbourn et al, 2001
Mycobacteria tuberculosis	no	yes	no	yes	no	yes	aerosol	yes	yes	Mycobacterium tuberculosis		Calle et al., 1989
Mycobacteria tuberculosis	no	yes	no	yes	no	yes	aerosol	yes	yes	Mycobacterium tuberculosis		Shin et al, 1995
Mycobacteria tuberculosis	no	yes	no	yes	no	yes	aerosol	yes	yes	Mycobacterium tuberculosis		Haberle 1970
Mycobacterium avium	no	yes	no	yes	no	yes				Same		Kilbourn 2003
Proteus spp	no	yes	yes	yes	no	yes	direct contact	yes	yes	Proteus spp	yes	Zimmerman et al, 2011
Pseudomonas aeruginosa	no	yes	yes	yes	no	yes	direct contact	yes	yes	Pseudomonas aeruginosa	yes	Zimmerman et al, 2011
Pseudomonas aeruginosa	no	yes	no	yes	no	yes	aerosol borne	Yes	Unknown	No	Unknown	Lawson, 2006
Pseudomonas alkaligenes	no	yes	no	yes	no	yes	aerosol borne	Yes	Unknown	No	Unknown	Lawson, 2006
Salmonella sp	no	yes	no	yes	no	yes	Faeco-oral	Yes	Yes	Same	Yes	Meier 1982
Staphylococcus aureus	no	yes	no	yes	no	yes	aerosol borne	Yes	Unknown	No	Unknown	Lawson, 2006
Staphylococcus spp	no	yes	yes	yes	no	yes		yes	yes	Staphylococcus spp	yes	Zimmerman et al, 2011
Streptococcus sp	no	yes	no	yes	no	yes						Chai 2009
Streptococcus spp	no	yes	yes	yes	no	yes	direct contact / aerosol	yes	yes	Streptococcus spp	yes	Zimmerman et al, 2011

Delegate Challenge Team 2–THE COMMUNICATORS. Organized/material provided by Steve Unwin. Team led by Siska Sulistyo.



CONTACT PERSON

Organization	Contact	Who	Who respnsible for contacting	Initial Contact Made (Y/N)
PHKA	Director KKH (cc Kasubdit Jenis & Genetic)	Bpk. Novianto Bambang (Jakarta)	CEO	
BKSDA	Head of BKSDA	Bpk Kholid	Manager	
PDHI (IVMA)	Head of IVMA (cc Manager)	Wiwik Badja, drh.	Vet Coordinator	
Donor	PR from each Donor org		CEO	
Research Centre	Head of Centre (cc. Manager)		Vet Coordinator	
University	PR from University	drh. Heri Lab. Anatomi UGM/Primatologist	Manager	
Media	Kalteng Post (Local Newspaper)		PR Centre	
	Kompas (National Paper)		PR Centre	
	Metro TV (National TV)		PR Centre	
Local Community	Head Village		PR Centre	
Local NGO			PR Centre	
National/International			CEO	

Press release materials follow – utilizing materials from Group 1

Situation:

1. A villager called local media informing that an orangutan from NGO A had escaped and run amok in the Village Sukalepas which is located 2 hours' drive from NGO A rehabilitation centre. The journalist from the local media later investigated the event and found that the orangutan had been shot to death. It was also put to the newspaper and went viral in social media.
2. Upon necropsy of the orangutan in NGO A, the vets found a tubercle lesion in the left lung of the orangutan which is highly suspected for TB. A keeper who is originated from Village Sukalepas found out about this and spread the news to the Head Village.

Chronology

- Difficult road, worse than expected due to prolonged rainy season.
- Flat tyre incident at dusk time, orangutan got aggressive and broke cage, escape. Team couldn't hold a flanged male without injuring themselves.
- Keeper kept track of the animal, vet prepared a dart gun, and driver called the centre manager.
- Due to the dark situation and unfamiliar area for the team, we lost track. Back to the car to collect radio-receiver to track.
- By midnight the team located the orangutan in around Village Sukalepas.
- Unfortunately, when the team reached the village, the orangutan had been killed for destroying the villager's crop and raiding into one of the house and run amok in it.
- Team immediately took the body back to the centre and promised the villagers to come back the next morning.
- The next morning the com-dev team visited the village to discuss and list all the damages made by the orangutan. Payment was agreed on returning the same items that had been damaged and as minimum as possible will be paid with cash.

Expression of concerns

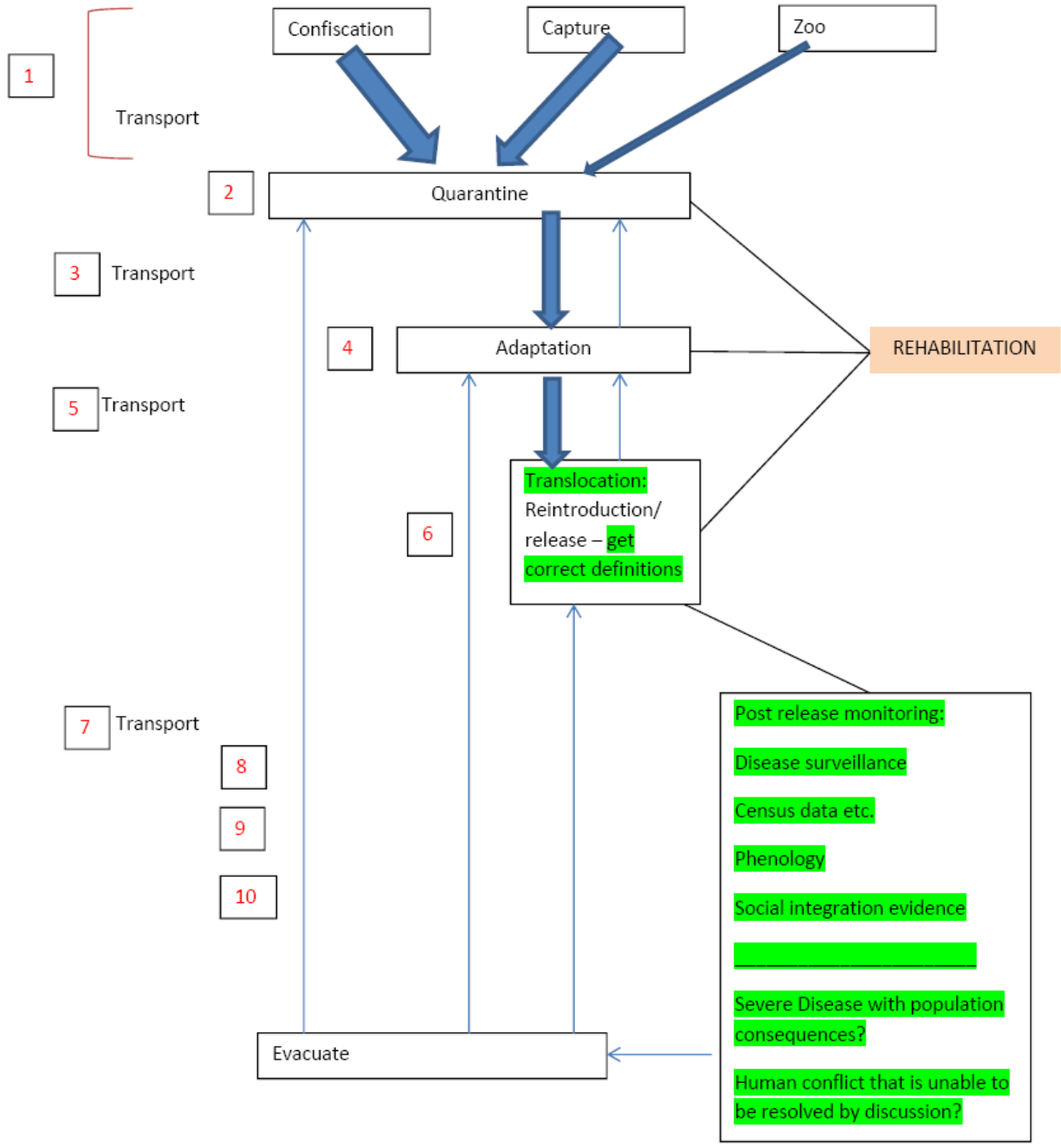
- NGO A apologises deeply to the Village of Sukalepas, but discourages the acting of killing an orangutan. NGO A also appreciates the villagers for cooperating well with the initial release team as well as the com-dev team and accepting the payment method suggested by NGO A.
- NGO A concerns about scrutiny especially from international public regarding the killing of the orangutan by the villagers. NGO A understands the hard situation the village must be having at that time.
- In the future there will be a conservation education program in the village of Sukalepas and other villages along the way from rehabilitation centre to the release site to give a better understanding to the villagers about what should be done when this kind of unfortunate event happens.

TB rumour on the killed orangutan

- The vets of NGO A had found a lesion (1 cm diameter) in the left lung of the dead orangutan which highly suggestive of Mtb infection. PCR conducted from the lesion confirmed as M.tb but other samples (lymph nodes, liver, and spleen) were all negative.
- The vets of NGO A was very devastated by this event, however, they confirmed that a proper quarantine had been applied in the centre to the orangutan. A range of tests to detect M.tb infection (TST, chest x-ray, and tracheal wash for PCR and culture) had been conducted and the results are attached.
- The misdiagnoses of TB on antemortem examination is most likely due to:
    - TST test has low accuracy on orang-utans.
    - Chest x-ray has low sensitivity in general and it's not a specific diagnostic test for TB.
    - PCR method to detect Mtb in orangutan is not yet standardised and validated as well; hence an extensive communication with the lab is being conducted to discuss about the PCR method as well as the different results from the antemortem and post-mortem examinations.
- As the animal showed no clinical signs during quarantine and on its way to the release site, it is suspected that if it did have Tb it is a latent or subclinical infection with very low transmission risk to other animal let alone to human.
- There has not been any report about anthroponotic infection of Tb from primates (orang-utans) to human.
- We are also aware that this incident has indicated that there is something wrong with the quarantine process we are conducting. Thus we are reviewing our protocol as well as re-assessing the practice on-site with our keepers and vets. Further action will be to hire a group of independent reintroduction experts to assess our current procedure. OVAG and PDHI will assist NGO A to choose and contact the experts.
- We sincerely hope that this unfortunate incident will not lessen the trust that the public and donors have put on us. We are doing everything we can to improve our procedures and to prevent any similar event happen again in the future. We are still, if not more committed to save the orang-utans in the best way and conserve their existence in this earth. In order to do so, we need all the support from every partners and stakeholders.

Delegate Challenge Team 3 – THE REINTRODUCTION ASSESORS. Organized/ material provided by Steve Unwin. Team led by Yenny Jaya. Other teams helped out throughout. Material highlighted in green from facilitators for follow up after the workshop.

The basic pathway



1. 3. 5.7. Confiscation – transport. TRANSPORT PROTOCOL.

•For PPE (overalls, gloves, masks, boots).

•Clean transport cage and truck. (Specifics needed)

•Avoid crowded places to stop for break during transport.

•Check the animals' condition every 2 hours and use mask when checking them.

- Animals in poor condition should be treated accordingly and transportation should be withheld when it is not applicable. Emergency treatment should be aimed to stabilize the animal during transportation to center. (stabilize on site – kit needed? Triage regime?)
- Only members of the rescue team (vet, keeper, driver) can make contact with the animal. Accompanying officials keep themselves and public at distance (at least 15m).
- Driving instructions – steady speed. If convoy stops officials must be responsible to protect team and OU.
- Carry emergency and anesthetic medicine for OU (Suggestions? – see Section 4 – BOSF has an example)
- Prepare enough food and water for the animal during transportation.
- Make sure OU is awake and in a stable condition before transport.

2. QUARANTINE.

- Minimum 1 month quarantine (but see testing requirements – suggest at least 8 weeks)
- Medical check before employment heck for quarantine staff: TB, Hepatitis A, B, C, HSV 1 and 2, Salmonella, Plasmodium, HIV. Health check annually for staff (Hep B (RBT), TB (Xray + sputum)).. Vaccinations: Hep A and B, tetanus. Staff deworming every 6 months.
- EITHER dedicated staff in isolation/ quarantine facility (2-3 people) OR special PPE for people working in isolation facility. PPE required for everybody entering the facility. Must have a sign in and sign out book for visitors.
- It is the responsibility of all staff to comply with these requirements, and to support each other in this compliance. It is the vet and manager's joint responsibility to monitor compliance and take steps (training or warnings or dismissal) based on severity of transgression.
- Health procedure for OU (to compare with what is actually done in centers): Thorough check-up is done on arrival (several days to settle in?), and annually for resident. If unreleasable (time frame?) evaluate contraception. Head to toe examination: body weight, morphometrics (specifics?), Microchip ID, age, teeth, sex, background history. Diet evaluation/ adjustment. Behavior evaluation and stress management (enrichment, grouping). Deworm on arrival. Repeat worming based on fecal check results. Special treatment for OU with medical problems. Alter treatment for age groups as needed – e.g. different treatment for baby (housing, nursery quarantine) – evaluation for medical check and quarantine socialization ASAP in these cases.
- TB: TST, chest X-ray (1d), sputum for AFB (3d), culture (8-12 w), and PCR (3d) – use this same sample for other respiratory viruses (e.g. hRSV) and bacterial culture.).
- Hepatitis: serology and PCR 3d.
- HSV: serum PCR (3d).
- Hematology/ biochemistry: 3d
- Plasmodium: 3d
- Salmonella: 3d
- Meliodosis: 3-4w
- Fecal check 1st day, repeat in second week.

4. ADAPTATION

- Pre-adaptation general health check
- Skill and activity assessment
- Social behavior assessment (grouping)
- Food assessment (food shifting)
- Disease surveillance/ preventative medicine.

a. FACILITY SANITATION.

- Cage designed for safety of staff and OU at cleaning time (C – what does this mean?)
- Clean cage and surrounding environment at least once a day (C).
- Disinfection rotation (C)
- Waste management (C)
- Pest control (ALL)

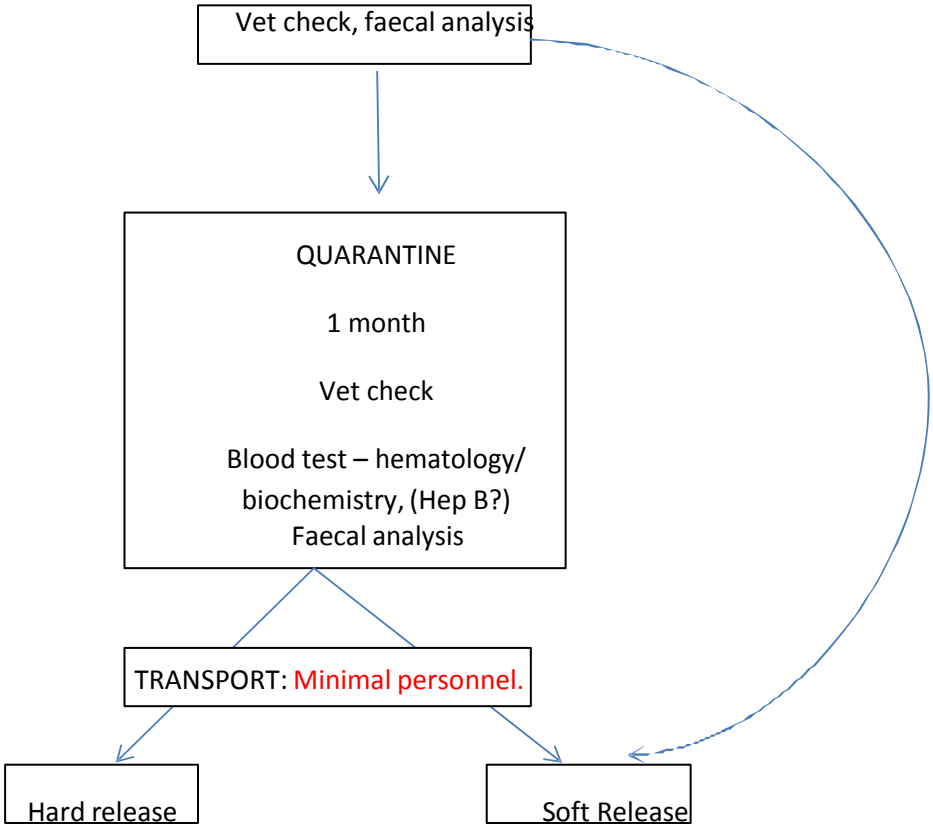
Hygienic food preparation and storage (5Tk – what does this mean?)

- Clean clinic daily
- Medicine supply check list – clinical best practise.

b. VISITOR

- LT =long term, ST = short tem
- Health screening before coming to site, as for staff (LT)
- PPE (LT, ST)
- MUST comply with quarantine protocol (LT, ST)
- Quarantine period of 10 days before entering the site (LT)

6. RELEASE



EXAMPLE OF SOP FOR CLEANING CAGEs

1. Perform a visual thorough check on the cages' condition. Look for rust, nut and bolt, mesh, lock system, and any damage.
2. Put a piece of board on the door and the rear side, ¾ heights from the bottom of the cage to reduce visual contacts of the orangutans. Make small holes on the board to provide good access of air inside the cages.
3. Wash / rinse cages with water to get rid of bulk dirt.
4. Brush with soap (detergent) entirely. Rinse well.
5. Prepare 0.5% sodium hypochlorite solution by putting 500 ml BAYCLIN (household bleach) into 5 l water in a bucket. Solution must be freshly prepared before usage.
6. Rinse cages with the disinfectant solution, leave for ± 15 minutes, rinse thoroughly with water.
7. Leave to dry under sunlight.
8. Prepare a number of cages needed for the next day, put fresh leaves into the cages.
9. Upon receiving cages after being used, check and clean with the same procedure as above.

24. Diet management of Orangutan at reintroduction site Bukit Tiga Puluh, Jambi - Winny Pramesywari

The natural diet of the orangutan contains fruits, leaves, branches, bark, flowers, seeds, honey, insects, and meat. The following are various aspects of feeding culture at the Jambi release site.

Main focus: energy, fiber, and protein

90% fruits and greenery / 10% protein (not including enrichment foods)

Food types: high calorie/fleshy fruits/protein (egg, monkey chow, soy milk, high fiber foods)

Different feeding amounts dependent upon age – juvenile / sub adult / adult male / adult female with maternal costs. Food is fed out at 0800/1000/1200/1400/1600.

Evaluation methods: food allometric scale/body condition/behavior monitoring

All food is weighed in grams and recorded per item and gram weight and composition (protein, carbohydrates, sugar intake, etc). Total kcalories for the day are recorded.

Name/age/weight/sex/energy needed per food item is considered before the food is configured.
Body Condition Score (BCS) is taken and recorded.

BCS 1 – thin – bones are visible (a female was released with infant but could not find food so the baby died)
BCS 2 – thin – but bones are not as visible as BCS1
BCS 3 – a bit fuller
BCS 4 – in good shape
BCS 5 – a bit obese

Juveniles:	800-900 kcal/day
Sub adult:	1000-1100 kcal/day
Adult male:	1500-1600 kcal/day
Female w/maternal costs:	1400-1500 kcal/day

Following this system, Winny was able to see a decrease of immunosuppressive cases
In 2010: 8 cases / In 2011: 4 cases / In 2012: 0 cases

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Section 4

Quiz for workshop

Circle your preferred answers. For questions that need sentence answers, please be as brief as possible.
The results of this will help us determine how good we are at sharing information at these workshops, NOT to test your knowledge as such.

Remember - Some questions have more than one answer Good Luck

PARASITOLOGY

1. The most sensitive method for diagnosing Strongyloides infection is:
   - A Antibody detection test
   - B Fecal concentration
   - C Fecal culture
   - D Saline preparation for motile larvae.

2. The stage in the life-cycle of the malaria parasite most commonly seen in a stained blood film is the:
   - A Merozoite.
   - B Sporozoite.
   - C Trophozoite.
   - D Gametocyte.

3. Finding an amoebic cyst of 18μm in diameter with 8 nuclei in a stool may:
   - A Indicate the animal has amoebiasis.
   - B Indicate the animal has a non-pathogenic infection.
   - C Indicate the animal could also have anaemia.
   - D Be the cause of diarrhoea.

ANIMAL HEALTH PROTOCOLS

4. Define 'biosecurity'

5. Which of the following are components of a disease or pathogen contingency plan?
   A. A list of people and organizations 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

6. List ways pathogens and disease can be transmitted. (as many as you can).

7. For each answer to question 6, describe one way of how you can break that transmission

8. Define disease risk analysis

9. Define malnutrition

10. What is the OIE and who is your country representative?

PRACTICAL ANIMAL HEALTH

11. An orang-utan stops breathing under anaesthetic. Your emergency resuscitation protocol should include several things, but what should be done immediately?
   A. Begin chest compressions as per CPR protocol (to the rhythm of 'Staying Alive') B. Inject adrenaline
   C. Calmly plan who should be doing what
   D. Confirm airway patency
   E. Reverse the anaesthetic

12. In radiography – the Higher the kV
   A. The faster the electrons are at hitting the plate
   B. The more electrons are hitting the plate
   C. The greater the tissue penetration
   D. The more X-rays produced

13. In 1 sentence, why do we collimate 'cone down' radiographs.

14. In one or two sentences describe what a cardiac biomarker is **and** explain how it can help determine the cardiac health of an animal

15. List other ways to investigate cardiac health.

SCIENTIFIC INVESTIGATIONS

16. List the following types of investigative studies in order of result reliability, with the most reliable first
    A. Cohort Studies
    B. Expert Opinions, textbooks, personal experience and the internet
    C. Systematic review
    D. Randomised control trial
    E. Meta-analysis
    F. Single Case report
    G. Case series

17. What are the top 5 sources of information you would make use of when faced with a medical issue you need to investigate

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
    B: 454 Sequencing
    C:Statpak
    D:Paralens
    E. MAPIA
    F. Culture

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

20. How should you test for Tuberculosis?

ANSWERS
1. C
2. C
3. B
4. Similar to: Protocols designed to reduce the risk of pathogen transmission
5. They all are
6. Fecal-oral, direct contact, Aerosol, indirect (soil/ water/vector), body fluids
7. Hygiene (hand washing), PPE, etc.
8. 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. The analysis is the process to quantify or qualify this, to assist in animal management decisions.
9. Similar to: Malnutrition occurs when the body does not get the right amount of vitamins, minerals, and other nutrients it needs to maintain healthy tissues and organ function and can occur when an animal is either undernourished or over nourished.
10. The OIE (World Organization for Animal Health) is the intergovernmental organization responsible for improving animal health worldwide. Rep will vary by country.
11. D
12. A and C
13. Similar to: To control the size of the primary beam and improve image clarity and to reduce scatter.
14. B-Type Natriuretic Peptide (BNP or NT-ProBNP). Measure of volume overload / ventricular stretch / ventricular stress. Cardiac Troponin (cTn). Measure of cardiac damage
15. Imaging (ultrasound/ ECG/ Radiograph); exercise tolerance, secondary – body condition/ dietary history, genetic markers etc.
16. C, E, D, A, G, F, B.
17. Open to interpretation
18. A. body reaction. B. Organism C. Body reaction D. Organism E. Organism F. Organism
19. a and b Photos to histology. Bonus points if mention multiple aliquots.
20. As many modalities as possible – culture and PCR currently most recommended.

N=23. Good to see that most delegates attempted answers, with very good results in areas that have been covered in previous years with the worst scores in areas not yet taught.

	Q	Correct % (n)	Partially correct % (n)	Wrong % (n)	Not answered % (n)
Parasitology	**1**	52 (12)	4 (1)	44 (10)	0
	2	70 (16)	0	30 (7)	0
	3	39 (9)	8 (2)	48 (11)	4 (1)
Animal health protocol	**4**	79 (18)	13 (3)	0	8 (2)
	5	79 (18)	23 (5)	0	0
	6	70 (16)	23 (5)	4 (1)	4 (1)
	7	57 (13)	23 (5)	17 (4)	4 (1)
	8	26 (6)	48 (11)	17 (4)	8 (2)
	9	30 (7)	66 (15)	4 (1)	0
	10	30 (7)	52 (12)	0	17 (4)
Practical animal health	**11**	39 (9)	17 (4)	39 (9)	4 (1)
	12	13 (3)	48 (11)	30 (7)	8 (2)
	13	30 (7)	4 (1)	23 (5)	44 (10)
	14	13 (3)	13 (3)	13 (3)	61 (14)
	15	44 (10)	23 (5)	0	35 (8)
Scientific	**16**	17 (4)	48 (11)	17 (4)	17 (4)
	17	48 (11)	44 (10)	4 (1)	4 (1)
	18	57 (13)	13 (3)	4 (1)	26 (6)
	19	66 (15)	23 (5)	0	13 (3)
	20	88 (20)	4 (1)	0	8 (2)

N=24	**Strongly Agree**	**Agree**	**Neutral**	**Disagree**	**Strongly Disagree**
New Knowledge: Did I gain useful knowledge?	14	9	1		
New ideas: Did I gain new ideas that will improve the way I do my job?	14	9	1		
Applying the learning: Will I use the information?	9	14	1		
Applying the learning: Have I been shown how to impart this knowledge to colleagues and managers?	5	16	3		
Effect on results: Do I think that the ideas and information provided at this workshop will improve the way I do my job?	11	13			
Effect on results: Do I think that the ideas and information provided at this workshop will improve the health of the animals under my care?	6	16	2		

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OC/OVAG supports World Orangutan Day