APPENDIX No. 0

Graham Barker

From: [redacted]
Sent: 24 November 2016 16:09
To: Graham Barker
Cc: [redacted]
Subject: Direction Order ZDO/1607

Importance: High

Dear Mr Barker,

As you are aware I act for David Gill.

I have had sight of your email of earlier today.

The Zoo Licence is, of course, in Mr Gill's name and he is aware of the responsibilities which follow from that. He has traditionally had the final say in matters within the Zoo. However, he is aware that the governance of the Zoo must change and in response to concerns raised, he has taken the decision to hand over the reins. We are therefore in something of a transitional period, in that Mr Gill remains licence holder but has empowered the proposed new management team. As of the end of last week he has passed all day to day decision-making responsibility to Karen Brewer and her team in anticipation of Cumbria Zoo Company Limited becoming the tenant of the Zoo site and becoming the licensee in due course.

As such, the evidence given to the Committee in November was correct.

In relation to management of the Zoo in Karen's absence, I have been informed that there are Directors from CZCL on site at all times. Stewart Lambert has been deputising for Karen Brewer today. The zoo's Animal Managers are also in post. There is also always a Keeper in Charge each day and that individual can contact either Karen Brewer or Jon Cracknell if anything comes up which is out of the ordinary or requires a higher-level decision.

If you have any communications which you wish Mr Gill to be made aware of, if you can please email myself rather than him? I will be liaising with him and the new management team will ensure that he and they are kept abreast of all issues.

Yours sincerely,

[redacted]

[redacted]
Director and Solicitor
Livingstons Solicitors Limited
9 Benson Street
Ulverston
LA12 7AU
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Ext:[redacted]
Fax[redacted]

REPORT 2 APPENDIX No. P

Report regarding the Inspectors' decision to refuse the fresh application for South Lakes Safari Zoo ltd following the inspection on 16th and 17th January 2017.

This report aims to provide background information for the Licencing committee of the LA, and expands upon the reasoning behind the conditions recommended. The inspection team have completed Zoo Inspection form 11, and this report must be read alongside that.

Inspection

This inspection was undertaken by three Secretary of State Zoo Inspectors, Professor Anna Meredith MRCVS, Nick Jackson MBE and Dr Matthew Brash MRCVS (acting as the LA advisory vet), accompanied by two LA representative Anne Chapman and Graham Barker.

The inspection was undertaken to look at the Fresh Licence application that had been put forward by South Lakes Safari Zoo Ltd (SLSZ), owner David Gill (DG) as a result of the rejection of his previous application for a Renewal of the existing old Licence.

Despite the rejection of the Renewal application, in July 2017, the zoo continues to remain open whilst the fresh license application is determined.

An inspection was also concurrently undertaken to inspect the Original License application put forward by Cumbria Zoo Company Ltd (CZCL). CZCL have recently signed an agreement to operate the zoo, signing leases, a service agreement and loan agreements on the 12th of January 2017 with DG and SLSZ. A report regarding the inspection of the CZCL application is a separate document to this.

This is a highly unusual situation, where two inspections are being undertaken simultaneously, (the Fresh (renewal) license for SLSZ and the Original license inspection for CZCL). It is important therefore to lay out the specific differences between the two applications;

1. DG is the owner and has been the license holder, and the SLSZ the operator, until contracts (two leases, a services contract, and two animal loan contracts) were signed on the 12th January 2017, when CZCL became the operator.
2. Whilst CZCL is now the operator, DG is still the Licence holder.
3. CZCL does not have a Licence at this time.
4. The zoo will continue to operate under the Licence of DG, until the Licence is determined.
5. The zoo perimeter for CZCL differs subtly from the zoo perimeter for SLSZ. DG and SLSZ have retained certain areas for their own use. If CZCL was to be granted a License, then these areas would no longer be within the zoo boundary.
6. The areas retained by SLSZ include the front entrance, large shop, a children's play area adjacent to the front and a number of other buildings adjacent to the front.

There is also an area adjacent to DG private house retained, known as the Tambopata aviary, the Tropical house, and the old Lemur houses.

7. These areas are marked in red in the attached map.
8. DG, SLSZ and CZCL are also sharing some areas, such as the car parks, and the keeper's kitchen.

The Tambopata aviary, Tropical house, old Lemur houses, and surrounding land.

- From here on this area will be described as TA
- This area is under the direct control of DG and is under the license of DG.
- It lies within the curtilage of the licensed zoo.
- This an area adjacent to DG's house.
- The area is off show to the public, but still within the licensed zoo.
- The Tambopata aviary is a long, metal wire mesh walk through aviary containing a mix of species including waterfowl, cranes, psittacines, Spoonbills, Bettongs, and Parma wallabies.
- The Tropical house is a standard 'barn type' construction with a concrete floor. It can be divided into three parts.
    - The indoor accommodation for the Aviary,
    - A larger open area in the middle, Housing wallabies and Sulcata tortoises, a pond with terrapins; and a number of enclosures with smaller tortoises, e.g. Red footed.
    - There are some smaller aviaries at one end. These used to act as the isolation facilities for the zoo, and now house a number of psittacines.
- The Old lemur houses have a number of pheasants and psittacines.
- The inspectors understand that in the grounds surrounding the aviary were more wallabies, but this was not confirmed.
- This area is staffed with a single member of staff employed by DG, AB (name withheld) present on three mornings per week.
- The inspection team were informed by the keeper that she understood that DG had made an arrangement with CZCL to look after the animals on her days off. However CZCL informed the inspection team that they had made it clear that they would only be providing food and water, and nothing else.

- From the stock list supplied to the inspectors there are over 170 animals in this area. See Appendix 'Animals in Tambopata aviary, tropical house and top lemur house'
- This list excludes animals that have died, of which the inspectors are aware of nine recently (since 2nd December 2016).

The significance of this area; its level of staffing, animal management and husbandry; provision of suitable food and water; and veterinary care, is important, as, in the inspectors' opinion, it is directly under the management of DG, and his license. As this report will show, many of the serious animal welfare issues that were noted within the zoo, failings that mirror those previously been identified in this zoo were noted only in this area.

The inspection team noted a significant difference between the ongoing level of management between the two zoos, CZCL and SLSZ (DG).

With CZCL, whilst there are still some deficiencies, the inspectors noted a genuine attempt to improve, within the constraints placed upon them by the old operator, and the new recently signed contracts.

Within the TA, however, the fact that the operator did not attend, and later when asked if he had further comments to make, replied that he did not, shows a callous disregard for the welfare of the animals within this area. Many of the welfare issues noted by the inspection team can clearly be put down to poor management.

During the inspection for the fresh license application a number of areas of concern were raised by the Inspection team. In normal circumstances, if rejection of the license was being recommended then no conditions would be added. However, as the zoo is still operating pending the determination of the license, it is important that in order to ensure animal welfare and the proper conduct of the zoo number of additional conditions are added to the license.

It should also be noted that a number of existing conditions have still not been complied with.

Additional Conditions recommended

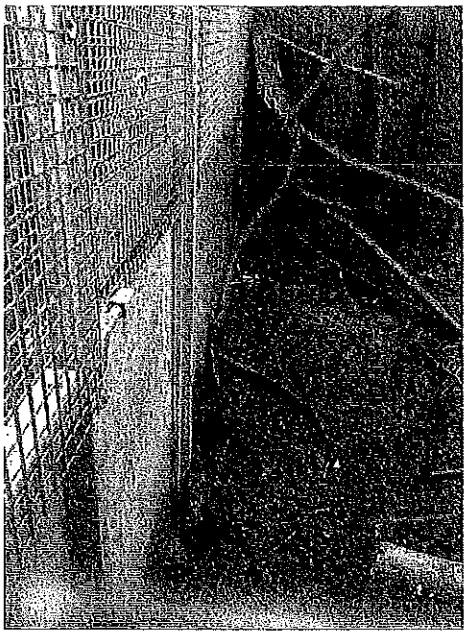
1. Rodent control

Rodent control has been an ongoing problem at this zoo for a number of years, and problems with rodents have been noted and reported at numerous inspections. Conditions have had to be applied to the license to deal with these issues.

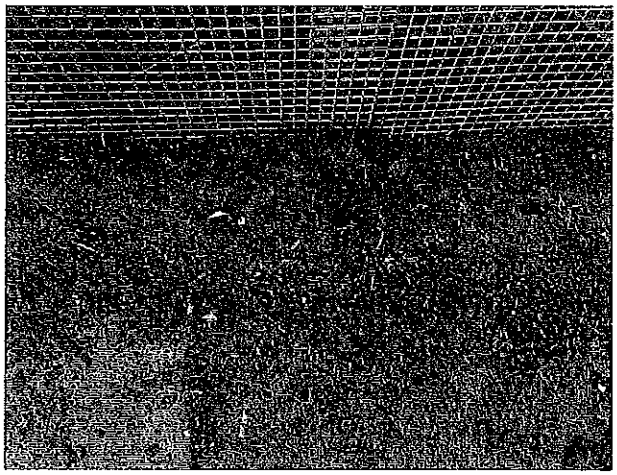
Since the last inspection, pest control specialists have been brought in to advise the CZCL, and a copy of this report was supplied to the inspectors. Much of the zoo has little evidence of ongoing rodent issues, or where there are issues, they are known and being dealt with.

However in the TA and the surrounding buildings there is a significant rodent problem.

- A rat was observed running down a rat hole adjacent to the buildings known as the old monkey houses.
- There are a large number of rodent tracks visible in and around the buildings.
- Rodent droppings were noted in the building.
- The keeper AB reported that she had seen rodents during the day time on a couple of occasions.
- Injuries likely to have been caused by rats were identified and noted on a Palma wallaby at post mortem.
- Injuries likely to have been caused by a rat were noted on a Pheasant at post mortem.
- With the high stocking density of animals present in this area, there is a significant amount of spilled food, thus attracting rodents.
- The poor hygiene is further attracting rodents.



Rat hole adjacent to old lemur house.



Rat tracks by the old lemur house.

The operator of SLSZ, DG did not attend for most of the zoo inspection process and was not present when the inspection team walked around this area. When he was asked during an interview with the inspectors (with his lawyer present), whether he had anything to add to his application he replied that he did not. Furthermore he did not attend the wash- up meeting to discuss the findings of the inspectors, and so they were unable to gather any further information regarding what attempts might have been made to deal with the ongoing rodent issue.

Rat droppings were also noted in the pigmy hippo house, and evidence of rodents were noted in the Illescas aviary. CZCI were aware of these, and ongoing rodent work was being carried out to deal with the problem.

However in the TA, there is an obvious and serious rodent infestation and no evidence of attempts to manage this problem.

Recommended condition

There is evidence that the vermin control in the Tambopata Aviary, Tropical House and old lemur houses is inadequate. In accordance with 1.3a and 3.35 of the Secretary of State's Standard of Modern Zoo Practice (SSSMZP) a report must be produced for the Licensing Authority by an independent professional pest control company on the safe and effective control of rodent vermin (within 1 month). The Zoo must them implement the recommendations of that report (within 3 months).

2. Animal welfare and husbandry issues

In the TA inspectors found significant problems caused by over-crowding of animals, poor hygiene, poor nutrition, lack of suitable animal husbandry and a lack of any sort of developed veterinary care, or preventative and curative veterinary programme.

The concerns of the inspectors included, but not an exhaustive list;

- The zone had mixed species of too high stocking density.
- There were a considerable number of non-compatible species such as macaws which may pose a physical danger to the other animals. (The inspectors noted that at a previous inspection there had been a report of a cattle egret having had its beak broken by a macaw). Reptiles, primates and macropods shared the same living space leading to a risk of disease transmission.
- There appears to be an ongoing high level of trauma in this aviary. This will have been exacerbated more by the considerable increase in stocking density that has occurred over the last few months.
- There is poor hygiene, and levels of accumulated faeces that were considered excessive in certain areas.
- There was a large amount of waste food that would then act as an attraction for vermin.
- There was inappropriate substrate for the wallabies and a lack of refuge
- There was a completely inappropriate husbandry for the Sulcata tortoises.

- There was limited perching considering the high stocking density.
- There had been an unacceptably high mortality rate, including seven Parma wallabies, a Spix's Guan and a Lady Amherst Pheasant .
- The keeper AB informed the inspection team that she had been informed that if there were any further deaths, she was just to dispose of the bodies and not to tell anyone.
- DA informed the inspectors that the Spix's Guan had been found dead, 'hanging' from a tree in November.
- The post mortem report for the Lady Amherst pheasant (14/1/2016) says;

  'Looks like eaten by rat, found in outside enclosure'

  'Had tail feather damage previously, thought to be rats'.
- There was no evidence, written and then confirmed orally, of qualified licensed veterinary involvement in the management of these birds. (Both the routine vet RB and the consultant zoo vet AG were asked whether they had had any input or involvement in this area, and both responded that they had not).

Parma Wallabies

The inspectors understand that;

- Historically there had been a few Parma wallabies present in this area, including one that FS had hand reared earlier in 2016.
- To this had been added all the other Parma wallabies present in the zoo. These had been moved up into this area, on or up to the 2nd of December, on the direct instructions of DG.
- In total there had been seventeen Parma wallabies, plus joeys in the pouch.
- During the inspection seven adult, and one large joeys (out of the pouch) had been counted in the barn, and a further three more were outside.
- The reason given for this, was that the three outside were the males, as there had been some fighting.
- The keepers and on site veterinary Nurse, for CZCL, had drawn the attention of the inspectors to the post mortem records as they had concerns regarding the welfare of the animals in this area (TA).
- Seven Parma wallabies have died since they were all moved to this area on the 2nd of December 2017. These have died on; 6/12/16, 16/12/16, 24/12/16, 25/12/16, 6/1/17 7/1/17, 15/1/17.
- The post mortem records show that three of these animals have died from trauma, another one had a paralysed limb, with no evidence of trauma (but it may have been),

one had an infected toe (which might be due to the inappropriate substrate and one had hepatitis.

- Whilst it is theoretically possible that some of these animals might have died even if they had not been moved to this unsuitable environment, there is no doubt in the inspectors' opinion, that the poor conditions, close confinement and overcrowding is more than likely to have led to the deaths from trauma, and conspecific fighting.
- It should also be noted that one of the wallabies also had injuries on its tail consistent with being bitten by rats whilst still alive.
- The conclusion in the post mortem report for the wallaby that died on the 16/1/17 reads;

> *The risk to other animals is unknown but the recent number of deaths suggests that a major review of the husbandry and environment is needed urgently.*

Conclusion

The level of husbandry, overcrowding, poor hygiene, rodent problems, lack of veterinary care have all meant that these animals are likely to suffer. A number of these animals have died directly from the problems stated about, and in the inspectors' opinion will have suffered unnecessarily in their deaths.

The causes of these deaths can be laid either directly or indirectly upon the modus operandi of SLSZ, under the direction of DG. The way these animals have been housed, treated and looked after is typical of the poor levels of management that the inspection team have found when the zoo was under SLSZ management, and can without any doubt lay the entire blame at his door.

It is the inspector's view that the Local Authority should consider prosecuting DG under section 4 of the Animal Welfare Act for allowing these animals to suffer (and some of them to die), and be likely to suffer.

The conditions that these animals are being maintained in, is quite frankly appalling and shocking, and has led directly to the death of a number of them. It falls far below the standards required under the SSSMZP, and is indicative of the lack of suitability for DG to hold a zoo license.

Improvement was required immediately within this area, and the inspectors considered recommending a Zoo closure Direction Order, so that the LA could facilitate immediate improvements in the welfare of these animals. However, after the Inspectors had a conversation with CZCL, the area and the animals were handed back from SLSZ to CZCL with

immediate effect. CZCL then sent in their veterinary consultant JC, who drew up an emergency Welfare Audit, and CZCL began to address the issues.

However to ensure that this is fully undertaken a condition must be applied to the license of SLSZ to ensure that compliance occurs.

Recommended Conditions

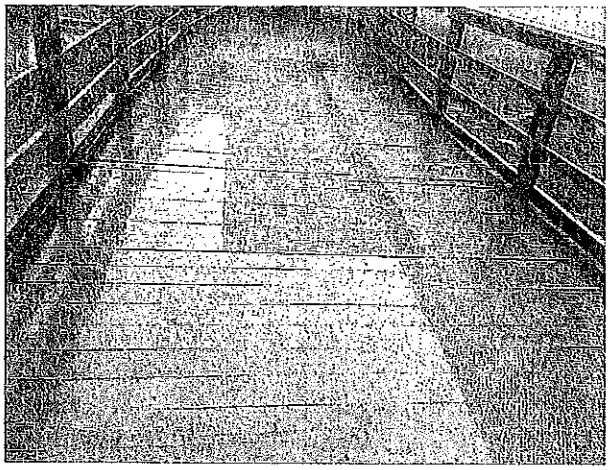
In accordance with 3.24, 4.3, 4.4, 4.5 of the SSSMZP the indoor and outdoor facilities for the mixed group of animals housed in the Tambopata Aviary, Tropical House and old lemur houses are insufficient leading directly to welfare problems amongst these animals. A suitably qualified person must inspect this area, produce a welfare audit for all the animals housed in this area, and a plan as to how their welfare needs are to be met. This plan must then be immediately instigated. A copy of the welfare audit must be forwarded to the LA. (1 week)

In accordance with 3.1 of the SSSMZP the condition, health and behaviour of the animals housed in the Tambopata Aviary, Tropical House and old lemur houses must be checked twice daily (Immediately) and actions taken to ensure their ongoing welfare.

3.Walkways

1. The raised wooden walkway adjacent to the Bear enclosure, in the WWS zone, is surfaced in most places with chicken wire nailed to the wood to minimise the risk of the wet wood being a slip hazard. However this wiring is still missing along one stretch and this must be put in place.

In another area within the WWS the wiring on the wooden walkway is coming loose, or is distorted, and this could act as a trip hazard.



Recommended Condition

In accordance with 8.15 of the SSSMZP parts of the wooden walkway in the World Wide Safari must have remedial work carried out to ensure that it is not a trip or slip hazard (3 months).

2. Further along this same path, the edge of the path borders a steep bank that then drops down through a wooded area to a pond. This is a potential hazard should any child slip or trip, as they would fall down the bank into the water.

There is a small fence along part of this area, but now there is a more noticeable need for a protection to be put in place, possibly due to removal of shrubbery, or because with the removal of the elevated walkways this path is more commonly used.

Recommended Condition

In accordance with 8.45 of the SSSMZP the edge of the pathway in the World Wide Safari must be guarded by a barrier capable of preventing people from falling down the steep bank (3 months)

4. Electric fencing

On the far side of the Meerkat enclosure the pathway, which once led up towards the top lemur houses, now is blocked by fencing. Across the pathway is the new perimeter fence erected by DG to surround property that he wished to remove from public access. This is tall chain link fence, with metal posts. To keep animals from this fence, a lower four foot high, electric fence has been erected. The operators and keepers of CZCL were unable to inform the inspectors whether this fence was 'live' or not. However it must be assumed that it is live and any person walking round the corner could walk straight into

the fence, and receive an electric shock. Putting up notices would not be effective, as this might not deter a young child or toddler.

Conclusion

Any potential danger to the public, for example from an electric shock, must be reasonably eliminated, either by restricting access or removing the fence.

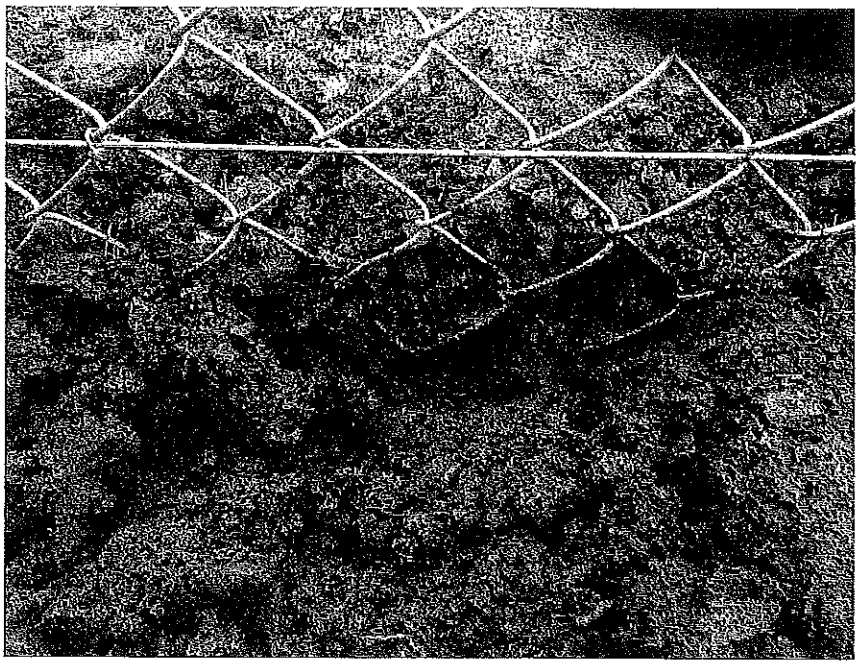
Condition

8.The electric fence across the pathway adjacent to the meerkats enclosure is a potential danger to the public. In accordance with 8.23 of the SSSMZP electrified fences must be placed beyond the reach of the public and suitably fitted with warning signs, so that visitors are not injured. (3 months)

Perimeter fence

A new perimeter fence has recently been erected between the WWS and DG's private house, by DG. This fence separates the land being retained privately by DG, although still on the ground plan for SLSZ, from the rest of the zoo, now being managed by CZCL.

The WWS has a mixed species exhibit including prairie dogs. The new fence is a metal chain link fence, and is not under wired. In fact it only goes into the ground by a couple of inches.



This is completely inappropriate as a perimeter fence for an area that includes animals such as Prairie dogs, an animal that burrows underground.

Whilst the inspectors accept that, at present, the Prairie dogs have not developed burrows in this direction, they have already expanded across the pathway and down the bank in other areas of the WWS. If they were to decide to move in this direction, this perimeter fence would not keep them within the zoo confines.

The perimeter fence was of concern at previous inspections, regarding its depth and whether it was sufficient to prevent the escape of the animals contained. A condition was recommended and then applied to the license that has still not been complied with.

The insertion of this fence, despite previous concerns expressed by the inspectors regarding the possibility of escape by these animals, is a further example of how DG has ignored the SSSMZP, and the conditions applied to his license.

Condition

9. If the recently installed fencing is to remain as the perimeter fence of South Lakes Safari Zoo and if sections of it are to act as the primary barrier holding animals in the World Wide Safari, then remedial work must be undertaken to ensure that the fence has been buried under ground to a suitable depth to ensure that animals capable of burrowing, e.g. prairie dogs, are unable to burrow under the fence and escape from the Zoo site. (3 months)

Free flying birds

Free flying Macaws have been a long standing problem at previous inspections. See other attached report. Historically the inspectors have been informed that either they could not be caught, or that they did not belong to the zoo, even though they were being fed and watered by zoo staff.

The inspectors noted, that with the current outbreak of Avian Influenza, that most of these free flying Macaws have been caught and contained, and that at the time of the inspection only two Macaws were still flying free.

One was noted to be perching on one of the buildings adjacent to the Tambopata aviary.

To allow non-native birds to fly freely and un-restricted is a breach of the WCA and contrary to the GB Invasive Non-native Species Strategy, and these birds must be contained. It is important the zoo realises its statutory obligations and does not allow these birds to be released once Avian Influenza restrictions are lifted.

Old Giraffe house

The old giraffe house houses a number of hybrid giraffe. At the time of the inspection the main doors to the outside were open, the heating was not on, and the ambient temperature in the room measured 9 degrees Celsius.

These finding are particularly disappointing, as they highlight the need for an animal manager that is up to date with current modern zoo thinking. It is further disappointing to have discovered after the concerns over the lack of heating in the new Africa house that had to be addressed by the LA with application of a condition last autumn.

Penguins feet

During the inspection the penguins were swimming. Two of the inspectors noted apparent bumble foot in four of these animals, during a brief viewing. Whilst it is impossible to say whether these birds have acute or chronic bumble foot, or whether this is causing unnecessary suffering, the fact that this had not been observed is of concern. To ensure that there is not a welfare issue these animals must have their feet examined and if there is a problem then remedial action must be taken.

Condition

Penguins with any visible foot lesions of pododermatitis (bumblefoot) must receive appropriate veterinary assessment and care (3 months).

Further conditions

See report Form 11

Animal Manager

In accordance with Condition 34, currently applicable to this licence, an experienced senior animal manager with Curator or Zoological Director status must be employed to have overall responsibility for all aspects of the animal collection. (3 months)

Veterinary care

In accordance with 3.7 to 3.18 of the SSSMZP (and following guidance in Appendix 5 of the SSSMZP) the current local veterinary service must be replaced or upgraded by consultant input to ensure a level of service in line with modern zoo veterinary standards. This process must be supervised by and to the satisfaction of consulting specialist veterinary advisors and the Local Authority. (1 month)

APPENDIX No. Q

Report related to Informal inspection of South Lakes Zoo, undertaken on 9th February 2017

The Inspection team was made up of Anne Chapman, Graham Barker, and (LA) Matthew Brash MRCVS (LA vet advisor). Representing SLSZ ltd was Karen Brewer, Stewart Lambert and Kim Banks, and David Armitage.

This informal inspection was undertaken as part of a monitoring process undertaken by the LA to ensure that the zoo continues to be run in an orderly manner, whilst the complex process of the determination of the Fresh Licence application from Mr Gill and the Original Licence application from Cumbria Zoo Company Ltd is under way.

The inspection was undertaken in two phases, an initial meeting with the managers, followed by a walk round the zoo. During the walk round the inspection team paid particular attention to areas of concern that were noted at the previous formal inspection (January 2017).

During the meeting the zoo informed the inspectors about progress that they had made with their staffing, veterinary input, and managing the business.

Notes from the walk round the zoo

1. The old Giraffe house heating was now on and working, and the ambient temperature was suitable. The hard yard has been scraped.

2. The male hybrid giraffe, has a chronic wart like growths on his ossicones, possibly viral, age related or traumatic in origin. The LA have received a complaint, because they had observed bleeding. The keepers believed this to have occurred when he pushed his head through the horizontal bars to get at food provided by the public. He would then hit the top of his head on the roof. This is a learnt behaviour, and it is plausible that this has more recently become an increased problem as, under the new management, the giraffe are now being kept in doors when the ambient temperature outside is below 10 degrees Celsius.

On the day of the inspection the left ossicones was still sore, inflamed and had recently been knocked and was bleeding. The keepers informed the inspectors that despite their efforts, he continued to rub the ossicones exacerbating the problem. He was resistant to topically applied medication.

The zoo has;

1. Had the collection vet to examine the animal
2. Placed the giraffe onto antibiotics and pain killers (NSAIDS)
3. The giraffe has been isolated from the others during public feeding times.

4. Boarded up the area where the keepers felt he was damaging his ossicones, to prevent him pushing his head through the bars.
5. The zoo consultant vet is due to look at the animal on the 20th February to assess response to treatment.

The inspectors recommended a sign was put up informing the public of the problem, and the steps that they were taking to deal with it. It is possible that this will not fully settle down until the spring, when the animals spend longer periods of time outside.

3. The ant eater housing has been upgraded.

1. The old wooden beds have been removed.
2. The hole in their enclosure wall has been repaired.
3. They have a deep bedding of bark chipping
4. They have been supplied with a modified feeder box to promote natural feeding.

4. The Reindeer hard yard has been scraped. The condition of the male reindeer is considerably improved.

5. Much of the fencing around the Boma feeding area has been removed. This was originally put up to prevent the free roaming primates having access to the public when they were eating. As the free ranging primates have all been relocated, there is no requirement for this fencing.

6. The picnic tables in this area have all been brought back.

7. The substrate in the cat houses has been modified, with the addition of bark chippings to provide a varied substrate. This may reduce the chronic high ammonia levels, although the animal manager informed the inspector improved ventilation was on the list. None of the cat houses were entered.

8. There is increased, now suitable, bedding for the tapirs, and the maned wolves.

9. The heating in the baboon house has been altered, with the fan now facing inwards and there is a noticeable difference in the ambient temperature in the baboon house and subsequently baboon behaviour.

10. The tapirs have been provided with an outside hard stand.

11. Much of the new fencing adjacent to the entrance and Africa house, put in over the last few months, has been removed.

12. All free ranging parrots at the zoo have now been caught, and the operators assured the inspection team that they would not be released again, such that they could leave the zoo perimeter. The precise ownership of these birds is still to be determined.

13. Apart from a single sick rat observed in the Tambopata aviary, there was little evidence of rodents.

14. The lemurs relocated to the bear enclosure, have a considerably enriched environment. Wooden boarding around their enclosure has been removed, and the housing is heated. A catchment area is being built at the back of this house, so that they can be trained to return to this area as a routine.

15. The Open sided barn, in the WWS, has increased bedding for the animals, e.g. capybara.

16. The New giraffe house continues to maintain a suitable temperature, even during this cold snap. The house has been opened up to escorted public viewing for certain periods of the day. A stand-off barrier has been installed. The rhino have now also been supplied with bark chipping as bedding as well as straw.

17. **Tambopata aviary and adjacent housing.**

This was an area of considerable concern at the formal inspection in January 2017. As a result the inspectors advised that a three further conditions be applied to the licence. These included;

> *3. There is evidence that the vermin control is inadequate in the Tambopata Aviary, Tropical House and old lemur houses and in many other areas, e.g. rat droppings in the pigmy hippo house and rat runs in the vulture aviary. In accordance with 1.3a and 3.35 of the Secretary of State's Standard of Modern Zoo Practice (SSSMZP) a report must be produced for the Licensing Authority by an independent professional pest control company on the safe and effective control of rodent vermin (within 1 month). The Zoo must them implement the recommendations of that report (within 3 months).*
>
> *4. In accordance with 3.24, 4.3, 4.4, 4.5 of the SSSMZP the indoor and outdoor facilities for the mixed group of animals housed in the Tambopata Aviary, Tropical House and old lemur houses are insufficient leading directly to welfare problems amongst these animals. A suitably qualified person must inspect this area, produce a welfare audit for all the animals housed in this area, and a plan as to how their welfare needs are to be met. This plan must then be immediately instigated. A copy of the welfare audit must be forwarded to the LA. (1 week)*
>
> *5. In accordance with 3.1 of the SSSMZP the condition, health, behaviour and nutrition of the animals housed in the Tambopata Aviary, Tropical House and old lemur houses must be checked twice daily (Immediately) and actions taken to ensure their ongoing welfare.*

Immediately after the inspection in January, the owner DG, passed management of these animals in the Tambopata Aviary area back into the control of CZCltd. A report was drawn up by the veterinary consultant. A copy of this is attached to this report.

At the time of the inspection in February 2017, the inspectors noted;

1. The whole area has been thoroughly cleaned. The previously overwhelming smell due to the high level of ammonia is no longer present.
2. The stocking density has been decreased with a number of species removed. There are plans to reduce the stocking density further, but this is limited at this time of year.
3. The reptiles have been provided with an improved environment.
    - They now have thick rubbing matting, to keep their plastrons off the concrete, and assist with thermo regulation.
    - They have now been supplied with U/V light.
    - There is improved substrate throughout the rest of the enclosure
    - Diet has been improved
    - The environment is still limited, but is a marked improvement
4. The Parma Wallabies have a significantly improved environment.
    - The edges, piping, where they were thought to be injuring themselves has been blocked off with wood.
    - Visual barriers have now been put in place.
    - There is increased bedding and food.
    - The substrate has been altered with markedly increased provision of straw.
5. The veterinary nurse informed the inspectors, that apart from one more Parma wallaby that died soon after the last inspection in January there have been no further deaths, in this area.
6. All diets for animals in this section have been reviewed by the veterinary consultant and signed off.
7. There has been a concerted attempt to get rid of vermin, although a sick rat was noted during the inspection.

Summary

At the time of the February 2017 inspection the operator had not had sight of the inspectors report from January 2017 and so would not have been fully aware of potential conditions. This was due to the licence holder not passing on the report. However the operators were aware of the concern that the inspectors had had at the time of the inspection, in January, and had taken immediate steps to rectify the problems.

The housing, diet, hygiene, general welfare conditions and management of these animals in the Tambopata aviary are all markedly improved since the formal Inspection in January 2017.

The conditions recommended by the inspectors have been partially complied with, however on going monitoring is essential to ensure that the standards are maintained.

18. **Electric fence adjacent to the Meerkat enclosure.**

At the January 2017 formal inspection, a fence, required under BALAI to ensure that there could be no 'Nose to Nose' contact with non-zoo animals, had been placed inside new perimeter fence adjacent to DG's private house. This was potentially electrified, although the operators informed the inspectors that it was not functioning.

The fence cut directly across an old path, was unsigned and even though not turned on would act as a dangerous hazard to a member of the public. The inspectors had therefore recommended a condition be applied to the license;

> *The electric fence across the pathway adjacent to the meerkats enclosure is a potential danger to the public. In accordance with 8.23 of the SSSMZP electrified fences must be placed beyond the reach of the public and suitably fitted with warning signs, so that visitors are not injured. (3 months)*

At the Inspection in February 2017 the inspectors noted that the electric fence has been blocked off so that there is no longer public access. It may now be removed as there will not be any animals on the other side of the fence.

Recommendations

1. There is an area at the back of the barn, called the Ark, where the electric fencing comes quite low. This should be suitably signed to warn the public as in other areas of the zoo.

APPENDIX No. R

Part One

LICENSING REGULATORY COMMITTEE	(D) Agenda Item 7
Date of Meeting: 5th – 7th July 2016	
Reporting Officer: Principal Environmental Health Officer	

Title:

Zoo Licensing Act 1981 (as amended)
Zoo Licence for South Lakes Safari Zoo Ltd

Compliance Report Regarding Current Licensing Conditions

Summary & Purpose of the Report

Mr David Stanley Gill holds a zoo licence issued on 8th June 2010 to operate a zoo at premises known as South Lakes Safari Zoo Ltd, Crossgates, Dalton-in-Furness, Cumbria, LA15 8JR.

At a meeting of this Committee on 23rd / 24th February and 2nd March 2016 Members placed a number of conditions on the premises' Zoo Licence.

A special inspection was carried out at the Zoo on 23rd, 24th and 25th May 2016 to assess the Zoo's progress towards compliance with licence conditions. This report details the finding of that inspection and makes recommendations to Members in relation to conditions that have been complied with, and those where compliance hasn't been demonstrated.

Background Information

Mr David Stanley Gill holds a zoo licence issued on 8th June 2010 to operate a zoo at premises known as South Lakes Safari Zoo Ltd, Crossgates, Dalton-in-Furness, Cumbria, LA15 8JR.

A special inspection was undertaken at the Zoo on 23th/24th and 25th May 2016 to check compliance with a number of conditions placed on the zoo licence at a Committee Meeting held on 23/24th February and 2nd March 2016.

The inspectors undertaking the inspection were:-

The Secretary of State Inspectors:

Professor Anna Meredith; MA VetMB PhD CertLAS DZooMed DipECZM MRCVS
Nick Jackson MBE, Director of the Welsh Mountain Zoo.

The Local Authority representatives were:

Dr Matthew Brash; B.Vet.Med Cert Zoo Med MRCVS Council's professional veterinary advisor,
Richard Garnett. MCIEH
Simon O'Hara

The inspectors produced three reports following the inspection:

- **Report 1**Defra Inspection Report Form – see APPENDIX A
- **Report 2** Special Inspection Ancillary report – see APPENDIX B
- **Report 2** Assessment of ZLA Compliance during Special Inspection – 23rd to 25th May 2016 – see APPENDIX C

The Zoo received a copy of all three reports and were given the opportunity to make representations. Their representations are attached at APPENDIX D and include a letter from the management and staff at the Zoo to the Committee and Defra Zoo Inspectors.

The inspectors provided a further response to the Zoo's representations and this is attached at APPENDIX E.

General Comment About Compliance with Licence Conditions

In report 1 the Inspectors make a general comment about compliance as follows:-

"The inspectors were very disappointed that many conditions had not been complied with, and with the number of problems detected during the inspection, resulting in the zoo failing to comply with many of the SSSMZP.See ancillary report for further details"

The Zoo's response to this is as follows:-

We respectfully submit that the zoo was placed in an impossible situation by the deadlines placed on conditions in the February Meeting of the Licencing committee.

Criticisms placed as above do not take in account or acknowledge the vast amount of works done in the zoo between December and May where our team of 9 full time construction and maintenance staff worked every day and over time to try to achieve the requirements of the Local Authority not only the Conditions placed on the Licence but also further unexpected potential safety issues regarding the need to demolish walkways or modify them once the standard of construction was changed from the original design loadings placing Public safety as our utmost priority that took up all the staff time for 14 weeks . Not only did this engage all our staff fully it created an extra financial burden and cost to the zoo of over £60,400 in unexpected costs. Thus preventing other issues being address due to physical time constraints and zero cash availability at a time of negative cash flow in the zoo. As the Zoo has no ability to borrow money from any source

prioritisation of safety work had to be done at the expense of other equally important works as we unexpectedly had no funds to contract outside labour to assist.

- It is also of note that ALL the difficulties that have arisen with timescales for completion stemmed from our fencing and fabrication contractor being taken away from the zoos vital work for the whole summer in 2015 when he took on major contracts for Barrow Borough Council at much higher hourly rates than our contract. This placed all our projects behind by 6 months. Contractors from Preston, Chorley and a number of other places were contacted who had similar skills to complete our works and they all refused to work in the locality due to 3 hour drive times to and from work. There is a serious shortage of suitable contractors for fabrication and fencing in this region.

Condition 17 Review of Veterinary Programme

A review of the Veterinary programme must be undertaken in conjunction with the consulting veterinarian and a resulting written programme of care (to include parasite control, vaccination, p.m. routine etc) be agreed, recorded and maintained accordingly.
Elevated to Direction Order 4th March 2016
Compliance Date 22nd May 2016

The Inspectors' Comments

In report 1, the Inspectors noted the following:

"The veterinary programme has been reviewed and improved. Veterinary visits are now more regular (2-3 times a week, total 3-4 hrs on average/week by Rick Browne; once a month by Andrew Greenwood) and documentation and record-keeping greatly improved and kept up to date. But also additional comments below re implementation and interventions for improvement of welfare." (Question 3.9, page 5).

In report 2 the inspectors have stated that this condition is complied with.

Zoo Comments

- *A full review of the programme was undertaken and presented to inspectors during inspection. Part of that review was to instigate a monthly review of vet "cases" the results of which would form the basis of a biannual review carried out by the Vet teams (Rick Browne, Andrew Greenwood, Frieda Rivera Schreiber). 4 months were presented to the inspection, those 4 months of discoveries outlined by our veterinary coordinator Frieda Rivera Schreiber have formed the basis of the claims in pages 4,5,6, of the inspectors report. Analysis as discussed by the inspectors is for veterinary review and a meeting of the veterinary team to review the veterinary situation of Safari Zoo for the period 1.1.16-30.4.16 has taken place.*
- *The conclusion of that review resulted in 5 action points which the team thought essential to provide proper useful analysis of the zoos situation rather than rely on a snapshot of information.*

AP 1. It was decided the period under observation was too narrow, just a snapshot, that further investigation was essential to provide a clearer picture as to what was occurring and so a review of the annual inventories over a 5 year period (2011-2015) must take place. By 30th September for a special Veterinary meeting arranged to discuss the findings.

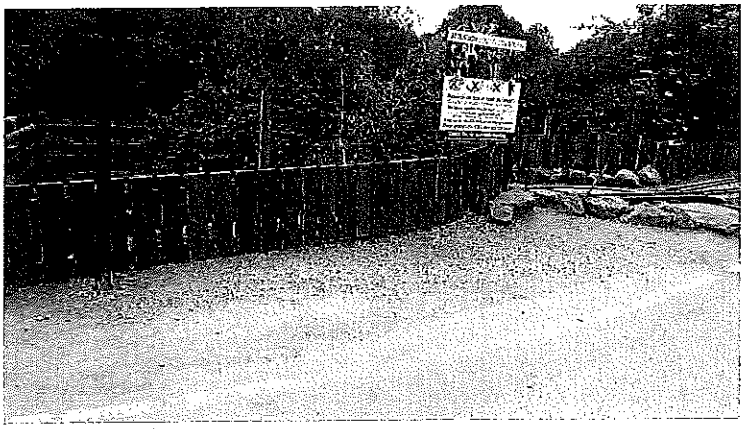
AP2. Contact Marsupial TAG/ vet advisor to the tag for further information/ help re wallaby mortality rates. Safari Zoo is the ESB coordinator for all Macropods except Parma and Bennetts Wallabies as they do not have programmes. It is therefor unlikely that information is collated. However, Parma Wallaby mortality rates at Safari Zoo have been very low over many years until the very wet difficult winter of 2015/6. It is suggested this could be the precursor of the deaths in this period as the animals' free range and are

not locked within dry housing. (suggestion of bringing them inside next winter with all the other macropods. The group was from wild caught stock ex New Zealand islands. It is apparent from the 15 years of managing the Macropd studbooks that we have now lost 3 species from Europe due to the necrobacillus infections taking more lives than births and we only have two self supporting species in Red Kangaroo that is stable and Western Grey Kangaroo that is now stable. Al other species are in decline due to the same issue of non treatable infection as the main overriding cause.

AP 3: Squirrel Monkeys contact Colchester zoo or Edinburgh who keep large troops of squirrel monkeys for their experience of multi male multi female groups.

AP4: Lemurs - promotion of a research project to arrange students to come and study the groups year round. How they interact and what their ranges are, where the issues occur. AG IZVG have employed a new co-ordinator of research therefore they will write brief and coordinate to find students.
We funded a study on wild Ring Tailed Lemurs in Madagascar in 2002. Find this thesis and re appraise the conclusions in relation to our groups.

AP5: Ducks. Fencing has been installed separating duck from vehicles. Speed limits reinforced and training of drivers that anything in the road has right of way



Duck Fencing

Officer Comments

The Inspectors concluded after the May 2016 inspection that the work undertaken by the Zoo's Veterinary department provides compliance with the Direction Order and Condition 17

Officer Recommendation

- **Members note this information only**

Reason for recommendation

The Zoo have appealed the direction order dated 4th March 2016 and a hearing is scheduled to take place on 14th July 2016 in Barrow Magistrates' Court. As a result this matter cannot be considered further at this time. However it will be brought back to Committee after the appeal has been determined.

Condition 18 Delivery of Veterinary Services

The delivery of veterinary services to and in the zoo, is still unclear and in some areas appears uncoordinated.

The operator must, in conjunction with the Zoo's veterinary advisor and/or other such professional advice as deemed necessary, develop to the modern standards of good zoo practice and implement, an improved and clearly defined programme, for the delivery of veterinary services to the collection. (This must include the additional and extended collection). This programme must detail: the frequency of routine visits, duties expected of the Vet, routine prophylaxis (vaccination etc.), agreed surveillance policy – to include screening, post mortem protocols, transmission & recording of p.m. records & pathological results. All relevant information must be integrated into the animal records system, such that, information on any individual animal is quickly and easily retrieved. Agreed protocols for relevant veterinary cover when the principal vet is unavailable, must be clear. A written copy of the final procedures must be lodged with the licensing authority within 3 months & clear evidence of implementation provided within 6 months.
Elevated to Direction Order 4th March 2016
Compliance Date 22nd May 2016

Officer/Inspector Comments

The Veterinary System at any Zoo is a synergy of the procedures and paperwork married against the 'hands on' treatment of the animals, in either reactive or proactive scenarios. The Zoo Vet has further involvement on all aspects of animal care from enclosure design through to dietary review and should be instrumental in progressing the Zoo's Collection Plan.

In report 1 the Inspectors noted:

"New system: Monthly summary signed by all vets and veterinary summary produced Jan-April 2016 for review at vet meeting in June 2016." (Q 3.10).

Regarding veterinary records – "Improved since last inspection, but notes by consultant vet very brief, e.g. do not give anaesthetic drug dosages used." (Q3.11).

Regarding medicines – "Room is too hot and, although locked away, antibiotics etc not kept in refrigerator." (Q3.12).

Regarding controlled drugs – "Pentobarbitone kept in locked gun cupboard." (Q3.13).

In their ancillary report (report 2) inspectors noted:

"Complied with. However, the inspectors have ongoing concerns that the veterinary programme, although much improved recently in terms of process and regularity, still deals largely with preventive (non-infectious) morbidity, especially traumatic injuries due to fighting in primates, and foot and dental disease in macropods. At the admission of the vet (RB) this is essentially unchanged over the last 20 years. In addition there are

ongoing deaths due to exposure/hypothermia and emaciation. This is fundamentally due to management structure and practices."

The inspectors provided more detail in Report 3 stating:

A. "Veterinary Records

More comprehensive veterinary records are now maintained for the animals. There is a monthly summary sheet of animals that have died, or been treated, and a four month summary had been prepared for the inspectors.

Mortality and causes of mortality

1. *From examining the previous year's stock list, the inspectors noted that the mortality rate is still high. Over the period of time January 2015 to December 2015 there have been 146 deaths. This is made up of approximately half mammals, half birds and some reptiles.*
2. *During the first four months of 2016, i.e. from Jan 1st to April 31st, a further sixty one animals have died (50) or had to be euthanased (11).*

More detailed veterinary records are now being maintained and the causes of death during this period, for these animals were available.

From the records the inspectors noted that there were a significant number of deaths (19) from preventable causes.

The veterinary team had recorded that;

1. *Two animals died from rat poison*
2. *Five Inca terns died from exposure undetermined*
3. *One Alpaca died from hypothermia*
4. *Thirteen animals died from trauma*
5. *One bird euthanased after having a beak broken by a Macaw*
6. *Three from emaciation*
7. *One lemur had drowned*
8. *Three Ducks had been run over.*

A significant proportion of these are due to fighting amongst animals. At interview the vet for the collection RB agreed that there was a large number of injuries from fights but did not see how he could resolve this. He agreed that that a major cause of deaths was from injuries and trauma.

Furthermore, whilst there have been seventeen animal deaths from trauma related causes, during the period between 1 January and 30 April 2016, a further fifteen animals have been treated for traumatic injuries and wounds. (Other animals have been treated for other medical problems).

(The actual figure is likely to be higher, as not included in this figure are other animals that might have received injuries and not received treatment, and other animals that are

listed for having received treatment but not stated as having received treatment for trauma, e.g. a hand infection).

The inspectors noted that there is now an obvious increase in the number of visits and the veterinary involvement in the zoo, and this is to be commended. There is also a significantly improved recording system of veterinary matters, and it is partially because of that, that the inspectors now have the written evidence of the welfare issues that they are concerned about.

The veterinary department (FS and RB), were interviewed regarding this at length and accepted that the level of injuries and death were unacceptably high. However they did not have a plan as to how it could be reduced. FS was of the opinion that injury due to fighting is what would happen in the wild, and the risk of this should be balanced against their 6 freedom to range freely. They did inform us that they had planned a meeting in June, with the consulting vet Andrew Greenwood, to discuss the first four months of data.

The veterinary department, despite attending more regularly, seem to be largely reactive and 'firefighting'. Qu RB 'I spend most of my time stitching animals up' the management in preventing these problems.

The inspectors do acknowledge that they have implemented a program of vaccinations, contraception and worming in many areas, which is to be commended.

The inspectors would like to stress that their concern over the high level of trauma and mortality is not a criticism of the keepers themselves, of whom the inspectors were impressed with their keenness, and obvious passion about looking after the animals to the best of their ability. It is also acknowledged that a programme of training and CPD for keepers is now place that was not evident in November 2015.

There are likely to be many complex reasons for the high level of trauma and mortality, however it is the inspectors' belief that, to a large part, it is fundamentally the way the animals are kept; i.e. in large groups, in a large space, where it is difficult to manage the animals and to detect injuries or body condition, with uncontrolled breeding in some instances, (e.g. ring-tailed lemurs).

During interview, DA commented that he thought the collection was overstocked, and had too many animals, however DG informed the inspectors that the lemurs were allowed to breed as they liked. However there is a collection plan which does contain some more detail.

For example in the collection plan; for ring tailed Lemurs it states: 'Monitor breeding and surplus as numbers increase. Possible to stop breeding next year'.

It is a requirement under the Section 1A (vii) of the ZLA that a zoo must;

> 'accommodate their animals under conditions which aim to satisfy the biological and conservation requirements of the species to which they belong, including providing each animal with an environment well adapted to meet the physical, psychological and social needs of the species to which it belongs; and providing a high standard

of animal husbandry with a developed program of preventative and curative veterinary care and nutrition.'

In the inspectors' opinion the mortality rate is high and sadly, from the information supplied, the cause of many of these deaths are preventable. Whilst the inspectors accept that deaths from trauma can, and do, occur, and that other preventable accidents can occur, it is the consistently high number, plus the lack of any written or verbally produced action plan to remedy this, that is of concern.

These are problems that are preventable provided a suitable environment for the animals to live in has been provided, whilst demonstrating most normal behaviour, but not undergoing fear and distress.

There is little evidence that the present management team, with DG acting as a hands on manager, have made any significant attempts to reduce this problem. In fact there is no evidence that the management team have made any efforts to reduce this problem by putting together and implementing a plan to improve the current welfare of these animals. However, DA stated that, were he allowed to, he would implement such changes."

Zoo's Comments

- *We have consulted widely and had assistance with research into this issue and taken advice from numerous sources. It would seem from this exercise there is a wide variation in the way DEFRA Inspectors apply and set standards within the ZLA and SSSMZP. There is no defined standard or indeed is there legal obligation to comply to very specific criteria that some Inspectors may set as their personal standard. The SSSMZP gives broad parameters for compliance and this Zoo should not be subjected to the application of a standard that is not universally applied to the wider Zoo community under the ZLA in the UK.*
- *We have concerns over the way the Veterinary situation at the zoo was described and reported in the November Inspection report, our complaints and observations do not seem to have been considered valid however we should point out that numerous documents and procedural activities were not considered, inspected or acknowledged by the inspection team at that inspection in November 2015 and then the zoo was accused of major failings because the team did not see or acknowledge those issues that were totally available to them at the inspection or beforehand in submissions.*
- *Further the zoo questions the scientific factual basis that the inspectors have made their negative comments and opinions regarding management. We ask that the inspectors quantify and qualify their comments and opinions sticking to facts and not personal views and opinions. If a specific person is to be isolated and criticised it is essential that factual evidence is gained rather than personal comments or hearsay.*
- *In the inspectors' opinion the mortality rate is high and sadly, from the information supplied, the cause of many of these deaths are preventable. Whilst the inspectors accept that deaths from trauma can, and do, occur, and that other preventable accidents can occur, it is the consistently high number, plus the lack of any written or verbally produced action plan to remedy this, that is of concern.*

We question this opinion based on facts.
The International Species Identification System or ISIS is a worldwide data base of each zoo that subscribes to the programme. It is generally seen as requirement of zoos to be members. This data base holds the detailed records of a huge number of zoos from around the world and in this instance from the UK under the ZLA and DEFRA inspection standards.
We have undertaken a limited but ongoing study into mortality rates in other UK zoos that are fully licenced and seen as "model" or established well managed zoos. We do not intend to name all the Zoos involved in this publicly available document but have all of the information available for any further appeals that may be needed.

It is a requirement under the Section 1A (vii) of the ZLA that a zoo must;

'accommodate their animals under conditions which aim to satisfy the biological and conservation requirements of the species to which they belong, including providing each animal with an environment well adapted to meet the physical, psychological and social needs of the species to which it belongs; and providing a high standard of animal husbandry with a developed program of preventative and curative veterinary care and nutrition

[redacted]

Our Veterinary care programme and recording of such is at least equal to if not better than many zoos licenced under the Act. We have data from the largest zoo in the UK that shows that we compare extremely well and indeed few zoos of comparative size or collection have better mortality or trauma records.

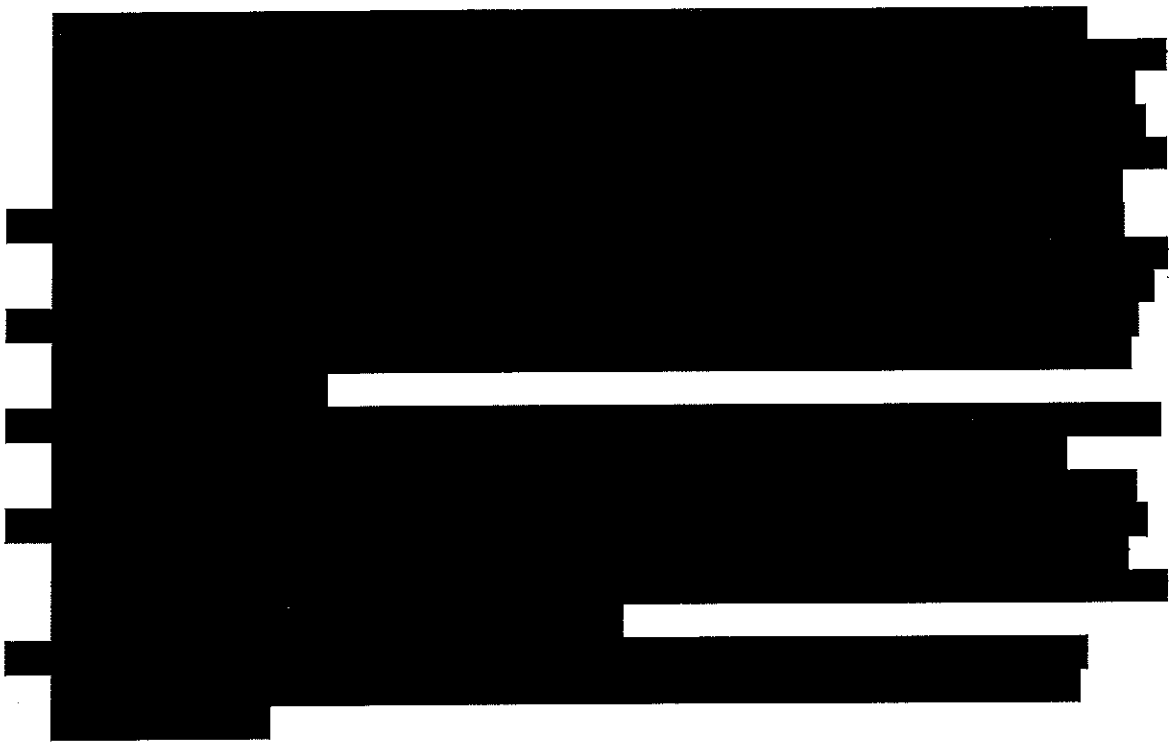
[redacted]

It is our intention to prove that the standard and criteria demanded from this Zoo by inspectors in the last two years is not the standard actually maintained by others. At our DEFRA Balai Veterinary inspection that concentrated on Veterinary records, practices and procedures, we were inspected in great detail (far deeper and longer than the Special Inspection) and this gave us an excellent report and we passed the strict test with no issues . Whilst the DEFRA Zoo inspectors made verbal comment that the DEFRA officially employed Veterinary inspector was "not experienced in zoos or qualified" she did in fact spend far more time and went into far deeper detail about our practices and recording and health and welfare record and is directly employed by the government to uphold the strictest standards for animal health and welfare in Zoos under the European Directive.

The Veterinary review does identify some preventable deaths but once again all zoos looked at had similar numbers of preventable deaths. This has to be seen as the "learning curve" of working with exotic species. However some are down to practices that need to be changed or reviewed in all collections and this must be recognised and actioned.

We have identified issues that need addressing and we believe we have done this via re training and more responsive action orientated Animal Management . Instances of Rat poison being identified in a number of deaths has been reduced to zero by training and specialist courses on the subject.

[redacted]



It seems from the information on other holders of large groups of squirrel monkeys that they have exactly the same breakdown trauma deaths and injuries. It is impossible to predict when a breakdown will occur in a group of 5, 10 or 50.

- *In 2016 a list of causes of death has been raised. There was specifically criticism made of a Night heron death where it is noted the Vet stated or suggested a possible attack from a Macaw. This cause is disputed greatly and was not the thoughts of the staff. It is far more likely that this injury causing death was caused by flying into the mesh at high speed during high winds. With regards to management causes, it is not tenable to suggest that a bird flying into mesh in high winds is management related or indeed if a Macaw indeed did bite the Heron how can this be prevented when this is such an abnormal occurrence? Macaws and Herons have been mixed for many years with great success and numerous breeding successes not least once again this spring when Night Herons have successfully reared outside in the aviary.*
- *The Alpaca was and still is undetermined as the cause of its loss of condition as it was in the same group as 3 others and all the others had good condition. The PM simply described the physical condition at death and could not isolate a cause. Alpacas have extremely thick woolly coats and it was impossible to see this loss of condition in comparison to the others. It is not possible to simply feel their backs very easily without excessive stress in capture thus increasing trauma related injury, illness or death. This cannot be blamed on management as the illness did not reveal itself until it was dead.*
- *The Inca terns was a one off freak event caused by the severe wet weather in January /February . We received a large new group of birds from Emmen in Holland . they were winter hardy and we kept them in for a few weeks before releasing them into the Illescas Aviary. We suffered serious rain storms and*

continued wet conditions that was unprecedented. Sadly 5 Inca Terns succumbed to the wet and wind outside when they refused to come inside the housing shelters. We have not lost any since that day and indeed they are breeding. We do not accept that this was a bad management decision but rather a freak weather situation and unavoidable if the birds chose to stay outside the shelter.

- *Re emaciation this refers to Parma Wallabies that all were investigated fully. The conclusion was that possible toxoplasmosis was the cause. However further investigation revealed keeper failure to feed concentrated food everyday and check health status to prevent such issues, the specific keeper involved in the shortcutting of duty has now left the zoos employment due to continued failure to comply with duty of care. Resolved.*
- *With reference to the Ducks being run over, prior to these events we had no record of this issue in the past. In response to the sudden change in incidents management placed a fence between the ponds and the road to prevent this occurrence again. Resolved.*

We would argue that using the facts recorded in ZIMS our style of management has advantages over more traditional approaches in welfare and death rates and the concerns voiced by inspectors are unfounded in fact. We acknowledge that preventable deaths are exactly that and more work has to be done to address this aspect and improve just as all zoos need to do the same.

We do not accept the criticism of management that has been submitted without any factual evidence as to comparative standards being submitted to qualify or prove the accusations made in the opinions.

The criticisms of the management are serious and make clear comment that the zoo is badly managed or "not to modern Zoo practice" and this has been used very widely in national press and the web domain doing great damage to the whole management and keeping staff credibility without any scientific evidence to back up the accusations aimed at DG alone and no evidence whatsoever to support this criticism in the factual statistical evidence available. It is simply a personal view based on no comparative evidence and we would request this accusation be immediately publicly removed from the record on the basis of the factual evidence that compares other zoos mortality and trauma records.

We do not intend to bring other zoos names or credibility into this situation if the report is to be in the public domain. However the full details and examples of other zoos failures to reach the standard demanded tor Safari Zoo will be available for any litigation or appeal if it was found necessary in the future to clear this zoos name and reputation.

- *The comments or criticisms are not balanced in reality or based on knowledge of historic interactions and behaviours and experience. 2106 so far is by far the best breeding season ever for birds in the Zoo. with tremendous success with exceptionally difficult species such as Roseate Spoonbills where 6 are now fully fledged.*

This Condition in our view is now Complied with in full and continuing development will take place

Officer Recommendation
That Members:

- **Note this information only**

Reason for recommendation
The Zoo have appealed the direction order and a hearing is scheduled to take place on 14th July 2016 in Barrow Magistrates' Court. Therefore this matter cannot be considered further at this time. However it will be brought back to Committee after the appeal has been determined.

APPENDIX No. 5

SAFARI ZOO

SOUTH LAKES SAFARI ZOO

PREVENTATIVE HEALTH & MEDICINE PROGRAMME

AIM

This document, the South Lakes Safari Zoo Preventative Medicine and Health Programme, is a comprehensive overview of the structure and expected implementation of our veterinary health care programme. It incorporates both preventive and curative health policies, including the frequency and nature of our surveillance programmes and the key responsibilities across each department. The primary intention of this document is to facilitate learning for staff members with regards to our health and welfare programmes; to ensure a consistency in language and understanding of the elements of the health care programme; and to allow staff to understand their role and responsibilities with regard to animal health related welfare. It should be considered a procedural document and a training tool to facilitate animal welfare and best care practice.

This document describes, by relevant taxonomic group, the protocols undertaken with regards to surveillance (disease screening) and quarantine/isolation (of animals added to the collection). Where relevant it also covers regimes for parasite control, vaccination, contraception and identification. For specific protocols on park-wide biosecurity, post mortem (PM) examinations, zoonoses and close contact, see the relevant appendices.

It is envisaged that in combination these protocols this document will cover all necessary criteria for the approval of South Lakes Safari Zoo (SLSZ) under Article 13 of the Council Directive 92/65/EEC (balai). As well as covering all species applicable to balai, it accounts for other vertebrate and invertebrate groups, and as such should form a comprehensive preventive medicine programme for all animals in the collection at SLSZ.

VERSION

This version, 2.1, replaces the previous versions of the South Lakes Safari Zoo Veterinary Protocol and Biosecurity documentation, the most current version being Veterinary Protocol 090516 (Version 1.8) which has evolved from Version 1.1 (Veterinary Protocol 180913). The majority of the components of Version 1 of the Veterinary Protocols are reproduced here with best practice and current knowledge being included in this current version.

The SLSZ is an evolving document that takes into consideration best practice with regards to veterinary health care and will be updated based on best practice or changes in current knowledge.

SLSZ Preventative Health and Medicine Programme Version Control Table	
Version 2.1	Issued 09/10/16 (current version)
Version 1.9	Issued 09/05/16

INDEX

LEGISLATIVE REQUIREMENTS

The SLSZ Preventative Health and Medicine Programme is intended to outline best practice for Safari Zoo utilising current knowledge of veterinary health and preventative medicine and ensuring compliance with legislative requirements.

The specific nature of the preventative and curative health programme does not form a legal requirement of the zoo licensing act (ZLA 1981) nor the Secretary of State's Standards of Modern Zoo Practice (SSSMZP 2012), however guidance on possible content is described in the Standards. In addition other aspects of the veterinary operation and review are clearly defined, as outlined below.

The EU Directive 1999/22/EC, which underpins current UK zoo legislation, requires that member states take measures to ensure that zoos must:

> *"...(maintain) a high standard of animal husbandry with a developed programme of preventative and curative veterinary care and nutrition".*

The 2002 changes to the ZLA (1981), putting the EU Directive in to UK law, outlined the conservation measures a zoo must undertake, these included that zoos must:

> *"...(provide) a high standard of animal husbandry with a developed programme of preventative and curative veterinary care and nutrition".*

The current SSSMZP (2012) provides guidance on the expectation required of the veterinary team and what the responsibilities of the veterinarian should endeavour to deliver, these include:

> *"0.12. Disease:* ***curative and preventive veterinary medicine should be provided.*** *Every effort must be made to provide a correct diet and suitably hygienic environment from which pathogens are excluded or controlled.*
>
> *3.7 A* ***comprehensive programme of care must be established*** *and maintained under the supervision of a veterinary surgeon who is familiar with current practice in the care of zoo animals, particularly in the types maintained in the collection. He or she must make arrangements to meet the ethical responsibilities of veterinary cover, set out in the Guide to Professional Conduct of the Royal College of Veterinary Surgeons.* (Note: this is generally accepted as a written protocol or programme which this document delivers).
>
> *3.8 Where a zoo uses a local veterinary practice for basic cover, supported by a specialist (or a specialist supported by a local veterinary practice),* ***adequate advance arrangements must be made to allow early contact and discussion between all parties whenever necessary, and particularly for emergency cases.***
>
> *3.9* ***The veterinary surgeon should be responsible for, or actively involved in, the following:***
>
> *a) routine inspections of the collection;*
> *b) directing or carrying out treatment of all sick animals;*

c) *administration of vaccines, worming and other aspects of preventive medicine;*
d) *health monitoring of animals including submission of blood and other samples for laboratory examination;*
e) *safe and proper collection, preparation and dispatch of diagnostic and other samples. (Where these tasks are to be carried out by someone other than the veterinary surgeon, a suitably qualified or appropriately trained member of zoo staff should be nominated to carry out the task e.g. a laboratory technician or veterinary nurse);*
f) *training of zoo personnel in health and hygiene;*
g) *ensuring that post-mortem examinations of animals are carried out where necessary;*
h) *supervision of quarantine premises and other such tasks required by law or as part of good zoo veterinary practice;*
i) *the nutrition and the design of diets;*
j) *planning and exhibit design;*
k) *the establishment of written procedures to be followed in the event of the accidental use of dangerous drugs.*

3.10 The ***level of veterinary facilities must be consistent with the welfare needs of the animals.***

3.11 ***Comprehensive records must be kept*** *– where possible on computer – and be made available to inspectors covering the following:*
a) *preventive medicine;*
b) *clinical medicine and surgery;*
c) *pathological findings from ante-mortem testing; and*
d) *results of post-mortem examination and testing.*

3.12 ***There must be systems for regular review, by the relevant veterinary and curatorial staff, of clinical, behavioural and pathological records and mortality. Husbandry and preventive medical practices must be reviewed where problems become apparent.***

3.13 Zoo management must ensure that the zoo, or a local hospital, or their veterinarian has ***readily available antidotes to potentially toxic veterinary products*** *used at the zoo.*

3.14 A member of staff must be readily available at all times to take decisions regarding the euthanasia of sick animals on veterinary advice. There must be provision of an effective humane method of euthanasia and standard written protocols should be set down.

3.15 ***Adequate facilities must be available either at the zoo or within a reasonable distance for the post-mortem examination*** *of all species held at the zoo.*

3.16 ***Dead animals must be handled in a way which minimises the risk of transmission of infection.***

3.17 ***Animals that die at the zoo should be examined post-****mortem in accordance*

with veterinary advice. Where appropriate, samples for diagnosis or health monitoring should be taken for laboratory examination.

3.18 ***Retained samples must be stored in conditions advised by the veterinary surgeon*** *and away from animal feeding substances. The establishment of a reference collection should be encouraged".*

Here at Safari Zoo the SLSZ Preventative Health and Medicine Programme aims to meet these recommendations and legislative enforceable elements of the veterinary programme, considering them to be a basic foundation of the veterinary care at our zoo. Where practicable the veterinary care programme aims to build on these foundations to ensure we provide best practice in animal care and health.

In addition there are many other legislative requirements that the health care programme must meet and the most relevant animal health legislation are outlined in Appendix 01.

VETERINARY TEAM STRUCTURE

Animal health care strategies are exactly that: a strategic approach to ensure and maintain the health of the animals in our care. There are multiple components of a comprehensive health care programme involving multiple stakeholders. These include keepers, the veterinary team, nutritionists, the maintenance department, plants team, curatorial staff, in fact everyone can be considered to have input one way or another in contributing to the health management of a collection's animals.

Programmes are principally designed to prevent disease from entering a collection, termed **preventative medicine**, but the system needs to be adaptable and able to manage disease outbreaks or individual medical cases, which is termed **reactive or curative medicine**. In the case of a death, either naturally or by euthanasia, then the health care strategy must incorporate **post mortem investigations** and identify the cause of death and potential risk to other animals in the collection. In reality the process is a smooth, linear programme that consists of multiple other components as outlined in this document.

The core providers of animal health care is the veterinary team. They direct the treatment, ensure disease is managed or mitigated and that the health care provision provides for one aspect of the animal's welfare. The veterinary team at Safari Zoo consists of the following:

Title	Currently held by	Role
Veterinary Coordinator	Teresa Cullen VN	Coordinates vet programme and surveillance testing, on site daily.
Approved Veterinarian	Rick Browne MRCVS	Approved Veterinarian providing day-to-day support for the collection, minimum of weekly visit.
Specialist support veterinarian	Andrew Greenwood FRCVS	Specialist support to oversee the health care programmes, minimum of monthly visit
Additional consultants	As required	Specialist, targeted support as needed

VETERINARY VISIT OVERVIEW

The veterinary programme has a structured programme of **weekly visits by the Approved Veterinarian**, supported by **monthly visits by the Specialist Zoo and wildlife medicine veterinarian** in a similar structure to that as outlined in the SSSMZP (2012) section 3.8 and frequency as suggested in Appendix 5.5. For the purposes of benchmarking **SLSZ is classed as a medium zoo**, as defined by the Zoo Experts Committee Handbook, with numbers >200,000 but under 400,000 visitors per year. The recommended frequency of visits, as outlined in the SSSMZP (2012) is:

- Medium sized zoo – vet visit every other week

We have a local veterinary practice that is available for day-to-day veterinary services and health care monitoring for the collection:

Browne & McKinney Veterinary Surgeons
East View, Church Street, Broughton in Furness, Cumbria LA20 6HJ
Tel: 01229 716230

The primary veterinarian being Mr Rick Browne MRCVS who is the Approved Veterinarian for Safari Zoo. Mr Browne oversees the general management of both the curative and preventative health care of the collection.

In addition to this, due to the specialist nature of the collection, Safari Zoo has a monthly visit from a recognised specialist in zoo and wildlife medicine:

International Zoo Veterinary Group,
Station House. Parkwood Street, Keighley, BD21 4NQ
Tel: 01535 692000

The primary clinician from this support group of specialists being Mr Andrew Greenwood DipECZM FRCVS. IZVG providing specialist support where needed both in development of the health care programmes and husbandry systems but also with regards to specific case management that require specialist input.

Overseeing this and ensuring consistency in the delivery of the health care programme is the Veterinary Coordinator. The Veterinary Coordinator is a permanent position at Safari Zoo allowing fast access to a qualified veterinary nurse who can triage patients' needs, administer first aid and liaise with the vets directly to ensure appropriate health care provision is delivered. In addition, the Veterinary Coordinator ensures that the preventative medicine programmes are adhered to, the records maintained, and that the staff have access to on hand welfare knowledge and support. The current Veterinary Coordinator is Ms Teresa Cullen RVN.

VETERINARY COVER AND SPECIALIST SUPPORT WHEN THE PRINCIPLE VET IS UNAVAILABLE

In the cases of emergency, or when the core veterinarians are on holiday or sick, Safari Zoo has access to cover provided by the other veterinarians at Browne & McKinney Veterinary Surgeons.

Mr Browne's named deputy for the purposes of balai is Ms Emma Sunderland MRCVS with additional support available from the other two assistant veterinarians found at the practice, currently Mr Andrew Doull MRCVS and Mr Chris Smith MRCVS. Support is available 24 hours a day through Mr Browne, even when on holiday, and through the IZVG group to ensure continual health care support is available to the collection.

Additional veterinarians maybe called upon in the case of specialist care or long term locum cover if needed. Consultants in specialist disciplines are often referred cases, for instance ophthalmologists, anaesthetists or other specialist zoo and wildlife veterinarians and veterinary pathologists. Consultants are made available to ensure Safari Zoo has access to the best health care providers in the country whenever it is needed in addition to the professional health care team already in place.

THE ROLE OF THE VETERINARIAN IN ANIMAL HEALTH CARE STRATEGIES

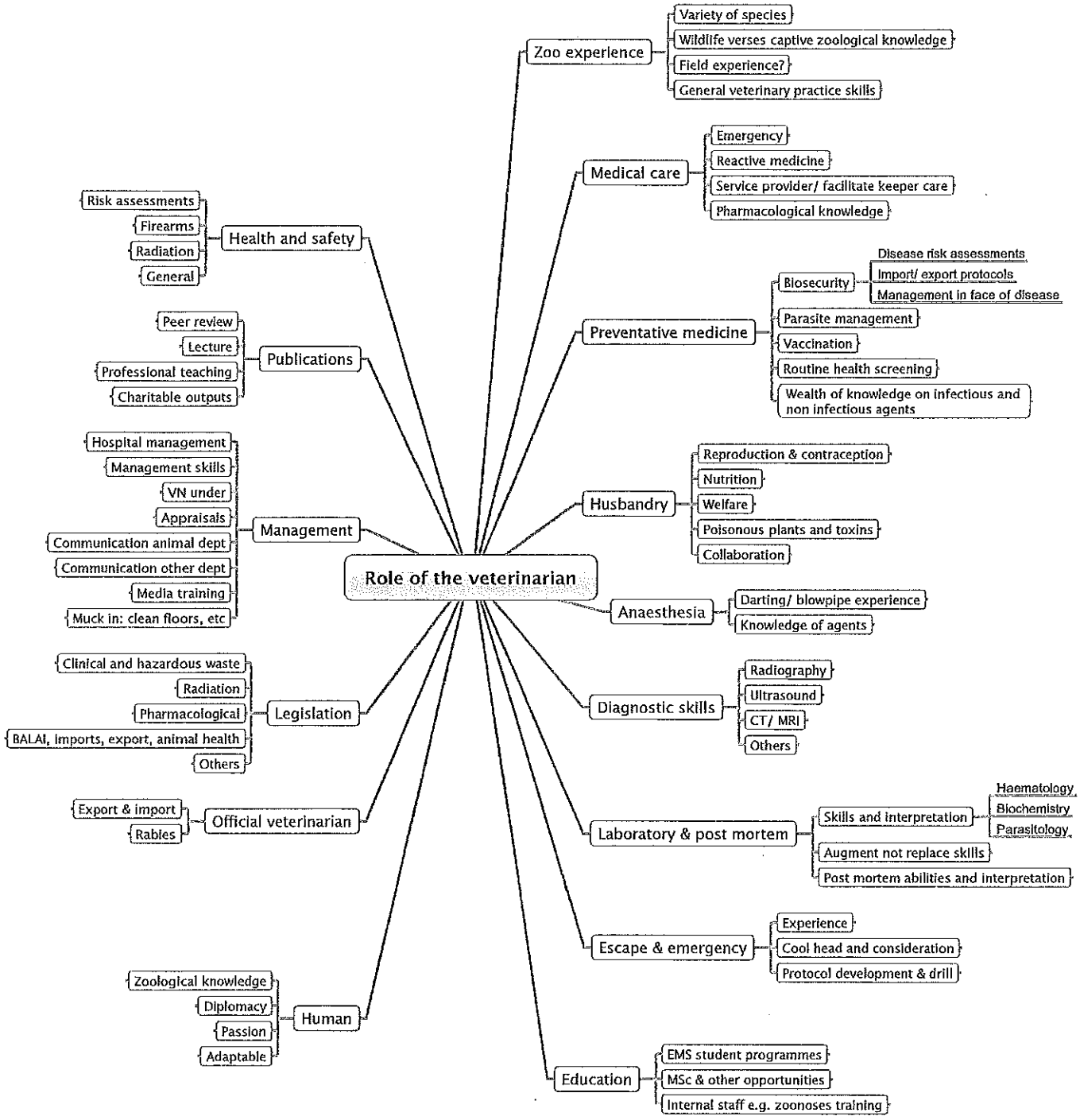
The veterinarian is often considered to only manage and prevent disease. But veterinarians have a wealth of skills that can be drawn on to facilitate the care of the animals within a collection. Despite the varied skills available to the veterinarian the main component of the vet's role can be broken down into three broad categories;

1. **Reactive medicine:** reactive medicine is also known as curative medicine, which can be an inaccurate term. This type of medicine consists of reacting to clinical signs and managing a case to minimise the impact to an animal's welfare. Curative implies that the animal has been cured, in some cases this is not true and a pathological process is simply managed e.g. renal (kidney) failure in an aged felid. Quality of life verses cure is the careful balance that is strived for here. This includes infections, disease outbreaks, fractured limbs, injuries and other sporadic cases or incidents.

2. **Preventative medicine:** aims to ensure that the risk of disease occurring is minimised or managed before disease occurs or whilst it is at a sub-clinical (i.e. no clinical signs yet apparent) level. The core constituents of the biosecurity programme form part of the preventative medicine programme and includes vaccination, parasite monitoring and worming, health screening and import controls.

3. **Husbandry support:** this includes advice on enclosure design, nutrition, reproductive support or assessment, contraception, animal moves, legislative requirements, welfare and ethical programmes, research and many other aspects of a modern zoological collection.

The various responsibilities and skills of a zoological veterinarian are outlined in the following figure:


Role of the veterinarian
Zoo experience
Variety of species
Wildlife verses captive zoological knowledge
Field experience?
General veterinary practice skills
Medical care
Emergency
Reactive medicine
Service provider/ facilitate keeper care
Pharmacological knowledge
Preventative medicine
Biosecurity
Disease risk assessments
Import/ export protocols
Management in face of disease
Parasite management
Vaccination
Routine health screening
Wealth of knowledge on infectious and non infectious agents
Husbandry
Reproduction & contraception
Nutrition
Welfare
Poisonous plants and toxins
Collaboration
Anaesthesia
Darting/ blowpipe experience
Knowledge of agents
Diagnostic skills
Radiography
Ultrasound
CT/ MRI
Others
Laboratory & post mortem
Skills and interpretation
Haematology
Biochemistry
Parasitology
Augment not replace skills
Post mortem abilities and interpretation
Escape & emergency
Experience
Cool head and consideration
Protocol development & drill
Education
EMS student programmes
MSc & other opportunities
Internal staff e.g. zoonoses training
Health and safety
Risk assessments
Firearms
Radiation
General
Publications
Peer review
Lecture
Professional teaching
Charitable outputs
Management
Hospital management
Management skills
VN under
Appraisals
Communication animal dept
Communication other dept
Media training
Muck in: clean floors, etc
Legislation
Clinical and hazardous waste
Radiation
Pharmacological
BALAI, imports, export, animal health
Others
Official veterinarian
Export & import
Rabies
Human
Zoological knowledge
Diplomacy
Passion
Adaptable

CURATIVE HEALTH CARE PROGRAMME

When a veterinarian approaches a clinical case or any problem that will benefit from veterinarian intervention they will usually follow a sequence of events that will ultimately lead to the presentation of a treatment or solution. These events can be considered as;

- **History:** this is an evaluation of the animal health or husbandry records and forms a considerable part of the clinical evaluation. Have there been problems of a similar sort in this animal or the group? Have there been any subtle signs consistent with the current problem faced? What previous treatment regimens have been used? Many questions can be answered from review of well-documented animal records and this is one reason why good animal record keeping is essential. A history not only relies on the animal records but also utilises the knowledge the keeper has of the species and the individual in their care. A veterinarian's diagnosis is partly down to their knowledge of the various diseases in exotic species but also requires the correct information to be given. The veterinarian's skill is to identify these pieces of information but also to be able to communicate and tease this information out of the keeper. The keeper's role in this important part of clinical evaluation should not be overlooked. A comment used in research is very fitting here: bad data in, means bad data out.
- **Clinical evaluation:** the veterinarian is likely to assess the animal in different ways. The first is visual assessment. The veterinarian, in conjunction with a keeper, will assess behaviour, gait, ability or interest to eat, any abnormal signs, or any other clues that will assist in a diagnosis. This often occurs at the same time that a veterinarian is taking a history. It maybe that a diagnosis can be made at this point: this is a presumptive diagnosis and is made based on the likelihood of the evidence presented. This type of diagnosis is weighed up against a definitive diagnosis, which requires the need for further work up, often using anaesthesia. With a presumptive diagnosis a balanced therapeutic plan will be started and the patient monitored, if it responds well then it is likely that the presumptive diagnosis was correct, OR the treatment regime instigated works as well for the actual cause of the malaise. If the veterinarian does not feel that he/she can make a presumptive diagnosis or that in the best interest of the animal that further information is needed then the next step of clinical evaluation is the clinical examination. Triage is a form of clinical evaluation where the basic data is collected and priorities are made on the most serious and needy cases.
- **Clinical examination:** in most cases this requires the need for restraint, be it chemical (anaesthesia or sedation) or physical. Often anaesthesia is preferred as ultimately it reduces the stress on the patient and allows a comprehensive clinical examination. Different vets have different techniques on how to undertake an examination; one is to examine each body system, the other common method is to examine from nose to tail. Essentially in both the whole animal will be checked for any signs of illness or other unapparent lesions. An example would be an aged field that has broken its hind limb: this is an obvious lesion but the vet during his/her examination also finds mammary cancer and, on radiograph, lesions in the lungs. Normally a broken leg is manageable however in this case combined with the age of the animal and the metastatic cancer the animal was euthanased. The point of the clinical exam is, in combination with the history and the clinical evaluation, to consider a complete and all-encompassing picture of the animal and provide the most suitable treatment for that individual or group.

- **Further diagnostic modalities:** A modality is a term used to indicate a method or procedure. In the case of the clinical work up additional modalities include the array of lab test and diagnostic imaging available to the clinician. These include, but are not limited to; radiography, ultrasound, biochemistry, haematology, serology, parasitology, bacteriology, biopsy, CT, MRI, blood pressure monitoring and blood gas analysis. There are many others, each being considered on its validity to support the diagnosis being contemplated as well as budgetary considerations.
- **Therapeutic plan:** once the veterinarian has all of the information at hand the data is assimilated and a tentative diagnosis is made. Sometimes this is wrong due to similar clinical signs of different pathologies, changes in the pathogens causing the disease (e.g. bacterial resistance to antibiotics), or in some cases, as vets are only human, mistakes in the work up and the actual aetiology being missed. However, assuming that the diagnosis is correct, a therapeutic plan will be started. This will often be pharmaceutical therapy but can also consist of various surgical, management or nutritional support programmes. Treatment may extend from the one sick individual to others in a group; this is a form of preventative medicine. It is essential that the therapeutic plan is adhered to and that if an animal does not take its medication then this is reported immediately to the veterinary coordinator or veterinarian so changes in the plan can be made. The therapeutic plan is not static and continually evolves in response to clinical signs, the tractability of the animal, and the efficacy of the treatment programme itself. If in doubt always ask the veterinarian or question the programme if you feel it won't work (e.g. a certain form of medication will not be suitable for a species), this will help all parties concerned from the onset.

It should be noted that in some cases new pathogens, diseases, or animals that are presented too late cannot always be treated adequately. This is the nature of zoo and wildlife medicine; which is limited in many ways, mainly due to the diversity of the species, their needs, the pathogens they are exposed to and the fact that they are all wild animals. Veterinarians do not know have all the information available to them for all the species, unlike they do for companion animal medicine, but they do have a considerable knowledge, and have access through web forums and discussion, to a collective knowledge that can be best used to ensure the health of the collection here at Safari Zoo.

There are three ways that an animal can receive treatment:

1. The attending veterinarian may prescribe treatment for a sick or injured animal
2. An animals undergoing treatment for a previous condition / injury may have a course continued, some may even be for the remainder of an animal's life
3. Routine or elective procedure, which includes:

    a. Scheduled appointments for pre-export health screening as part of animal moves
    b. Health checks upon receiving animals into the collection from other zoos
    c. General health checks or specialist procedures as part of case work ups under anaesthesia

DISEASE: DEFINITIONS AND CONSIDERATIONS

To define disease would seem to be an easy task. After all disease is an often used, familiar word. Yet it can be used in many different ways, some of which are correct and others that are not. The long held definition is:

> *"...traditionally defined as a finite abnormality of structure or function with an identifiable pathological or clinicopathological basis, and with a recognisable syndrome of clinical signs. Its cause is more often than not unknown'.*
>
> Bailliere's Comprehensive Veterinary Dictionary, 5th Edition, 1995

This is not dissimilar to the original concepts of disease since medicine began. Basically, disease is a term that refers to an abnormality in structure or function that has an underlying cause that can be identified by the pathologist or clinician and results in a consistent syndrome of clinical signs. Interestingly in this definition it ends with the statement that more often than not we cannot identify the cause (also known as aetiology) of the disease in the first place: remember this when a vet cannot find or identify the factors that led to the disease in your collection.

This definition does not seem unreasonable does it? However, this definition focuses on the need for there to be clinical signs associated with a disease. This is not always the case and an animal may have a disease process that is either terminated before clinical signs are seen (remember wild animals often hide signs of illness until they are too sick to do so) or the pathogen is designed to infect an animal but not lead to sickness to ensure that it survives itself and can be transmitted to other animals. In both cases, or prior to clinical signs developing, these signs are called subclinical ("less than" clinical) i.e. they appear normal. This is an important part of the disease process to understand. In infectious diseases these subclinical animals are often a bigger problem than the sick animals, as they appear fine but are often capable of spreading the agent. In the case of non-infectious agents but other pathological processes these animals are the ones that look OK today but are sick tomorrow and they represent the varying levels and different timelines of a disease process as it passes through a collection. Another concept to consider here are carriers which are animals that appear clinically fine but shed virus, bacteria, parasites or other infectious agents that can infect and cause disease in other animals that are immunologically naïve (i.e. their immune system has never been exposed to the infectious agent before which results in the likelihood of disease or death occurring more likely).

Disease should also not be considered as a result of an infectious agent. There are plenty of examples of diseases where this is not the case. In fact, a large proportion of diseases in captive collections result from inadequacies in the husbandry systems that we employ and result from environmental, nutritional, congenital disease through inbreeding, and many others.

Wobeser (2006) expands the above definition of disease as:

> *"...any impairment that interferes with or modifies the performance of normal functions of the individual, including responses to environmental factors such as nutrition, toxicants, and climate; infectious agents; inherent or congenital defects; or combinations of these factors".*

This is a better definition as it incorporates subclinical disease and other factors that are not solely considered to be infectious agents. However recent work has shown that there are other considerations when discussing the impact a disease may have on an animal's physiology: here we need to expand the concept of disease to the population or a species as a whole. In the case of the bank vole (*Clethrionomys glareolus*) and the wood mouse (*Apodemus sylvaticus*) that is infected with cow pox, for which they are the wildlife host, the virus reduces the reproductive rate of these animals and in doing so the animals spend more time foraging and feeding and have improved life spans and health. For the individual vole cow pox infection is a benefit but for the species as a whole it is a disadvantage and numbers, over time, can decrease. This is an amazing adaptation to ensure the survival of the virus and moves the idea of disease in individuals to disease in populations and their effects over time, which can be substantial.

So in summary the basic definitions regarding disease include:

- **Disease:** defined as a finite abnormality of structure or function with an identifiable pathological or clinicopathological basis, and with a recognisable syndrome of clinical signs. Its cause is more often than not unknown. However this should be expanded to include any impairment that interferes with or modifies the performance of normal functions of the individual, including responses to environmental factors such as nutrition, toxicants, and climate; infectious agents; inherent or congenital defects; or combinations of these factors.
- **Clinical disease:** there are obvious signs of disease or abnormality associated with a disease process.
- **Subclinical disease:** a disease process is present yet the animal shows no signs of illness. It may develop into clinical disease or may not.
- **Carrier:** an animal that has long term, possibly even life long, infection but does not show clinical signs of disease or may have relapses throughout life, a human example would be cold sores and herpes virus.
- **Aetiology:** the causes of disease e.g. nutritional, environmental, infectious, others.
- **Immunity:** physiological defences of the body to infectious and some non-infectious agents.
- **Immunologically naive:** animals that have never been exposed to an infectious agent, or have immunity that has waned, with the result that exposure to a pathogen is likely to result in disease and possible death dependent on the pathogen when compared to an animal that has immunity to the agent through previous exposure or vaccination.

See Appendix 02 for a summary of the types of disease that maybe encountered, Appendix 03 for Notifiable Diseases in the UK and Appendix 04 for Annex A Diseases under balai.

VETERINARY HEALTH CARE RECORD KEEPING

Medical or clinical records are an essential part of the veterinary care of animals within any collection. The analysis of medical records, in combination with other recording systems, promises a wealth of information that can further inform our knowledge of species, their breeding, mortality, and health, and the impact of our housing and husbandry regimes.

The medical records should provide an accurate review of a condition, a record of procedures or examinations carried out, the use of therapeutic or anaesthetic agents, as well as directions

for the plan or strategy of management in specific cases. The success or failure of therapeutic regimes should be included. In addition, retrospective review of medical records for a species of medical or pathological condition is essential for the development of our knowledge of the animals in our care.

The keeping of comprehensive veterinary records is both a Directive requirement and part of normal good veterinary practice. Safari zoo needs to ensure that full and up-to-date records are kept on site, as they will be required to be seen by inspectors. They should also be available for access by any other vet who may be required from time to time to deal with an animal, and for despatch to another zoo, should an animal be moved. These records should be provided to any other vet who takes over a case, or indeed the care of the whole zoo, and so should be clearly regarded as the property of the zoo. If there is any doubt about this, it should probably be made part of the contractual arrangement that any copyright is assigned to the zoo, without which the transfer of records becomes impractical, Zoos Forum Handbook (DEFRA, October 2008).

Safari Zoo recognises the importance of maintaining quality animal record systems, including those of the medical records. Comprehensive records of each visit by the veterinary surgeon is recorded in compliance with the animal record keeping policy which includes a dedicated vet diary, procedural and treatment logs and typed records maintained on medical ZIMS. In addition to case records, records are maintained with regards to:

a) preventative medicine
b) clinical medicine and surgery
c) pathological findings from ante-mortem testing
d) results of post-mortem examination and testing.

Safari Zoo medical health records include details on:

a) the number and identity (age, sex, species and individual identification where practical) of the animals of each species present in the establishment;
b) the number and identity (age, sex, species and individual identification where practical) of animals arriving in the establishment or leaving it, together with information on their origin or destination, the transport from or to the establishment and the animals health status;
c) the results of blood tests or any other diagnostic procedures;
d) cases of disease and, where appropriate, the treatment administered;
e) the results of the post-mortem examinations on animals that have died in the establishment.
f) observations made during any isolation or quarantine period

Full details of record keeping management systems can be found in the Animal Record Keeping Policy (2016).

Similar to the codes used in the Animal Records a system of codes should be used in the hand written notes to ensure that there is consistency in data submission to the registrar and onto ZIMS / ZIMS Medical. These codes are as follows:

ID	The species and ARKS number must be present on any written notes, keepers must supply this information.

Wgt	Weight of the animal – where possible animals should be weighed, especially when anaesthetised, to allow accurate drug dosing.
GA	General (or other) anaesthesia – details of the anaesthetic agents used, including the pharmacological agent in full, the total dose in milligrammes (mg) or grammes (g) as appropriate, the concentration of the pharmaceutical agent, and the volume given if felt pertinent. The route (location if needed) and method given should also be recorded e.g. ketamine (100mg/ml) 660mg, IM, left hind, blow dart. The use of antagonists and any complications during anaesthesia or in recovery should be recorded here. Other useful information includes position. monitoring equipment, etc, should also be considered.
Hx	History – the pertinent clinical history and reason for the assessment of the animal.
Ex	The findings of any clinical examination should be recorded here, this includes physical examination, surgery, the use of diagnostic modalities and the results, and the taking of blood including the site, the preservatives used and whether smears were made. This should be full and detailed in discussion e.g. for foot trim specific feet should be mentioned with the work performed if there is variation between the individual feet and whether photographs or measurements were taken.
Enq	If an enquiry, but not a physical examination of an animal is undertaken then it should be noted under enquiry. This includes follow ups, or just monitoring of the progression of a case, phone conversations and updates, and the recommendations made.
Tx	When any specific therapeutic agents are given as injections or prescribed then the details should be provided here. The details should include pharmaceutical agent, brand if felt pertinent, dose rate if felt pertinent, total dose in milligrammes or grammes, as well as total volume if injectable or liquid. The route and location of injection should be recorded in case of later problems. If prescribing a course of therapy the frequency and duration should also be recorded here. When prescribing a course of treatment the veterinarian must fill out an animal treatment sheet. If over the phone prescriptions are made then the veterinarian is responsible for ensuring the details are correct on that day's vet treatment record which is sent out via email and if any concerns arise then it is the responsibility of the vet to ensure these details are checked and confirmed to be in accordance with the initial phone prescription. It is the veterinarian's responsibility to ensure the details here are correct and not to rely on the lay staff of Safari Zoo to correctly fill in prescriptions or dispensary forms.
Lab	Results of laboratory or diagnostic testing should be interpreted for the medical records. This can be through email that is copied and pasted into the veterinary treatment record by lay staff at Safari Zoo and these details should be checked remotely on the sheet, with any changes or errors corrected by the veterinarian. A summary of the results should be provided in this section e.g. hypochromic anaemia with a leucopaenia. The registrar should not rely on the comments, if present, on the returned diagnostic testing form, as these can sometimes be inaccurate.
PM	When a post mortem is undertaken or an external laboratory undertakes a post mortem then the gross findings, tissues taken for histology and other tests, such as swabs, should be recorded here. When histology is returned this should be entered here. Reference can be made to supplementary post mortem forms if they have been produced.

Plan	A management plan should be summarised at the end of the case notes section to allow other veterinarians or Safari Zoo staff to know the plan of action and recommendations made when managing a case. This allows subsequent veterinarians to ensure continuity with the therapeutic programme.

The veterinarian or attending member of staff should initial every case note. If under the direction of a veterinarian, then this must be recorded as the vet making the recommendation and the member of staff carrying out the action.

ANIMAL TREATMENT SHEETS

All medication or ongoing animal treatments dispensed by the veterinarian must be accompanied by an Animal Treatment Sheet.

The Animal Treatment Sheet outlines the animal being treated, the reason for the treatment and the drugs being dispensed for treatment. Each drug clearly noted as to concentration of the drug, amount to be given and the times as to when to give it.

Keepers must tick the boxes when giving drugs to the animals to ensure compliance with the treatment regime, for those agents given twice daily they can be ticked then crossed for the morning and evening treatments respectively and for those agents requiring more frequent dosing intervals each box can be subdivided into the relevant number of treatment times.

The treatment sheet is in addition to the treatment log held in the veterinary room which is considered to be the main log of drugs used, the Animal Treatment Sheet being a tool for the keepers to ensure drug regimens are followed and complied with.

An example of the Animal Treatment Sheet can be found in the Appendix 05. See the separate 'Animal Record Keeping Policy' for further details.

POLICY ON THE USE OF POM MEDICATIONS

A "veterinary medicine product" (VMP) means any substance or combination of substance presented for treating or preventing disease in animals – that is, all animals other than man and including birds, reptiles, fish, molluscs, crustaceans and bees ("medicinal by presentation"); or which may be used in or be administered to animals with a view to making a medical diagnosis or to restoring, correcting or modifying physiological functions in animals by exerting a pharmacological, immunological or metabolic action ("medicinal by effect").

In the UK, authorised VMPs are legally classified into;

Classification	Description – dispensing authority
AVM-GSL	Authorised Veterinary Medicine – General Sales List
	There are no restrictions on the supply of these medicines. A veterinarian can sell these to anyone, whether a client or not.
NFA-VPS	Non-Food Animal-Veterinarian, Pharmacist, Suitably Qualified Person
	These medicines may be supplied without prescription but only by a Registered Qualified Person (RQP)
POM-VPS	Prescription-Only Medicine- Veterinarian, Pharmacist, Suitably Qualified Person

	These medicines can be prescribed by a veterinarian, pharmacist or an SQP in accordance with a prescription from one of those persons, which may be written or oral.
POM-V	Prescription-Only Medicine – Veterinarian
	These medicines may be prescribed by a veterinarian after carrying out a clinical assessment of the animal under his/her care. Pharmacists can supply the medication but only with a veterinarian's written prescription.

The legislation implementing the law relating to the administration, supply, and management of medicines in veterinary practice is extensive. The main Acts and Regulations include:

- Animal Welfare Act 2006
- Animals and Animal Products (Examination for Residues and Maximum Residue Limits) Regulations 1997 (and amendments)
- Animals (Scientific Procedures) Act 1986
- Control of Substances Hazardous to Health Regulations 1999 (COSHH)
- The Controlled Waste Regulations 1992
- Environmental Protection Act 1990
- Firearms (amendment) Act 1997
- Groundwater Regulations 1998
- The Hazardous Waste (England and Wales) Regulations 2005 (and others)
- Health and Safety at Work etc Act 1974
- Health and Safety (First Aid) Regulations 1981
- The Horse Passports (England) Regulations 2004 (and others)
- The Medicines Labelling Regulations 1976 (and amendments)
- The Misuse of Drugs Regulations 2001
- The Misuse of Drugs (Safe Custody) Regulations 1973 (and amendments)
- Offices, Shops and Railway Premises Act 1963 (OSPRA)
- Poisons Act 1972
- The Reporting of Injuries, Diseases and Dangerous Occurences Regulations 1995 (RIDDOR)
- The Supply of Relevant Veterinary Medicinal Products Order 2005 (2205 No. 2751)
- Veterinary Medicines Regulations (re-enacted annually)
- Water Environment (Controlled Activities) (Scotland) Regulations ("CAR") 2005 (and others)

It is currently a legal offence to prescribe and treat an animal with POM-VPS and POM-V medications unless under the direction of a veterinary surgeon. As such it is considered gross misconduct for staff to prescribe any veterinary medicine classified as a POM-VPS or POM-V to an animal at Safari Zoo.

Here at Safari Zoo the following policy must be adhered to with regard to the use of POM medicines:

- Animal is noted to be in need of veterinary attention
- Vet is contacted and information is provided, either verbally or electronically
- Vet then decides whether;
    - visit necessary
    - animal should be brought to surgery if applicable

    - medication can be dispensed through verbal advice: animal treatment form to be filled in and animal to be checked at next vet visit or at the earliest opportunity as dictated by the veterinarian
    - euthanasia indicated if decision not already made by member of the senior animal team
- If medication dispensed then:
    - animal treatment form filled in with details of prescribed medicine given by veterinarian
    - if available in the veterinary room then can it be dispensed by the Veterinary Coordinator and the pharmacy dispensary book filled in (vet must sign either at time of dispensing or when next in) OR drugs to be picked up from Browne & McKinney Veterinary Surgeons
    - medication dispensed with animal treatment sheet to the relevant section
- Animal Treatment sheet to be adhered to and any changes to be under veterinary guidance only
- Drugs, animal and treatment information to be filled in in the drug dispensing record book and on the individual animal records (including daily diary), including batch numbers and expiry dates at the beginning of a course of medication
- Animal treatment sheet returned at end of treatment to Veterinary Coordinator

Here at Safari Zoo we endeavour to provide optimal health care programmes, using effective pharmacological agents dispensed under the Cascade (see Appendix 06: Notes on the use of the Cascade). As part of our responsible drug usage and administration it is imperative that drugs are purchased, transported, stored, used and disposed of as per the legal and manufacturer's recommendations:

- Pharmacological agents must be stored at correct temperatures as dictated by the individual agents. These must be monitored with appropriate methods.
- POM and other restricted use pharmaceutical agents must be stored in locked receptacles, with access limited to senior staff.
- Pharmacological agents must be dispensed at the correct dose for the species and the condition for which it is being dispensed for, utilising similar taxonomic groups where a dose is not available for the specific species.
- Pharmacological agents must be disposed of once they reach the individual agent's expiry date or their broach date (the latter being the time that any bottle or medication is allowed to be used for once it has been opened or a needle inserted into the bottle – this information is found on the agent's label). The pharmaceutical agent must then be placed in the DOOP bin or given to the vet for appropriate disposal.
- Pharmacovigilance must be observed and any adverse reactions noted and reported to the relevant authorities.

See Appendix 07: Routes of drug administration for details of methods of therapeutic agent delivery.

THE USE OF POTENTIALLY TOXIC VETERINARY PRODUCTS

All veterinary therapeutic and pharmacological agents maybe potentially toxic in certain situations but most are safe if handled appropriately. The veterinary surgeon will inform you of any specific risks and the precautions needed, such as appropriate PPE, required in the

handling of certain agents. These can include, but are not limited to, certain antibiotics, hormonal contraceptives, vaccines and anaesthetic agents.

Where required the veterinary surgeon will have readily available antidotes to commonly used potentially toxic veterinary products.

The most important of these that is commonly utilised at Safari Zoo is the use of Etorphine, a potent opioid anaesthetic which is known as Immobilon or M99. However other anaesthetic agents can also be potentially dangerous if accidently injected, particularly at the larger doses used in the induction of anaesthesia of some of our larger species.

Care should always be taken when handling any pharmacological agent, particularly when utilised in a remote delivery system such as a blow pipe or dart rifle. Please see relevant risk assessments and safety data sheets. If you are unsure about an agent contact the veterinarian for further information.

See Appendix 08: Etorphine Use and Emergency Procedures, Appendix 08b Etorphine Exposure chart.

PREVENTATIVE HEALTH CARE PROGRAMME

INTRODUCTION

Preventative Health Care Programme here at Safari Zoo aims to ensure that the risk of disease occurring is minimised, managed before disease spreads in a collection, or whilst it is at a sub-clinical (i.e. no clinical signs yet apparent) level. The ultimate goal of a preventative medicine programme is prevention and early detection of disease. A sound program is one that involves a written plan, education and training of all parties expected to carry it out, continued monitoring, and persistence in the practice of the plan. An optimum preventative medicine programme is reviewed and upgraded annually to reflect collection and species-specific-health concerns and consists of the elements listed below. The core constituents of the biosecurity programme form part of the preventative medicine programme and includes vaccination, parasite monitoring and worming, health screening and import controls.

Preventative Health is a system of health monitoring designed to ensure that the animals do not suffer from disease or when they do, ensure that the disease is addressed and the risk of spread to other animals, staff or guests is minimised. This concept of preventative health is one part of the welfare strategy here at Safari Zoo, working alongside best practice in animal care and husbandry. Preventative health is the responsibility of both the animal keeping staff and the veterinary team, both working in conjunction with the same goal – optimal animal welfare through best practice health care and disease mitigation.

The Preventative Health Care Programme can be considered to consist of the following:

- Surveillance / Disease Screening on Importation (import controls)
- Surveillance / Disease Screening during Isolation / Quarantine
- Surveillance / Disease Screening of the current collection
    - Parasite Surveillance – dedicated programme
    - Bacterial pathogen Surveillance – dedicated programme
    - Other pathogens Surveillance

    - Zoonoses Surveillance
- Post mortem disease surveillance
- Preventative Medicine
    - Vaccination
    - Contraception
    - Nutritional reviews
    - Exhibit design and husbandry techniques
    - Periodic reviews of vermin control
    - Periodic reviews of mortality and morbidity

SURVEILLANCE / DISEASE SCREENING

Adequately comprehensive veterinary records of all animals are kept (and retained for at least 5 years) in such a format that they can be easily reviewed at Safari Zoo at any time, and inform future veterinary care.

EAZA and BIAZA recommend minimum tests to be performed when transporting animals between zoos in the EU (see species specific EAZA recommended codes of practice and the Transmissible Disease Handbook) and the BIAZA Guidance on Disease Risk protocols for New Stock (BIAZA, 2012 and 2014). These are considered as a foundation when importing animals to Safari Zoo, with testing based on individual disease risk assessments by the Appointed and Specialist Consultant Veterinarians or as may be required if animals are imported from outside the EU, from an unknown source, or from a country where a disease outbreak has occurred. Furthermore, rabies regulations may be applied above and beyond the protocols found in this document. Full guidelines for disease importation considerations can be found in Appendix 09.

DISEASE SURVEILLANCE IMPORTATION: MINIMUM REQUIREMENTS

Screening requirements and apportioning of costs must be decided between sending and receiving collections prior to any import. Each and every case needs to be discussed with the Approved Veterinarian (AV) since they are always unique.

- At least one month prior to acquisition, a full clinical history (including diet sheet, parasite control and vaccination regimes, temperament and any disease diagnosed in the last 5 years) should be made available to the AV for Safari Zoo.
- Ideally all animals should be physically examined at the sending collection within the last week pre-export, and visually within the last 24 hours pre-export.
- Faecal parasitology and bacteriology are nearly always appropriate.
- Test availability and impact on the animal to be transported must also be considered; a good health history, including details of any new imports to the group and results of post-mortem examinations over a period of years, may prove adequate.

Full details of testing considerations for each taxa can be found in Appendix 10 – disease risk assessments must be undertaken by the veterinary team at Safari Zoo and appropriate pre-import testing undertaken. Such tests are then recorded in the animal's records and decisions made on the suitability to import the animal or not.

DISEASE SURVEILLANCE: QUARANTINE / ISOLATION

Requirements under the rabies legislation take precedence over any requirements of balai. Rabies quarantine areas for relevant species are approved and regularly reviewed by DEFRA under The Rabies (Importation of Dogs, Cats and Other Mammals) Order 1974 (as amended), and will not be covered further here.

The required isolation of animals added to the collection under balai may be less stringent but must be adhered to. Isolation for all species must last for at least 30 days. The requirements listed in Appendix 10 are for added animals, i.e. from a non-balai approved source in the EU.

Animals imported from a Third Country (although an unlikely event) will need to meet additional quarantine requirements, whilst those coming from balai-approved collections may have no legal requirement for isolation, although this will be undertaken as a matter of good practice.

Under balai the relevant forms of transmission of pathogenic organisms are deemed to be direct contact or contact with secretions and excretions (urine, saliva, respiratory droplets). As a result, the general conditions of balai require isolation quarters to:

1. Be located a reasonable distance from other animal enclosures (to reduce the likelihood of airborne viral transmission).
2. Be clearly demarcated by physical means.
3. Use a double door system for all access (with signs up displaying: QUARANTINE – No Admission to Unauthorised Persons).
4. Have the facility to allow staff to change personal protective equipment (PPE) (usually overalls and footwear) and to wash hands at the access point.
5. Have sufficient dedicated equipment that none of it leaves the isolation facility for the duration of the isolation period.
6. Allow loading/unloading and restraint of animals without escape risk. Any transport crates used must allow proper cleaning and disinfection within the isolation unit.
7. Allow proper cleaning and disinfection of the structure. There must be a written programme for the cleaning and disinfection before and after each isolation period, and the use of DEFRA-approved disinfectants and an appropriate rest period.
8. Minimise access by vermin (rodents, birds and insects).
9. Have suitable waste disposal methods and storage to ensure no risk of disease transmission.
10. Have facility to perform PM examination of isolated animals without risking disease transmission to resident animals.
11. Have sufficient staff to assess the animals at least once a day and to ensure there is no risk of transfer of infection to resident animals.
12. Operate an 'ALL-IN, ALL-OUT' system with late additions requiring the extension of the isolation period.
13. Allow the movement and treatment of any ill animals under the direct supervision of the AV throughout, without risking disease transmission. Diseased and dead animals in isolation must be reported and dealt with as for resident animals at SLSZ (see surveillance/disease screening).
14. Essential visitors (non dedicated animal keeping staff) (e.g. for maintenance) must comply with the same hygiene rules and record their details (date, name, address) in a visitor record book.

15. Have specific records kept, namely:

    a. Date, number and ID of animals entering and leaving the isolation unit.
    b. Copies of export health certificates and border crossing certificates.
    c. Daily health records, including any morbidity and mortality.
    d. Dates and results of any diagnostic tests.
    e. Dates and types of any treatments.
    f. Dates and names and addresses of persons entering the isolation unit (see record book above).

See Appendix 10 for taxon-specific additional requirements/details.

Co-terminus quarantine is allowed under the discretion of the AV for welfare reasons in social species, but the whole group must then meet the above isolation requirements from the time of the last addition to the group.

Pre-export screening does not replace the need for post-import quarantine. As a rule of thumb mammals, birds and fish should be isolated from the rest of the collection (or in co-terminus with other con-specifics for social taxa) for a minimum of 30 days, whilst 90 days is recommended for reptiles and amphibians. Standard quarantine durations are listed in Appendix 10 by taxon.

Some screening not conducted prior to acquisition may be undertaken during quarantine, at which stage all animals must be given at least a visual examination. A full clinical examination may be conducted where appropriate, including checking unique identification, weight, body condition and teeth.

All quarantine and isolation procedures must be complaint with the appropriate legislative requirements which will be highlighted by the veterinary team. Failure to comply with the quarantine and isolation procedures will put not only your own health at risk but that of the rest of the team, guests and other animals and is considered gross misconduct.

SURVEILLANCE / DISEASE SCREENING OF THE LIVING COLLECTION

All animals in the collection (including in quarantine/isolation) are observed daily by keeping staff. Any abnormal symptoms or behaviour must be noted and reported to the Veterinary Coordinator who is the direct link between keeping staff and the vets. The AV will be notified immediately if there is any suspicion of a disease notifiable under GB national legislation or Annex A of the Balai Directive (Appendices 03 and 04 respectively).

Laboratory diagnostics will be used to establish presence of infectious disease agents in live and dead animals. Any cases of abortion in ungulates will be investigated for brucellosis. Any sudden deaths in ungulates will be checked for anthrax prior to post-mortem. All animals will be examined post-mortem unless there is a clear case not to, or if a representative sample will suffice.

Any cases suspicious for Annex A or B diseases will be further investigated and any positive results reported to the APHA. In the case of nonhuman primates, and according to the AV's assessment of the zoonotic risk, the post mortem examination may be devolved to a suitable external laboratory. Post-mortem records are kept and sufficiently detailed to allow meaningful

annual review. Any suspicion of notifiable disease (as listed in Appendices 03 and 04) will be reported immediately to the APHA.

PARASITE SURVEILLANCE

Parasites in a pure sense of the term is defined as a plant or animal that lives upon or within another living organism at whose expense it obtains some advantage. Some of the infectious agents already discussed can be classed as parasites. However, the term is used more generically to identify the multi-cellular organisms that can be infectious:

- **Ecto-parasites:** these are typically invertebrates that live on the external surface of the body, particularly the lice, mites, ticks, and other invertebrate parasites.
- **Endo-parasites:** these are parasites that live within an organism and typically include the nematodes (roundworms), trematodes (flukes), cestodes (tapeworms) and others.
- **Intra-cellular parasites:** are parasites that live within the host's cells, there are many examples of this in the other classes, an example is the obligate intracellular bacterium *Chlamydia psittaci (previously known as Chlamydophila psittaci)*, which causes psittacosis.

Parasite surveillance is a core component of the preventative health programme to ensure early detection of any parasites is guaranteed and mitigation steps including anthelmintic drug administration combined with appropriate management practices can be implemented. Parasite control is more complicated than the simple periodic administration of anthelmintic preparations. A regular schedule of faecal examinations is important to facilitate the detection and treatment of parasitic infections before clinical signs appear. Faecal examinations are also an important part of the quarantine procedure. External parasites, though more difficult to detect, should also be considered during surveillance procedures. Examination for external parasites should be part of a complete physical exam. The movement of animals or exhibit furniture from one exhibit to another needs to be carefully considered to prevent exposure to parasites that could cause a fatal infection.

Here at Safari Zoo we have implemented a structured protocol to ensure endoparasite surveillance testing is undertaken in a coherent fashion:

- Faecal screening of every species is undertaken in a continuous process and follows a structured programme specific to each taxonomic group, based on known or general parasite disease risk assessments.
- Faecal parasite screening will primarily focus on in-house concentration techniques combined with direct preparations where indicated, undertaken by the Veterinary Coordinator. This will be augmented with external laboratory assessments in the case of clinical disease, veterinary requests or as part of zoonosis surveillance for walk through enclosure species.
- Surveillance will allow rapid identification of the presence of parasitic infections and targeted, species-specific anthelmintic administration and assessment of husbandry changes as required to be implemented, for the individual or group as appropriate
- Any faecal testing found to be negative for parasites will be reviewed at a set period for the taxa.

- Any faecal testing found to be positive will be reassessed at 4 weeks post anthelmintic therapy and again at 8 weeks, if both negative then falls back into the usual regime. If repeat infection then anthelmintic policies will be reviewed for suitability and possible husbandry and environmental changes assessed as appropriate and practicable.
- The full screening protocol is a living document and will be updated and revised as necessary with the aim that groups and enclosures are sampled at least twice yearly.
- All results are recorded in the preventive health file and on medical ZIMS in the animal's record – with images for later validation and confirmation of species ID where possible.
- Faecal samples can be presented as either individual animals, pooled samples from a species housed together or pooled samples from a mixed species enclosure.
- Known recurrent problems, particularly with known environmental burdens, may have specific anthelmintic regimens implemented as needed e.g. large felid species are specifically treated for *Toxascaris leonina* which is a known specific problem at Safari Zoo.
- Continued parasite surveillance/ treatment is advised to be risk assessed again as animals are taken from winter housing on to spring/summer housing.
- In addition observation by keeping staff of weight loss, faeces inconsistencies or the presence of adult nematodes noted in the faeces will automatically trigger in-house faecal testing as required for each clinical case as part of the diagnostic work up.

Checking for the presence of internal and external parasites is a routine process with a written schedule of testing for each species needing testing. See for details:

Appendix 10: Importation testing considerations
Appendix 11: SLSZ Faecal parasitology and bacteriology surveillance schedule

BACTERIOLOGICAL SURVEILLANCE

Separate to pre-import faecal bacteriology Safari Zoo is committed to monitoring the animals in our care with respect to animal encounters with the public. Faecal bacteriology gives an indication of potential normal or abnormal gastrointestinal bacteria that could potential have zoonotic risk but also allows assessment of bacteria that may have been introduced to the animals in the collection from the public or other sources such as native wildlife. Pathogens can appear, often from unknown sources, despite the biosecurity and pre-import testing and it is essential that animals are assessed and mitigation strategies deployed appropriately.

Bacteriological surveillance can occur in a multitude of situations:

- As part of standard faecal surveillance protocols, especially walk through or animal encounter experiences (see Appendix 11 for schedule of testing) which are undertaken twice a year
- In response to specific clinical case assessments as part of the diagnostic process, this is not limited to faecal assessment but includes other opportunities where bacterial pathogens are suspected as aetiological factors e.g. abscesses, lump jaw, foot rot, etc

- As part of requested pre-export requests for other collections
- As part of disease surveillance in response to specific disease outbreaks

Bacteriological samples must be sent to dedicated laboratories for culture to be undertaken. Antibiotic sensitivities are utilised to ensure appropriate antibiotic usage and improved, targeted treatment of cases. See Appendix 06b for consideration fo appropriate antibiotic usage under the cascade.

Bacteriology may also be undertaken when assessing food as part of hygiene surveillance programmes e.g. the assessment of fish quality for the piscivores or meat for the carnivores. Specialist techniques may be needed for certain species e.g *Mycobacterium bovis*, the cause of bovine tuberculosis, can take up to 3 months to grow.

OTHER PATHOGEN ASSESSMENTS

There are many other pathogens that may be present within the collection, these include viruses, prions, and other multicellular pathogens not mentioned above. Surveillance is typically focused on pre-import assessment prior to arrival and the specific areas of concern are outlined in Appendix 10.

In the case of suspected diseases being present in the collection specific tests, appropriate to the suspected pathogen will be used to aid in the identification of any causative agents. Tests vary as to suitability, efficacy and availability, but include PCR, serology, scanning EM, and histopathology. Tests are requested by the veterinarian and are often in response to specific disease management situations.

ZOONOSES SURVEILLANCE

Zoonoses are infectious agents that are transmissible from animals to man. The reverse is called a reverse zoonosis or anthropozoonosis: it is not a one-way street and diseases can move back and forth across the animal-human divide. Zoonotic disease can present a significant health risk to staff and members of the public and all efforts should be made, under the **Health and Safety at Work etc Act 1974** and **Management of Health and Safety at Work Regulations 1999,** to ensure that suitable risk assessments, provision of suitable personnel protective equipment (PPE), and training are provided by the employer, and that the employee adheres to the policies of the organisation with regard to zoonotic agents.

The veterinarian will be aware of the zoonotic risks of diseases as they appear and will communicate the risks and management methods that will be suitable to remove or reduce the risk to staff and public.

Prevention is better than cure but this does require the recognition of zoonoses as a risk and the implementation of control policies in the first place. Procedures should be in place to minimise the exposure of workers to zoonotic diseases. These include;

- Appropriate PPE including gloves, masks, paper suits, and your uniform which in an ideal world should not leave the zoo's premises at the end of the day.
- Wash stations in animal houses for washing hands.
- Standard operating procedures for working in animal houses, the aim to minimise injury or contact with potentially infectious material.
- Standard operating procedures for high risk areas such as rabies quarantine, combined with appropriate risk assessments.
- Training in zoonotic disease and management of all staff.
- First aid procedures including thorough rinsing of cuts, scratches or bites and the reporting through RIDDOR 1995.
- Ensuring occupational health programme for all staff, including appropriate vaccination for diseases such as tetanus, rabies, etc.
- Ensuring that Doctors or ER medics are aware of animal contact when presenting for assessment.

If an animal is suspected or confirmed to have a zoonotic disease, then the following should be considered:

- Euthanasia of the animal for public health reasons and confirm for post-mortem, this is a legal requirement for some diseases.
- Treatment of the animal:
    - Discuss and undertake risk assessment.
    - Minimise the number of staff that have contact with the animal.
    - Only suitably trained and informed staff should have contact.
    - Appropriate PPE should be provided.

If a zoonosis is suspected in a keeper then they should seek medical advice immediately. In addition the member of staff should discuss this with their line manager as there may be a risk to the animals in their care: although there is no legal obligation to do so.

Zoonosis surveillance at Safari Zoo consists of multiple methods of assessment that include:

- Parasite and bacteriological surveillance in walk through or animal encounter areas
- Post mortem examination of all animals within the collection
- Curative health programmes that respond to keeper observation of disease or sickness in animals, especially those in walk through exhibits
- Pre-import testing health checks

A general list and introduction to zoonoses can be found in Appendix 13, with BIAZA's guide to managing zoonoses in zoos and wild animal parks in Appendix 14..

POST MORTEM SURVEILLANCE

Post mortems, literally 'after death', is the examination of animals after they have died to ascertain the cause of death but to also assess the presence of other potential subclinical diseases (co-morbidities), the condition of the animal and possible husbandry related pathologies, and the presence of parasites and other organisms. They are an extremely important part of any surveillance programme and provides accurate information on the disease and health status of the collection.

Post-mortems examinations (PME) can be classed into one of two types:

- Gross PME – the anatomical dissection of the body at a gross level, with examination and collection of samples taken from the cadaver.
- Histological PME – microscopic examination of the samples taken at gross PME, often required to clarify or confirm the suspicions found at gross PME and provide an accurate confirmation of the cause of death and any underlying pathology found at gross PME.

Further laboratory and clinical testing is possible with tissues from gross PME and include:

- Radiographic examination
- Bacteriology, parasitology or viral examination
- Blood and bone marrow sampling
- Frozen tissue storage – store for later testing
- Formalin tissue storage – store for later testing
- Immunohistochemistry
- Toxicology
- Many others

Accurate, consistent pathological descriptions accompanied by quality photographs are a very useful tool to facilitate communication between clinicians, particularly in disease surveillance or outbreak management programmes. Preferably all animals should undergo at least gross post mortem, even if the cause of death is known e.g. seen to have been run over by road train, as the body parts (termed viscera) often will demonstrate the presence or absence of pathology which acting as markers for disease for the living collection, particularly those other animals in contact with the deceased animal. This information is not only useful for animal welfare but also forms part of zoonoses surveillance.

POST MORTEM POLICY

Post mortem examination of animals that die is routinely carried out on all specimens by the veterinary surgeon, veterinary coordinator or an external laboratory at the discretion of the veterinarian. The following outlines the post mortem examination policy here at Safari Zoo, a summary of which can be found in Appendix 14):

- All animals that die, either naturally or euthanased, will undergo post mortem examination (PME) at Safari Zoo.
- On finding that an animal had died the keeper is to inform their line manager and/or senior management as soon as practicably possible, securing the animal away from other animals in an enclosure where appropriate. The line manager should then request a veterinarian attend for the PME or discuss and organize the export of the carcass to an external laboratory.
- Consideration must be given to safe handling and the use of appropriate PPE, if a large animal or unsure on the risk of handling than advice must be obtained from the approved veterinarian on the appropriate handling of the carcass.
- Where of a suitable size the animal should be moved, ensuring no leakage and contamination of the environment with bodily fluids, to the post-mortem room or to an external laboratory. Where an animal is too large to safely move it it maybe more

appropriate to undertake the PME in situ, in such a case living animals must not only be separated from the PME site physically but also visually and auditory.

- Animals that can be easily moved, such as those <50kg, should be documented as to their position, side they were found on and any relevant details that may assist the pathologist, photographic documentation can be particularly useful. The animal should then be double bagged using appropriate clinical waste bags or robust, leak proof rubble sacks. These should then be closed, preferably with a cable tie, labelled and taken to appropriate cold storage to await PME or direct to the PM room where a vet is present or will be soon on site. The bag must be labelled with the species and the date of death, taking care not to rip or puncture the bag.
- The area where the animal was found should be cleaned an disinfected, assuming (especially in the case of primates) that the area may harbor potential zoonoses and therefore suitable PPE must be worn.
- All PME must aim to be undertaken as soon as possible, at a maximum within 24 hours of death. In the event that a PME cannot be performed within the 24 hour period consideration must be given to sending the carcass to an external laboratory verses internal storage and possible loss of tissue quality if refrigerated prior to PME at some time >24 hours. The exceptions, due to potential zoonotic risk, are:
    - All primates are sent to IZVG Pathology, unless the AV feels that it can safely be undertaken on site on a case-by-case basis, for post mortem.
    - All psittacines are sent to IZVG Pathology, unless the AV feels that it can safely be undertaken on site on a case-by-case basis, for post mortem.
- The member of staff that discovered the body must immediately complete a PME Submission form (see Appendix 15) which is completed in full to provide as much support to the pathologist. This must accompany the carcase to the PM room or a copy to the external laboratory, the information must contain, as a minimum:
    - Date
    - Species
    - Location
    - Time found
    - Identification (microchip/ring/ARKS)
    - Pertinent information as to how the animal was found and any antemortem information that may assist the pathologist in the accurate diagnosis
- For bodies that are to be exported to an external lab they must be packaged in accordance with the Category B UN3373 (Diagnostic specimens) requirements as outlined in Appendix 16 and the Royal Mail guidelines on Prohibitions and restrictions in UK and international mail. See below for summaries.
- On-site PME must be undertaken either in the PM room, part of the veterinary hospital area, or in situ if an animal is too big to move. Preference is to moving an animal away from other animals to undertake the PME.
- Appropriate PPE must be worn, as determined by the Approved Veterinarian.
- Appropriate safe tissue handling techniques must be undertaken, including the minimisation of aerosols, body fluid splashes or needle stick or blade stab injuries.

- PME must be of an appropriate level of assessment to allow accurate identification of cause of death, assessment of other body systems and potential co-morbidities, and appropriate tissue sampling for storage, histopathology or further diagnostic testing as indicated.
- Histopathology and further diagnostic testing is not indicated in all cases and will be actioned as indicated by the species, disease risk assessment and the wishes of the attending veterinarian on a case-by-case basis.
- The veterinary surgeon in charge is to decide where the post mortem examination is to be conducted. This may be onsite, at the veterinary surgery or at a specialist laboratory.
- Carcasses must be disposed of by incineration or rendering. This is to be arranged through the facilities available to the veterinary surgeon or a commercial firm if necessary (e.g. Messer's Robinson & Mitchell).
- Rare species may be allowed to go for professional preservation and education at National Museums of Scotland.

All deaths must be recorded on a PME submission sheet, which are then stored in the veterinary hospital and transferred on to the PM database and medical ZIMS. All PM reports are attached to the corresponding PME submission sheet and any further testing undertaken to allow rapid identification of historical records. PM reports are also saved on the computer on the zoo shared network.

SAFE PATHOLOGICAL AND SPECIMEN HANDLING AND PACKAGING FOR POSTING

General Collection Procedures:

- employees must handle animal waste or removal and disposal of carcasses as outlined in this policy.
- all dead animal remains and waste are to be handled separately from other refuse.
- the following PPE will be provided and is to be used (as dictated by the situation): disposable gloves, eye protection, face shield, and disposable gowns.
- all tools and surfaces that came in contact with the dead animal must be disinfected after use

Specific Procedures for Collection, Freezing and Incineration:

- The location and time the carcase is found must be noted (photography useful)
- PPE must be worn at all times
- All carcasses are to be double bagged in yellow clinical waste bags, or alternatively heavy gauge black or green colored dustbin bags, and sealed by twisting the neck of the bag followed by the application of cable ties. Each bag is to be tied individually.
- All carcasses once double bagged are to be transported immediately to the veterinary room and placed in the refrigerator
- A PME submission form must be filled in and attached to the bag: forms available on the shared drive or in the vet room
- Disposable PPE should be disposed of in the clinical waste bins in the vet hospital
- Notification to the veterinary coordinator or Approved Veterinarian that a fresh cadaver has been placed in the refrigerator

- If veterinary attention is not possible and the animal cannot be postmortemed then it should be placed into the clinical waste freezer for disposal and written justification made on the PME submission form.

Risk of Exposure:

- Provided the handler is wearing proper PPE, it is highly unlikely that employees handling dead animals can contact zoonotic diseases.
- Items (clothing, gloves, etc.) that become soiled while handling a carcass should be removed immediately and disposed of with the carcass.
- For the purposes of this policy, all dead animal carcasses and waste will be approached with appropriate precautions and treated as though known to contain zoonotic diseases.
- Appropriate PPE must be worn while handling and disposing of dead animals within the grounds of Safari Zoo or on the business of Safari Zoo.
- all tools and surfaces that came in contact with the dead animal must be disinfected after use

PACKAGING OF SPECIMENS

In all cases the specimen container must be appropriate to the specimen, be properly closed, correctly labelled and not externally contaminated by the contents. Following sample collection the container should be placed in an individual clear, plastic, ziplock transport bag, correctly labelled and properly sealed at the top to contain any leakage.

Request forms should not be placed inside the same pocket as the specimen to prevent contamination of the form and to easily identify leaks. Request forms can be placed in a second bag with the specimen container placed inside with the request form. NEVER use pins, staples or metal clips which may puncture the bag and cause injury.

Specimens sent to an external laboratory via the postal service must conform to the post office regulations for pathological material packaging of UN3373. These state that:

- The primary receptacle must be a watertight leak proof container, containing the sample and wrapped in enough absorbent material e.g. wadding or cotton wool to absorb all fluid in case of breakages.
- The secondary receptacle must be durable, leak proof to enclose and protect the primary receptacle.
- Enough absorbent material must be used to cushion multiple primary receptacles.
- The secondary package should then be placed in an outer package which protects it and its contents from outside influences (e.g. a padded bag is recommended by the Royal Mail for small samples moving to rigid hard containers for small cadavers).
- Information concerning the enclosed sample/s and the identity of the sender and receiver should be attached to the outside of the second receptacle.
- The outer package must be labelled PATHOLOGICAL SPECIMEN, FRAGILE, HANDLE WITH CARE.

All specimens should be sent by the fastest available route and be received within 24 hours by the external laboratory. In some cases a courier service maybe more appropriate for larger

specimens. If in doubt contact the receiving laboratory for advice on appropriate packaging of samples.

VACCINATION

Animals are vaccinated against infectious diseases to which they are known or likely to be susceptible, including some listed in Appendix 3 and known zoonoses. Most of these vaccines will be used off licence and therefore under the auspices of the 'Cascade' (see Appendix 6).

- Giraffes; annual vaccination with Heptavac P PLUS (combined 7 in 1 Clostridial plus Pasteurella vaccine).
- Reindeer; annual vaccination with Heptavac P PLUS (combined 7 in 1 Clostridial plus Pasteurella vaccine).
- All kangaroo and wallaby joeys vaccinated with Heptavac P PLUS (combined 7 in 1 Clostridial plus Pasteurella vaccine) when they leave the pouch. All joeys vaccinated before one month after leaving the pouch.
- Felids to be vaccinated once a year with Felocell CVR (except Snow leopards - killed multivaccine)
- Equids to be vaccinated against tetanus and equine influenza once a year.
- Animals at Safari Zoo have been risk-assessed and no other vaccinations have been advised to be put in place.

All vaccinations will be recorded in the diary in the 'vet centre' on the day vaccinations are given and the next date vaccination to be done will be updated in the diary. This information will also be entered into each animal's individual record on ZIMS.

Other vaccinations considered for specific species are outlined in Appendix 10.

CONTRACEPTION

Surgical, pharmacological, vaccination, and management methods of reproductive management and population control are all available for use at Safari Zoo and are used on a case-by-case basis as required on the advice of the veterinary team working in conjunction with the curatorial management staff.

All contraceptive implants, if used, will be placed subcutaneously between scapulae (unless specifically stated otherwise in clinical notes).

NUTRITIONAL REVIEWS

Nutrition and dietary management at Safari Zoo are developed based on current best practice with the input of professional nutritionists, animal keeping staff and the veterinarians. Diets are reported in a written format as diet sheets which must be regularly reviewed at least biennially or earlier if nutritional pathology are noted at PME, best practice species specific recommendations are made to improve the nutritional provision of certain animal diets, or availability of food items are unavailable and alternative dietary modification is required in the short to medium term.

AUDIT

CLINICOPATHOLOGICAL AUDIT

As per 3.12 of the SSSMZP (2012) Safari Zoo is committed to appropriate clinicopathological audit to ensure that disease trends are monitored and assessed to allow rapid implementation or management of long term disease, mortality or morbidity trends in the collection. Regular review, by the relevant veterinary and curatorial staff, of clinical, behavioural and pathological records and mortality is undertaken both formally for specific areas of concern, at the ethics committee meetings, and as a general review at the specialist zoo and wildlife consultant visits as part of general husbandry and health care. Husbandry and preventive medicine practices must be reviewed where problems become apparent and any changes noted in the animal record and in the Preventative Health and Medicine Programme as required.

Summaries of the reviews should be documented and made available to management and zoo inspectors as part of legislative compliance and best practice for animal welfare management.

PREVENTATIVE HEALTH AND MEDICINE PROGRAMME AUDIT

To ensure the Preventative Health and Medicine Programme Policy is fit for purpose and reflects the current operational practices here at Safari Zoo the policy must be formally reviewed on an annual basis and any changes reported to the Ethics Committee for approval and general communication of improvements that are to made to this document. Any changes made must be recorded in the document control with minor changes reflected as successive increases in the subversion number e.g. 2.2, with considerable changes to the document recorded as version changes e.g. 3.1.

SPECIFIC POLICIES

EUTHANASIA POLICY

Safari Zoo adheres to the use of euthanasia guidelines as outlined by BIAZA and EAZA recommendations. Safari Zoo considered euthanasaia is a recognized management tool to alleviate suffering in certain cases and that:

- Euthanasia is a management tool to be used on healthy animals only when ALL other avenues of resolution of issues is concluded and the welfare of the animal or other animals is at risk of deterioration to below acceptable humane standards.
- Only agreed by Ethics Committee on strict understanding that each potential euthanasia of a healthy animal be discussed and approved by the committee under the guidance of the veterinary surgeon where it is an elective procedure or on the basis of advice from the veterinary surgeon and the most senior member of the animal team in the case of emergency euthanasia to alleviate the suffering of an animal.
- The choice and timing of all euthanasia be dictated and controlled by the veterinary surgeon.

- Emergency compassionate euthanasia to be carried out only by trained staff when veterinary assistance is not available as an emergency welfare issue in line with current legislation.

This policy is to be reviewed annually at the Ethics Committee meeting.

Full details of appropriate, taxa specific methods of euthanasia are outlined in Appendix 17 (draft out for review – to be in Version 2.2).

PINIONING POLICY

To be reviewed and updated at the next Ethics Meeting (October 12th, 2016).

END

Legislation literally means "proposing a law". Law is difficult to define. Gray and Wilson (2006) consider it to be the, "principles recognised and applied by the state in the administration of justice. Law is concerned with providing a just system of punishment, and providing a system for redress, against wrongdoing". Law originates from legislation, written as Acts of Parliament, or from precedents arising from judicial decisions in previous, similar cases. Statutes are developed to provide detailed regulations within a broad legislative framework for the operation of the law; with the regulations being the tools used to enforce the law and are termed statutory instruments. In addition law originating in the European Union can influence UK law. There are three main categories of EU legislation: EC Regulations which member states must comply with, EC Directives are not directly binding and must be incorporated into national legislation before it can take effect, and EC Decisions which are binding to member states but are limited in scope (Hoesy, Melfi, and Pankhurst, 2009). For an excellent overview of legislation and how it applies to zoos readers are directed to;

- Zoo Animals: Behaviour, Management and Welfare
  Hoesy, Melfi, and Pankhurst, Oxford University Press, 2009
  Chapter Three: Regulatory framework, pg 54-81.
- How do national and international regulations and policies influence the role of zoos and aquariums in conservation?
  Holst and Dickie, Cambridge University Press, 2007
  In Zoos in the 21st Century: Catalyst for Conservation

There are multiple pieces of legislation and law that will affect the veterinary service ranging from health and safety through to employment law. However there are more animal health specific elements of legislation that affect the service, the most important include:

The EC Zoos Directive 1999 (EC Directive 1999/22/EC) is a piece of European legislation governing zoos across the member states of the EU. It sets out requirements for the licencing and inspection of zoos. This includes standards of animal care, record keeping, education and conservation. The majority of EU member states have now incorporated this into their own legislation. However some critics feel that the piece of legislation is a missed opportunity to clarify the actual role of zoological collections in their conservation efforts, this is especially true with the guidelines or recommendations on captive breeding and potential return to the wild (Rees, 2005).

Zoo Licensing Act 1981. The ZLA is a piece of UK legislation that incorporates the EC Zoos Directive through its 2002 amendment. The amendments have included areas in conservation and education as the zoo industry re-evaluated its role in society and in line with the EC Zoos Directive. The ZLA 1981 outlines the formal requirements for obtaining and maintaining a licence for a zoological collection. A zoo is defined as a place where non-domesticated animals are kept and which is open for at least 7 days each calendar year. It excludes pet shops, circuses and private collectors, which are covered by other legislation (see later). From a veterinary perspective the ZLA requires that: records of the health of an animal be maintained; preventative or curative veterinary care and nutrition is provided; under veterinary advice, euthanasia will not be prevented if it is in the best interests of an animal's welfare, features of the zoo are in line with health and welfare best practice and that the inspection for the zoo licence includes a veterinarian to assess and review the health care provided by a zoological collection.

Secretary of State's Standards of Modern Zoo Practice (SSSMZP) (2012) are guidelines produced by the UK Government that provide guidance and interpretation of principally the Zoo Licensing Act but also other legislative documents. It should be considered the first port of call when considering legislation and minimum standards in a zoological collection in the UK. It is not limited to animal care but includes: provision of food and water, a suitable environment, provision of animal health care, provision of the opportunity to express most normal behaviour, protection from fear and distress, guidance on transportation and movement of live animals, conservation and education, public safety, stock records, staff and training requirements, public facilities, and display of the zoo licence of which a current copy must be displayed at each public entrance. The SSSMZP are regularly updated. The SSSMZP requirements for veterinary support must be consistent with the welfare needs of the collection. Interested readers are recommended to read the whole document, focusing on Section 3 and Appendix 5, which outline the basic veterinary requirements for a zoological collection.

Balai Directive (EC Directive 92/65/EEC) is a directive aimed at the transport of non-domestic animals between EU member states. It includes live animals, semen, ova, and embryos. It does not include domestic animals and fills the gaps left by legislation that cover domestic species in the EU: Balai literally translates from the French as "broom" because it "sweeps" up the animals not covered by other legislation. It is considered as an animal health directive with the aim of reducing import testing between Balai-approved centres. As a concept it is sound but in practice a veterinary service may still test depending on it's own biosecurity protocols.

Veterinary Surgeons Act 1966 is used, in part, to, "...make provision for the management of the veterinary profession, for the registration of veterinary surgeons and veterinary practitioners, for regulating their professional education and professional conduct and for cancelling or suspending registration in cases of misconduct". It is a criminal offence for any non-veterinary surgeon to practice veterinary surgery on a mammal, bird or reptile. Currently it is considered that anyone may treat fish, invertebrates and (probably) amphibians subject to the provisions of the Protection of Animals Act 1911 (amendment 2000). However the VSA is under review and it is likely that the Act will be extended to include fish, amphibians and invertebrates. There are some exceptions to be able to perform medical or veterinary procedures on the higher vertebrates. One allows veterinary students, under veterinary guidance to perform certain acts of veterinary practice and surgery, another, which came into being in the 2002 Schedule 3 amendment, allows veterinary nurses to undertake medical treatment or minor surgical procedures that do not enter a body cavity. In addition anyone may provide first aid in an emergency.

Mutilations Report. Report of Working Party established by RCVS Council to consider the mutilation of animals. Royal College of Veterinary Surgeons. 1987. Whilst not law per se it does provide guidance on best practice of procedures classed as mutilations, including the practice of pinioning which the document states "Species kept for agricultural purposes-satisfactorily covered by legislation. IN respect of others, it is felt that feather clipping properly carried out provides a perfectly good substitute in some cases. However, if the procedure is to be carried out then it should be performed by a veterinary surgeon with full knowledge of all of the circumstances relative to the bird and its environment". It also states <10 days of age.

Dangerous Wild Animals Act 1976, (Modification Order) 1984, and (Modification Order) 2007 is mentioned here for consideration but is not required for zoos, pet shops, circuses or establishments under the Animals (Scientific Procedures) Act 1986. It has a similar assessment

process to the zoo licence inspection regarding minimum husbandry requirements and health and safety. It includes non-domesticated species that have the potential to cause harm.

Animal Welfare Act 2006 only applies to vertebrate animals, it does not apply to invertebrates, foetal or embryonic animals, wild animals that do not fit into the definition of a protected animal (see later) and research animals that are regulated by the Animals (Scientific Procedures) Act 1986. Protected animals are classed as animals commonly domesticated in the UK including feral cats and dogs, under the control of man (e.g. circuses and zoos or those caught in a trap), and those not living in a wild state (e.g. escaped wild animals that are non-native to the UK). The Act consists of elements of promoting animal welfare the prevention of harm to animals. It considered duty of care, i.e. whom is responsible for an animal, and this is not limited to the organisation but also the individual keeper whom potentially could be prosecuted under this Act. This Act is based around the basic concept of the Five Freedoms (see earlier) and the reader is advised to become familiar with these concepts. The RSPCA provides a good over view of the core responsibilities and tenements of this Act and readers are advised to review this document (see electronic resources).

Protection of Animals Act 1911, (Amendment) 2000 was first introduced a century ago. it was the principal piece of legislation that managed animal welfare in the UK. The PAA has now been replaced by the Animal Welfare Act 2006.

Wildlife Countryside Act 1981 is the principal Act providing for the protection of wildlife in the UK. This makes it illegal to kill, injure, take, possess or sell certain UK native wild animals. An exception is made for those taking and possessing sick or injured animals, or euthanasing injured animals. The burden of proof falls on the person in possession of the animal so accurate and up-to date records must be kept. Section 8 of the act states that birds should be kept in cages large enough for them to stretch the wings fully. A smaller cage may be used for transport or while undergoing veterinary treatment. Schedule 9 outlines non-native species that cannot be released into the wild and includes animals such as the grey squirrel (*Sciurus carolinensis*) and the Canada Goose (*Branta canadensis*). This act is especially important for wildlife rehabilitators and any projects that zoological collections maybe involved in within the UK. Others include the WCA amendment 1985 reviewing attacks on badger setts and the Wild Mammals (Protection) Act 1991 which provided tighter regulation for wild mammals.

Animal Health Act 1981 and 2002 is a piece of legislation to protect and provide powers to enforce the protection of the biosecurity of the UK food industry. It was reviewed from the previous Act in 1981 in response to the FMD and TSE outbreaks in the decade previous. It provides for measures for the prevention and eradication of animal diseases, including the control and monitoring of imports of animals into the UK. Principally notifiable diseases are covered by this legislation and the controls associated with them. Other specific pieces of legislation exist that focus on specific infectious diseases e.g. Avian Influenza and Influenza of Avian Origin in Mammals (England) Order 2006.

The Welfare of Animals (Transport) (England) Order 2006 aims to ensure a high minimum standard of animal welfare for animals as they are transported. This applies to all zoo animals transported by road, sea, air or rail, from the moment animals are loaded on a vehicle, through to their care during transport and unloading at their final destination.

International Air Transport Association (IATA) Live Animals Regulations. IATA has existed since 1945 and sets clearly defined rules regarding the air transportation of specific items including

those deemed as hazardous or dangerous goods. This includes animals as well as biological specimens or samples. These are updated almost annually.

Convention on International Trade in Endangered Species (CITES) of Wild Flora and Fauna 1973 is an international agreement that is often mistaken to be for conservation. It is actually a trade agreement that is intimately bound with conservationally sensitive species but not in all cases. From a zoo perspective CITES major impact is on the movement of live and dead specimens around the world. In addition to live animals it includes blood samples, pathological samples, as well as teaching specimens, skins or skulls. An article 10 certificate is needed by zoos within the EU for the sale or movement of animals listed under Annex A of the convention.

Animals Act 1971 is an act to make provision with respect to civil liability for damage done by animals and with respect to the protection of livestock from dogs. Animals used in displays or education programmes, or even escaped animals, that cause injury will likely result in the organisation being penalised under this act.

Animals (Scientific Procedures) Act 1986 regulates the use of laboratory animals in the UK. How research is defined is quite clear and this must be considered when approaching a research project. This is especially true for veterinary research. If a procedure or project is deemed to fall under the ASPA then it will require a licence from the Home Office, if the research is performed as retrospective or non-invasive then it is unlikely to. An example would be looking at faecal progesterone levels to monitor reproductive cycles in an animal does not necessitate the need for a licence, conversely if an animal is repeatedly anaesthetised to assess blood levels of a drug being used in a species for the first time then this would require a licence. The majority of zoo and conservation based research does not come under ASPA but keepers should be aware that it exists.

Veterinary Medicines Regulations 2008 are intended to replace previous controls and procedures for the authorisation, manufacture, supply and use of veterinary medicines. This includes medicated feeds and feed additives. These regulations concern all aspects of veterinary medicines other then the issue of drug residues and controlled drug related management. The main concerns for the zoological veterinarian include handling, record keeping, labelling, dispensing, prescriptions, feed stuffs and the importation of medical agents from the EU or elsewhere.

The Misuse of Drugs Regulations 2001, Amendment 2005 are used to legislate the management and control of controlled drugs. It is presented as a list of controlled drugs under different schedules, each with its own penalty for supplying or possessing. Although aimed at drugs such as heroin there are certain veterinary drugs commonly used in a zoological collection that fall under this legislation e.g. the anaesthetic agent LA Immobilon (etorphine HCl and acepromazine maleate). The different schedules require different levels of record keeping as well as disposal and acquisition policies.

Control of Substances Hazardous to Health (COSHH) Regulations 2002 describe how to control hazardous substances at work so that they do not cause ill health. This is across any industry and in the veterinary hospital covers a variety of products including medicinal products, disinfectants, radiography processing fluids, laboratory dyes and many others. It includes anything that can be hazardous to health including dust, fumes, topical contact, etc.

Risk assessments and written protocols must be written up for the safe use or practices around agents that fall under this legislation.

Ionising radiation regulations 1999 protects persons against ionising radiation arising from any work activity. In the zoological collection the main source would be that generated by the radiography machine but also could be considered in some specialist therapies or diagnostic modalities such as scintigraphy.

Hazardous waste regulations 2005 require businesses that produce more then 200kg of hazardous waste per year to register with the Environmental Agency. Hazardous waste in the zoological veterinary hospital includes infected clinical waste, radiography developer fluid and certain medicines. This does not include non-infectious health care waste, cadavers, blood, sharps or non-cytoxic and non–cytostatic medicine which are covered by other legislation.

Animal By-Products Regulations 2005, amendment 2009 are designed to manage the collection, transport, storage, handling, processing and use or disposal of animal by-products. The local authority, meat hygiene service and the secretary of state enforce this act where appropriate. The regulations include animal carcases, parts of carcases (e.g. carnivore feed waste), or products of animal origin that are not intended for human consumption. It should be considered as an act to prevent the spread of disease amongst animals (and humans to some degree).

The Pressure Equipment Regulations 1999, The Pressure Systems Safety Regulations 2000, and The Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations 2004 all have an impact on the use of compressed gas cylinders (as used in veterinary anaesthesia) and the use of autoclaves (used in sterilising surgical kits) that function at pressures greater then 2 atmosphers above atmospheric pressure (i.e. >3 atm).

Firearms Act 1968-1997. The Firearms Acts 1968-97 regulates the possession of firearms and ammunition in Great Britain. This not only covers the shotguns and rifles used in the management of escaped animals but also the slaughtering instruments and remote chemical immoblisation equipment. This includes the dart rifle, pistol and the blow pipe, all of which are classed as prohibited weapons that discharge noxious substances under section 5(1)(b) of the 1968 Act. However under section 8 of the 1997 Act the possession of this items can be authorised on a firearm certificate in connection with the treatment of animals.

Health and Safety at Work etc Act 1974. The Health and Safety at Work etc Act 1974 , also referred to as HASAW or HSW, is the primary piece of legislation covering occupational health and safety in the United Kingdom. The Health and Safety Executive is responsible for enforcing the Act and a number of other Acts and Statutory Instruments relevant to the working environment. The other major piece of Health and Safety legislation is The Management of Health and Safety at Work Regulations 1999, which has impacts on several areas but is the major driver of risk assessments and subsequent control measures. There are multiple specific pieces of legislation but these are beyond the scope of this discussion. Interested readers are advised to read: A guide to health and safety regulation in Great Britain produced by the HSE.

Reporting of Injuries, Diseases, and Dangerous Occurences Regualtions (RIDDOR) 1995 places a legal duty on employers, self-employed people,and people in control of premises to report

work related deaths, major injuries, or over three day injuries, work related disease, and dangerous occurrences (near miss accidents). This is allows a national auditing process by the HSE on what, how and where risk is in the work place. Risk assessments form an important part of the process when reviewing incidents and assessing the cause and future risk to people on site. Zoonotic diseases come under this legislation.

There are many other pieces of legislation and amendments continually replace older, outdated material. Readers are advised that this list is not complete and that they should ensure they are familiar with the most current versions of the law.

INFECTIOUS AGENTS: AN INTRODUCTION

After husbandry related diseases the most important group of diseases are the infectious diseases. There is a wealth of information on infectious agents and this is just an overview of the principle groups of importance:

BACTERIA are single-celled micro-organisms that are ubiquitous (found everywhere). They are called prokaryotes and their DNA is free within the organism. In most cases they are part of the normal fauna of an animal, and in certain cases are essential for digestive function. However, there are a small number of pathogenic bacteria i.e. that cause disease, and others that are normal but in large numbers or in areas where they shouldn't be where they can result in disease. Antibiotics are the main pharmacological weapons against bacteria. Bacteriology is the study of bacteria but is also used when referring to culture and sensitivity which is the process of growing, identifying and then testing various antibiotics against the bacterium to ensure the suitability of the antibiotic being used. Resistance to antibiotics is increasingly a problem. Important examples include tuberculosis (*Mycobacterium sp.*), salmonellosis (*Salmonella sp.*), Leptospirosis (*Leptospira sp.*), and many others.

VIRUSES literally means slimy, liquid poison which refers to the fact that in early microbiology these infectious agents were so small that they could be filtered through mesh that stopped bacteria. Viruses are dependent on host cellular replication mechanisms and cannot replicate outside of the host. Like other species they vary in size, type and appearance with combinations of protein coats, membranes, and the viral nucleic acid which drives the development of new virus particles from inside of the host cell. Some survive very well outside of the host e.g. parvovirus, whilst others do not e.g. herpes virus and the latter require direct contact for spread. Important examples include rabies (lyssavirus), Foot and Mouth Disease (aphthovirus), Blue tongue (orbivirus), and many others.

FUNGI are a group of eukaryotic organisms, similar to us at a cellular level and each cell contains a nucleus containing the organism's genetic information. They are ubiquitous and few cause disease. They reproduce by means of spores and disease develops slowly. Fungal infections can be difficult to treat. Important examples include Aspergillosis (*Aspergillus sp.*), dermatophytosis or ringworm (e.g. *Trichophyton sp.* and others), and others.

PROTOZOA are unicellular organisms that are also eukaryotic. They are often not dependent on the host cells and can live outside of a host for a period of time. Reproduction is often asexual but there are some groups that can have a sexual phase, in the case of *Eimeria* both can occur within the same host. Similar to bacteria some protozoa can be part of the normal gastrointestinal fauna. Important examples include *Eimeria, Trypanosoma, Giardia, Leucocytozoon* and many others.

PRIONS are infectious agents that are composed of protein. There is some argument as to whether they are living or not. They replicate by transmitting a mis-folded protein state, which utilises the host cellular machinery to produce further infectious agents. All known prion diseases are universally untreatable and fatal. The most important are the Transmissible Spongiform Encephalopathies such as BSE, FSE, and others.

PARASITES in a pure sense of the term is defined as a plant or animal that lives upon or within another living organism at whose expense it obtains some advantage (see later). Some of the infectious agents already discussed can be classed as parasites. However, the term is used more generically to identify the multi-cellular organisms that can be infectious:

- **Ecto-parasites:** these are typically invertebrates that live on the external surface of the body, particularly the lice, mites, ticks, and other invertebrate parasites.
- **Endo-parasites:** these are parasites that live within an organism and typically include the nematodes (roundworms), trematodes (flukes), cestodes (tapeworms) and others.
- **Intra-cellular parasites:** are parasites that live within the host's cells, there are many examples of this in the other classes, an example is the obligate intracellular bacterium *Chlamydophila psittaci*, which causes psittacosis.

ZOONOSES

Zoonoses are infectious agents that are transmissible from animals to man. The reverse is called a reverse zoonosis or anthropozoonosis: it is not a one-way street and diseases can move back and forth across the animal-human divide. Zoonotic disease can present a significant health risk to staff and members of the public and all efforts should be made, under the **Health and Safety at Work etc Act 1974** and **Management of Health and Safety at Work Regulations 1999,** to ensure that suitable risk assessments, provision of suitable personnel protective equipment (PPE), and training are provided by the employer, and that the employee adheres to the policies of the organisation with regard to zoonotic agents.

The veterinarian will be aware of the zoonotic risks of diseases as they appear and will communicate the risks and management methods that will be suitable to remove or reduce the risk to staff and public.

Prevention is better than cure but this does require the recognition of zoonoses as a risk and the implementation of control policies in the first place. Procedures should be in place to minimise the exposure of workers to zoonotic diseases. These include;

- Appropriate PPE including gloves, masks, paper suits, and your uniform which in an ideal world should not leave the zoo's premises at the end of the day.
- Wash stations in animal houses for washing hands.
- Standard operating procedures for working in animal houses, the aim to minimise injury or contact with potentially infectious material.
- Standard operating procedures for high risk areas such as rabies quarantine, combined with appropriate risk assessments.
- Training in zoonotic disease and management of all staff.
- First aid procedures including thorough rinsing of cuts, scratches or bites and the reporting through RIDDOR 1995.
- Ensuring occupational health programme for all staff, including appropriate vaccination for diseases such as tetanus, rabies, etc.
- Ensuring that Doctors or ER medics are aware of animal contact when presenting for assessment.

If an animal is suspected or confirmed to have a zoonotic disease, then the following should be considered:

- Euthanasia of the animal for public health reasons and confirm for postmortem, this is a legal requirement for some diseases.
- Treatment of the animal:
    - Discuss and undertake risk assessment.
    - Minimise the number of staff that have contact with the animal.
    - Only suitably trained and informed staff should have contact.
    - Appropriate PPE should be provided.

If a zoonosis is suspected in a keeper then they should seek medical advice immediately. In addition the member of staff should discuss this with their line manager as there may be a risk to the animals in their care: although there is no legal obligation to do so.

NOTIFIABLE DISEASES

A **notifiable disease** in an animal is a disease named under the Animal Health Act 1981 or an Order made under that Act. These are diseases that are often considered to have severe financial impact on the commercial animal trade in the UK, with some of the agents having potentially fatal or chronic human health concerns. These must be reported to the police and Animal and Plant Health Agency (APHA), part of Defra. Notifiable diseases are also monitored by the Health Protection Agency as some diseases that can be transmitted by animals but not covered by the Animal Health Act 1981 are covered by other medical legislation. The latter must be reported under RIDDOR if a member of staff becomes infected. Notifiable disease in animals do not have to be fatal to an animal, some of them cause chronic disease that has financial losses to the animal industry.

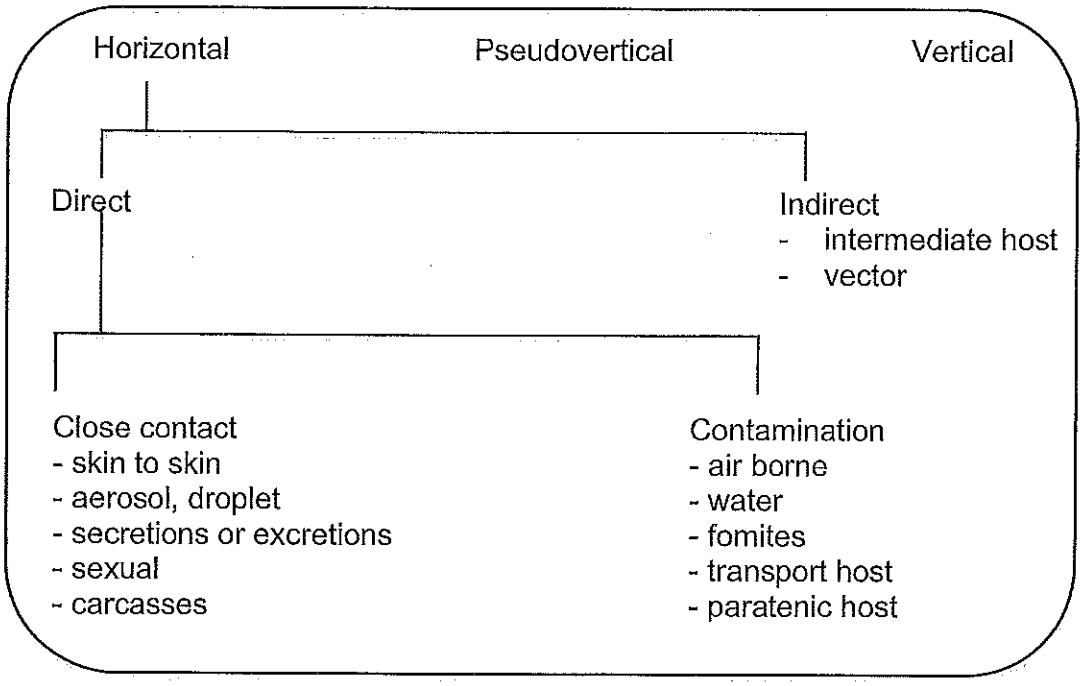
The list of important notifiable diseases can be found at:

https://www.gov.uk/government/collections/notifiable-diseases-in-animals

This includes diseases such as Foot and Mouth Disease, Blue Tongue, Rabies and many others (see Appendix 03 for a full list of notifiable diseases).

ROUTES OF TRANSMISSION

Disease can be transmitted in a variety of fashions, this incudes infectious agents or non-infectious agents such as contaminants or toxins. The following diagram outlines the principle methods of transmission:



Adapted from Wobeser 2006

Infectious agents must leave the body of the host for transmission to occur. This can occur between individuals through a variety of methods, which can be classed as:

- **Vertical:** transmission from parent to offspring, this can be from semen, ova, through the placenta or milk, or through the egg in egg laying species. Malignant Catarrhal Fever exhibits both vertical and horizontal transmission.
- **Pseudovertical:** transmission occurs soon after birth or hatching and can occur from parent to offspring, however other sources can result in transmission e.g. bovine tuberculosis in badgers where the kits become infected in a communal den before they emerge from the den.
- **Horizontal:** transmission from one individual to others in the population, independent of parental relationship. This is the most common method of disease spread.

Horizontal spread of disease is by far the most important and there are many different ways that infectious agents have developed to maintain their existence. These can be thought of in two simple terms: direct or indirect methods.

Agents that are fragile and cannot survive for long in the environment favour **direct methods** of transmission: the infectious agent is only in the environment for a short time. Typically, infection comes from close contact with excretions, secretions or skin-to-skin contact. Carcasses should not be forgotten about and can contain massive numbers of infectious agents e.g. at *postmortem*. Reproductive, respiratory and faeces are all well-known routes of transmission for specific agents, each being specifically adapted to manipulate and hijack the normal physiological mechanisms of the body system infected e.g. coughing.

Some of the more robust infectious agents can survive for longer periods of time out of the body and wait in the environment for the host to come to them or for a vehicle to transport them to the host. Water and feed contamination are one such example, but hands, vehicles, or other inanimate objects including perches, scrubbing brushes, the soles of your work boots or your uniform can be used by some agents to infect other animals. Such inanimate objects used in this fashion are termed **fomites**. Some of the aerosols produced when sneezing, if smaller then 5µm, can be transported for considerable distances. An example of this was seen with the Foot and Mouth Disease outbreak on the Isle of White in 1981, which was believed to have been carried on the wind from France some 250km away.

Other animals may act as carriers of disease and bring infectious agents into a collection. These animals maybe planned and come from other collections or maybe wild animals that come into the zoo. Wild animals are also known as **sylvatic vectors** with a vector being another name for a living carrier of an infectious agent. Pest control and biosecurity measures are mainly focused on minimising or preventing these important routes of infection from occurring. Humans are another animal and equally can bring disease into a collection, either as fomites or vectors. **Transport hosts** are animals that physically transport an infectious agent, whilst **paratenic hosts** are hosts that become infected with an organism but reproduction does not occur with the paratenic host. Paratenic hosts are not always required for the lifecycle to occur but do enhance the probability of transmission.

Indirect methods of transmission require the involvement of one or more species in addition to the target species. Indirect transmission is very common among some of the larger parasites and involves complex life cycles, usually associated with predator-prey interactions. In some cases the parasite actually alters the behaviour of the prey species to increase the likelihood that it will be eaten. Some of these lifecycles can be extremely long. In the lifecycle of the nematode *Trichinella sp.* the larvae penetrate the gut wall and encyst in the muscle, waiting for a predator to later ingest the meat which can be several years later. Vectors have been discussed already. Vectors in a more restricted sense are a living creature that acquires a pathogen from one living host and delivers it to another, this is the case of mosquitoes and malaria. Vector-transmitted diseases are relatively common and many are highly virulent. Most vectors are arthropods, such as flies, ticks, fleas and mosquitoes. It is thought that the vector-borne diseases are often more virulent because debilitation of the host may enhance their transmission through the host being unable to swat away flies or feeding insects. Compare this to diseases utilising direct methods of transfer that require the host to be able to move and come into direct contact with hosts for transmission to occur.

Many infectious diseases have more than one route of transmission, and these vary in different situations and for different species.

Interested readers are directed to Wobeser (2005) *Essentials of disease in Wild Animals, Blackwell Publishing.*

NOTIFIABLE DISEASE	SPECIES AFFECTED	OCCURRED LAST IN GB
African Horse Sickness	Horses	Never
African Swine Fever	Pigs	Never
Anthrax	Cattle and other mammals	Present
Aujeszky's Disease	Pigs and other mammals	1989
Avian Influenza (Bird flu)	Poultry	2016
Bovine Spongiform Encephalopathy	Cattle	Present
Bluetongue	All ruminants and camelids	2007
Brucellosis (Brucella abortus)	Cattle	2004
Brucellosis (Brucella melitensis)	Sheep and Goats	Never
Chronic wasting disease	Deer	Never
Classical Swine Fever	Pigs	2000
Contagious agalactia	Sheep and Goats	Never
Contagious Bovine Pleuro-pneumonia	Cattle	1898
Contagious Epididymitis (Brucella ovis)	Sheep and Goats	Never
Contagious Equine Metritis	Horses	2010
Dourine	Horses	Never
Enzootic Bovine Leukosis	Cattle	1996
Epizootic Haemorrhagic Virus Disease	Deer	Never
Epizootic Lymphangitis	Horses	1906
Equine Infectious Anaemia	Horses	2010
Equine Viral Arteritis	Horses	2010
Equine Viral Encephalomyelitis	Horses	Never
European Bat Lyssavirus (EBLV)	Bats	2008
Foot and Mouth Disease	Cattle, sheep, pigs and other cloven hoofed animals	2007
Glanders and Farcy	Horses	1928
Goat Pox	Goats	Never
Lumpy Skin Disease	Cattle	Never
Newcastle Disease	Poultry	2006
Paramyxovirus of pigeons	Pigeons	Present
Pest des Petits Ruminants	Sheep and Goats	Never
Porcine Epidemic Diarrhoea	Pigs	2002
Rabies (Classical)	Dogs and other mammals	2006
Rift Valley Fever	Cattle, Sheep and Goats	Never
Rinderpest (Cattle plague)	Cattle	1877
Scrapie	Sheep and goats	Present
Sheep pox	Sheep	1866
Swine Vesicular Disease	Pigs	1982
Teschen Disease (Porcine enterovirus encephalomyelitis)	Pigs	Never
Tuberculosis (Bovine TB)	Cattle, deer and other sp.	Present
Vesicular Stomatitis	Cattle, pigs and horses	Never
Warble fly	Cattle, (also deer and horses)	1990
West Nile Virus	Horses	Never

COMMISSION REGULATION (EC) No 1398/2003

of 5 August 2003

amending Annex A to Council Directive 92/65/EEC to include the small hive beetle (*Aethina tumida*), the Tropilaelaps mite (*Tropilaelaps* spp.), Ebola and monkey pox

(Text with EEA relevance)

THE COMMISSION OF THE EUROPEAN COMMUNITIES,

Having regard to the Treaty establishing the European Community,

Having regard to Council Directive 92/65/EEC of 13 July 1992 laying down animal health requirements governing trade in and imports into the Community of animals, semen, ova and embryos not subject to animal health requirements laid down in specific Community rules referred to in Annex A(1) to Directive 90/425/EEC [1], as last amended by Regulation (EC) No 998/2003 of the European Parliament and of the Council [2], and in particular Article 22, first paragraph, thereof,

Whereas:

(1) The trade and importation of bees in the Community is governed by Directive 92/65/EEC. Directive 92/65/EEC lays down certain rules concerning animals and species susceptible to the notifiable diseases listed in Annex A to that Directive.

(2) The small hive beetle (*Aethina tumida*) is an exotic pest affecting honey bees and bumble bees that has spread from Africa to a number of other third countries, creating serious problems to the apiculture industry.

(3) The small hive beetle is not listed by the Office Internationale des Epizooties (OIE) and information about the extent of its infestation in third countries is not available.

(4) No cases have been reported in the Community however the small hive beetle is not a notifiable disease within the European Community under Directive 92/65/EEC.

(5) If introduced into the Community, the small hive beetle could have devastating consequences on the health status of honey bees, on the apiculture industry and on the production of honey.

(6) Tropilaelaps (*Tropilaelaps* spp.) is an exotic parasitic mite affecting honey bees that is mainly found in south-east Asia but which if imported into the Community could have devastating consequences on the health status of honey bees, on the apiculture industry and on the production of honey.

(7) Tropilaelaps is an OIE notifiable disease. However it is not a notifiable disease within the European Community under Directive 92/65/EEC.

(8) Ebola virus and monkey pox virus are recorded from time to time in certain third countries and Community measures restricting imports have been taken against Ebola and monkey pox as these zoonotic diseases can affect or be carried by certain animals; it is therefore opportune for transparency and clarity to include these diseases as notifiable under Directive 92/65/EEC.

(9) Therefore it is necessary to add the small hive beetle, *Tropilaelaps* spp., Ebola virus, and monkey pox virus to the list of notifiable diseases in Annex A to Directive 92/65/EEC.

(10) Directive 92/65/EEC should therefore be amended accordingly.

(11) The measures provided for in this Regulation are in accordance with the opinion of the Standing Committee on the Food Chain and Animal Health,

HAS ADOPTED THIS REGULATION:

Article 1

Annex A to Directive 92/65/EEC is amended in accordance with the Annex to this Regulation.

Article 2

This Regulation shall enter into force on the 20th day following that of its publication in the *Official Journal of the European Union*.

[1] OJ L 268, 14.9.1992, p. 54.
[2] OJ L 146, 13.6.2003, p. 1.

This Regulation shall be binding in its entirety and directly applicable in all Member States.

Done at Brussels, 5 August 2003.

For the Commission
David BYRNE
Member of the Commission

ANNEX

Annex A to Directive 92/65/EEC is replaced by the following:

'ANNEX A

Notifiable diseases in the context of this Directive

Disease	Order/family/species primarily concerned
African horse sickness	*Equidae*
African swine fever	*Suidae* and *Tayassuidae*
Avian influenza	*Aves*
American foulbrood	*Apis*
Anthrax	*Bovidae, Camelidae, Cervidae, Elephantidae, Equidae* and *Hippopotamidae*
Bluetongue	*Antilocapridae, Bovidae, Cervidae, Giraffidae,* and *Rhinocerotidae*
Brucella abortus	*Antilocapridae, Bovidae, Camelidae, Cervidae, Giraffidae, Hippopotamidae* and *Tragulidae*
Brucella melitensis	*Antilocapridae, Bovidae, Camelidae, Cervidae, Giraffidae, Hippopotamidae* and *Tragulidae*
Brucella ovis	*Camelidae, Tragulidae, Cervidae, Giraffidae, Bovidae* and *Antilocapridae*
Brucella suis	*Cervidae, Leporidae, Ovibos moschatus, Suidae* and *Tayassuidae*
Classical swine fever	*Suidae* and *Tayassuidae*
Contagious bovine pleuropneumonia	Bovines (including zebu, buffalo, bison and yak)
Ebola	Non-human primates
Foot-and-mouth disease	*Artiodactyla* and Asian elephants
Infectious haematopoeitic necrosis	*Salmonidae*
Lumpy skin disease	*Bovidae* and *Giraffidae*
Monkey pox	*Rodentia* and non-human primates
Mycobacterium bovis	*Mammalia,* in particular *Antilocapridae, Bovidae, Camelidae, Cervidae, Giraffidae,* and *Tragulidae*
Newcastle disease	*Aves*
Peste des petits ruminants	*Bovidae* and *Suidae*
Porcine enterovirus encephalomyelitis	*Suidae*
Psitacosis	*Psittaciformes*
Rabies	*Carnivora* and *Chiroptera*
Rift valley fever	*Bovidae, Camelus* species and *Rhinocerotidae*
Rinderpest	*Artiodactyla*
Small hive beetle *(Aethina tumida)*	*Apis* and *Bombus*

Disease	Order/family/species primarily concerned
Sheep and goat pox	*Bovidae*
Swine vesicular disease	*Suidae* and *Tayassuidae*
Tropilaelaps mite (*Tropilaelaps* spp).	*Apis*
Vesicular stomatitis	*Artiodactyla* and *Equidae*
TSE	*Bovidae, Cervidae, Felidae* and *Mustelidae*'

SOUTH LAKES SAFARI ZOO

Animal Treatment Sheet

Date
Prescribed
Dispensed
Sheet No.

Species: ______________________ ARKS: __________

Reason: ______________________

Instructions for use: ______________________

____

Section: ______________________

Drug: __________ Conc. __________ Dose: __________

Frequency: __________ Route: __________ Duration: __________

Month: __________

1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

Month: __________

1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

Drug: __________ Conc. __________ Dose: __________

Frequency: __________ Route: __________ Duration: __________

Month: __________

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Month: __________

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8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

Drug: __________ Conc. __________ Dose: __________

Frequency: __________ Route: __________ Duration: __________

Month: __________

1	2	3	4	5	6	7
8	9	10	11	12	13	14
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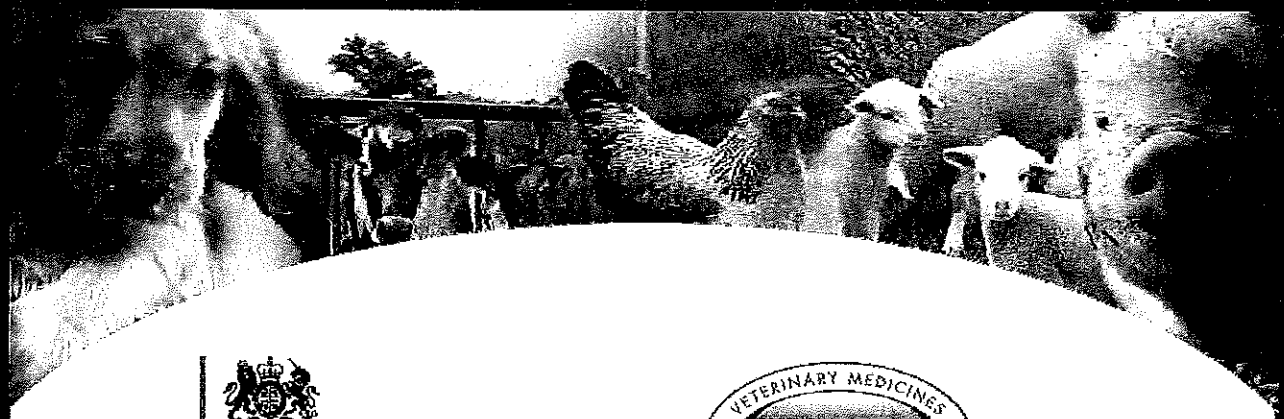
22	23	24	25	26	27	28
29	30	31				

Month: __________

1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				



Veterinary Medicines Directorate

ASSURING THE SAFETY, QUALITY & EFFICACY OF VETERINARY MEDICINES

VETERINARY MEDICINES GUIDANCE NOTE

No 13

GUIDANCE ON THE USE OF CASCADE

Last updated July 2013

www.vmd.defra.gov.uk

QUICK START GUIDE

This Veterinary Medicines Guidance Note (VMGN) is aimed primarily at veterinary surgeons and is intended to provide guidance on the application of the Cascade.

The quick start guide is a summary of the provisions of the Veterinary Medicines Regulations (VMR); detailed information is found in the body of the guidance note.

- The Cascade is a legislative provision in the VMR that allows a veterinary surgeon to prescribe unauthorised medicines that would not otherwise be permitted.

- The principle of the Cascade is that, if there is no suitable veterinary medicine authorised in the UK to treat a condition, the veterinary surgeon responsible for the animal may, in particular to avoid causing unacceptable suffering, treat the animal in accordance with the following sequence, in descending order of priority:

    - A veterinary medicine authorised in the UK for use in another animal species or for a different condition in the same species.

    - If there is no such product, the next option is either –
        - a medicine authorised in the UK for human use, or
        - a veterinary medicinal product (VMP) not authorised in the UK but authorised in another Member State (MS) for use in any animal species (in the case of a food-producing animal the medicine must be authorised in a food producing species) in accordance with an import certificate issued by the VMD.

    - If there is no such product, the last option is a medicine prescribed by the veterinary surgeon responsible for treating the animal and prepared extemporaneously by a veterinary surgeon, a pharmacist or a person holding an appropriate manufacturer's authorisation. In exceptional circumstances, medicines may be imported from Third countries through the VMD's import scheme.

Food producing animals may only be treated under the Cascade with medicines which contain pharmacologically active substances listed in the Table of Allowed Substances in Commission Regulation EU (European Union) No 37/2010, in the interest of food safety. EU Commission Regulation No 37/2010 can be found on http://ec.europa.eu/health/files/eudralex/vol-5/reg_2010_37/reg_2010_37_en.pdf

- A veterinary surgeon prescribing for, or administering a medicine to, food-producing animals under the Cascade is required to specify an appropriate withdrawal period to the animal produce. When setting the withdrawal period, a veterinary surgeon must take into account known information about the use of the product on the authorised species when prescribing to another species under the Cascade. Unless the medicine indicates a withdrawal period for the species concerned, this should not be less than:

    - 7 days for eggs and milk
    - 28 days for meat from poultry and mammals
    - 500 degree days for meat from fish

- For products imported from another MS under a Special Import Certificate (SIC), provided that the product is used strictly according to the terms of its EU authorisation, the withdrawal period applied should be the period stated on the EU product literature. For products imported under an SIC and used in a manner different from that described on the summary of product characteristics (SPC) the minimum statutory withdrawal periods above will apply unless the medicine indicates a withdrawal period for the species concerned.

- There are specific requirements for labelling of products to be used under the Cascade and also for record keeping. Further detailed information is found in the body of the guidance note.

FURTHER INFORMATION

- For more information on the requirements of the prescribing Cascade please contact the VMD's Legislation team on 01932 338321 or alternatively contact VMD reception on 01932 336911 and quote "Cascade".

TABLE OF CONTENTS

Introduction

1. This is one of a series of Veterinary Medicines Guidance Notes (VMGNs) explaining the requirements of the Veterinary Medicines Regulations (VMR). The VMR are revoked and replaced on a regular basis, so the references to them should be read as referring to the ones that are currently in force. Therefore, the date and number of the Statutory Instrument are not shown in this VMGN. The VMGN will be updated as necessary and the date of the most recent update is shown on the front cover.

2. The VMR set out the UK controls on veterinary medicines, including their manufacture, advertising, marketing, supply and administration. VMGN 1 Controls of Veterinary Medicines provides basic information about the scope of the VMR, which can be found on: http://www.vmd.defra.gov.uk/public/vmr_vmgn.aspx
Additional information, including the requirements for Marketing Authorisations (MAs), is given in VMGN 2 Marketing Authorisations for Veterinary Medicinal Products which can be found on: http://www.vmd.defra.gov.uk/public/vmr_vmgn.aspx

The Authorisation Process and the Controls on the use of medicines in animals

3. Applications for authorisation of veterinary medicines are scientifically assessed against statutory criteria of quality, safety and efficacy. This assessment process evaluates the benefits of the product and takes account of potential risks to the environment, to animals, to people who administer the medicine and to those who may consume produce from treated animals. It also forms the basis of a benefit:risk evaluation on which the decision to grant an authorisation is based. A summary of product characteristics (SPC) is prepared at the end of the assessment process and lists information such as dosage, posology, indications, withdrawal period if relevant, and specific warnings for the safety of the species, users and environment.

4. The use of medicines in ways that have not been authorised may pose potential risks that the authorisation process seeks to minimise. The law therefore requires that, wherever possible, only medicines authorised for the condition and species being treated are used. The law also imposes controls on the administration of veterinary medicines and prohibits the administration of a veterinary medicine unless it is authorised and the administration is in accordance with its SPC. The VMR also prohibit the prescription, supply and administration of medicines unless these activities have been carried out by an appropriate person in accordance with controls on distribution. Non-compliance with the provisions is an offence and may result in prosecution.

5. However, the legislation recognises that there will be clinical situations where no suitable authorised veterinary medicine is available. The law provides exemptions to allow a veterinary surgeon to treat animals under his or her care in this situation. These exemptions are:

- **Products Administered for Research**
  Medicines administered in accordance with an animal test certificate (ATC) or a licence issued under the Animals (Scientific Procedures) Act 1986.

- **Exceptional Circumstances**
  In the event of serious epizootic diseases the VMD, acting on behalf of the Secretary of State, may permit in writing the marketing and use of immunological products without an MA.

- **Immunological Products for Imported/Exported Animals**
  Where an animal is being imported from, or exported to, a country that is not in the European Economic Area (EEA), the VMD may permit the use of an immunological product that is not authorised in the UK but is authorised in the exporting/importing country. The EEA comprises the European Union (EU) plus Iceland, Liechtenstein and Norway.

- **The Cascade**
  The cascade allows veterinary surgeons to legally prescribe medicines that are not authorised for the relevant clinical case or for the relevant species under treatment when there is no authorised veterinary medicinal product (VMP) available.

The Principles of the Cascade

6. The Cascade is a risk based decision-tree to help veterinary surgeons decide which product to use when there is no authorised veterinary medicine available. Without the Cascade, veterinary surgeons would only be allowed to prescribe veterinary medicines that are authorised for a given species and for a given condition.

7. The Cascade is based on the principle that, if there is no veterinary medicine authorised in the UK for treating a disease, the veterinary surgeon responsible for the animal may, in particular to avoid unacceptable suffering, treat the animal with a product from one of the following categories in descending order of suitability:

   a) A veterinary medicine authorised in the UK for the same condition in another animal species or for another condition in the same animal species;

   b) Either:

      (i) a medicine authorised in the UK for human use; or

      (ii) VMP not authorised in the UK but authorised in another Member State (MS) for use in any animal species in accordance with an import certificate issued by the VMD (for further information on the Import Certificate Scheme please refer to VMGN 5 Import Certificate Schemes, which is published on the VMD website:
      http://www.vmd.defra.gov.uk/public/vmr_vmgn.aspx

   c) A medicine prescribed by the veterinary surgeon responsible for treating the animal and prepared extemporaneously by a veterinary surgeon, a

pharmacist or a person holding an appropriate manufacturer's authorisation (so called "specials manufacturer"). Under exceptional circumstances medicines may be imported from third countries in accordance with a VMD Import Certificate.

8. A medicine prescribed in accordance with the Cascade may be administered by the prescribing veterinary surgeon or by a person acting under the veterinary's surgeon's direction. The responsibility for the prescription and use of the medicine remains with the prescribing veterinary surgeon.

Considerations on the legal use of Cascade

9. The Veterinary Medicinal Products Directive 2001/82/EC (as amended) sets out the controls on the manufacture, authorisation, marketing, distribution and post-authorisation surveillance of veterinary medicines applicable in all MS. The Directive provides the basis for the UK controls on veterinary medicines, which are set out nationally in the VMR.

10. The European Commission (EC) has acknowledged that insufficient authorised VMPs are available for the treatment of every clinical case in every species. Therefore, Directive 2001/82/EC allows, under Articles 10 and 11, veterinary surgeons to prescribe products that are not authorised for the relevant clinical case or for the relevant species - this provision is known as the Cascade. This is a derogation from the main requirement in the EU legislation to use authorised veterinary medicines - therefore the Cascade increases the range of medicines that a veterinary surgeon can use.

11. In the UK the Veterinary Medicines Directorate (VMD) has fully implemented the Cascade into national legislation under Schedule 4(1) of the VMR.

12. As already mentioned elsewhere in the VMGN, every indication and dosage recommendation authorised for a VMP is derived from scientific data produced by the manufacturing authorisation holder (MAH) and has been subjected to a benefit:risk assessment. This information is set out in the SPC. For example, where the SPC specifies a particular dosage regimen or vaccination schedule in a named target species and for a named indication, there has been data assessed by the VMD to show that the product can be used safely and efficaciously in these circumstances.

13. The decision tree in the Cascade seeks to allow veterinary surgeons to use their clinical judgement to treat an animal under their care. However, when a product is used under the Cascade, it means that no data or insufficient data have been submitted to the VMD to support the authorisation of this differing dosage regimen or indication.

14. In departing from the clinical particulars on the SPC the veterinary surgeon must balance the benefits against the risks of doing so and thus take responsibility for their clinical decision. The potential benefits of using the product are usually obvious but the risks may not be. Risk could relate to the animal, the owner or person administering the product, consumers (where veterinary medicine residues in food might be affected), the environment and even wider public health (for example where increased selection for antimicrobial resistance might be the outcome). Any departure from the SPC must be considered carefully as the advice and warnings

given are there for good reason and based on assessed data. To ignore or disregard them without due care and thought would be inappropriate and, if something goes wrong with the treatment, could lay the veterinary surgeon open to litigation.

15. The aims of the existing legal provisions are to ensure that unauthorised medicines are used only when there is no authorised product for the condition and species concerned. In the case of food-producing animals, the aims are to ensure that potentially harmful residues of veterinary medicines do not enter the food chain. Definitive interpretation of legislation can only be given by the Courts. It is likely that the legislation will be interpreted in the light of how a competent and professional veterinary surgeon would reasonably act in pursuance of the aims in a particular set of circumstances. Please see Annex A for some illustrative, practical examples of the VMD's view of how the Cascade provisions may be applied.

The term "off-label use"

16. The term "off-label use" is regularly used but there are different interpretations as to what it means. There is no definitive legal definition for the term - for this reason this VMGN avoids the use of this misleading terminology and refers only to "authorised use" and "Cascade use".

17. Authorised use corresponds to the situation where a product is used in accordance with the clinical advice given on the SPC, for example the indications, dosage regime, contra-indications, target species safety warnings.

18. Cascade use corresponds to the situation where a product is used in a different species or when it is used in the authorised target species but for a different condition (which may or may not require a different dose) to that specified on the SPC. Where a product is used in accordance with the clinical particulars given on the SPC, but certain warnings/advice are not taken into account this is not considered to constitute Cascade use and may represent a safety risk (eg,failing to follow the user warnings on protective clothing such as gloves). In some cases, it may constitute illegal use (e.g., supplying a product outside its expiry date).

19. Please see the Annex A to this VMGN for some practical examples of authorised and Cascade use of veterinary medicines.

Prescribing under the Cascade

Food producing animals

20. If there is no medicine authorised in the UK for a condition affecting a food-producing species, the veterinary surgeon responsible for treating the animal(s) may use the Cascade options as set in paragraph 7 except that the following additional conditions apply:

- the treatment in any particular case is restricted to animals on a single holding;
- any medicine imported from another MS (option b(ii)) must be authorised for use in a food-producing species in the other MS;

- the pharmacologically active substances contained in the medicine must be listed in the Table of Allowed Substances in Commission Regulation EU No 37/2010 – Maximum Residue Limits (MRLs) available at http://ec.europa.eu/health/files/eudralex/vol-5/reg_2010_37/reg_2010_37_en.pdf

- the veterinary surgeon responsible for prescribing the medicine must specify an appropriate withdrawal period;
- the veterinary surgeon responsible for prescribing the medicine must keep specified records.

21. This provision does not specifically require an MRL to be set for the species for which the veterinary surgeon intends to use it. Therefore, even if the MRL entry for that substance does not include e.g. eggs, a veterinary surgeon could consider it for use in chickens intended to produce eggs for human consumption. In this case the veterinary surgeon should consider the risks of using this substance and is obligated to consider the time of use in relation to the stage of development of the eggs and the length of time between administration of the last dose and the first egg being laid and to set an appropriate withdrawal period to ensure that residues of any substances administered will not enter the food chain.

22. These additional provisions are to safeguard consumers of produce from treated animals against risk from any potentially harmful residues of the medicines administered.

Setting an appropriate withdrawal period for food producing species treated with medicines under the Cascade

23. The withdrawal period is the period of time following treatment of animals with a veterinary medicine in which the meat, milk, eggs or honey from the treated animal must not enter the human food chain due to the possible presence of residues from pharmacologically active substances. It is determined by scientific studies conducted on the target species and is stated on the SPC for the authorised medicine.

24. Where a product is used under the Cascade in a food producing species the veterinary surgeon is responsible for defining an appropriate withdrawal period in all cases. Such a withdrawal period has to be selected to ensure that residues above the MRL will not occur. If the product is administered to a species not identified on the SPC, or to an authorised species but at a higher dosage than recommended, it is necessary to apply the **minimum** statutory withdrawal periods, or the withdrawal period stated on the SPC, whichever is longer. The minimum statutory withdrawal periods are as follows:

- 7 days for eggs and milk
- 28 days for meat from poultry and mammals
- 500 degree days for meat from fish

25. For products imported under a Special Import Certificate (SIC), provided that the product is used strictly according to the terms of its EU authorisation, the withdrawal period applied in the UK should be the period stated on the EU product literature. For products imported under an SIC and used in a way different from that described

on the SPC then the UK minimum statutory withdrawal periods will apply or the withdrawal period stated on the SPC, whichever is longer.

26. As there is no minimum withdrawal period set for honey, it is up to the prescribing veterinary surgeon to set a suitable withdrawal period that will ensure no risk to consumer health. Further guidance on setting a suitable withdrawal period is available from the National Bee Unit (telephone: +44 (0) 1904 465636).

27. Human homeopathic products may be used in food producing animals under the rules of the Cascade, but only if the pharmacologically active substances are listed in Table 1 Allowed Substances of Commission Regulation No 37/2010. In this case, the statutory withdrawal period must be applied.

The use of the Cascade in horses

28. As first choice, horses should be treated with VMPs which have a UK MA for use in horses. However, if there is no suitable authorised product available, the Cascade may be used to prescribe an alternative medicinal product.

29. A horse declared as non-food producing in its passport can be treated under the Cascade as a companion animal. A horse that has not been signed out of the food chain in its passport can only be treated with a veterinary medicine that contains pharmacologically active substance(s) listed in Table 1 of Regulation EU 37/2010 for use in a food producing species. Products imported from another MS, or in exceptional circumstances from Third countries, in accordance with a VMD Import Certificate may also be used, providing that a withdrawal period can be set.

30. Commission Regulation 122/2013 amending Commission Regulation 1950/2006 establishing, in accordance with Directive 2001/82, a list of substances essential for the treatment of equidae, which can be found on:
http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2013:042:0001:0017:EN:PDF.
This legislation allows the use of certain substances in horses (declared as food or non-food producing in the passport) under the use of the Cascade and with a statutory withdrawal period of six months.

31. Detailed information on the use of medicines in horses in the context of the horse passport legislation may be found in VMGN 16 Guidance on Horse Medicines and Horse Passports, which is published on the VMD website
http://www.vmd.defra.gov.uk/public/vmr_vmgn.aspx

Use of human medicines

32. The veterinary medicine sector is a much smaller market than the human medicine sector and it is also more complicated because of the different controls for food producing animal medicines and companion animal medicines. There is a general assumption that human and veterinary medicinal products containing the same active substances are interchangeable. This is not always the case and the human medicine has no specific safety or efficacy data on its use in animals to corroborate this.

33. For example, animal species react differently to medicines between themselves (e.g. permethrin works in dogs but is poisonous to cats) and humans (e.g. ibuprofen is

poisonous to dogs) so controls are required on inter species use except where this has been authorised. These risks relate to all the components of the medicine, not just the active ingredient. There exists the risk that other constituents in the formulation of the human medicine will affect the safety and efficacy of the medicine when used in animals

34. Medicine selection under the Cascade is totally under the responsibility of the prescribing veterinary surgeon. The VMD does not seek to interfere with the veterinary surgeon's clinical judgment in determining the best available treatment to the animal under his or her care. The use of a human medicine under the Cascade is legal provided that the veterinary surgeon follows the Cascade decision tree and is able to justify the choice of treatment based on animal welfare. It is not permissible to use a human medicine simply because it is cheaper than an authorised veterinary medicine.

Prescription of extemporaneous preparations, including Specials

35. Neither European nor national legislation offers a definition of extemporaneous preparations. Our interpretation of the legal text is that any medicine tailored for a particular animal or herd, prepared by a veterinary surgeon, a pharmacist or a person who holds an appropriate manufacturing authorisation, is an extemporaneous preparation and may be used under the Cascade. A veterinary prescription is required but this prescription may be written or simply oral.

36. When it is necessary to have a medicine prepared as an extemporaneous preparation, in the first instance it is recommended that the veterinary surgeon contacts a manufacturer holding an authorisation that permits them to manufacture such products - a Specials Manufacturing Authorisation (ManSA). This is because premises that hold a ManSA are inspected for compliance with the principles of Good Manufacturing Practice (GMP) and therefore are well prepared and equipped to prepare a medicine of suitable quality.

37. Manufacturers of Specials are authorised by the VMD or, if they also manufacture human medicines, by the Medicines and Healthcare Products Regulatory Agency (MHRA).

38. A list of veterinary-only Specials Manufacturers can be found on the VMD website http://www.vmd.defra.gov.uk/pdf/register_specials.pdf — and a register of combined human and veterinary Specials Manufacturers can be found on the MHRA website:
http://www.mhra.gov.uk/Howweregulate/Medicines/Licensingofmedicines/Manufacturersandwholesaledealerslicences/index.htm

39. For further information on the manufacture of Specials please refer to VMGN 15 Guidance for Manufacturers, which is published on the VMD website http://www.vmd.defra.gov.uk/public/vmr_vmgn.aspx

40. Medicines marketed under Schedule 6 of the VMR – Exemptions for small pet animals are available over the counter medicine and may be administered at any time in accordance with the product's recommended use. However, if the product is to be administered to an animal in a way not in accordance with the product literature (for example, the product is for ferrets and the veterinary surgeon wishes to use it in

a cat) because in his/her professional judgement, such a product could provide a safer or better option than an authorised medicine, then this would consist of use of a product under the Cascade (use of an extemporaneous preparation).

41. For further information please refer to VMGN 12 Exemptions for Small Pet Animals, which is published on the VMD website http://www.vmd.defra.gov.uk/public/vmr_vmgn.aspx

"Office stock" of medicines for use

42. In the interest of animal welfare, a veterinary surgeon may have in his possession medicinal products such as human medicines, imported medicines and extemporaneous preparations intended for administration to animals under the Cascade. The VMD does not specify a maximum quantity that may be held in a practice as this varies from practice to practice and will depend on the products involved. However, the quantity held should be justified by the clinical need under the Cascade rules – these medicines must not be used as a first choice treatment in every situation. It is important for veterinary surgeons to keep up to date with new authorisations and adjust their prescribing habits and stocking policies accordingly.

Dispensing of medicines

43. Only veterinary surgeons registered with the Royal College of Veterinary Surgeons (RCVS) may prescribe medicines under the Cascade for use in animals in the UK.

44. A Suitably Qualified Person (SQP) may dispense an authorised VMP, which falls within the scope of the qualification they hold, for use under the Cascade against a valid prescription from a veterinary surgeon.

45. A pharmacist may dispense authorised VMPs, human medicines or extemporaneous preparations against a prescription from a veterinary surgeon.

Labelling of medicines

46. The following information must be included on labels for products administered under the Cascade. Where the product is supplied in its original packaging and already includes some of this information which remains legible following application of the dispensing label, it is not necessary to repeat this information on the dispensing label. If it is not feasible to include all of the information on the label due to the size of the packaging it must be included on a separate sheet.

- the name and address of the pharmacy, veterinary surgery or approved premises supplying the VMP
- the name of the veterinary surgeon who has prescribed the product
- the name and address of the animal owner
- the identification (including the species) of the animal or group of animals
- the date of supply
- the expiry date of the product, if applicable
- the name or description of the product, which should include at least the name and quantity of active ingredient
- dosage and administration instruction

- any special storage precaution
- any necessary warnings for the user, target species, administration or disposal of the product
- the withdrawal period, if relevant, and
- the words "Keep out of reach of children" and "For animal treatment only

47. The veterinary surgeon prescribing under the Cascade must use his/her judgment to list the safety warnings that should be placed on the label of the dispensed medicine.

48. Unless the veterinary surgeon who prescribed the medicine both supplies the product and administers it to the animal in person, the person supplying the medicine must label it or give instruction for it to be labelled as described above.

Record keeping requirements

49. In addition to the standard record keeping requirements set out in VMGN 14 Record-Keeping Requirements for Veterinary Medicinal Products, which can be found on the VMD website http://www.vmd.defra.gov.uk/public/vmr_vmgn.aspx there are specific record keeping requirements for veterinary surgeons who administer or supply medicines to be used under the Cascade. These are set out below and must be retained for at least 5 years and be made available on request to a duly authorised person.

50. The information recorded must include the following:

- date of examination
- owner's name and address
- the identification and number of animals treated
- result of the veterinary surgeons clinical assessment
- trade name of the product(s) prescribed, if applicable
- manufacturer's batch number
- name and quantity of the active substance
- doses administered
- duration of treatment
- withdrawal period

51. If the client or other records already have this information no additional separate records are needed as long as the information is accessible on request. Veterinary surgeons may also find it helpful to include information identifying treated animals among their records.

Informed consent before treatment of animals

52. It is not a legal requirement under the VMR to obtain informed consent from the owner of an animal to be treated under the Cascade. This requirement is part of the RCVS Code of Professional Conduct for Veterinary Surgeons which can be found on:

http://www.rcvs.org.uk/advice-and-guidance/code-of-professional-conduct-for-veterinary-surgeons/
The VMD supports this initiative in the interest of good communication between client and practitioner.

Reporting of an adverse event

53. It is not a legal requirement for veterinary surgeons to report adverse events (AEs) to medicines prescribed under the Cascade. However, we encourage reporting of any AEs to the MAH or to the VMD as this will provide us with knowledge of the use of the medicine in the field. Unless such reports are received the incidence and severity of side effects, and the ongoing efficacy of products, cannot be assessed, and consequential action, for example, to amend product literature, cannot be taken. Further information on the VMD's AEs scheme may be found in VMGN 11 Pharmacovigilance Guidance on Adverse Events, which is published on the VMD website: http://www.vmd.defra.gov.uk/public/vmr_vmgn.aspx

Further Information

54. Further information is available from the Veterinary Medicines Directorate, Woodham Lane, New Haw, Addlestone, Surrey, KT15 3LS - Tel: +44 (0)1932 336911; Fax: +44 (0)1932 336618 or E-mail: VMGNotes@vmd.defra.gsi.gov.uk. Veterinary Medicines Guidance Notes and other information, including details of VMD contacts, are available on the VMD website (www.vmd.defra.gov.uk).

ANNEX A

PRACTICAL CONSIDERATIONS CONCERNING THE USE OF THE CASCADE

A) When is treatment considered "authorised use" or "Cascade use"?

When a veterinary medicine is used in another species or to treat another disease this is clearly Cascade use. However, there may be some situations where it is not so immediately apparent that use is under the Cascade provisions.

The following table is intended to provide some examples of areas where guidance may be helpful in clarifying the position. It is not intended to be a comprehensive list but offers examples based on previous queries posed by veterinary surgeons. Decisions on whether a product is being used under the Cascade are integrally linked to the very specific wording on that product's SPC. **It is essential to emphasise that specific decisions on whether use is Cascade use can only be reached when all relevant SPC sections are taken into account.**

Scenario	Cascade use (not supported directly by VMD assessed data)	Authorised use (supported by VMD assessed data)
The SPC dose regimen is 10 mg/kg for 3 days and the applied dose regimen is 20 mg/kg for 3 days.	✓	
The SPC dose regimen is 10mg/kg but this is extended in duration from a recommended 3 days to 6 days.	✓ (from days 4 to 6)	✓ (from days 1 to 3)
The SPC dose is 10 mg/kg for 6 days and the applied dose regimen is 20 mg/kg for 3 days.	✓	
The SPC includes special warnings concerning the use of the product in animals with kidney disease but the animal to be treated has kidney disease.		✓ (as long as special warnings followed)
Anticancer drug indicated for use in dogs with tumours with specific genetic markers – used in dogs with tumours not displaying the markers or the tumour markers are not established	✓	
The SPC for the vaccine specifies primary vaccination in animals from 10 weeks of age or older, and animals are 12 weeks at the time of vaccination.		✓
The SPC for the vaccine recommends a primary schedule of vaccination at 6 and 12 weeks but the animal to be treated is vaccinated at 8 and 14 weeks.		✓

B) Special consideration for use of vaccines under the Cascade

Where the SPC for a vaccine specifies a booster vaccination for a component after three years but an annual booster vaccination is carried out this is Cascade use.

Where an animal is to be revaccinated beyond the period of the authorised schedule (e.g. an adult dog being revaccinated some time after puppy vaccinations) there is no requirement that you must use the same product on the animal as was used previously. Veterinary surgeons should make a risk:benefit assessment taking into account current knowledge concerning the individual disease against which they are vaccinating. For example, there may be no real justification for administering a full primary puppy vaccination course for the WSAVA (World Small Animal Veterinary Association) recommended core antigens (i.e. Distemper, Adenovirus and Parvovirus) when a dog's booster vaccination schedule has been allowed to lapse, as a single dose of vaccine may be sufficient to provide adequate immunity. This is not the case for antigens, such as, leptospira and so it is important for veterinary surgeons to make a benefit:risk assessment in relation to the specific animal and its circumstances.

Simultaneous and concurrent use of vaccines
Where SPCs specifically state that two named vaccines can be administered:

- concurrently
    - at the same time at different sites or
    - at the same site at different times or
- simultaneously (i.e. they can be mixed together immediately prior to administration)

There will be data to show they are compatible and that there are no adverse effects on the safety and efficacy of either individual product. Where there is no such SPC statement, no data have been assessed by the VMD to demonstrate whether the two products could interact in such a way as to adversely affect the immune response to either product and/or have the potential to cause significant adverse reactions. Therefore, in this case, concurrent or simultaneous administration represents Cascade use. A decision to use a vaccine before or after any other VMP needs to be made on a case by case basis by the veterinary surgeon.

Use of a route of administration other than the authorised route
Safety and efficacy data have been generated using the route of administration stated on the SPC. This is of particular relevance to live vaccines where safety, in respect of reversion to virulence and the likelihood of dissemination and spread of the live virus, has been established. This demonstrates that using the authorised route of administration is safe. Use of an unauthorised route of administration could have serious consequences for the animal, the owner, the environment and the consumer if the attenuated virus behaves differently when administered by a different route (e.g. administering a vaccine intended for intramuscular administration in drinking water or feed).

C) Some illustrative examples of the VMD's view of how the Cascade provisions may be applied, in particular regarding companion animals

- **Dosage Considerations** - Sometimes a veterinary surgeon may consider that the effective treatment of a particular condition in a particular animal requires a different dosage regime from that on the label of a product. In such circumstances recourse to the Cascade would be appropriate and the veterinary surgeon may compare the merits of using that product with a dosage regime different from that described on the product's SPC with an alternative authorised veterinary medicine. If neither can

safely be administered at the dosage required, the veterinary surgeon should consider further options under the Cascade.

- **Individual Characteristics** - If a particular animal has characteristics, such as age, general condition or known sensitivity to a particular substance, which the veterinary surgeon judged to present unacceptable risks and to contra-indicate the use of the authorised product, he or she could conclude that no authorised product existed for that condition in that animal and consider other treatments.

- **Chronic Infections** - If a condition persists following treatment with an authorised product, the veterinary surgeon may consider in a particular case that there is no authorised treatment for that particular condition and that further use of medicines containing substances in the same chemical group is not appropriate. In such circumstances it would be legitimate to consider alternatives in accordance with the Cascade.

- **Complex Conditions** - Diagnosis is a matter for the veterinary surgeon under whose care an animal or animals have been placed. Some conditions need to be viewed more widely and treated accordingly. For instance, pneumonia may be regarded as a single condition. On the other hand, the diagnosis may be of more than one concurrent condition, such as pneumonia with fluid retention. In such circumstances the veterinary surgeon would need to exercise his or her professional skills to reach a diagnosis and prescribe the most effective treatment.

  If he or she considered that in the circumstances there were two or more concurrent conditions, the treatment of each would need to be considered in accordance with the VMR. However, due account of the usual factors such as drug incompatibilities or side-effects must be considered.

- **Unavailability of Products** - If a product cannot be obtained despite diligent search and in a reasonable time, the veterinary surgeon may conclude that in the circumstances it does not exist. In such circumstances the Cascade should be followed to identify a suitable alternative. However, it is appreciated that there may be cases where urgency dictates that a veterinary surgeon uses whatever is to hand, whether authorised or not. The VMD publishes on its website details of supply issues which have the potential to cause animal welfare issues and provides where possible information on alternative products. http://www.vmd.defra.gov.uk/vet/supply.aspx

- **Animal owner considerations** - If a veterinary surgeon considers that, for example, an elderly or disabled pet owner would have difficulty in crushing and administering tablets which were the only form in which an authorised product was available, it would be unlikely that action would be taken if he or she concluded that medicine in tablet form were not appropriate in the circumstances, and alternatives in line with the Cascade were considered.

- **Medicines commonly found around the home** - Sometimes a veterinary surgeon may judge there is a need to alleviate a pet's discomfort until a home visit can be made or the animal brought to the surgery. It would be unlikely that action would be taken if in such circumstances a home remedy, e.g. antihistamine, were to be recommended. This means that in an emergency a vet could recommend that an animal owner could use a human medicine that the owner already has in his/her

possession. This does not mean a pet owner should be encouraged to go into a pharmacy and ask for a human medicine for their pet.

List of Abbreviations

AE	Adverse Event
ATC	Animal Test Certificate
Defra	Department for Environment, Food & Rural Affairs
EC	European Commission
EEA	European Economic Area
EU	European Union
GMP	Good Manufacturing Practice
MA	Marketing Authorisation
MAH	Marketing Authorisation Holder
ManSA	Specials Manufacturing Authorisation
MHRA	Medicines and Healthcare Products Regulatory Agency
MS	Member State
RCVS	Royal College of Veterinary Surgeons
SIC	Special Import Certificate
SQP	Suitably Qualified Person
SPC	Summary of Product Characteristics
VMD	Veterinary Medicines Directorate
VMGN	Veterinary Medicines Guidance Note
VMP	Veterinary Medicinal Product
VMR	Veterinary Medicines Regulations

VETERINARY MEDICINES GUIDANCE NOTE

Veterinary Medicines Directorate
Woodham Lane, New Haw, Addlestone, Surrey KT15 3LS
Telephone (+44) (01932) 336911 Fax: (+44) (01932) 336618
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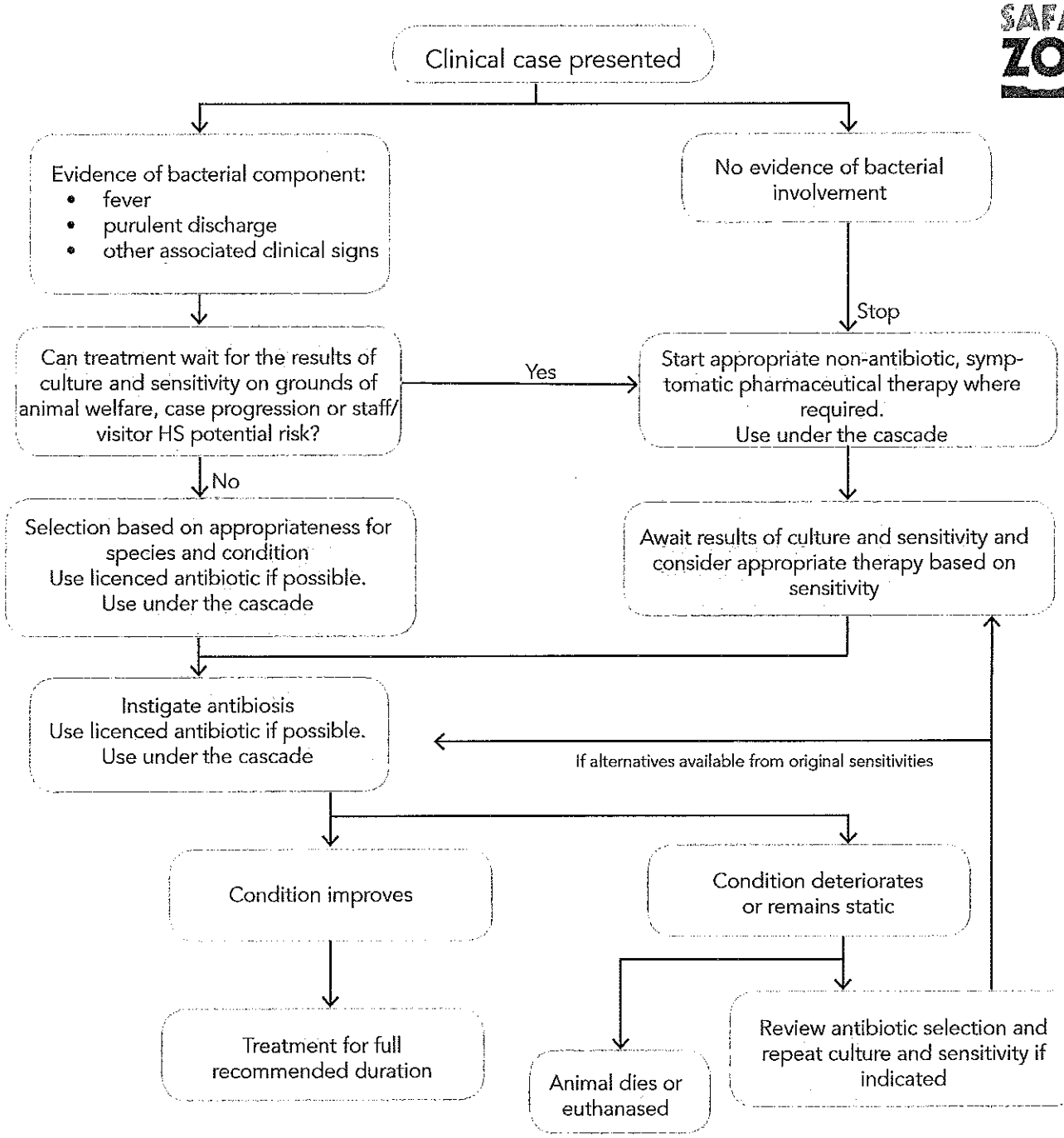
Antibiosis selection under the cascade



Cascade

If there is no suitable veterinary medicine authorised in the UK to treat a condition, the veterinary surgeon responsible for the animal may, in particular to avoid causing unacceptable suffering, treat the animal in accordance with the following sequence, in descending order of priority:

- A veterinary medicine authorised in the UK for use in another animal species or for a different condition in the same species.
- If there is no such product, the next option is either a medicine authorised in the UK for human use or a veterinary medicinal product (VMP) not authorised in the UK but authorised in another Member State (MS) for use in any animal species in accordance with an import certificate issued by the VMD.
- If there is no such product, the last option is a medicine prescribed by the veterinary surgeon responsible for treating the animal and prepared extemporaneously by a veterinary surgeon, a pharmacist or a person holding an appropriate manufacturer's authorisation. In exceptional circumstances, medicines may be imported from Third countries through the VMD.

Additional considerations

- Check recognised texts and formularies for doses, side effects and warnings
- Note special labelling requirements for drugs used under the cascade
- when using drugs on the cascade FULL records regarding the use and reasons MUST be kept
- Note food animals e.g. ostrich have additional requirements
- Always refer to the current VMG: currently Note 13, Sept 2011.

Last updated Oct 2016

Based on guidelines draw up by the British Veterinary Zoological Society

THERAPEUTIC AGENTS: ROUTES OF ADMINISTRATION

Veterinarians provide the knowledge to diagnose and dispense therapeutic agents or advise on husbandry changes and supportive therapies, yet it is the keeper that ultimately has to deliver these. There are almost as many different types of medicines and supportive therapies available as there are different species. There are certain aspects to consider when reading the label on the dispensed medication:

- **Drug name:** drugs must be dispensed with a clearly written label. On this there will be the drug's name. Drugs have two names, one is the brand name and varies between different companies, whilst the other is the generic name, which is the active ingredient contained in the product and this does not differ for different forms of the drug. For instance the antibiotic clavulated amoxicillin (generic name) is manufactured by several companies and is known as noroclav, synulox, augmentin and many others. The important name is the generic name as this is the active ingredient.
- **Concentration:** a drug may be presented in varying concentrations. This is important to know as the same drug will require different volumes to be given if different concentrations are used e.g. the analgesic meloxicam comes in 0.5mg/ml, 1.5mg/ml, 15mg/ml, and 20mg/ml solutions which means that an animal needing a 20mg dose would require either 40ml, 13.3ml, 1.3ml, or 1ml of each of the different concentrations to achieve the same dose. Sometimes drugs are dispensed as a percentage solution e.g. baytril (enrofloxacin) 2.5%. In these cases, just simply multiply the percentage by 10 to give the concentration per ml, in this case 2.5% is 25mg/ml. It should be noted that the veterinarian will have worked this out for you and all you need to do is adhere to the instructions.
- **Dose:** this is the number of tablets or volume of liquid that must be given at each of the time periods dictated in the frequency.
- **Frequency:** this is the number of times a day a drug must be given. Abbreviations exist to denote the frequency:

    - **sid** once daily
    - **bid** twice daily
    - **tid** three times a day
    - **qid** four times a day

- **Duration:** the length of time that the treatment should be given for.

All courses should be finished; in the event that some drug is spilt or lost, or an animal rejects a treatment then the veterinarian should be informed immediately so replacement or alternatives can be supplied.

There are various routes of administration available for most medications. The choice is based on the suitability for the species but this is sometimes limited by the formulation that a drug comes in. The various routes include:

Force-feeding or supportive oral therapy: in sick patients that are bright and alert it is possible for nutritional and fluid support to be given to support the animal as it attempts to heal. Oral rehydration fluids are extremely useful and this is a more physiologically normal method then the intravenous or subcutaneous routes. However, in cold or moribund patients the fluid can just sit in the stomach and cause discomfort.

Oral rehydration fluids may be given at 4-10% body weight initially, moving to liquidised feeds or commercially available diets once the animal is hydrated. In general, when force-feeding animals a small amount of food should be available to the animal to allow it the opportunity to self-feed. It is important that the diet selected is appropriate to the species e.g. herbivorous diets for herbivores. Feeding the incorrect diet can lead to digestive disturbances that may severely compromise an already sick patient. There are various options for force-feeding patients, the choice is often limited by the species that you are attempting to feed:

- **Syringe feeding:** is mainly restricted to mammals which often have a strong chewing response to items placed in their mouths. The tip of the syringe should be placed in the corner of mouth, or in the diastema. Small amounts should be injected and the patient allowed to chew and swallow. This is time comsuming but can be effective. However, it is extremely stressful for wild patients and is limited to a handful of species in most zoos.
- **Naso-gastric tube** is a tube placed through the nose and ultimately into the oesophagus or stomach depending on the species. They are usually very narrow and it can be difficult to get food blended enough to go down them. It is a useful technique though and does not require surgery. Its use is limited in the zoo situation. A veterinarian should only perform this.
- **Pharyngostomy or oesopharyngostomy tubes** are extremely useful in patients that may require long-term nutritonal or medical support; this is especially true of chelonians. It does require them to be surgically placed under anaesthesia and for them to be maintained and cleaned regularly to prevent infection. A veterinarian should only perform this.
- **Crop feeding or crop tubing:** is specific to birds and requires the use of either a long blunt ended needle or a fairly rigid but soft edged tube. The bird should be restrained suitably, the mouth opened and the tube guided over the back of the throat, ensuring the larynx (windpipe) is not entered. Care should be taken not to tube a bird that is struggling, that the choana is not damaged and that the tube is palpable within the crop before fluids or food are given. Fluids/food should be injected slowly and the mouth monitored for any regurgitation: if this occurs then the tube should be removed and the bird released. Crop tubing is relatively easy but if doing it for the first time then you should receive tuition from an experienced member of staff.
- **Stomach tubing:** is similar to the technique in birds but is used in reptiles. Care should be taken not to damage the teeth when opening the mouth or restraining the animal. If this occurs then it should be reported to the veterinarian and the mouth assessed at fortnightly intervals to ensure infection does not occur, potentially leading to osteomyelitis. Some species of chelonian have an S shaped curve in their neck, therefore the neck should be fully extended before attempting tubing otherwise you may damage the oesophagus. Rigid or metal tubes should not be used. Regurgiatation can be common in stressed animals and they should be left for 12-24 hours to ensure this does not occur.
- **Direct placement of food in the mouth:** amphibians will often swallow food that is directly placed in the caudal oral cavity. Live food should be killed prior to force feeding in the amphibians.

Oral administration (per os, PO): drugs can be given using any of the methods mentioned above in force-feeding. Administration of drugs via drinking water is of limited use and typically results in animals being under dosed. It is worth discussing with your veterinarian the availability of different formulations and concentrations as this may make it easier for you to administer the agent required e.g. higher concentrations require smaller volumes, or banana flavoured antibiotics designed for children may be more useful in primates then other bitter formulations of the same drug.

Parenteral route: refers to any route of administration other then orally.

Subcutaneous (SC): subcutaneous injections are literally placed under the skin. The skin is pinched and lifted upwards, often forming a tent, and the drug is injected into the space created. It is a simple and quick technique that is effective in most instances. However in dehydrated or moribund animals the uptake of the drug can be extremely slow or not at all and alternative routes should be considered. SC fluids are used for ease but this route is not recommended unless all other options such as IV, IO, or IP cannot be used.

Intramuscular (IM): intramuscular injections are exactly that, injections of an agent into a muscle group where it is absorbed into the circulation and then distributed around the body. IM injections are common but should be limited to the volume given as it can be painful. Multiple injections are tolerated better than one large injection. In smaller mammals there is no real advantage over SC injections and this route should be avoided. It is useful in larger mammals, birds (the pectoral muscles typically) and in herptiles. Any muscle body can be used. Remember fish are predominantly muscle and this is a common injection route for this taxa. Abscessation and drug leakage is not uncommon in all taxonomic groups.

Intraperitoneal (IP) or intracoelomic: is injection of, normally fluids, direct into the abdomen of mammals or the coelom of birds, reptiles or fish. It is imperative that the fluids are at room temperature. In birds this is not recommended as the likelihood of injecting fluid into an air sac and the bird drowning is high. In other species care must be taken as damage to organs with the needle and the fluids is possible. Other agents, other than fluids, can be injected using this but it is not commonly used now.

Intra-venous (IV): is injection of agents directly into the blood stream. This is a specialist technique that should only be attempted by vets. Cannulation (sometimes incorrectly called catheterisation: this is bladders only) is the placement of small tubes that lie in a blood vessel and allow continual access for IV medications or fluids.

Intra-osseus (IO): is injection into the medullary cavity of the bones. It sounds quite aggressive but is similar to IV techniques. The bone marrow cavity produces blood cells in most species and generally has a good blood supply. In animals that are too small or IV access cannot be achieved then IO is a good alternative. Obviously this requires veterinary placement and management

Intra-cardiac (IC): is injection directly into the heart and is a quick and easy technique to achieve intravascular access. However, it is extremely painful in mammals and is limited to moribund or anaesthetised patients, and even then only after attempts have been

made to obtain IV access. It is used in snakes where IV access is not possible, it can even be used as a site for cannulation in these species.

Topical: is the placement of ointments or creams on to the surface of the body or into accessible orifices such as ears. Animals will often lick this off and the agents should be safe to eat, or collars or bandages can be used to prevent access. The topical route is especially useful in amphibia as some species can directly absorb the agents through the skin, in these species this route can even be used to induce anaesthesia.

Nebulisation: takes a drug and makes it into a fine mist that can then be inhaled. It is particularly useful in treating respiratory or air sac infections which are usually difficult to treat with other routes. In addition, it has the advantage of being relatively stress free, with the disadvantage that operators must take care not to inhale the agent too.

Environmental (water): fish and amphibia can have their environment treated to treat the animal. Care must be taken with this technique as there are several considerations on water quality, disposal of treated water, the drugs used and their efficacy depending on the hardness of the water, dispersal of the drug through the water, and the type of filters in the system (e.g. the use of antibiotics is contraindicated in biological filtration systems). The veterinarian should be your principle contact if considering these treatments.

AIM

Etorphine, also known as Large Animal Immobilon or M99 is a very potent neuroleptanalgesic used in the induction of anaesthesia. It is highly toxic to humans. This document details the procedures and protocols indicated in the safe use of etorphine at Safari Zoo and on related projects.

INTRODUCTION

Etorphine is an anaesthetic agent commonly used for hoof stock and other large animals. There are alternative anaesthetic agents available for some species, yet for the majority of artiodactylids Etorphine is still the agent of choice for the induction of anaesthesia.

Etorphine is a very potent neuroleptanalgesic consisting of a combination of the opioid agonist **etorphine hydrochloride (2.45mg/ml LA Immobilon or 9.45mg/ml M99)** and the phenothiazide **acepromazine maleate (10mg/ml LA immobilon only)**. When purchased it comes with the partial opioid antagonist **diprenorphine hydrochloride 3.26mg/ml** (Revivon / M5050) which also has some agonist properties itself. **Naltrexone HCl (50mg/ml)** is a full antagonist available and sometimes used.

Etorphine is a member of the family of drugs called the opioids, and is classed as an agonist agent. It is highly potent and humans are extremely sensitive to small volumes. The lethal dose is 0.03-0.12mg/person, which equates to 0.01-0.04ml/human. Compare this to the volumes of 1-3mls that are commonly used during anaesthetic procedures. However, etorphine has been used for last 20 years with a good safety record at Safari Zoo. As long as care and consideration is employed when using etorphine the risk to humans is low, however accidents can happen and the following procedure guidelines minimise the need for emergency treatment but also, when needed, allow emergency therapy to be administered accurately and rapidly.

USING ETORPHINE

ETORPHINE IS RAPIDLY FATAL TO HUMANS, EITHER BY INJECTION OR ABSORPTION ACROSS MUCOUS MEMBRANES

LETHAL DOSE IS 0.01-0.04ml/human (Etorphine)

Etorphine, or more specifically Etorphine Hydrochloride is an extremely potent opioid that can lead to severe respiratory depression and death relatively rapidly. Exposure can occur through needle stick injury, accidental injection, dermal contact (especially if cuts are present), and through aerosolisation. It is an anaesthetic agent that requires respect, but can be used safely as long as users are not complacent and follow the following recommendations.

The use of Etorphine at Safari Zoo can be considered in three stages, each with specific risks associated with them;

- Preparation of remote chemical immobilisation equipment
- The act of darting itself (including hand injection)
- Collection and cleaning of the dart contaminated with Etorphine

1. Preparation of remote chemical immobilisation equipment

The technique for assembling a dart is the same as that outlined within the Remote Chemical Immobilisation at Safari Zoo Protocols. However due to the nature of etorphine it is essential that additional safe guards are employed;

- An assistant, trained in emergency etorphine exposure, is always present when darts containing etorphine are being prepared
- Before approaching the etorphine bottle the emergency protocol should be checked and verified in the correct place and that the assistant is aware of the location, in addition all stocks of naloxone should be checked to ensure adequate supply for emergency treatment
- Latex (or similar) gloves, a full face shield with respirator must be available
- The dart should only be made up immediately before it is used, no pre-made darts should be made nor transported around the park
- All unnecessary staff should be made to stand away at some distance, except for the assistant, to avoid distraction and risk of spray when pressurising the dart if incorrectly assembled
- The etorphine bottle should have negative pressure, i.e. air must not be injected into the bottle prior to (or after) removal of the correct amount of etorphine. All efforts must be made to only remove the correct amount of etorphine so it is not necessary to re-inject excess back into the bottle: this avoids spillage
- The needle and syringe used to draw up the etorphine must be disposed of immediately into a sharps bin after the drug is injected into the dart's chamber, no attempts to re-sheath the needle with the cap should be made
- The dart needle sheath must be in place before pressurisation can occur
- If any of the above are not possible then the procedure should be delayed until all safety equipment is in place, or an alternative anaesthetic induction agent should be selected

2. The act of darting itself (including hand injection)

The technique and considerations for darting with etorphine are no different to that of other agents, as outlined in the Remote Chemical Immobilisation at Safari Zoo Protocols, however there is a need for consideration of additional safe guards when using etorphine;

- The etorphine bottle must be kept in a secure receptacle close to the darting act or locked in the vehicle used for the procedure when not attended during the darting procedure
- The dart should be placed into the rifle or pistol's dart chamber immediately after it is pressurised to prevent accidental exposure to the operator or surrounding staff
- After darting the dart should be monitored for any external leakage on the skin of the target animal, if it is seen then the area should be liberally doused with water to decontaminate the area. At least one full bucket of water should be used for every millilitre of etorphine used. This should be undertaken by the dart operator or veterinarian
- If the dart falls from the animal during induction, then this should be retrieved by the veterinarian and placed immediately into a metal or plastic tin for safety and transport. Latex (or nitrile) gloves should be worn at all times
- If the dart remains in the animal then it should be depressurised before it is removed from the animal, using artery forceps or pliers, whether it has fully emptied or not. This should then be placed immediately into a metal or plastic tin as already described

- If too high a pressure is used and the dart rebounds then the area contaminated by the etorphine should be hosed down with any suspect bedding bagged in clinical waste bags for disposal by incineration. Extreme care should be taken by staff in disposing of this bedding and appropriate personal protective equipment including disposable overalls should be worn
- If a dart misses and hits the ground or a solid object then it should be depressurised and then safely stored in the metal or plastic tin. If safe to do so it can be reused for induction after assessment by the veterinarian or operator
- **Blowpipes should not be used with etorphine darts except in extreme circumstances under the guidance of the Approved Veterinarian**
- Top up or additional doses of etorphine can be given by hand injection using similar guidance to dart preparation, the needle and syringe should not be separated once etorphine has been drawn up to reduce spillage and therefore a suitable gauge for the animal's skin should be selected to withdraw the etorphine from the bottle
- Where a dart or hand injection has been in an animal the area should be marked with a water soluble spray paint to clearly mark areas where keepers (even when wearing gloves) should avoid touching

3. Collection and cleaning of the dart

Equally as important is the collection and cleaning of the dart. This is an area that often people become complacent. Etorphine darts, as all darts, should be cleaned immediately after use to prevent exposure occurring and whilst operators know that a dart contains a specific agent and therefore suitable precautions need to be taken.

- In all instances the etorphine dart should be approached wearing latex (or nitrile) gloves, the dart should be depressurised, and then placed immediately into the a metal or plastic tin
- The metal or plastic tin are the only acceptable method for transportation of used darts through the park
- On return to the veterinary hospital the darts should be cleaned as soon as possible, at least by the end of the day they were used
- An assistant should be present that is trained in the emergency etorphine exposure protocol
- The cleaner should wear face shield, and latex (or nitrile) gloves, and prepare all of the necessary equipment for cleaning and emergency exposure as needed
- The dart should be removed from the metal or plastic tin from the flight end of the dart. This prevents needle stick injury on removal
- The darts should be cleaned as outlined in the Remote Chemical Immobilisation at Safari Zoo Protocols
- If etorphine remains in a dart then they should be disposed of as outlined below
- Following cleaning the cleaning area should be washed down with water and then cleaned in an appropriate manner

DISPOSAL OF ETORPHINE

Disposal of etorphine can occur through the application of etorphine into a syringe or dart that is subsequently not used for induction e.g. in the situation where it is deemed a top up is needed but by the time the dart is prepared the animal has sufficiently succumbed to the original induction dose. The other situation requiring disposal of etorphine will occur when the

agent is still within the bottle but has past it's use-by-date. Disposal is not a simple procedure, and must comply with Regulation 27 of the Misuse of Drugs Regulations, 2001):

- Etorphine, and other CD Sch II drugs, can only be destroyed in the presence of an authorised representative of the Secretary of State
- The quantity and date of destruction must be recorded in the register and this must be countersigned by the authorised representative of the Secretary of State

In addition, the risk of etorphine to human safety means that it is not prudent to inject Etorphine back into the original bottle due to risk of spray or bottle breakage from increased pressure, nor the large diameter of the dart needles making holes in the rubber stopper which could lead to leakage. The following are acceptable routes as specified;

- Out of date bottles of etorphine should be disposed of and recorded in the presence of an authorised representative of the Secretary of State
- If an animal is being induced for euthanasia, then unused Etorphine can be darted or hand injected into the animal as part of the induction and euthanasia process
- If an animal is being induced for a non-lethal procedure then the syringe or dart should be safely transported back to the veterinary hospital and disposed of into the specific Pharmaceutical Sharps Bin. The needle on the syringe or dart should not be removed, and the dart must be depressurised.

An authorised representative is a chemical liaison officer from the local constabulary. In the future this may change but at present this is the only option. Interpretation of legislation and changes in the definition of an authorised representative can be reviewed and confirmed with the Home Office, Schedule II and Interpretation of Legislation department, (020) 7035 0458.

EMERGENCY HUMAN ETORPHINE EXPOSURE: CLINICAL SIGNS

Etorphine overdosage leading to clinical signs can occur through injection, transdermal (contact with the skin, especially open cuts), transmucosal (contact with mucous membranes or oral ingestion), and through inhalation of aerosolised material. Care must be taken at all times when handling this drug. When an operator or bystander undergoes opioid overdose due to contamination with etorphine then the clinical signs include;

- panic
- dizziness and incoordination
- nausea and vomiting
- pinpoint pupils
- respiratory depression
- cold skin and extremities
- collapsed veins through hypotension
- respiratory collapse
- heart failure
- leading to rapid death.

Death can occur within minutes depending on the route of exposure. Recognition of exposure and prompt treatment is essential to prevent loss of life.

EMERGENCY HUMAN ETORPHINE EXPOSURE PROTOCOL

An antagonist is a physiological agent that interferes with or inhibits the action of another agent. In the case of opioid overdose the licensed human preparation for opioid antagonism is **naloxone hydrochloride (0.4mg/ml)**. If an operator is accidentally exposed to etorphine through injection, transdermal, transmucosal, aerosolisation, or ingestion then the following guidelines should be strictly adhered to. The most important consideration is that all parties involved remain calm and ensure that further exposure to Etorphine does not occur. Following this the antagonist naloxone hydrochloride should be administered at a dose (as recommended by the BNF 56, 2008) of;

"Mini-ject" Naloxone 1-5mls IV (IM) (intranasal for first dose)

This can be repeated at intervals of 2-3 minutes
with no more then a total dose of 10mg or 25mls to be given
if there is no improvement in respiratory function

In practice the dose administered should be 2mls naloxone every 2-3 minutes until improvement of respiratory depression occurs or until an ambulance arrives.

It is essential that all staff involved in any anaesthetic procedures within Safari Zoo or associated institutions are aware of the emergency Etorphine Human Exposure Emergency Protocol and the application of the antagonist Naloxone. To ensure familiarity it is essential that;

- The Etorphine Human Exposure Emergency Protocol is present at every etorphine darting procedure
- At the beginning of the procedure all staff are made aware that etorphine is to be used
- At the beginning of each anaesthetic involving etorphine that the emergency protocol is pointed out to all staff, including the location of the naloxone
- Training in the use of naloxone should occur at least annually as well as the availability of this protocol
- Records of the training sessions should be kept

The emergency human etorphine exposure response is as follows;

- Remain calm
- Ensure patient remains calm
- Ensure wearing latex (or nitrile) gloves before approaching patient
- Confirm etorphine exposure
- Immediately call for help on radio and for ambulance
- Decontaminate the affected area using copious amounts of water, being careful not to expose yourself or others to further exposure
- Inject 2mls naloxone intranasally (squirt it up the nose) or intramuscularly, if unconscious then use the base of the tongue, if conscious then any major muscle mass such as the upper limbs
- Establish venous access, typically the cephalic vein located at the angle of the elbow similar to where blood is taken: this should be attempted only by the veterinarian or others that have competency in cannulation of veins

- Once intravenous access has been achieved inject 2mls naloxone intravenously every three minutes until improvement occurs, if IV access not achieved then continue with IM injections until obtain IV access or help arrives
- A maximum of 25mls of naloxone should be given, unless improvement seen and then deterioration occurs before help arrives
- If unconsciousness occurs combined with respiratory arrest then Cerebral Cardiopulmonary Resuscitation (CCPR) should be instigated, ensuring that the resuscitator does not expose him or herself to further contamination with etorphine. An Ambu bag is especially useful. This should be continued until medical help arrives
- The data sheet and the Use of etorphine protocol should accompany the patient to the hospital, paramedics should be informed that etorphine overdosage is similar to opioid overdose therapy e.g. morphine or heroin

Alternative antagonists in emergency situations, which are non-licensed for humans and should be avoided except in extreme circumstances include;

Naltrexone Hydrochloride; full agonist, useful in emergencies but long half-life and cannot titrate to patients needs. Only use if run out of naloxone and no medical help arrived. Use 10mg (0.2ml) substitute to naloxone until desired effect.

Diprenorphine Hydrochloride; partial agonist-antagonist, **not recommended** as may exacerbate the condition. However if only option then can attempt at dose of 0.1ml Revivon / M5050 as substitute for naloxone.

Opioid exposure emergency response

Immediately inform another person

Call for person skilled in first aid but do not wait for them to arrive
Alert emergency services

Inject 2mls naloxone (narcan) INTRAMUSCULARLY

(0.4mg/ml naloxone)
Alternative route:
Intranasal spray (paramedic route)
Base of tongue if unconscious

Establish venous access

Continue IM / intranasal injections every 3 minutes until obtain IV access

Inject 2mls naloxone (narcan) INTRAVENOUSLY

Continue IM / intranasal injections every 3 minutes until obtain IV access

Repeat every 3 minutes until improvement occurs

Keep the patient calm and in the shade

Most capable person remains with patient until emergency services arrive

Ensure information sheet accompanies patient to the hospital

Cardiopulmonary resuscitation

AIRWAY: Maintain Respiration
BREATHING: Mouth to mouth
CARDIAC: Cardiac massage
DRUGS: Saline fluids if IV access

Symptoms opioid exposure

Dizziness and uncoordinated
Nausea and vomiting
Pinpoint pupils
Respiratory depression
Cold skin and extremities
Heart failure

Lethal human etorphine dose

0.03-0.12mg
(0.01-0.04ml LA immobilon)
(0.0025-0.01ml M99)

1 drop = approx 0.05ml

BIAZA Guidelines on Minimising the Risk of Disease Transfer between Member Collections

Introduction:

The purpose of these guidelines is to set down general principles of veterinary surveillance to which a collection worthy of being a BIAZA member should aspire.

With this in mind a sending institution has a duty of care to ensure that any animals transferred are, as far as can reasonably be ascertained, healthy and fit for purpose. No animal showing clinical signs of disease should be moved between collections unless the condition in question is chronic in nature and the receiving collection is willing and able to continue to manage the animal in appropriate facilities.

Diseases of concern are likely to change with time such that it is the intention that these guidelines and the Appendix be reviewed annually.

General Principles:

1. Any animal move carries with it a risk of disease transfer.
2. These diseases may be infectious or non-infectious.
3. **Infectious diseases** may cause problems in the individuals being transferred, their conspecifics, other species in the collection or in humans (staff and/or visitors).
4. **Non-infectious diseases** (including behavioural abnormalities) tend to affect only the health and welfare of specimens being transferred but they may also have other knock on effects (e.g. suitability for breeding if the animal is infertile due to testicular abnormality, suitability for enclosure type available if the individual cannot move normally etc).
5. The aim of this document is to provide guidance as to how to minimise the risk of disease transfer between BIAZA collections. For the majority of moves this will be very straightforward.
6. The most important techniques for minimising disease transfer are:
    a. Pre-export health screening
    b. Quarantine and post-import health screening
7. Both of these techniques should be seen as routine for all animal moves, but this document will focus on disease screening (quarantine protocols are covered elsewhere).
8. Effective disease screening generally requires one to know what one is looking for and what the significance of finding it is.
9. Some tests (such as physical examination or haematology/biochemistry will be broad spectrum and can pick up a range of different abnormalities, but most tests are very specific hence the list of diseases of concern needs to be decided first.

10. The diseases of concern may vary from one move to the other as they are dependent on many factors including:
    - The species being transferred.
    - The disease history and adequacy of the veterinary surveillance programme of the sending collection.
    - The disease history of the receiving collection.
    - The purpose of the animal in the receiving collections (e.g. for handling sessions with the public, for breeding, as part of a mixed species exhibit).
    - The current UK/regional disease status
    - The suitability of post import quarantine facilities

The following sections outline:

Section A: BIAZA recommendations for pre-transfer disease screening: minimum standards

Section B: Disease Risk Analysis: guidelines on the risk assessment process

Appendix: Potential Infectious Diseases of Concern for Transfers within the BIAZA Region: arranged taxonomically and including justification as to why these diseases (excluding those which are non-infectious) should be considered and how they might be screened for.

A. BIAZA Recommendations

- As a minimum before sending an animal to another institution all members should:
    - Submit a full medical history of the animal to be transferred AT LEAST 1 WEEK PRIOR TO TRANSFER to the receiving collection. In the absence of a medical history, as a minimum a written declaration stating that the animal being transferred appears to be in good health and that there have been no known recent problems with it or its conspecifics should be sent to the receiving collection.
    - Notify the receiving collection AT LEAST 1 WEEK PRIOR TO TRANSFER of any disease concerns in its immediate group / or in the collection as a whole.
    - Where practicable carry out a physical examination of the animal within 7 days of transport (by a vet) and a visual examination by a vet and/or experienced person with the species in question within 24 hours of transport/upon departure.
    - Faecal parasitology and bacteriology (depending on medical history)
- Additional disease screening for certain taxa is recommended (see Appendix).
- Screening requirements should be agreed between the sending and receiving collections.
- Test availability and impact on the animal to be transported must also be considered. A good health history, including details of any new imports to the group and results of post-mortem examinations over a period of years, may prove adequate.
- Liability for screening costs to be agreed between the parties involved.

- Pre-export screening does not replace the need for post-import quarantine. As a rule of thumb mammals, birds and fish should be isolated from the rest of the collection (or co-terminously with other conspecifics if preferable for social taxa) for a minimum of 30 days; 90 days is recommended for reptiles.

B. Disease Risk Analysis

Disease risk analysis should be performed by the receiving institution's vet in partnership with the animal management staff. Though the process may seem involved the first time round, many transfers are very similar in make up and a pre-export testing schedule for many of a collection's routine imports from their key partners should quickly emerge. These tables need only then be worked through for more unusual ones.

Questions	Considerations
Q1.What groups might be at risk?	• animal being transferred • animals of the same species already in the collection • animals of different species which may come in contact with the imported animal either directly or indirectly • humans (staff and/or visitors)
Q2.What are the infectious disease agents that this species might be harbouring?	• See Appendix for some of the more important diseases of this species. • Also consider diseases of in-contact species that this individual might also be carrying (e.g. mechanical transfer of chytrid fungus between collections)
Q3.What non-infectious health issues might the individuals to be imported be harbouring?	• Examples might include chronic foot problems, teeth problems, poor fertility, metabolic bone disease, drug or food intolerances, heart disease .... • Behavioural health should also be considered (e.g. History of infanticide, abnormal levels of aggression to other animals or staff).
Q4.What is the likelihood that the animal to be transferred is harbouring these diseases / disease agents?	• Consider current diseases of concern in the UK or region. (e.g. TB, avian influenza, tetanus etc). • Closed collections (i.e. ones without any recent imports to the group) are much less likely to be incubating infectious diseases • Measures to decrease the likelihood of disease transfer include pre-export prophylactic treatment (e.g. worming, vaccination).
Q5.What is the potential significance of each of these diseases / disease agents to each of the risk groups?	• See Appendix for guidance. • The significance of some disease issues might be decreased by adjusting the management practices at the receiving collection (e.g. handling chutes to allow training for conscious foot care, avoidance of certain drugs that the animal has reacted badly to). • Be aware that some pathogens might not cause disease in your collection but, if they are detected, they might lead to restrictions on animal moves (e.g.

	presence of low pathogenic strains of avian influenza may shut down the zoo)
Q6. Can the diseases / disease agent that are both significant and likely, be screened for before export?	• Not all diseases can be screened for: The diagnostic test may not have been developed, may not be routinely available, may not be accurate, may require samples that are difficult or dangerous to obtain or may be prohibitively expensive. • The Appendix provides guidance as to whether a diagnostic test is available and what samples might be required.
Q7. If they can't be effectively screened for, are there any other measures that could be taken to reduce the risk?	• For those diseases where no diagnostic tests are practicable a combination of medical history (including PM's) and post import isolation may be the best protection. • Prophylactic treatment may be useful in some instances (see Q4)

APPENDIX: Potential Infectious Diseases of Concern for Transfers within the BIAZA (British & Irish) Region

MAMMALS

ALL ANIMALS SHOULD HAVE:

- **Medical history sent a minimum one week prior to export**
- **Declaration of presence or absence of declaration diseases**
- **Prophylactic treatments as recommended**
- **A physical examination – including notification of findings to receiving collection**

IT IS HIGHLY RECOMMENDED THAT ALL ANIMALS SHOULD HAVE:

- **Tests for the diseases of concern indicated**

Taxonomic group of species	Disease of Concern	Justification	HAZARD (H/M/L)	LIKELY-HOOD (H/M/L)	[illegible]	Screening Test available	Type of sample required	Notes (eg sampling regime, vaccine available / recommended?)
Primates	**Declaration diseases: (must declare if the following found in this taxonomic group of species in previous 12mths)** • Tuberculosis (bovis or tuberculosis) in previous 5 YEARS • Suspicious reactors to TB skin test in previous 12 months. • Animals testing positive for Herpes B (macaques) • Animals testing positive for Hepatitis B							
	Enteric nematodes (highlighting Strongyloides, pinworm)	Zoonoses. Known to cause morbidity in NHP's	M	M	N Treat	Faecal parasitology -3 day pooled sample. Strongyloides may require charcoal culture for ID	Faeces	3 day pooled sample (plus history of this being done). cancan be difficult to pick up (intermittent shedding) so treatment should be considered prior to a move even if test negative
	Enteric protozoa (highlighting E.histolytica, B.coli, B.hominis,	Most zoonoses. Confirmed clinical disease and carrier states in majority of NHP. Severe under	M	H	N	Fresh stained faecal smear. Fresh-frozen faeces for	Faeces	Sample twice, 1 week apart.. Samples must be very fresh.. If no in house ability, can put faeces in formalin for lab

Taxonomic group of species	Disease of Concern	Justification	HAZARD (H/M/L)	LIKELY-HOOD (H/M/L)	[illegible]	Screening Test available	Type of sample required	Notes (eg sampling regime, vaccine available / recommended?)
	D.fragilis)	reporting of protozoal infections in UK zoos suspected				E.histolytica		analysis of any cysts.
	Enteric bacteria (Highlighting Shigella (apes), Salmonella, Campylobacter)	Zoonoses – known to cause morbidity and occasionally mortality in NHP's	M/H	M	Y potentiall y	Bacteriology	Faeces	Salmonella should be typed and Campylobacter speciated, especially in subclinical carriers
	Tuberculosis caused by M. bovis or tuberculosis	Important cause of mortality/morbidity and ZOONOSIS	H	L	Y	Y – skin test, also gamma interferon blood test for some species Culture gold standard but slow and insensitive	First line standard: Skin test May also consider: Tracheal/ bronchial wash for culture Serum/ plasma (Investigating TB antibody Stat-Paks from Chembio)	Highly recommended though might be acceptable to forgo if closed group with regular negative testing. NEED TO DISCUSS REGIME WITH RECEIVING COLLECTION Remember to consider TB status of in contact humans. If animals are in a walkthrough exhibit or there is any chance their carers may have been infected, testing is highly recommended.
	Hepatitis B	potential zoonosis	L	M	N but vacc. keepers	Y - Virus Isolation/ PCR/ ELISA etc	Blood (Serum)	Gibbons common carriers. See TAG for notes on management.
	Herpes Viruses eg: simplex (apes) ateles (spider and owl monkeys) B (macaques)	Herpes B potential Zoonosis. Other herpes viruses can cause fatal disease in aberrant primate species)	H/L (sp. Dependa nt)	M	Herpes B Y Others N but sp dep.	Y - Virus Isolation/ PCR/ ELISA etc	Blood (Serum)	HPA reference laboratory for Herpes B. – can also screen for presence of other alpha herpes viruses but may not be able to identify to species level.
Ruminants and camelids	**Declaration diseases: (must declare if the following found in this taxonomic group of species in previous 12mths)** • Tuberculosis/Mycobacteriosis. (in previous 3yrs) • Paratuberculosis (Johnes Disease - in previous 2yrs) • Transmissable spongiform encephalopathies (in previous 10yrs). • Lumpy Jaw • Foot rot • Bluetongue • Domestic Cattle on premises: History of BVD/MD, IBR, Leptospirosis.							

Taxonomic group of species	Disease of Concern	Justification	HAZARD (H/M/L)	LIKELY-HOOD (H/M/L)	STATUS	Screening Test available	Type of sample required	Notes (eg sampling regime, vaccine available / recommended?)
	• Trichuris (especially for camels)							
	Endoparasites. Helminths, protozoa etc	Important cause of disease/morbidity	M/H	H	N TREAT	Faecal examinination. Pooled faeces from group is probably acceptable although individual samples better	faeces	Faeces collected over several days better than an individual sample
	Salmonellosis/ Campylobacter	Important cause of disease/morbidity and ZOONOSIS	M	M	N	Faecal cultures. Pooled faeces from group is probably acceptable	faeces	Faeces collected over several days better than an individual sample
	Tuberculosis	Important cause of disease/morbidity and ZOONOSIS.	H	L	Y	Intradermal skin test Possible gamma interferon blood test available		Test could be omitted on basis of collection history and local disease status. To be discussed between vets for both collections
	Mycobacterium paratuberculosis (Jones Disease)	Important cause of disease/morbidity and ZOONOSIS.	H	L	Y	ELISA and AGID available for cattle. CFT and AGIDT available for sheep and goats. Faecal exam unreliable	Blood	Appropriate test for species to be discussed between vets and VLA. Vaccination may affect tests. Faecal culture is gold standard to eliminate atypical mycobacterial infection
	Malignant Catarrhal fever	Important cause of disease in deer, antelope and cattle. Sheep can be symptomless carriers	H	M	Y	IFAT and SNT available.	Blood	sheep, wildebeest and other alcelaphine antelope should be screened if planning mixing or accommodating near sensitive species such as Pere David Deer
	MV/CAE	Important cause of disease in sheep and goats.	H	M	Y	ELISA	Blood	Sheep and goats only

Taxonomic group of species	Disease of Concern	Justification	HAZARD (H/M/L)	LIKELY-HOOD (H/M/L)	[illegible]	Screening Test available	Type of sample required	Notes (eg sampling regime, vaccine available / recommended?)
Pigs Peccaries and hippos	**Declaration diseases: (must declare if the following found in this taxonomic group of species in previous 12mths)** • Tuberculosis/mycobacteriosis (previous 3yrs) • Domestic pigs on premises: PRRS, Atrophic Rhinitis, Parvovirus, Mycoplasma hyopneumoniae, PMWS/PDNS, TGE, Strep suis meningitis..							
	Endoparasites. Helminths, protozoa etc	Important cause of disease/morbidity	M-H	H	N TREAT	Faecal examination. Pooled faeces from group is probably acceptable although individual samples better	faeces	Faeces collected over several days better than an individual sample
	Salmonellosis/Campylobacter	Important cause of disease/morbidity and ZOONOSIS	M	M	N	Faecal cultures. Pooled faeces from group is probably acceptable	faeces	Faeces collected over several days better than an individual sample
	Tuberculosis	Important cause of disease/morbidity and ZOONOSIS in Hippos Questionable justification in pigs and peccaries at this time	H	L	Y	Intradermal skin test not reliable/validate. Possible blood test available	Blood	Testing should be discussed with receiving collections and with TAG. May be recommended in Hippos depending on history of population / individual.
Equidae	**Declaration diseases: (must declare if the following found in this taxonomic group of species in previous 12mths)** • Contact with domestic horses: influenza, strangles, CEM • EHV, EIA and sarcoid • Must have a Horse Passport (mandatory from July 09)							
	Enteric parasites. Strongyles in particular and strongyloides, parascaris, oxyuris, spirurids, tapeworms and cyathastomes	Common, can be important cause of morbidity	M	H	N TREAT	Various methods of quantitative and qualitative faecal tests and hatching of eggs into larvae with subsequent identification	Quantitative egg count on 3 consecutive day faecal sample. Need 3-5g faeces	Faeces collected over several days better than an individual sample Where risk of occult cyathostome infections, special treatment regimes are needed

Taxonomic group of species	Disease of Concern	Justification	HAZARD (H/M/L)	LIKELY-HOOD (H/M/L)	HOW STORE (Y/N)	Screening Test available	Type of sample required	Notes (eg sampling regime, vaccine available / recommended?)
	Salmonella spp.	Zoonotic disease	M	L	N	Culture (+/- serotyping also PCR)	Faecal sample on 3-5 consecutive days. Need 3-5g faeces.	Faeces collected over several days better than an individual sample
Tapir and Rhino	**Declaration diseases: (must declare if the following found in this taxonomic group of species in previous 12mths)** • Rhino: skin disease • Tuberculosis							
	enteric parasites	common in white rhino with little clinical disease	M-L	M-H	N	Faecal examination.	faeces	Pooled faeces from group is probably acceptable although individual samples better
	Tuberculosis	Important cause of disease/morbidity and ZOONOSIS	H	L	Y	Refer to TAG recommendations		TB infection is a reported problem in Tapirs. Definitely worth considering.
	faecal bacteriology		M	L	N	Faecal cultures.	faeces	Faeces collected over several days better than an individual sample Pooled faeces from group is probably acceptable
Elephants	**Declaration diseases: (must declare if the following found in this taxonomic group of species in previous 12mths)** • EEHV • Tuberculosis / mycobacteriosis (previous 3yrs) • Elephant pox							
	Endo-parasites	Cause of morbidity	L	M-L	N Treat	Faecal parasitology	Faeces (3 samples over 3 weeks)	
	Salmonella	Cause of mortality/morbidity and ZOONOSIS	M	L	N	Faecal culture	Faeces (3-5 consecutive days worth of samples cultured separately)	Carrier animals may only shed intermittently Faeces collected over several days better than an individual sample
	TB (M.tuberculosis or M. bovis)	Important cause of mortality/morbidity and ZOONOSIS Treatment options very limited	H	L	Y	Trunk washes for culture still definitive test despite 8 week wait and lack of sensitivity	Multiple trunk wash samples (at least 3 within 7 days) Whole blood, serum or plasma	Intra-dermal skin test demonstrates very poor sensitivity RT and MAPAI will replace culture once validity further demonstrated

Taxonomic group of species	Disease of Concern	Justification	HAZARD (H/M/L)	LIKELY-HOOD (H/M/L)	[illegible]	Screening Test available	Type of sample required	Notes (eg sampling regime, vaccine available / recommended?)
						Rapid Test (RT) and confirmatory Multiprint Immunoassay (MAPIA) technology appear to show upto 100% sensitivity and much earlier diagnosis		Refer to elephant TAG for current testing recommendations
	EEHV (Elephant Endotheliotropic Herpesvirus)	Many viruses circulating. No disease in most individuals BUT can be Important cause of mortality/morbidity with peracute course in naïve individuals no vaccines or well proven therapy	H-L	H?	??N	Serology possible in Europe or USA but needs co-ordination by someone! PCR on blood of clinical cases or PM tissues of other herd members	Plasma (preferred) or serum (can be frozen and sent as batches)	Current thinking suggests that all elephants are infected with one or more strains. Introduction of a new strain may cause peracute disease in naïve individuals. Refer to Elephant TAG recommendations (currently under review)
Rodents, insectivores and lagomorphs and sloths	**Declaration diseases: (must declare if the following found in this taxonomic group of species in previous 12mths)** • Sendai virus • Sialodacryoadenitis • EMCV (encephalomyocarditis virus) • LCMV • Yersiniosis • Capillaria hepatica **Recommended pre-export prophylactic treatments:** • Vaccination of Lagomorphs against myxomatosis and viral haemorrhagic disease							
	Enteric parasites (and fascioliasis in beavers)	Common,	M	H	N Treat	faecal smears , McMasters, identification of cysts or trophozoites in smears, serology for giardia	3 consecutive days faecal sample	Faeces collected over several days better than an individual sample Pooled faeces from group is probably acceptable although

Taxonomic group of species	Disease of Concern	Justification	HAZARD (H/M/L)	LIKELY-HOOD (H/M/L)	?HOW TREAT	Screening Test available	Type of sample required	Notes (eg sampling regime, vaccine available / recommended?)
								individual samples better
	Enteric bacteria (eg salmonella)	causes disease AND zoonotic	M	M	N	Y	Faeces / cloacal swab	Highly recommended
	Encephalitozoon cuniculi (lagomorphs)	Endemic in captive population of lagomorphs; infection of rodents possible	M	H	Y treat	serology	blood	Testing to determine positive or negative status in lagomorphs recommended; treatment available
	Sarcoptic mange, lice and other ectoparasites	Can be debilitating leading to morbidity and mortality and contagious	M	M	Y treat	microscopy /hair samples	Skin scraping / hair pluck/ tape strip / physical exam	All animals with significant ectoparasite burdens should be checked for other underlying disease
	Mycoplasma (rats)	important cause of respiratory disease	M	M	N	Y	nasal swab	
	Lymphocytic choriomeningitis LCMV (small rodents)	Zoonoses, can be spread to callitrichids and easily transferred from wild rodents to captive rodents	H	M	?Y depends on status of collection	serology	Blood/serum from individual or from small proportion of the group.	
Chiroptera	In-hand health-check to confirm ID and check general health including teeth, patagial integrity, limbs and external genitalia. Radiography to be performed if legs or wings give concern. **Declaration diseases: (must declare if the following found in this taxonomic group of species in previous 12mths)** • Lyssavirus (in previous 3yrs) – include screening history ie number of samples submitted over the previous 3yr period – this is particularly important for any walk through exhibits.							
	Intestinal parasites	Important cause of morbidity and mortality	L	L	N treat	Routine faecal flotation	Faeces	Three samples at weekly intervals from known individuals if small group or pooled sample from large group
	External parasites	Important cause of morbidity	L	L	N treat	Visual check/sticky tape and/or skin scrape	Skin/hair or skin debris	Single sample from unaffected animals at health check
	Faecal bacteria	Important cause of morbidity and mortality	L	L	N but depends if walk	Microbiology	Faeces	Three samples at weekly intervals from known individuals if small group or

Taxonomic group of species	Disease of Concern	Justification	HAZARD (H/M/L)	LIKELY-HOOD (H/M/L)	SHOW STOPPER (Y/N)	Screening Test available	Type of sample required	Notes (eg sampling regime, vaccine available / recommended?)
					through...			pooled sample from large group – ensure screened for zoonoses including *Salmonella* and *Campylobacter*
	Lyssavirus	Important cause of mortality/morbidity and zoonosis	H	L	Y	FAVN test /	Serum / also submit heads of any bat that dies to VLA for screening	Test performed at VLA Weybridge. Would recommend test on all if a small group or if destined for a walk-through exhibit, otherwise a representative sample
Marsupials	**Declaration diseases: (must declare if the following found in this taxonomic group of species in previous 12mths)** • Lumpy Jaw							
	Enteric parasites	Coccidiosis common in joeys. Monitor for nematodes	M	M	N TREAT	Faecal parasitology	Faeces	3 day pooled sample
	Salmonella and campylobacter	Zoonosis and can cause severe morbidity	M	M	N	Bacteriology	Faeces	Type Salmonella whenever possible
	Lumpy Jaw (Bacteroides/ Fusobacterium)	Common cause of morbidity	M	M	N	Clinical signs? Bacteriology	Lesion swab	Test only when suspect case
	Chlamydia	Common in Koalas. Zoonosis.	L	L	N	'Clearview' rapid test	Blood	Koalas only
Felidaea	**Declaration diseases: (must declare if the following found in this taxonomic group of species in previous 12mths)** • Any of the diseases listed below **Recommended pre-export prophylactic treatments:** • Vaccinations for FELV, FIV,+ other feline viruses up to date (full vaccination history and opportunistic testing may negate need for testing prior to export – discuss with receiving collection). NOTE Beware use of modified live vaccines in non-domestic felids.							
	enteric parasites		M-L	M-H	N	Faecal examination.	faeces	Pooled faeces from group is probably acceptable although individual samples better
	faecal bacteriology		M	L	N	Faecal cultures.	faeces	Faeces collected over several days better than an individual sample Pooled faeces from group is probably acceptable

Taxonomic group of species	Disease of Concern	Justification	HAZARD (H/M/L)	LIKELY-HOOD (H/M/L)	[illegible] (Y/N)	Screening Test available	Type of sample required	Notes (eg sampling regime, vaccine available / recommended?)
	Feline Immunodeficiency Virus (FIV)	Potential cause of serious immunodeficiency-like disease	H/M	L (except lions)	Y	Antibody testing by ELISA & Western Blotting	Serum	Possibly prolonged seroconversion times in non-domestic species.
	Feline Leukaemia Virus (FeLV)	Potential cause of neoplastic & degenerative conditions	M	L	Y	Antigen test	Serum	Domestic cat vaccines not validated in non-domestic species
	Feline Coronavirus	Potential cause of fatal Feline Infectious Peritonitis	M	L	N	Antibody test. (PCR for virus shedding currently unavailable in the UK)	Serum	Interpretation of antibody titres complicated. Seek veterinary advice if positive
	Chlamydophila felis	Cause of ocular & respiratory disease, and possibly involved in infertility	M	M	N	PCR	Conjunctival swab	Vaccination probably effective
	Feline Herpes Virus (FHV)	Cause of severe respiratory disease, ulcerative keratitis & dermatitis	H (if not vac)	M	Y	PCR & virus isolation	Oropharyngeal swab in VTM	Carrier status recognised. Vaccination effective
	Feline Calicivirus (FCV)	Cause of severe oral & respiratory disease (and lamness)	M	M	Y	PCR & virus isolation	Oropharyngeal swab in VTM	Carrier status recognised. Vaccination variably effective due to rapid virus evolution.
Canidae	**Declaration diseases: (must declare if the following found in this taxonomic group of species in previous 12mths)** • Distempter, parvovirus, adenovirus, leptospirosis, sarcoptic mange **Recommended pre-export prophylactic treatments:** • Vaccinations up to date for canine distemper, parvovirus, adenovirus 1 and leptospirosis							
	Endoparasites Nematodes Cestodes Coccidia (Neospora caninum)	Common, some zoonotic	M	H	N	Faecal flotation, including Baermann technique for lungworm	Faeces	Test pre-move and treat with appropriate anthelmintics/anticoccidials pre-move. If positive inform receiving zoo, which should also test on arrival and re-treat during quarantine period

Taxonomic group of species	Disease of Concern	Justification	HAZARD (H/M/L)	LIKELY-HOOD (H/M/L)	SHOW-STOPPER? (Y/N)	Screening Test available	Type of sample required	Notes (eg sampling regime, vaccine available / recommended?)
	Ectoparasites Fleas Mites/Lice/Ticks	Can cause morbidity. Can be involved in transfer of infectious agents e.g ticks and *Borrelia*	L	M	N	Visual examination Skin scrape	skin scrape. Visual exam	Treatment indicated with appropriate ectoparasiticide if ectoparsites detected on pre-move physical examination. Any animals with skin lesions should be investigated pre-move
	Salmonella	Common, can cause morbidity. Zoonosis	M	M	Variable	Culture	Faeces	Test pre-move, only if animal has abnormal faeces. If positive, discuss significance with receiving zoo's vet. NB Healthy animals with normal faeces highly unlikely to be positive. Treatment with antibiotics generally only indicated if risk of contact with immunosuppressed people/animals or children, and may induce latent carrier status
Mustelids/ viveridae/ procyonidae	**Declaration diseases: (must declare if the following found in this taxonomic group of species in previous 12mths)** • distemper **Recommended pre-export prophylactic treatments:** • Consider use vaccines against canine disease but beware use of modified live vaccines as may cause disease in these species.							
	enteric parasites		M-L	M-H	N	Faecal examination.	faeces	Pooled faeces from group is probably acceptable although individual samples better
	faecal bacteriology		M	L	N	Faecal cultures.	faeces	Faeces collected over several days better than an individual sample Pooled faeces from group is probably acceptable
Marine mammals	**Declaration diseases: (must declare if the following found in this taxonomic group of species in previous 12mths)** • Tuberculosis • Morbillivirus • Herpes virus in seals • Small pox							

Taxonomic group of species	Disease of Concern	Justification	HAZARD (H/M/L)	LIKELY-HOOD (H/M/L)	[illegible]	Screening Test available	Type of sample required	Notes (eg sampling regime, vaccine available / recommended?)
	• Brucellosis							
	enteric parasites incl. lungworm		M-L	M-H	N	Faecal examination.	faeces	Pooled faeces from group is probably acceptable although individual samples better
	faecal bacteriology		M	L	N	Faecal cultures.	faeces	Faeces collected over several days better than an individual sample Pooled faeces from group is probably acceptable
	morbillivirus		H	L	Y	Serological and/or PCR	blood	
	herpes (seals)		H	M	Y? possible	Serological and/or PCR	blood	Data deficient in most but does affect commmon seals seriously
	Brucella		Zoonotic hazard	M	N?	Serology at VLA	blood	
	Tuberculosis		H	Species related	Y	Skin though not reliable. New rapid tests		Particularly some sealions and South American fur seals

BIRDS

ALL ANIMALS SHOULD HAVE:

- **Medical history sent a minimum one week prior to export**
- **Declaration of presence or absence of declaration diseases**
- **Prophylactic treatments as recommended**
- **A physical examination – including notification of findings to receiving collection**

IT IS HIGHLY RECOMMENDED THAT ALL ANIMALS SHOULD HAVE:

- **Tests for the diseases of concern indicated**

Taxonomic group of species	Disease of Concern	Justification	HAZARD (H/M/L)	LIKELYHOOD (H/M/L)	SHOW CONTROL (Y/N)	Screening Test available	Type of sample required	Notes (eg sampling regime, vaccine available / recommended?)
Passerines	**Declaration diseases: (must declare if the following found in this taxonomic group of species in previous 12mths)** • Chlamydophilosis • Atoxoplasmosis							
	Enteric nematodes	Big cause of morbidity and occasionally mortality	M	H	N TREAT	Parasitology	Faeces	3 day pooled faecal sample
	Atoxoplasma	Known infection in the UK. Several species – causes high mortality – fledglings usually, but Bali mynah particularly sensitive	H	M/H	Possibly Y (dependant on sp.)	Faecal parasitology for oocyst detection (multiples required)	Faeces +/- blood buffy coat	Will be species dependant. At least 3 negative faecal samples required at one week intervals if using parasitology alone.
	Salmonella and Campylobacter	Zoonosis	M	?M	N	Bacteriology	Faeces	Salmonella positives should be typed
	Chlamydophila	Zoonosis. Found in UK collections.. Can cause debilitation.	M	M/L	Y TREAT	PCR	Heperanised blood, Faeces or cloacal swab	Only if history at collection within the previous 12 months. Single sample required.
	Avian Polyoma virus (Gouldian finches)	Species specific?	H	M	?Y	PCR	Feather, heperanised blood, faeces, cloacal swab	Single sample required
Falconiformes	**Declaration diseases: (must declare if the following found in this taxonomic group of species in previous 12mths)** • Avipox: Spread by flies. Declare if cases in previous 12mths, suggestive clinical signs or if the bird has been imported or has been housed with/near birds imported from Middle East.. DX by EM/histopath of lesions. Serology also possible. • Chlamydophilosis							

Taxonomic group of species	Disease of Concern	Justification	HAZARD (H/M/L)	LIKELYH OOD (H/M/L)	[illegible]	Screening Test available	Type of sample required	Notes (eg sampling regime, vaccine available / recommended?)
	Recommended pre-export prophylactic treatments: • Aspergillosis: Important cause of morbidity in stressed raptors especially gyrs (and their crosses), goshawks, Snowy Owls and mountain eagles (eg Golden Eagles) Use of itraconazole at 10mg/kg sid po recommended in all susceptible species for 7-10 prior to move until 2 weeks post-moveNote:, if the administration of drug will cause more stress or if the bird is paired with another (thus making administration unreliable) then it may be wise to ignore this							
	Endoparasites nematodes -coccidia	Coccidia esp in falcons, esp merlins and their hybrids	M	H	N Treat	Faecal floatation	Faeces	Would recommend at least one sample pre- and post- move – the latter being 7-14 days after move during quarantine period Faecal samples should be pooled 3-day samples for coccidia
	Chlamydophilosis	Many wild raptors appear to be seropositive Therefore worth considering in passage birds or in those that have had exposure to wild birds – eg used for hunting	M	L/M	Y Treat	Serology to assess exposure Faecal PCR to assess shedding	Blood / Faeces	Serological test – if positive then perform PCR
Waterfowl	**Declaration diseases: (must declare if the following found in this taxonomic group of species in previous 12mths)** • Avian TB • Yersiniosis • Chlamydophilosis							
	Enteric Parasites	major cause of debility	M/H	H	Treat	Y	Faeces	Highly recommended
	Enteric bacteria (eg salmonella)	causes disease AND zoonotic	L	H	N	Y	Faeces / cloacal swab	Highly recommended
Psittacines	**Declaration diseases: (must declare if the following found in this taxonomic group of species in previous 12mths)** • Chlamydophilosis • PBFD • Polyoma • Psittacine Herpes Virus (Pacheco's Disease) • Proventricular Dilitation Disease							

Taxonomic group of species	Disease of Concern	Justification	HAZARD (H/M/L)	LIKELYHOOD (H/M/L)	SHOW TEST? PLI Y/N	Screening Test available	Type of sample required	Notes (eg sampling regime, vaccine available / recommended?)
	Enteric nematodes	Big cause of morbidity and occasionally mortality	M	H	TREAT	Parasitology	Faeces	3 day pooled faecal sample
	Salmonella and Campylobacter	Zoonosis	M	?M	N	Bacteriology	Faeces	Salmonella positives should be typed
	Chlamydophila	Zoonosis. Can cause debilitation.	M	M/L	Y TREAT	PCR	Heperanised blood, Faeces or cloacal swab	Highly recommended.
	Psittacine Beak and Feather Disease (PBFD)		H	M	Y	PCR	Heperanised blood, Feather pulp	Highly recommended.
	Polyoma Virus		H	M	Y if receiving collection is free	PCR	Heperanised blood, Faeces or cloacal swab	Highly recommended. Lovebirds can be latent carriers.
	Psitticine Herpes Virus		H	M	Y	Serology (VLA) but not very sensitive. Autopsy only reliable test	Blood	Species specific
Columbiformes	**Declaration diseases: (must declare if the following found in this taxonomic group of species in previous 12mths)** • Chlamydophila.							
	Enteric nematodes	Big cause of morbidity and occasionally mortality	M	H	N TREAT	Parasitology	Faeces	3 day pooled faecal sample
	Thrichomonas/ Candida	Known morbidity in the UK	M	M	N Treat	Crop swab – examine warm on microscopy	Crop swab	Only if suspect on clinical examination
	Salmonella and Campylobacter	Zoonosis	M	?M	N	Bacteriology	Faeces	Salmonella positives should be typed
	Chlamydophila	Zoonosis. Found in UK collections.. Can cause debilitation.	M	M/L	Y TREAT	PCR (BioBest)	Heperanised blood, Faeces or cloacal swab	Only if history at collection within the previous 12 months. Single sample required.
Penguins	**Declaration diseases: (must declare if the following found in this taxonomic group of species in previous 12mths)** • Plasmodium • (Pododermatitis)							

Taxonomic group of species	Disease of Concern	Justification	HAZARD (H/M/L)	LIKELYHOOD (H/M/L)	TREATMENT (Y/N)	Screening Test available	Type of sample required	Notes (eg sampling regime, vaccine available / recommended?)
	Recommended pre-export prophylactic treatments: • Aspergillosis: Important cause of morbidity in stressed penguins. Use of itraconazole at 10mg/kg sid po recommended in all susceptible species for 7-10 prior to move until 2 weeks post-move							
Other Birds	**Declaration diseases: (must declare if the following found in this taxonomic group of species in previous 12mths)** • Avian TB • Chlamydophillia • Yersiniosis							
	Enteric Parasites	major cause of debility	M	H	TREAT	Y	Faeces	Highly recommended
	Enteric bacteria (eg salmonella)	causes disease AND zoonotic	M	M	N	Y	Faeces / cloacal swab	Highly recommended
	Psittacosis (Chlamydophila psitaccae)	Can cause mortality and infertility. common in some wild bird species. Zoonotic. Balai approval will be revoked if positive	M	M/L	Y (TREAT)	y	Blood, faeces	Highly recommended

LOWER VERTEBRATES AND INVERTEBRATES

ALL ANIMALS SHOULD HAVE:

- **Medical history sent a minimum one week prior to export**
- **Declaration of presence or absence of declaration diseases**
- **Prophylactic treatments as recommended**
- **A physical examination – including notification of findings to receiving collection**

IT IS HIGHLY RECOMMENDED THAT ALL ANIMALS SHOULD HAVE:

- **Tests for the diseases of concern indicated**

Taxonomic group of species	Disease of Concern	Justification	HAZARD (H/M/L)	LIKELYH OOD (H/M/L)	SHOW STOPPER? (Y/N)	Screening Test available	Type of sample required	Notes (eg sampling regime, vaccine available / recommended?)
Lizards	**Declaration diseases: (must declare if the following found in this taxonomic group of species in previous 12mths)** • Mortality rate and main causes death in previous year. • OPMV • Cryptosporidiosis							
	Endoparasites	Can be cause of debility	M	M	N Treat	Fresh faecal examination + floatation	Fresh faeces	3 tests one week apart.
	Paramyxovirus	Has been known to cause death in Rhinoceros iguanas	?M	L	?Y	Blood serology	Serum	Min test twice at 2 month intervals. Test currently available in UK can be difficult to interpret. Declare history and OPMV status of collection. Particularly important if receiving collection is negative see under snakes.
	Cryptosporidiosis	Can be cause of debility Can be a problem for zoos which intend public contact	M	M	Y	Fresh faecal examination	Faeces, If history in collection ? do stomach wash	Declare history of collection.
Snakes	**Declaration diseases: (must declare if the following found in this taxonomic group of species in previous 12mths)** • Mortality rate in previous year							

Taxonomic group of species	Disease of Concern	Justification	HAZARD (H/M/L)	LIKELYHOOD (H/M/L)	[illegible]	Screening Test available	Type of sample required	Notes (eg sampling regime, vaccine available / recommended?)
	• OPMV • IBD • Cryptosporidiosis • Amebiasis							
	Endoparasites	Can be cause of debility	M	M	N Treat	Fresh faecal examination + floatation	Fresh faeces	3 tests one week apart.
	Paramyxovirus	Has been known to cause peracute mortality in snakes.	?H	?M	Y (dependant on status of receiving collection)	Blood serology (only bird PMV tests available in this country – some cross reactivity but significance unclear). PCR developed but not currently commercially available.	Serum (potentially tracheal and cloacal swabs for PCR)	Min test twice at 2 month intervals Declare history and OPMV status of collection. Particularly important if receiving collection is negative. NB interpretation of PMV1 -7 serology results can be difficult in the absence of history of clinical disease.
	Cryptosporidiosis	Can be cause of debility Can be a problem for zoos which intend public contact	M	L	Y	Fresh faecal examination	Faeces, If history in collection ? do stomach wash	Declare history of collection.
	Boid inclusion body disease	Causes morbidity and mortality	H	?M	Y	Biopsies/Histology	Kidney/tonsil/lung/ liver	Declare history of collection. In particular nos of snakes died in last 3 years and nos of these that had pm and histology.
Chelonia	**Declaration diseases: (must declare if the following found in this taxonomic group of species in previous 12mths)** • Upper respiratory tract diseases (URTD) **Other:** • Note: Salmonella is not considered to be a disease of concern as all Chelonia should be considered to be carriers and appropriate hygiene measures should be taken. Cryptosporidia are also not included for the same reason.							
	Enteric parasites	Potential cause of debility	M	H	N	Faecal parasitology	faeces	3 faecal tests one week apart. Including fresh examination

Taxonomic group of species	Disease of Concern	Justification	HAZARD (H/M/L)	LIKELYHOOD (H/M/L)	SHOW STOPPER? (Y/N)	Screening Test available	Type of sample required	Notes (eg sampling regime, vaccine available / recommended?)
								for motile protozoa and Ziel Nielsen fro Cryptosporidium. Note many motile protozoa are normal commensals and required for proper gut function.
	Mycoplasma	Important cause of mortality/morbidity	H	M	Y/N dependant on status of receiving collection	PCR	Nasal wash, choanal swab	Declare history of upper respiratory tract disease In collection
	Chelonian herpesvirus	Important cause of mortality/morbidity	H-L dependant on species	M	Y/N dependant on status of receiving institution	PCR	Nasal wash, coanal swab	Declare history of upper respiratory tract disease I collection. Current test unable to differentiate between potentially pathogenic and commensal herpes viruses. Interpret results with caution.
Amphibia	**Declaration diseases: (must declare if the following found in this taxonomic group of species in previous 12mths)** • Chytridiomycosis (previous 2yrs) NB NOW A NOTIFIABLE DISEASE • Rana virus (previous 2yrs) NB NOW A NOTIFIABLE DISEASE							
	Endoparasites	Can be cause of debility	M-H	H	N Treat	Fresh faecal examination + floatation	Fresh faeces	3 tests one week apart.
	Chytridiomycosis	Major cause of death. Major risk for local amphibian fauna.	H	M	Y	Real Time PCR	Skin swab. Skin from post mortem cases, frozen or fixed in 70% ethanol.	Declare history of collection. And mass mortalities for last two years. Indispensable. Treatment + negative testing prior shipment required if positive.
	Ranavirus	Major cause of death.	H	M	Y	PCR	Tissue samples from post-mortem cases	Declare history of collection. No possibility of testing prior to moving the specimens but should be advised to test pm cases? Clear collection history

Taxonomic group of species	Disease of Concern	Justification	HAZARD (H/M/L)	LIKELYH OOD (H/M/L)	[illegible]	Screening Test available	Type of sample required	Notes (eg sampling regime, vaccine available / recommended?)
								should be obtained prior to transport?
Fish	• Prior to moving, I would ensure that a history of the tank/system/species is sent with a particular reference to parasites and infectious diseases. It would be useful to know if any histology has been done and if so how many post mortems/gills presses/skin scrapes and histology have been done cf the number of mortalities from the system/species/tank. • All fish should enter quarantine and the rare exceptions to this mean that pre movement testing is probably less useful than good history.							
Aquatic inverts (AR +ST)	No requirement for testing pre-move. • Tank and tank occupant history needed. • Histories of treatments e.g. levamisole for nudibranchs on corals but also e.g. *Cryptocaryon irritans* in fish in shared water. • Quarantine needed by recipients. • Awareness of disease in local area e.g. crayfish plague in signal crayfish and potentially UK white-clawed.							
Terrestrial inverts	In terms of disease control, few infectious diseases are well-described and most apparent outbreaks are simply reflecting husbandry stress Therefore, while quarantine is essential the length of time also cannot be known - needs muse tailor the length of quarantine to individual disease and to the species' lifespan. • If the supplying collection has had previous problems with a potentially infectious agent this should be checked during the quarantine period - where numbers allow this shoudl be done by culling and post-mortem. Also if numbers allow it may be worth culling a few anyway and preserving in alcohol for future investigation should need arise Sick animals should (where numbers allow) be culled for investigation. Dead animals should be stored - there is often little use in performing PM's on these. However, they may be of use for whole body virology, etc should an "outbreak" then start • If faeces can be identified endoparasite checks (esp spiders) may be done pre- / post-move • Handling animals - screening for salmonella screening not recommended as it would be unclear what either a positive or negative culture would mean. (Most zoonoses are generally contracted by eating the invertebrate!)							

MAMMALS

PRIMATES

Pre-export testing

The sending collection must provide documentation verifying that:

1. The animal was either born at the premises of origin or has been there for at least two years (OIE recommendation).
2. One TB test has been performed within 30 days prior to transport. Any reaction to human (mammalian Old or human PPD) or bovine tuberculin is deemed positive. (OIE recommendation is two TB tests within the 30 days (except in callitrichids) but this increases false positives).
3. The sending collection has had no incidence of TB over the previous 5 years.
4. Faecal screening for *campylobacter, salmonella, shigella, yersinia* (enterocolitica & pseudotuberculosis), and parasites has been conducted within 30 days prior to transport.

2. There has been treatment (with an avermectin) for any ectoparasites and endoparasites within 30 days prior to transport.

N.B. Balai registered collections will already be aware of the above requirements.

Diseases of concern with reference to SLSZ	Viruses: a. Retroviruses: SIV (except callitrichids), STLV (except callitrichids), SRV (macaques only if considered). b. Others: Herpes B (macaques) and other alpha herpes viruses, Hepatitis B (apes only), Hepatitis C. Bacteria: Tuberculosis, *Salmonella, Shigella, Campylobacter, Yersinia* (especially callitrichids). Parasites: Enteric parasites, Toxoplasma (callitrichids and lemurs).
Pre-export disease screening	• Physical examination. • Basic haematology and biochemistry profile. • Faecal culture (to include Salmonella, Shigella, Campylobacter and Yersinia) and parasitology (to include nematodes and protozoa). • TB test. (Currently comparative intradermal (eyelid) test with PPD of avian and bovine origin. Other tests such as DPP from Chembio or gamma-interferon may be appropriate).

	• Serology for SIV (except callitrichids), STLV (except callitrichids), SRV (macaques only), Hepatitis B (great apes only), and alpha Herpes viruses (according to species). • Radiography if appropriate (e.g. follow-up to positive TB test or musculoskeletal concern). • Store serum for future reference.
Length of quarantine	30 days (if within UK or statutory 6 months under rabies legislation). (12 weeks if animals coming from the wild or a collection without veterinary supervision). N.B. Social animals require group quarantine which may require co-terminus with already resident animals and therefore pre-export testing is paramount.
Added animals procedure required for balai approval	Double-fencing with a gap of 3m from any other resident species, unless solid construction to avoid droplet transmission. Ventilation must be secure enough to prevent primate escape (double wire mesh advised). Provision for separation and treatment of individuals within isolation unit. PPE must completely cover the body, and masks and eye protection should be worn (unless the AV agrees otherwise with APHA). Any incident exposing humans to primate blood or saliva must be reported immediately to the AV. Staff must not eat, drink or smoke in the isolation unit. Staff must report any personal illness to their supervisor. Hand-washing facilities must be present in each animal holding room with hot and cold running water, and the staff must use them regularly. Footbaths (using DEFRA-approved disinfectants agreed by the AV) must be used between each animal holding room, and each room must have dedicated equipment that is not transferred.
Parasite control	Routine faecal parasitology every 6 months with a particular focus on walk through exhibits. Anthelminthic therapy dependent on results.
Vaccination	Nil at present.
Contraception	As required for management and individual health purposes. Nil at present.
Identification	Transponder that complies with ISO standards. • All groups: SC between scapulae.
Special procedures	Nil at present.
Bloods	Routine Blood Profile: CBC, ALP, ALT, AST, GGT, TBil, TP, Alb, Glob, Chol, CK, Urea, Crea, Phos, Ca, Glu.

CARNIVORA (Felidae/Canidae/Mustelidae/Herpestidae/Viverridae/Procyonidae)

Pre-export health screening

The sending collection must send documentation verify that:

1. Testing for Salmonellosis has been conducted within 30 days prior to transport.
2. Vaccination against Distemper, Hepatitis, Leptospirosis, Parvovirus, Viral Rhinotracheitis, Calicivirus and Panleukopaenia (as appropriate) has been conducted not less than 4 weeks but no more than 1 year prior to transport. N.B. Only inactivated/dead vaccines to be used or discuss with resident veterinarian before
3. Testing for FIV, FeLV and FIP/FCoV (as appropriate) has been conducted.
4. There has been treatment for any ectoparasites and endoparasites within 30 days prior to transport.

N.B. Balai registered collections will already be aware of the above requirements.

Diseases of concern with reference to SLSZ	Chlamydophila, Salmonella, Campylobacter, Enteric parasites. Felids: FIV, FeLV, panleukopaenia (parvovirus), FIP (coronavirus), Chlamydophila, Rhinotracheitis virus (herpesvirus). Canids: Parvovirus, Distemper, Hepatitis, Leptospirosis, Parainfluenza. Mustelids: Parvovirus, Distemper, Hepatitis, Leptospirosis, Panleukopaenia.
Pre-export health screening	N.B. Vaccinations should be up to date before accepting the animal • Physical examination. • Basic haematology and biochemistry screen. • Faecal culture and parasitology (3 day pooled sample if possible). • Serology for FIV, FeLV and FIP/FCoV in Felidae. • Store serum for future reference.
Length of quarantine	30 days if within UK (or statutory 6 months under rabies legislation).
Added animals procedure required for balai approval	Double-fencing with a gap of 3m from any other resident species, unless solid construction to avoid droplet transmission. Provision for separation and treatment of individuals within isolation unit.
Parasite control	Routine faecal parasitology every 6 months (April and August/September). Anthelminthic therapy dependent on results. • Felid adult positives treated with piperazine powder or Drontal® Plus tablets at domestic cat dose rates per kg BW. Felid cubs administered oral Panacur® at vaccination.

	• Canid positives treated with Panacur® pellets or liquid in late gestation if possible. Canid cubs treated with Panacur® liquid at 3, 6 and 9 weeks re ascarid prevention. All canids administered Advocate® spot-on at vaccination.
Vaccination	Large felids: Fort Dodge Fevaxyn® ICHPChlam (and Fevaxyn® FeLV if appropriate) every 12 months (in February). Cubs vaccinated at 8 and 11 weeks. N.B. This is only inactivated such vaccine in UK. Canids: Duramune® DAPPi + LC every 12 months (in November). Others: Nil at present.
Contraception	Generally nil. If required GnRH analogue (deslorelin) implant (Suprelorin®) 12 months formulation. To be placed SC between scapulae. Need at least 2 x 9.4mg implants in big felids (e.g. lion). N.B. 6-month formulation may be appropriate in some circumstances. If permanent sterilisation acceptable then surgical options preferable.
Identification	Transponder that complies with ISO standards. To be placed SC between scapulae in all up to 30kg BW (e.g.cheetah), IM left supraspinatus in larger species.
Special procedures	Testing for certain diseases under certain circumstances e.g. Toxoplasmosis, rhinotracheitis and calicivirus. And specific species requirements (e.g. vitamin A levels in lion).
Bloods	Routine Blood Profile: CBC, ALP, ALT, TBil, TP, Alb, Glob, Urea, Crea, Phos, Ca, Glu.

CHIROPTERA

Bats represent a specific zoonotic risk in the form of European Bat Lyssavirus (EBLV), a possible cause of non-classic rabies in humans, and other infections. As such, the exhibit should comply with the guidelines laid down in Appendix 7. Further advice is due from DEFRA and HPA in the future.

Diseases of concern	Rabies (notifiable) (European Bat Lyssavirus – EBLV), Salmonella.
Pre-export health screening	• Examine post mortem history of sending collection for any evidence (or lack of) brain lesions. • Physical examination (to include teeth, propatagia, limbs, ectoparasites). • Serology for EBLV (from all animals if destined for walk-through exhibit or representative sample if large group away from public access). • Faecal culture and parasitology (including Salmonella, Campylobacter, Shigella and Yersinia).
Length of quarantine	30 days if within UK (or statutory 6 months under rabies legislation).
Added animals procedure required for balai approval	As described above under quarantine/isolation.

Parasite control	Routine faecal parasitology every 6 months. Anthelminthic therapy dependent on results.
Vaccination	No, although theoretically possible with killed vaccine.
Contraception	Nil.
Identification	Transponder that complies with ISO standards. To be placed SC between scapulae or over rump if species deemed of adequate size.
Special procedures	At PM all brains to be sent to VLA Weybridge for FAT/PCR re EBLV.
Bloods	Routine Blood Profile: CBC, ALP, ALT, TBil, TP, Alb, Glob, Urea, Crea, Phos, Ca, Glu.

XENARTHRA

Diseases of concern	Enteric parasites and bacteria, Bacterial pneumonia.
Pre-export health screening	• Physical examination (to include weight and sex determination). • Basic haematology and biochemistry. • Faecal culture and parasitology (including Salmonella and Campylobacter). • Store serum for future reference.
Length of quarantine	30 days if within UK (or statutory 6 months under rabies legislation).
Added animals procedure required for balai approval	As described above under quarantine/isolation.
Parasite control	Routine faecal parasitology every 6 months. Anthelminthic therapy dependent on results.
Vaccination	Nil.
Contraception	Nil.
Identification	Transponder that complies with ISO standards. To be placed SC between scapulae.
Special procedures	Nil.
Bloods	Routine Blood Profile: CBC, ALP, ALT, TBil, TP, Alb, Glob, Urea, Crea, Phos, Ca, Glu.

ARTIODACTYLIDS (Bovidae/Camelidae/Cervidae/Giraffidae/Hippopotamidae)

Pre-export health screening

The sending collection must send documentation verifying that:

1. No cases of Foot and Mouth Disease, Blue Tongue, Rinderpest, Contagious Bovine Pleuropneumonia, Bovine Meningo-encephalitis, or Maedi/Visna (sheep) have occurred within a 15 km radius of the zoo within the previous 42 days.
2. Testing for Bluetongue, Paratuberculosis, Tuberculosis, Brucellosis, Leptospirosis and Enzootic Bovine Leukosis has been conducted within 30 days prior to transport, as required.
3. The epidemiological status of spongiform encephalopathies within the collection is known.
4. Testing for Salmonellosis and endoparasites has been conducted within 30 days prior to transport.
5. There has been treatment for any ecto and endoparasites.

N.B. Balai registered collections will already be aware of the above requirements.

Diseases of concern	Salmonella, Campylobacter, Brucella, EBL, Johne's disease, TB, Leptospirosis, Malignant Catarrhal Fever, Bovine Virus Diarrhoea, Enteric parasites, Bluetongue.
Pre-export health screening	• Physical examination. • Basic haematology and biochemistry. • Faecal culture and parasitology (to include examination for cryptosporidium) (3 day pooled sample and individual samples where possible). • TB skin test (and possibly RT/MAPIA). • Store serum for future reference. • Serology for Brucella, Johne's, EBL, BVD, MCF, Leptospirosis, IBR, RSV dependent on history and species.
Length of quarantine	30 days (or up to 12 weeks depending on need for Johne's culture), in co-terminus if necessary. Pre-import sampling may allow a reduction in the length of quarantine.
Added animals procedure required for balai approval	If isolation unit has open paddocks the double-fencing with a gap of 3m from any other resident species is required. Both fences must be escape-proof. Provision for separation and treatment of individuals within isolation unit.
Parasite control	Giraffe, Goats, Nyala, Wildebeest: Routine faecal parasitology every 6 weeks for worm egg counts. Positives treated according to current anthelmintic policy. Dromedary and Bactrian camels: Routine faecal parasitology every 8 weeks for worm egg counts.
Vaccination	• Bluetongue vaccination: All Camelidae, Bovidae (including giraffe) and Cervidae to be vaccinated with 1ml BTV8 (Bovilis®) SC (or i/m if have to dart) annually. Primary course first dose 1 month second dose 3 weeks later. Booster two weeks before risk period. REVIEW AS NECESSARY

	• Goats and llamas: vaccination 2mls every 12 months (in March) against Clostridial disease (e.g. Lambivac®). Primary course first dose 1 month second dose 4 weeks later (currently none on site) N.B. Due to possible adverse reactions it is agreed not to administer BTV and Clostridial vaccines concurrently. • Giraffe, Wildebeest: Lungworm vaccine Huskvac® at 6 and 10 weeks in giraffe and 8 and 12 weeks in others.
Contraception	Nil.
Identification	Transponder that complies with ISO standards. • Bovidae and Camelidae: SC left side of neck. • Giraffidae: SC over left shoulder (within reach) within 1 week of birth. • Cervidae: Large – IM as for large felids, Small – SC between scapulae.
Special procedures	BCS (according to EAZA Husbandry and Management Guidelines – Kearney and Ball, 2001) giraffe every month.
Bloods	Routine Blood Profile: CBC, GGT, GLDH, TP, Alb, Glob, Urea, Crea, Phos, Ca, Mg, BHB.

SUIDAE

Pre-export health screening

The sending collection must send documentation verifying that:

1. No cases of Foot and Mouth Disease (FMD) or Swine Fever (SF) have occurred within a 15 km radius of the zoo within the previous 42 days.
2. The transporting vehicle will not travel through an area infected with FMD or SF.
3. Blood tests for Brucellosis have been performed with negative results within 30 days prior to transport, as required.
4. There has been treatment for any ectoparasites and endoparasites within 30 days prior to transport.

N.B. Balai registered collections will already be aware of the above requirements.

Diseases of concern	Salmonella, Campylobacter, Brucella, Enteric parasites.
Pre-export health screening	• Physical examination. • Basic haematology and biochemistry screen (including blood smear). • Faecal culture and parasitology (3 day pooled sample and individual samples where possible). • Serology for Brucella.

	• Store serum for future reference.
Added animals procedure required for balai approval	30 days isolation in co-terminus if necessary. Double-fencing with a gap of 3m from any other resident species. Signs. Double gate/door system with footbaths and dedicated clothing/equipment. Provision for separation and treatment within isolation facility. N.B. Will require extra testing if import domestic pig species.
Length of quarantine	30 days.
Parasite control	Routine faecal parasitology every 6 months. Anthelminthic therapy dependent on results.
Vaccination	Nil.
Contraception	Nil.
Identification	Transponder that complies with ISO standards. To be placed IM left supraspinatus.
Special procedures	Nil.
Bloods	Routine Blood Profile: CBC, ALP, ALT, TBil, TP, Alb, Glob, Urea, Crea, Phos, Ca, Glu.

PERISSODACTYLIDS (Equidae/Tapiridae/Rhinocerotidae)

Pre-export health screening

The sending collection must send documentation verifying:

1. The status of the animal with regards vaccination against tetanus.
2. The status of the animal with regards vaccination against equine influenza.
3. That the animal is free of African Horse Sickness.
4. That there has been treatment for any ectoparasites and endoparasites within 30 days prior to transport.

N.B. Balai registered collections will already be aware of the above requirements.

Diseases of concern	Salmonella, Campylobacter, Equine Influenza, Tetanus, Enteric parasites, Bluetongue (Tapiridae only).
Pre-export health screening	• Physical examination. • Basic haematology and biochemistry screen (including blood smear). • Faecal culture and parasitology (3 day pooled sample and individual samples where possible).

	• Store serum for future reference.
Length of quarantine	30 days.
Added animals procedure required for balai approval	30 days isolation in co-terminus if necessary. Double-fencing with a gap of 3m from any other resident species. Signs. Double gate/door system with footbaths and dedicated clothing/equipment. Provision for separation and treatment within isolation facility.
Parasite control	Zebra: Routine faecal parasitology every 6 weeks. Positives treated according to Appendix 8, and prophylactic treatment as described. Tapir: Routine faecal parasitology every 6 weeks. Positives treated according to Appendix 8. White rhinoceros: Routine faecal parasitology every 12 weeks. Positives treated according to Appendix 8.
Vaccination	Zebra: Influenza and tetanus vaccination annually (see Appendix 8). Foals from 5 months. Tapir: Tetanus toxoid 1ml i/m (November) with annual booster.
Contraception	Female administered 5ml Regumate® per os daily in feed.
Identification	Transponder that complies with ISO standards. To be placed IM left side of neck.
Special procedures	Faecal samples for progesterone assays taken from females every Monday and Thursday.
Bloods	Routine Blood Profile: CBC, ALP, AST, GGT, GLDH, LDH, TBil, TP, Alb, Glob, CK, Urea, Crea, Phos, Ca, Bile acids.

MARSUPIALS

Diseases of concern	Lumpy Jaw (Bacteroides/Fusobacterium spp – must be declared if confirmed in collection within previous 12 months), enteric parasites (especially coccidiosis in joeys), salmonella, campylobacter.
Pre-export health screening	• Physical examination (to include weight where possible). • Basic haematology and biochemistry (including blood smear). • Faecal culture and parasitology (including Salmonella, Campylobacter and coccidia – 3 day pooled sample preferably). Serotype salmonella if found. • Store serum for future reference.
Length of quarantine	30 days.
Added animals procedure required for BALAI approval	30 days isolation in co-terminus if necessary. Double-fencing with a gap of 3m from any other resident species. Signs. Double gate/door system with footbaths and dedicated clothing/equipment. Provision for separation and treatment within isolation facility.

Parasite control	Routine faecal parasitology every 6 weeks.
Vaccination	Nil.
Contraception	Nil.
Identification	Transponder that complies with ISO standards. To be placed SC between scapulae.
Special procedures	Nil.
Bloods	Routine Blood Profile: CBC, ALP, ALT, TBil, TP, Alb, Glob, Urea, Crea, Phos, Ca, Glu.

OTHER MAMMALS (Lagomorphs/Rodentia/Insectivora)

Pre-export health screening

The sending collection must provide documentation verifying that:

1. There have been no outbreaks of myxomatosis, brown hare syndrome, tuberculosis, viral haemorrhagic disease, tularaemia or yersiniosis within the 60 days prior to transport.
2. There has been treatment for any ectoparasites and endoparasites within 30 days prior to transport.

N.B. balai registered collections will already be aware of the above requirements.

Diseases of concern	Salmonella, Campylobacter, Yersinia, Myxomatosis and Viral Haemorrhagic Disease (lagomorphs), Enteric parasites, Encephalitozoon cuniculi (lagomorphs), Mycoplasma (rats).
Pre-export health screening	• Physical examination. • Basic haematology and biochemistry screen (including blood smear). • Faecal culture and parasitology (3 day pooled sample and individual samples where possible). • Consider serology to determine E. cuniculi status in rabbits • Consider nasal swabs to determine Mycoplasma spp. status in rats • Store serum for future reference.
Added animals procedure required for BALAI approval	30 days isolation in co-terminus if necessary. Signs. Double gate/door system with footbaths and dedicated clothing/equipment. Provision for separation and treatment within isolation facility.
Length of quarantine	30 days.

Parasite control	Routine faecal parasitology every 6 months. Anthelminthic therapy dependent on results.
Vaccination	Lagomorphs: Vaccinate against myxomatosis and viral haemorrhagic disease. Use cylap® 1ml s/c primary course first dose 3 months then annual booster. Nobivac Myxo® 0.1ml intradermal 0.9ml s/c primary course first dose 6 weeks then annual booster.
Contraception	Nil.
Identification	Transponder that complies with ISO standards. To be placed SC between scapulae.
Special procedures	Nil.
Bloods	Routine Blood Profile: CBC, ALP, AST, GGT, LDH, TP, Alb, Glob, CK, Urea, Crea, Phos, Ca, Glu, Bile acids, Triglycerides.

BIRDS

Pre-export health screening

The sending collection must send documentation verifying that:

1. The collection has had no cases of avian influenza for 30 days prior to transport.
2. The collection is not subject to or in an area subject to restrictions to combat Newcastle disease or avian influenza.
3. In the case of psittacines, Psittacosis has not been diagnosed in any psittacine bird for at least two months.
4. Testing for Salmonellosis and endoparasites has been conducted within 30 days prior to transport.
5. There have been no cases of Yersiniosis within 60 days prior to transport.
6. Any evidence of Pacheco's disease, PBFD, Proventricular dilatation syndrome, TB, avian pox or avian diphtheria within the last year has been reported to the receiving collection.

N.B. balai registered collections will already be aware of the above requirements.

PSITTACIFORMES

Diseases of concern	PBFD, Polyoma virus, Proventricular Dilatation Syndrome, Pacheco's (South American psittacines), Chlamydophila, Salmonella, Campylobacter, Enteric parasites, Aspergillosis.
Pre-export health screening	• Physical examination (to include weight and sex determination). • Basic haematology and biochemistry (including blood smear). • Faecal culture (including gram positive/negative ratio) and parasitology. • PCR for C. psittaci (3 day pooled faecal sample (days 1, 3 & 5) or heparinised blood). • PCR for PBFD (whole blood, feathers or faeces). • PCR for Polyoma virus (whole blood, feathers or faeces). • PCR for Pacheco's (whole blood) (South American psittacines only). • Store serum for future reference.
Length of quarantine	30 days or until all test results are in and satisfactory. All birds to test negative for parasites before release.

Added animals procedure required for balai approval	Standards of isolation have to be comparable to that required for commercial bird imports. 200m separation distance from other non-poultry birds in the collection. Ventilation essential but must not compromise the exclusion of all wild birds (double wire mesh advised). Separate isolation rooms within the unit require separate air spaces or the quarantine period must be extended to the last additions.
Parasite control	Routine faecal parasitology every 6 months. Anthelminthic therapy dependent on results.
Vaccination	None unless indicated. Highly Pathogenic Avian Influenza (H5N2 and H7 strains) may become necessary (license may be required).
Contraception	Nil.
Identification	Transponder that complies with ISO standards. • >200g BW: IM left pectoral muscle. • <200g BW: SC left side over ribs (through laparoscopy incision if appropriate). Wound should be closed with suture or tissue glue. N.B. Closed ringing of some species recommended but bird should still be transponded.
Special procedures	Nil.
Bloods	Routine Blood Profile: CBC, ALP, AST, GGT, LDH, TBil, TP, Alb, Glob, Chol, CK, Urea, Phos, Ca, Glu, Na, K, Uric acid, Bile acids.

NON PSITTACIFORMES

Diseases of concern	Mycobacterium avium/intracellulare complex (MAIC), Avipox (raptors imported from Middle East), Aspergillosis (especially raptors and penguins), Chlamydophila, Salmonella, Campylobacter, Enteric parasites.
Pre-export health screening	• Physical examination (to include weight and sex determination). • Basic haematology and biochemistry (including blood smear). • Faecal culture and parasitology (including gram positive/negative ratio). • PCR for C. psittaci (3 day pooled faecal sample (days 1, 3 & 5) or heparinised blood). • Store serum for future reference. • Details of anti-malarial prophylaxis and stage of moult (penguins only).
Length of quarantine	30 days or until all test results are in and satisfactory.
Added animals procedure required for balai approval	Standards of isolation have to be comparable to that required for commercial bird imports. 200m separation distance from other non-poultry birds in the collection. Ventilation essential but must not compromise the exclusion of all wild

	birds (double wire mesh advised). Separate isolation rooms within the unit require separate air spaces or the quarantine period must be extended to the last additions.
Parasite control	Routine faecal parasitology every 6 months. Anthelminthic therapy dependent on results.
Vaccination	All: Highly Pathogenic Avian Influenza (H5N2 and H7 strains) may become necessary (license may be required).
Contraception	Nil.
Identification	Transponder that complies with ISO standards. • >200g BW: IM left pectoral muscle. • <200g BW: SC left side over ribs (through laparoscopy incision if appropriate). Wound should be closed with suture or tissue glue. • Ratites: SC over rump or base of neck – note in clinical records. Darvic ring above TMT joint, other rings as necessary N.B. Closed ringing of some species recommended but bird should still be transponded.
Special procedures	Nil at present.
Bloods	Routine Blood Profile: CBC, ALP, AST, GGT, LDH, TBil, TP, Alb, Glob, Chol, CK, Urea, Phos, Ca, Glu, Na, K, Uric acid, Bile acids.

REPTILES

Pre-export testing

The sending collection must provide documentation verifying that:

1. Testing for Salmonellosis and endoparasites has been conducted within 14 days prior to transport.
2. Clinical cases of amoeba have been reported.

SNAKES

Diseases of concern	Viruses: Inclusion Body Disease (IBD) (Boidae only), Ophidian Paramyxovirus (OPMV). Bacteria: Salmonella (if diarrhoea). Parasites: Ectoparasites, endoparasites (ascarids, trematodes, protozoa – amoeba, coccidia, cryptosporidia).
Pre-export health screening	• History of IBD in sending collection over last 3 years (and any investigation) (Boidae only). • Physical examination (including ectoparasite removal and weight at start and finish of quarantine). • Basic haematology and biochemistry screen (fresh blood smear and heparin). • Standard profile: TP, Alb, Glob, Glucose, Uric acid, AST, CK, Ca & P. • Faecal culture and parasitology (ideally 3 negative tests all one week apart). • Reptile faecal: Aerobic bacteriology, selective culture for salmonella, WEC, coccidial oocysts & other protozoa. • Serology for OPMV 1 and 7 (2 tests 2 months apart) as deemed necessary. • Store serum for future reference.
Length of quarantine	Minimum of 6 months isolation in total (to guard against IBD).
Added animals procedure required for balai approval	None.
Parasite control	Routine faecal parasitology every 6 months. Worm as required or if 2 consecutive negative faecal results not obtainable. Treat ectoparasites with Frontline on entry and at end of quarantine.
Vaccination	Nil.
Contraception	Nil.

Identification	All CITES I and II and sex where possible. Transponder that complies with ISO standards. To be placed SC left side just anterior to cloaca.
Special procedures	Should consider routine ovariectomy in all iguanas and bearded dragons not for breeding.
Bloods	Routine Blood Profile: CBC, ALP, AST, GGT, LDH, TBil, TP, Alb, Glob, Chol, CK, Urea, Phos, Ca, Glu, Na, K, Uric acid, Bile acids.

LIZARDS

Diseases of concern	Viruses: OPMV. Bacteria: Salmonella (if diarrhoea), pseudomonas. Parasites: Ectoparasites, endoparasites (ascarids, trematodes, protozoa, hookworm, strongyles, strongyloides). Fungi: Dermatophilosis, systemic mycoses. Metabolic Bone Disease
Pre-export health screening	• Physical examination (including ectoparasite removal and weight at start and finish of quarantine). • Basic haematology and biochemistry screen (including blood smear). • Faecal culture (salmonella) and parasitology (ideally 3 negative tests all one week apart). • Serology for OPMV (2 tests 2 months apart). • Radiography to assess bone density if MBD suspected. • Store serum for future reference.
Length of quarantine	Minimum of 3 months.
Added animals procedure required for balai approval	None.
Parasite control	Routine faecal parasitology every 6 months. Worm as required or if 2 consecutive negative faecal results not obtainable. Treat ectoparasites with Frontline on entry and at end of quarantine.
Vaccination	Nil.
Contraception	Nil.
Identification	All CITES I and II and sex where possible. Transponder that complies with ISO standards. • Crocodilians: SC anterior aspect left thigh. • Lizards: SC or IM left thigh. (Small species SC left flank or intracoelomic).
Special procedures	Nil.

Bloods	Routine Blood Profile: CBC, ALP, AST, GGT, LDH, TBil, TP, Alb, Glob, Chol, CK, Urea, Phos, Ca, Glu, Na, K, Uric acid, Bile acids.

CHELONIA

Diseases of concern	Viruses: Herpes. Bacteria: Salmonella (if diarrhoea), pseudomonas. Parasites: Ectoparasites, endoparasites (pathogenic ascarids/trematodes/protozoa). Mycoplasmas
Pre-export health screening	• Physical examination (including ectoparasite removal and weight at start and finish of quarantine). • Basic haematology and biochemistry screen (including blood smear). • Faecal culture (salmonella) and parasitology (ideally 3 negative tests all one week apart). • Nasal wash for Chelonian herpesvirus PCR. • Radiography to assess bone density if MBD suspected, and for reproductive status. • Store serum for future reference.
Length of quarantine	Minimum of 3 months.
Added animals procedure required for BALAI approval	None.
Parasite control	Spur-thighed tortoises: Prophylactic fenbendazole (Panacur paste in May and September). Dose rate? And better by gavage? Tortoises: Prophylactic fenbendazole (Panacur solution by gavage pre and post hibernation). Dose rate? All: Treat ectoparasites with Frontline on entry and at end of quarantine.
Vaccination	Nil.
Contraception	Nil.
Identification	All CITES I and II and sex where possible. Transponder that complies with ISO standards. SC or intracoelomic left inguinal region. (Giant species SC tarsal area or loose skin behind head).
Special procedures	Nil.
Bloods	Routine Blood Profile: CBC, ALP, AST, GGT, LDH, TBil, TP, Alb, Glob, Chol, CK, Urea, Phos, Ca, Glu, Na, K, Uric acid, Bile acids.

AMPHIBIA

Pre-import testing

It is unlikely that any sending collection will test amphibia prior to export. Thus quarantine is especially important.

Quarantine protocol

Diseases of concern	Fungi: Chytridiomycosis (*Batrachochytrium dendrobatidis*). NOTIFIABLE DISEASE Viruses: Ranaviruses. NOTIFIABLE DISEASE Parasites: Cryptosporidium, nematodes (especially Rhabdius spp.). Maladaption syndrome: Poor husbandry related.
Pre-export health screening	• Physical examination (weight of non-tadpoles, impression smears of any skin lesions) with wet-gloved hands. • Faecal examination where possible for acid-fast organisms, direct and flotation techniques for parasites (ideally 3 negative tests all 1 week apart). • PCR for chytridiomycosis and ranavirus (if appropriate).
Length of quarantine and special considerations	Minimum of 60 days (90 if wild-caught). N.B. Frogs from high-risk chytrid sources to undergo itraconazole baths (1% sporanox solution diluted to 0.1% with 0.9% saline for 5 minutes a day for 10 days). • Quarantine on an all-in, all-out basis. • Only service quarantined amphibia after other animals in the collection, use disposable gloves and boot covers, and do not transfer equipment in or out of the quarantine area without disinfection. • Clean and disinfect all transport equipment and bedding on arrival. • All waste to be bagged as clinical and destroyed by incineration. • Maintain environmental temperature at 17 - 23°C to prevent asymptomatic carriage of chytridiomycosis at high temperatures. • On completion of quarantine all equipment to be disinfected and left empty for at least 7 days.
Added animals procedure required for balai approval	None.
Parasite control	Routine faecal parasitology every 6 months. Anthelminthic therapy dependent on results.

Vaccination	Nil.
Contraception	Nil.
Identification	Dependent on size and classification. Transponder that complies with ISO standards. Lymphatic cavity and closed with tissue glue.
Special procedures	Nil.
Bloods	Not usually applicable.

FISH

Diseases of concern	Infectious disease, especially mycobacterium and skin/gill parasites.
Pre-export health screening	Review of records to establish history of system/tank/species with particular reference to the above. Review all skin scrape/gill press results and all post mortems and accompanying histology to establish proportion screened in relation to number of mortalities.
Length of quarantine and special considerations	All fish should enter quarantine for a period of adaption and observation before transfer to currently stocked tanks.
Added animals procedure required for balai approval	None.
Parasite control	None routinely. Any therapy dependent on clinical signs and investigations.
Identification	Not applicable in the small number of species kept at SLSZ.

TERRESTRIAL INVERTEBRATES

Diseases of concern	Few infectious diseases are well-described and most outbreaks reflect husbandry stress.
Pre-export health screening	Review of records from previous collection.
Length of quarantine and special considerations	Essential but length of time required generally unspecified. Tailor to any specific disease concerns and species' lifespan. Investigate any known problem during quarantine through culling and post mortems if numbers allow. Store dead animals (e.g. in ethanol) for future testing (e.g. virology) in case of outbreak.
Added animals procedure required for balai approval	None.
Parasite control	None routinely. Can perform endo-parasite checks on faeces (especially spiders) pre- and post-export. Any therapy dependent on results. Salmonella checks NOT warranted – transmission only likely through ingestion of animal itself and pathogenic nature in host not established.
Identification	None routinely.

SLSZ Faecal parasitology and bacteriology surveillance schedule

KEY: Ext parasitology & bacteriology (C = Chlamydia psittaci testing) In-house parasitology (concentration, direct as required) (D=Direct prep) In-house parasitology with faeces sent for bacteriology (education animals)

Month	January				February				March				April				May				June				July				August				September				October				November				December			
Week	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52
Zoonotic assessment for walk throughs - external laboratory assessment																																																		
WWS Capybara																																																		
WWS Lemur feeding area																																																	
WWS Free ranging RT lemurs																																																	
WWS Squirrel monkeys																																																	
WWS Middle lemur house																																																	
WWS Micropods																																																		
WWS Emu	3 day pooled sample																				D																														
Free ranging peacocks	3 day pooled sample																				D																														
Tamborpata aviary - parrots	3 day pooled sample																				D																													
Tamborpata aviary - non parrot	3 day pooled sample																				D																													
Ibarpa Vulture experience	3 day pooled sample																				D																													
Parasite surveillance programme																																																	
Reptiles																																																	
Testudines																				D								D																					
Boa constrictors																																																	
Yellow anaconda																																																	
Corn snake																																																	
Burmese python																																																	
Birds																																																	
Rhea																																																	
Pheasants	Group mixed species WWS																																																
Ducks, swans and geese	Group mixed faecal WWS																																																
Chilean flamingos	Group mixed sample																																																
EA Crowned Crane																																																	
Inca terns																																																	
Humboldt penguins																																																	
White storks																																																	
Southern hornbills																																																	
Mammals																																																	
Marsupials																																																	
Brush tailed rat-kangaroo												D																																					
Western grey kangaroo												D																																					
Parma wallaby												D																																					
Red kangaroo												D																																					
Swamp wallaby												D																																					
Pilosa																																																	
Sloth																																																	
Giant anteaters																																																	
Primates																																																	
Black-and-gold howler													D																D																				
Black-headed spider monkey													D																D																				
Brown spider monkey													D																D																				
White-fronted lemur					D																					D																						
Alaotran reed lemur					D																					D																						
Lar gibbon													D																D																				
Ring-tailed lemur					D																					D																						
Hamadryas baboon													D																D																				
Red ruffed lemur					D																					D																						
Black and white ruffed lemur					D																					D																						
White-belted ruffed lemur					D																					D																						
Common squirrel monkey					D																					D																						
Saddleback tamarin					D																					D																						
Emperor tamarin					D																					D																						
Cotton-top tamarin					D																					D																						
Siamang												D																	D																				
Rodentia																																																	
Black-tailed prairie dog																																																	
Patagonian mara																																																	
Eurasian red squirrel																																																
Chiroptera																																																	
Rodrigues flying fox																																																
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Red Panda																																																	
Gray wolf																																																	
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Yellow mongoose																																																	
Banded mongoose																																																	
African lion																																																	
Jaguar																																																	
Sri Lankan leopard																																																	
Sumatran tiger																																																	
Northern raccoon																																																	
Giant otter																																																	
Slender-tailed meerkat																																																	
Spectacled bear																																																	
Snow leopard																																																	
Perissodactyla																																																	
Southern white rhinoceros																																																	
Plains zebra																																																	
South American tapir																																																	
Artiodactyla																																																	
Buru babirusa																																																	
Bactrian camel																																																	
Pygmy hippo																																																	
Common wildebeest																																																	
Giraffe																																																	
Kordofan giraffe																																																	
Reeves' muntjac																																																	
Reindeer																																																	
Nyala																																																	
Vicugna																																																	

Parasitology and sample submission

SOUTH LAKES SAFARI ZOO

Faecal, swab or other sample

Sample for PARASITOLOGY:
- Clinical case under vet direction
- Surveillance/screening in house
- Faecal egg count needed
- Other parasitology sample

Sample for BACTERIOLOGY:
- Clinical case under vet direction
- Pre-export move
- Import
- Other bacteriology sample

COLLECT SAMPLE

Collect sample in appropriate fashion:
- FAECES: Blue topped universal pot with spoon, clearly labelled
- SWAB: Transport media for most bacteria as indicated
- SWAB: Plain for Mycoplasma (runny tortoise eyes), chlamydia (parrots) or PCR (general)
- Use appropriate PPE and samples then in plastic bag

SUBMISSION

Submit sample in appropriate fashion:
- Under veterinary direction: as indicated by vet at time in suitable container
- Surveillance/screening: suitable container in plastic bag with submission form and clearly labelled

PARASITOLOGY (SAMPLE) DATABASE SUBMISSION

For all submissions the Parasitology Database must be filled in:
- Database found on the shared drive
- All data to the left of the black line must be completed except for the date reviewed
- Each sample given unique F number

Sample for PARASITOLOGY:
- Surveillance (egg +/-)
- PREFERRED
- IN-HOUSE

Sample for PARASITOLOGY:
- Second opinion
- Faecal Egg Count (vet)
- Export check

Sample for BACTERIOLOGY:
- Vet Direction
- Faecal Egg Count
- Export check

Diagnosis to sufficient level

NO

YES

Sent to external laboratory

Positive for parasites: images on shared drive

Results put in Parasite Database for review

ZOONOTIC DISEASE RISK

Due to the risk of transmission of infectious disease (in either direction) between animals and their keeping staff (or public), it is essential that SLSZ has a documented policy regards management of this risk. Close contact with animal body fluids, faeces and tissues is inevitable and minimising the risk of disease transmission requires well-trained personnel and stringent personal hygiene.

As a general rule the risk of primates carrying zoonotic pathogens is highest, as a result of their taxonomic position with regards to humans. Wild-caught individuals similarly represent a higher risk than animals born in captivity and maintained in a known environment and under veterinary supervision. Furthermore, young children and old or immune-suppressed people are more at risk. Whilst international legislation and guidelines cover the movement of animals between collections, including disease screening and quarantine requirements, this can never prevent the carriage of zoonotic disease in certain instances.

GENERAL PRECAUTIONARY MEASURES TO BE FOLLOWED (AND ENFORCED) BY STAFF

1. Correct handling of all animals, their body fluids, faeces and tissues with respect to zoonotic disease. In other words, strict personal hygiene practices, including the use of protective clothing and prohibition of eating, drinking and smoking in potentially infective areas. Hand-washing facilities must be available and used regularly.
2. Particular care with species of known zoonotic susceptibility or individuals of known zoonotic status, considering them as lifelong carriers (e.g. gorillas with chronic *Balantidium coli* infection or reptiles with *Salmonella sp*).
3. Implementation of an immunisation programme if and as appropriate.
4. Potential implementation of a targeted screening programme of staff health where circumstances indicate (e.g. instances of herpes simplex, tuberculosis, pathogenic enteric bacteria and endo-parasites).
5. All staff to alert the medical profession to their nature of employment should they be taken ill (through the use of a generic letter issued by SLSZ management).
6. Any primate keeping staff that are sick or in contact with other people thought to be suffering from common colds, measles, mumps, rubella, influenza, cold sores or severe diarrhoea, should inform their line manager. It may be appropriate to stop them working with primates temporarily (or other species as needed).
7. All carcases, body fluids, faeces and tissues to be disposed of in a manner that is not detrimental to public health.

8. In the case of non-walk/drive-through enclosures, barriers must prevent direct contact between members of the public and zoo stock.
9. Walk-though exhibits are restricted to those species that are unlikely to interact directly with visitors or where encouraged are supervised at all times during interaction periods. Visitors are not allowed access to off show animal feeding or roost/nest/den sites.
10. Direct animal contact is only allowed under close supervision and hand washing is enforced before and after handling. Animals that are used in handling sessions are kept separate from the main zoo stock (e.g. reptiles held for education).

***See specific animal encounter risk assessments for details of mitigation strategies and zoonotic disease management.**

MAJOR ZOONOTIC DISEASE OF CONCERN FOR STAFF, GUESTS, AND ANIMALS (GENERIC)

Disease	Susceptible species	Symptoms	Mode of transmission	Actions to mitigate risk
VIRUSES				
Hepatitis B Virus (HBV)	Gibbons, Great Apes, Woolly monkeys, Lemurs	In humans: Non-specific but include anorexia, colic, nausea, vomiting, jaundice	Bites, scratches, splashing of body fluids into eyes, nose, mouth or cuts	- Serological screening of susceptible animals - Hygiene and safe handling - Vaccination of all in-contact staff
Herpes Simplex Virus (HSV) or Herpesvirus hominis (types 1 and 2)	Great Apes, Gibbons, Woolly monkeys, Saki monkeys, Callitrichids, Lemurs	*In humans:* Cold-sores *In NHPs*: Conjunctivitis, mouth ulcers, salivation, encephalitis, death	Close contact and by fomites	- Keeping staff with active cold-sore lesion not to work on section
B Virus or (*Herpesvirus simiae)*	Macaques	In macaques: Asymptomatic or cold-sores *In people*: Fever, possibly ulcers, death	Bites, scratches, splashing of body fluids into eyes, nose, mouth or cuts	- Serological screening of susceptible animals - Hygiene and safe handling - Regular training of in-contact staff in the immediate action following a possible exposure (including immediate cleaning with iodine)
Alpha Herpes Viruses	N.B. Many alpha-herpes viruses have been isolated from many species of NHP. The disease-causing potential of these to man is mostly unknown. It would seem prudent to undertake the same actions, to mitigate risk in the case of B Virus, in all NHPs.			

Simian Varicella Virus	Great apes, Old World monkeys	In NHPs: Generalised vesicular disease, rarely death	Contact or by aerosol	- Keeping staff with active chicken pox or shingles lesions not to work on section
Simian Immunodeficiency Virus (SIV)	All NHPs (except probably New World monkeys and prosimians)	In non-host NHPs: AIDS-like illness *In people*: Apparently asymptomatic	Bites, scratches, splashing of body fluids into eyes, nose, mouth or cuts	- Serological screening of susceptible animals - Hygiene and safe handling
Simian T-cell Leukaemia Virus (STLV)	Great apes, Old World monkeys	In NHPs: Asymptomatic or lymphoma *In people*: Apparently asymptomatic	Bites, scratches, splashing of body fluids into eyes, nose, mouth or cuts	- Serological screening of susceptible animals - Hygiene and safe handling
Measles Virus	Great apes, Old World monkeys, Woolly monkeys	In NHPs: Fever, conjunctivitis, respiratory disease, death	Aerosol	- Vaccination of all in-contact staff - Prevent contact between young children and NHPs - Consider vaccination of great apes
Poliomyelitis	Great apes, Colobus	In NHPs: Asymptomatic to fever, gastrointestinal and paralytic disease	Faeco-oral	- Vaccination of all in-contact staff - Consider vaccination of great apes
Lymphocytic Choriomeningitis Virus (LCMV)	All NHPs, rodents	In human: Fever, nausea and vomiting, possibly but rarely fatal, may affect unborn foetus	Exposure to urine, saliva or faeces of infected animals – NHPs or more likely rodents	- Comprehensive rodent control plan - Pregnant staff to be made aware - Serological screening of susceptible animals - Hygiene and safe handling

Highly Pathogenic Avian Influenza	Probably all bird species	In birds: Rapidly fatal *In humans*: Generally not transmissible but include fever, shortness of breath, conjunctivitis, diarrhoea, vomiting and colic	Very close contact exposure to faeces or other infected tissue	- Avian Influenza contingency plan including strict biosecure epidemiological units with dedicated staff - Vaccination of all in-contact staff against current human influenza strains
Mammalian Influenza and Influenza-like viruses (common colds)	Great apes (possibly the majority of NHPs)	Fever, headache, upper respiratory tract discharge, muscular pain	Close contact	- Vaccination of all great ape in-contact staff against current human influenza strains - Any keeping staff with symptoms not to work on great ape sections
Rabies	All mammals (carnivores and bats most important epidemiologically)	In humans: Fever, headache, paralysis, convulsions, death	Passage of saliva from infected animal via bites (although scratches and splashing of body fluids into eyes, nose, mouth or cuts also possible)	- Enforced 6 months rabies quarantine with all attached conditions - Pre-exposure vaccination of all in-contact staff - Regular training of in-contact staff in the immediate action following a possible exposure (including immediate cleaning with iodine)
European Bat Lyssavirus (EBLV)	Unknown range of bat species	In humans: One death recorded	Bites, scratches, splashing of body fluids into eyes, nose, mouth or cuts	- Hygiene and safe handling

Contagious Ecthyma (Orf)	Artiodactylids	In artiodactylids: Crusty scabs around muzzle, vulva, udder and coronary band – generally self-limiting In humans: Red lesions on hands and arms for up to 6 weeks (can become secondarily infected)	Direct contact with lesions or with contaminated bedding	- Hygiene and safe handling
West Nile Virus (Not yet in UK)	Horses, other mammals, birds, reptiles	In humans: Asymptomatic through to severe neurological signs and some fatalities	Arthropod vectors	- Control of vectors

Disease	Susceptible species	Symptoms	Mode of transmission	Actions to mitigate risk
BACTERIA				
Anthrax	Mammals (mostly ruminants)	In ruminants: Often sudden death with bleeding from nose, mouth and anus *In NHPs and humans*: Sudden weakness, vomiting and death	Inhalation of spores or by biting flies	- Appropriate sampling of any suspect carcases - Incineration of confirmed carcases - Stringent disinfection of all in-contact materials
Tuberculosis (Mycobacterium tuberculosis/bovis)	All NHPs (especially Old World) and most other mammals (especially ungulates)	In humans: Fever, cough, weight loss *In animals*: Asymptomatic to severe respiratory disease, wasting and death	Close contact with aerosol, fomites or faeco-oral transmission	- Vaccination of all staff - Screening of all susceptible and suspected animals as appropriate with a move towards new technology as available and validated (e.g. Primagam, Rapid Tests, MAPIA) - Screening of keeping staff that are known to have been in contact with positives - Hygiene and safe handling
Avian 'TB' (*Mycobacterium avium/intracellulare* complex, M. genavense)	All birds (and many NHPs)	In humans: Rarely causes disease except in immuno-compromised when see gastrointestinal and respiratory disease	Close contact with aerosol, fomites or faeco-oral transmission	- Appropriate screening of suspected birds - Faecal cultures for all new birds prior to import - Limit exposure of immuno-compromised keeping staff

Fish 'TB' (M. fortuitum, M. marinum)	All fish	In humans: Localised granulomatous lesions, possible joint infections, systemic infection in immunocompromised	Contamination of cuts from fish ulcers or faeces	- Appropriate screening of suspected fish (especially post mortems) - Keeping staff to use impervious gloves during handling of fish - Keeping staff to never mouth-siphon - Limit exposure of immuno-compromised keeping staff
Fish Erisypelothrix or Seal Finger	All fish, marine mammals	In fish: No lesions In humans: Localised or diffuse skin lesions, rarely septicaemia	Contamination of cuts from fish external mucus	- Keeping staff to use impervious gloves during handling of fish
Yersiniosis or Pseudotuberculosis (Yersinia enterocolitica or pseudotuberculosis)	All NHPs, birds, rodents	In humans: Fever and diarrhoea *In NHPs*: As humans but may be fatal	Faeco-oral	- Hygiene and safe handling - Routine faecal screening - Rodent control
Shigellosis	All NHPs (and other mammals)	In humans: Fever, diarrhoea *In NHPs*: As humans, weight loss, abortion	Faeco-oral	- Hygiene and safe handling - Routine faecal screening - Consider screening of keeping staff in confirmed outbreaks (may be persistent carriers)

Salmonellosis	All NHPs, other mammals, birds, reptiles, fish	In humans: Fever, diarrhoea *In NHPs*: As humans with possible systemic infection *In birds/reptiles*: Often asymptomatic	Faeco-oral	- Hygiene and safe handling - Routine faecal screening
Campylobacteriosis	All NHPs, other mammals, birds, reptiles	In all species: Asymptomatic to fever, diarrhoea	Faeco-oral	- Hygiene and safe handling - Routine faecal screening
Escherichia coli (verocytotoxin-producing strains)	All animals	In humans: Abdominal cramps and diarrhoea, possible systemic infection and death)	Faeco-oral	- Hygiene and safe handling - Routine faecal screening
Brucellosis	Mammals (especially ruminants)	In humans: Fever, headache, muscular pain, abortion	Splashing of body fluids into eyes, nose, mouth or cuts	- Hygiene and safe handling - Serological testing of susceptible species prior to import if appropriate
Leptospirosis	Mammals (especially ruminants and rodents)	In NHPs and humans: Fever through to fatal Weil's disease	Bites, scratches, splashing of body fluids into eyes, nose, mouth or cuts	- Hygiene and safe handling - Serological testing of susceptible species prior to import if appropriate - Rodent control
Psittacosis (Chlamydia psittaci)	Mammals, birds (especially Psittacines), reptiles and amphibia	In birds: Non-specific In humans: Fever, pneumonia which can be fatal (especially children and immunocompromised)	Inhalation of fomites (dust from skin or feathers or secretions/excretions)	- Appropriate screening of birds prior to import - Hygiene and safe handling

Enzootic abortion (Chlamydophila abortus)	Mammals (mostly ruminants	In humans: Flu-like symptoms or abortion in pregnant women	Contact with aborted material or infected faeces (sometimes spread by rodents)	- Hygiene and safe handling - Isolation of any aborting ruminants - Rodent control - Limit exposure of pregnant keeping staff
Bite Wound infections (e.g. Streptococcus spp., Staphylococcus spp., Pasteurella spp., Clostridium tetani)	All animals (especially NHPs)	In humans: Swollen, painful, suppurating bite wound	Bite or scratch	- Safe handling - Site immediately cleaned post incident - Tetanus vaccination reviewed immediately post incident and boosted as necessary - Swabs taken for culture and sensitivity as necessary and indicated by medical doctor
Lyme disease (Borrelia burgdorferi)	Many mammals and birds	In humans: Asymptomatic to systemic illness over years	Exposure to infected tick (Ixodes ricinus)	- Ecto-parasite control of all species - Relevant protective clothing and repellents and vigilance for early tick removal where appropriate

Disease	Susceptible species	Symptoms	Mode of transmission	Actions to mitigate risk
PARASITES				
Amoebiasis (Entamoeba histolytica)	All NHPs	In NHPs: Diarrhoea, weakness, anorexia, weight loss, possibly fatal In humans: Fever, diarrhoea, dysentery	Faeco-oral	- Hygiene and safe handling - Routine faecal screening
Balantidium coli	All NHPs, pigs	In humans: Diarrhoea, tenesmus, nausea and vomitting	Faeco-oral	- Hygiene and safe handling - Routine faecal screening and appropriate treatment
Cryptosporidiosis (Cryptosporidia parvum)	All NHPs, other mammals, birds, reptiles	In NHPs: Asymptomatic to intractable diarrhoea and weight loss *In humans*: Diarrhoea, tenesmus, nausea and vomitting	Faeco-oral	- Hygiene and safe handling - Routine faecal screening
Giardiasis (Giardia intestinalis)	All NHPs	In NHPs: Asymptomatic to diarrhoea *In humans*: Steatorrhea (fatty faeces), colic and bloating	Faeco-oral	- Hygiene and safe handling - Routine faecal screening and appropriate treatment

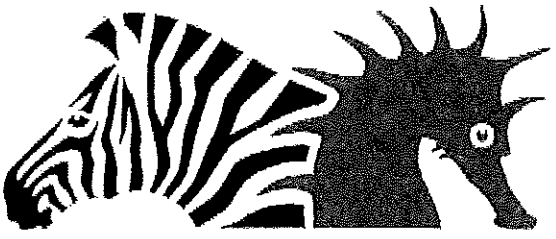
Toxoplasmosis (Toxplasma gondii)	All NHPs (especially squirrel monkeys and callitrichids), all mammalian and avian species (especially marsupials, meerkats and gazelles)	In NHPs: Fever, anorexia, diarrhoea and vomiting, possibly death *In humans*: Asymptomatic or fever except in young and immunocompromised	Ingestion of anything contaminated with infected feline faeces, or infected meat	- Hygiene and safe handling - Routine faecal and serological screening and appropriate treatment - Prevent exposure to feline faeces or uncooked meat - Exclude all feral cats - Limit exposure of pregnant and immunocompromised keeping staff
Oxyuriasis (known as 'threadworm' or 'pinworm') (Enterobius vermicularis)	All NHPs	In NHPs and humans: Anal pruritis and possibly secondary infections	Faeco-oral	- Hygiene and safe handling - Routine faecal screening and appropriate anthelmintic treatment
Strongyloidiasis (Strongyloides spp.)	All NHPs (especially Orangutans)	In NHPs: Diarrhoea, anorexia, weight loss, death *In humans*: Diarrhoea, colic, nausea, anaemia	Faeco-oral (or by direct penetration of the skin by larval stages)	- Hygiene and safe handling - Routine faecal screening and appropriate anthelmintic treatment
Trichuriasis (known as 'whipworm')	All NHPs	In NHPs: Diarrhoea, anorexia, enteritis, death *In humans*: Diarrhoea, colic, nausea, anaemia	Faeco-oral	- Hygiene and safe handling - Routine faecal screening and appropriate anthelmintic treatment

Hydatid disease (Echinococcus spp.)	All mammals (carnivores definitive hosts and ruminants and rodents as intermediate hosts)	In NHPs: Abdominal distension, sudden death In humans: Possibly fatal systemic disease dependent on location of cysts	Ingestion of anything contaminated with carnivore faeces	- Hygiene and safe handling - Routine faecal screening and appropriate anthelmintic treatment - Exclude all vermin (especially foxes) - Beware faecal contamination of foliage cut for browse/enrichment

Disease	Susceptible species	Symptoms	Mode of transmission	Actions to mitigate risk
FUNGI				
Ringworm (dermatophytosis)	All mammals and birds	In humans: Normally focal, round areas of skin that lose hair and become depigmented without being itchy	Direct or indirect contact with carrier animals	- Keeping staff to wear gloves during handling of or cleaning the enclosures of any suspected case

Managing Zoonotic Risk in Zoos and Wildlife Parks

2011



BIAZA

WORKING TOGETHER FOR WILDLIFE

Managing Zoonotic Risk in Zoos and Wildlife Parks

Introduction

1. This guidance is intended to provide a practical approach to the control of zoonotic disease in zoos and wildlife parks. It covers both risks to human health and risks to other zoo animals.

2. The guidance provides advice on meeting legal requirements for those managing zoos, as regards controlling the risk of infection to humans and animals and it both supplements and complements the guidance produced by the Health and Safety Executive (HSE) *Managing Health and Safety in Zoos* and the Department of Environment, Food and Rural Affairs (DEFRA) *Standards of Modern Zoo Practice* and general biosecurity guidance. Other HSE guidance, such as that on open farms may also be relevant where zoos have similar exhibits.

3. An approach to risk assessment is described, together with a suggested template, along with practical measures to control these risks. In addition, guidance is given on appropriate screening and monitoring for disease in animal populations and how this can contribute to the control of zoonotic disease.

What is a zoonosis?

A zoonosis is an infectious disease that can be transmitted between humans and animals. For example:

- by direct contact with an animal such e.g. rabies resulting from a bite
- by contact with an animal's faeces e.g. *E.coli* O157
- by contact with a contaminated environment e.g. anthrax
- by inhalation of contaminated dust or droplets e.g. psittacosis (chlamydiosis) and Q fever
- indirectly via ingestion of contaminated food e.g. campylobacteriosis
- via vectors such as biting insects e.g. West Nile fever and Lyme disease

The infectious micro-organisms that cause zoonoses include viruses, bacteria, fungi, protozoa and other parasites, with both domestic and wild animals acting as reservoirs for these pathogens.

The diseases they cause in humans range from mild and self-limiting (e.g. most cases of toxoplasmosis) to fatal (e.g. Ebola haemorrhagic fever). The potential for a particular disease agent to cause harm in humans will vary with the individual's immunological status. Those who may be more at risk include the very young and old, pregnant women and people who have a poor immune system as a result of other disease conditions.

In many countries, food is the most common source of zoonotic diseases. It is perhaps worth noting that many of the zoonotic agents causing disease in humans cause little or no obvious clinical disease in their animal hosts. e.g. *E.coli* O157 in cattle & Q fever in sheep

Scope

4. This guidance is aimed primarily at zoo operators but it should also be useful to those who are involved in the management and care of the animals such as zoo vets and those responsible for human public health such as the Health Protection Agency. External inspectorates (HSE, Local Authorities and DEFRA) can use the guidance as a means ensuring that operators are following best practice for the sector and so meeting their legal obligations.

5. The main aim of the guidance is provide advice for zoo operators/managers on controlling the risk of infection to visitors.

What is a zoo?

A zoo is defined as a permanent establishment where living, wild animals are kept for exhibition to the public for seven or more days a year, with or without charge for admission. This includes:

- Aquaria
- Sanctuaries
- Bird gardens (including birds of prey)
- Safari/wildlife parks

The zoo itself may be part of a larger concern e.g. display of exotic birds on a farm.

Legal framework

Health and safety law

6. The main legislation of relevance to the control of zoonotic infection at work, and to those who may be affected by the work, is the Control of Substances Hazardous to Health (COSHH) Regulations. Under COSHH, the definition of hazardous substances includes micro-organisms that can cause harm to human health and, although this guidance uses various terms such as "infectious micro-organism", "zoonosis/zoonoses" or "zoonotic infection", the term used in COSHH is "biological agent". This means the bacteria, viruses, fungi and internal parasites (such as tapeworms) that create a hazard to human health. Most agents cause harm by infection but they can also cause allergies, be toxic or otherwise harmful to health, for example the agents that cause spongiform encephalopathies.

7. COSHH applies in workplace situations where there is intentional work with biological agents eg growing them in a laboratory. But it also covers situations where there may be incidental exposure to the agents because they are present in either a human or animal, in their body fluids, waste products (urine and faeces) or material that could be contaminated by these waste products, for example animal bedding.

8. COSHH requires employers to protect their employees by assessing the risks of exposure to zoonotic agents and either preventing exposure or, where this is not reasonably practicable, putting in place measures to control exposure. COSHH also requires that the risk of exposure to those who may be affected by the work activity in this case, visitors to the zoo, be assessed and controlled so far as is reasonably practicable. This means taking reasonable steps to ensure the health and safety of visitors.

Animal health/biosecurity legislation

9. The Zoo Licensing Act 1981 (as amended) requires the inspection and licensing of all zoos in Great Britain. The Standards of Modern Zoo Practice, which include provisions for a high standard of animal healthcare and for animal contact areas, are used by inspectors when making their recommendations to local authorities as to whether to grant a licence under the Act.

10. The Animal Health Act 2002 includes a requirement to control the risks to human health from zoonoses as well as controlling the spread of disease among *"animals and poultry"* themselves. *Animals* are defined under the Act as cattle, sheep and goats, and all other ruminating animals and swine. *Poultry* are defined as domestic fowls, turkeys, geese, ducks, guinea-fowls and pigeon pheasants and partridges. All of these species of mammal and bird can be encountered in a zoo environment. The Act

can also be extended to cover any four footed animal or bird as well as fish, reptiles, crustaceans, or other cold-blooded creatures of any species if required.

11. Certain animal diseases (see Appendix 3 – Notifiable animal diseases), some of which are zoonotic, are notifiable i.e. if an animal is affected or suspected of having one of these diseases is must be reported to the local Animal Health office.

Public Health legislation

12. Health protection legislation in England was updated 2010 to give public authorities modernised powers and duties to prevent and control risks to human health from infection or contamination, including by chemicals and radiation (similar legislation is in place in Scotland and Wales). The amended Act and accompanying regulations[1] extend the previous list of notifiable diseases of humans (for new list, see Appendix 4 – Notifiable disease in humans) and gives local authorities wider and more flexible powers to deal with incidents or emergencies where infection or contamination presents, or could present, a significant risk to human health. Some of these powers can be exercised directly by the local authority, for example requiring disinfection/decontamination of premises on request; others require an Order from a Justice of the Peace. It is worth noting that there are many important zoonotic diseases of humans that are currently not notifiable in either humans or other animals, e.g. Q fever.

What is the risk of acquiring a zoonotic infection from visiting zoos?

In 2009 DEFRA estimated there were around 500 zoos in the UK. Of these, 267 are licensed zoos subject to periodic inspection by DEFRA and Local Authorities. (NB: very small zoos are eligible to apply to their Local Authority for exemption from a full zoo licence and this accounts for the discrepancy in numbers). Approximately 100 of these licensed zoos are members of the British and Irish Association of Zoos and Aquariums (BIAZA), the professional body representing the majority of the larger zoos and aquariums in Britain and Ireland.

Zoo visitation in the UK is steadily increasing with 24.8 million visitors to BIAZA collections alone in 2007. At the time of writing we can find no published zoonotic disease outbreaks associated with visitor contact with zoo animals in the UK.[2] There have however been a number of reviews published looking at zoonotic infection associated with a wide range of different types of animal exhibits including several high profile outbreaks affecting large numbers of members of the public. These outbreaks have largely been associated with contact with farm animals rather than zoo animals, e.g. on open farms in the UK and Europe or at US State/County fairs.

Zoos are unlikely to pose the same level of risk as open farm because of the nature of the exhibits and the much reduced (or zero) degree of contact allowed between visitors and the animals however there is still potential for zoonotic infection to take place. Reports of infection among zoo staff who have closer, more frequent contact with animals in their care[3], as well as the more notable outbreaks in members of the visiting public are evidence that the risk is real. Two case studies of zoonoses in zoo visitors are presented below:

[1] Public Health (Control of Disease) Act 1984 (as amended) together with the Health Protection (Notification) Regulations 2010, the Health Protection (Local Authority Powers) Regulations 2010 and the Health Protection (Part 2A Orders) Regulations 2010 The Health Protection (Notification) Regulations 2010

[2] There was a recorded outbreak of VTEC O157 amongst visitors to a zoo but the source of infection was wild rabbits frequenting a picnic area and not the zoo animals themselves. (G. Pritchard pers. com.)

[3] Examples of zoonoses acquired by zoo keepers: In 2007 in Germany, a healthy, unvaccinated animal keeper was infected with cowpox from an infected elephant. http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5808a3.htm

In 2008 in the USA, 3 caretakers were found to be infected with MRSA from an infected elephant. A further 2 confirmed cases, 15 suspected cases and 3 colonised individuals were then traced (all also caretakers).http://www.cdc.gov/eid/content/14/4/670.htm

An outbreak of psittacosis in a bird park in Japan[4] *– 12 confirmed cases of psittacosis were reported in visitors to a bird park associated with visiting an exhibit in a series of 3 hothouses. All birds in this exhibit were allowed to free fly, and public feeding was allowed. Of those infected, all had had direct contact with birds. Investigations revealed that sick birds were not quarantined and that the hothouses operated using a predominately closed air circulation system. This might have raised the concentration of the pathogen, increasing the possibility of transmission. In addition the routine use of dehumidifiers and high pressure water sprays (jet washers) in these closed hot houses might have led to increased dispersal of the pathogen and hence heightened risk of infection.*

An outbreak of salmonellosis associated with a reptile exhibit in a zoo[5] *– 39 confirmed cases of salmonellosis were reported in visitors to a temporary Komodo dragon exhibit in a US zoo. The young dragons were kept in an enclosure on a substrate of wood mulch and surrounded by a 2ft high wooden barrier. During the 9days that the dragons were on display the wood mulch was not changed and the animals were frequently seen to place their front feet on the tops of the barrier. One of these dragons was subsequently found to be shedding S. enteritidis in its faeces. None of the infected people reported touching the dragon but over 80% of those infected touched the barriers surrounding the exhibit. Washing hands at the zoo after visiting the dragons was highly protective. On the basis of an attack rate of 4.3% among exhibit attendees under 13 years old on whom data were collected, we estimate that 315 additional cases of salmonellosis occurred among visitors in this age group. This large outbreak demonstrates the importance of environmental contamination in the transmission of Salmonella from reptiles, and the protective value of hand washing. Recommendations regarding reptile exhibits should emphasize this indirect route.*

Risk assessment

13. The process of risk assessment is a specific requirement of COSHH and is carried out to identify substances hazardous to health (in this case, the risk of zoonotic infection) in the workplace, and to identify the measures necessary to prevent or control exposure to that hazard. Other health and safety legislation may require more general assessment of workplace hazards or else specifically address certain hazards e.g. manual handling. Although assessment is usually carried out to identify hazards to employees, the same process can be used for others who may be affected by the work such as visitors to the zoo. General guidance on controlling the risk of infection in the work place can be found at: www.hse.gov.uk/pubns/infection.pdf

14. The health and safety policy for the zoo must set out in general terms how the risk of zoonotic infection to visitors will be managed, and specific assessments should be carried out for any activities that bring visitors into contact with animals or their excreta/body fluids.

15. These risk assessments can take many different forms; they could be specific to zoonotic hazards or could address all hazards associated with the activity e.g. the risk of biting, scratching, escape etc during contact sessions or be specific to the animal concerned and address all activities involving that animal e.g. feeding, cleaning as well as visitor contact activities. They are best carried out with the input of those in charge of a particular activity/area as they will be most familiar with the animals concerned and should also include input from a technical specialist such as the zoo's vet who is familiar with the occurrence of potentially harmful micro-organisms in the zoo's animal collection.

16. There are four components to risk management

- Describing the activity to be assessed and who is involved
- Identifying the hazards
- Assessing the risk

[4] **An outbreak of psittacosis in a bird park in Japan** T. MATSUI, K. NAKASHIMA, T. OHYAMA, J. KOBAYASHI, Y. ARIMA, T. KISHIMOTO, M. OGAWA, Y. CAI, S. SHIGA, S. ANDO, I. KURANE, K. TABARA, A. ITAGAKI, N. NITTA, H. FUKUSHI, A. MATSUMOTO, and N. OKABE **Epidemiol Infect. 2008 April; 136(4): 492–495.**

[5] **An outbreak of salmonellosis among children attending a reptile exhibit at a zoo.** Friedman CR, Torigian C, Shillam PJ, Hoffman RE, Heltzel D, Beebe JL, Malcolm G, DeWitt WE, Hutwagner L, Griffin PM. **J Pediatr. 1998 May;132(5):802-7**

- Controlling the risk

A suggested template for assessment, together with example assessments, is shown in Appendix 5 – Risk assessment – template and example risk assessments. These examples are based on those activities where members of the public come into contact or are potentially in contact with animals or their excreta and body fluids

Describing the activity to be assessed and who is involved

17. You need to consider the nature of the activity that will, or could bring visitors into contact with animals, either directly or indirectly, and also whether there are any groups at increased risk of infection.

18. Consider:

- Numbers of visitors passing through the area being assessed, the activities which they may be undertaking and how these may vary between different visitors groups (ages/ special needs etc).
- Whether there is any staff presence/supervision and also the range of species with which the visitors may come in contact (either directly or indirectly).
- Whether free ranging wildlife and pest species are present (as well as animals within the zoo's collection that are under consideration), and whether these might act as a source of infection either to the zoo animal or the zoo visitors who may come in contact with them or their excreta.

Identifying the hazards

19. Micro-organisms are found virtually everywhere in the natural environment. Most of these are harmless to humans and serve many important functions. Some however, under certain circumstances can gain entry to the body and cause serious disease. When identifying potential hazards that might lead to zoonotic infection it is easier to consider potential ***sources of infection*** i.e. the material that could contain infectious micro-organisms rather than trying to produce an exhaustive list of potentially harmful micro-organisms. You then need to consider how the infectious material might gain entry to the body – ***the routes of transmission.***

20. A competent health and safety professional or zoo manager should be able to list the relevant sources of infection and transmission routes for the activities to be assessed.

21. There are four main sources of infection to consider:

- Blood and other body fluids such as saliva.
- Waste products such as faeces or urine
- Respiratory discharges such as those produced when coughing or sneezing
- Skin – direct contact

22. Routes of transmission that should be considered include:

- Putting contaminated hand or fingers in the mouth, nose or eyes - either directly or via eating or drinking with contaminated hands (i.e. faeco-oral route)
- Breathing in infectious droplets from the air e.g. respiratory discharges such as those produced when coughing or sneezing
- Splashes of blood and body fluids such as saliva from spitting into the eye or other mucous membranes such as the nose and mouth
- Broken skin if it comes into direct contact with a source of infection (eg faecal matter or saliva when being licked, sucked or spat at) or else something contaminated by a source of infection

- A skin penetrating injury e.g. a bite or a scratch or through the bite of insect that is able to transmit the disease from animals to humans.

23. In addition to considering sources of infection and transmission routes, it may be worth considering the hazard posed by some specific infections or diseases. Technical assistance from the zoo's vet would be required to identify any particular diseases of concern for the activities being assessed. For instance, the risk of exposure to animals infected with cryptosporidiosis or *E. coli* O157 might be considered high if visitors were bottle feeding young ruminants but not if they were simply driving through an enclosure housing animals and their young.

24. When considering which specific diseases to include in the assessment, the vet should consider (see also paragraph 27):

- The micro-organisms the animals in question are most likely to carry. This can be derived from knowledge of the literature[6] on diseases of the species being assessed and information on the types of micro-organisms found in the zoo's own animal collection.
- The potential for these microorganisms to cause harm in humans – some people may be more susceptible to infection than others; special consideration should be given to high risk groups (e.g. the very young, elderly or pregnant). Consultation with relevant health professionals e.g. local Health Protection Team (www.hpa.org.uk) may be useful.

Assessing the risks

25. The next stage of the assessment should identify the ***likelihood*** that visitors could come into contact with animals and other sources of infection. Three key situations to cover include:

A: Planned animal contact opportunities

Consider:

- Level of supervision – how is contact supervised? Ratio of supervisors to visitors, training given to supervisors etc.
- Behaviour of animals e.g. how likely are they to approach, how likely are they to lick, urinate/defecate/bite or scratch whilst being handled.
- Different types of visitor should be considered - some groups will be more susceptible to acquiring infection either due to their behaviour (e.g. young children putting things in their mouths) or due to differences in their immune status
- Type of contact and degree of contamination – are the visitors' clothes/footwear/hair likely to be contaminated or is contact limited to touching only.
- Established or short term – how habituated are the animals to being handled. Stressed and young animals are more likely to shed potentially harmful micro-organisms.
- Location of contact session – indoors/outdoors, on zoo premises or elsewhere, degree of environmental contamination in area during and after session
- Availability of hand washing facilities, their location, type and how obvious they are to the visitor (level of signage, supervision, visitor instruction etc)

[6] For example the European Association of Zoo and Wildlife Veterinarians' Transmissible Diseases Handbook www.eaza.net/activities/Pages/Transmissible%20Diseases%20Handbook.aspx

B: Walk through/drive through exhibits where animal contact is not encouraged

Consider:

- Degree and means of separation of humans and animals
- Type of substrate/materials visitors may come into contact with and such materials potential to harbour micro-organisms
- Cleaning schedule of the enclosure and areas that visitors may access.
- How much time visitors spend in the exhibit (dwell time) and activities undertaken. For example, the likelihood of them sitting, eating, drinking in the enclosure as opposed to just traveling through
- Behaviour of the visitor e.g. whether they are likely to obey instructions not to feed the animals or stray from the path
- Behaviour of animals e.g. are they likely to approach or stray into visitor areas

C: Other activities where visitors may come in contact with sources of infection

- Although assessments should focus on the most likely sources of animal contact, this process should be extended to cover areas where animals (including wildlife and pest species) may have contaminated the general environment, especially where hand-to-mouth contact is likely, for example outdoor picnic areas and children's play areas/equipment. Contamination may be as a result of material bought in on shoes or push-chairs or else because wild animal species congregate in the area.

26. So far as reasonably practicable, the likelihood of any specific zoonotic diseases identified (see paragraph 23) infecting and causing harm to the visitors also needs to be considered. The primary duty in COSHH is to prevent exposure, but if this cannot be achieved, then exposure must be adequately controlled – adequate means to a level that won't harm people's health.

27. This stage of the assessment should be carried out in conjunction with someone with specialist knowledge of zoonoses and their animal hosts e.g. the zoo's veterinary surgeon. They can provide advice, based on previous experience, local knowledge, and other sources of information (e.g. reports of disease in the literature).

Consider:

- The likelihood of potential zoonoses occurring within the zoo being assessed – have these diseases been reported in the UK, have they been reported in the zoo being assessed and if so at what frequency?
- The likelihood of these diseases being spread (i.e. communicability) both among the animal population and to the visitors, either from the animals directly or from contamination of the environment.
- The likelihood of these diseases going undetected and becoming established in the animal population or the environment – consider variation in clinical signs, whether the animals might become asymptomatic carriers, whether they are immune to infection e.g. as a result of vaccination, whether animals suspected of shedding potentially harmful micro-organisms are removed from the exhibit or not and how long the micro-organisms can persist in the environment given the current enclosure design and cleaning regime.

- The likelihood of new diseases being introduced to the population: knowledge of biosecurity measures such as quarantine and disease screening in newly acquired animals, separation from free ranging wildlife, pest control and health status of employees in contact with animals during routine husbandry including preparation of food.

Controlling the risks

28. Control measures fall broadly into two categories:

Measures controlling the load of potentially harmful micro-organisms in the animals & environment and the risk of the visitor becoming contaminated.	**Measures controlling the risk of infection becoming established in a visitor following contamination / exposure to potential harmful micro-organisms.**
A: Good biosecurity and high standards of veterinary care - measures that reduce or eliminate the occurrence of diseases of concern in the animals.	C: Good personal hygiene measures – measures taken by individuals to control their risk of infection using the facilities provided e.g. hand washing, not eating in animal areas etc.
B: Good environmental hygiene and design - measures to reduce contamination of the environment or the visitors themselves	

Controlling the load of potentially harmful micro-organisms

A: Good biosecurity and high standards of veterinary care

29. High standards of preventative health care and biosecurity should be maintained. Some useful guidelines on designing and implementing such a programme can be found at www.defra.gov.uk/animalhealth/inspecting-and-licensing/balai/index.htm .

Consider:

- Quarantine and appropriate health screening of all new animals before being introduced. Consider also health screening of animal keeping staff for key diseases that may be transmitted to the animals (e.g. screening primate staff for tuberculosis) and exclusion of staff suffering from gastrointestinal infections from animal food preparation areas as would be the case in human food preparation.
- Vaccination of staff and animals in order to reduce the potential of disease transfer into and within the animal group if this is deemed appropriate
- Measures to decrease the chance of disease transfer to the animals by free ranging wildlife or pest species.
- Prompt identification of disease in animals. Systems in place for recognizing and reporting suspicion of disease - including staff awareness of signs of disease in the animals (and themselves).
- Isolation of known or suspected case(s) of disease. This may require temporary closure of the exhibit if it is more practical or appropriate to isolate the whole enclosure rather than individual animals.
- Prompt veterinary investigation of any suspicion of disease and treatment as required.

- Preemptive screening for certain zoonotic agents may be useful – particularly those that occur infrequently but have serious consequences to human health should a visitor become infected (e.g. TB or Lyssavirus (rabies)). However screening may also lead to a false sense of security as many of the more common zoonotic organisms (e.g. *E. coli* O157) are only shed intermittently and hence a negative test result only indicates that the animal tested was not shedding that day, and not indicative of its infection status or capacity to shed in the future. Further information on screening and monitoring for disease in the animal population in Appendix 1 – Monitoring and screening for disease.
- The use of neonatal animals, animals in late pregnancy and animals that are not well habituated to humans for handling sessions should be avoided as these categories of animal are more likely to shed potentially harmful micro-organisms or bite or scratch the visitors.

B: Good environmental hygiene and design

30. Enclosures should be designed to reduce the chance of visitors coming into contact with sources of infection (i.e. animals or their excreta/body fluids). This can be done by use of barriers e.g. use of standoff barriers (double fencing) or solid barriers or by making the areas occupied by visitors less attractive to the animals than other parts of their enclosure e.g. judicious placement of feeding areas, perches and preferred rest areas so that these are still visible to the public but not within easy reach.

31. Special consideration should be paid to preferred areas for defecation and urination and measures taken to discourage contamination of signage explaining about the animals, public pathways, handrails and barriers, doors and any other items that you would expect the visitor to touch.

32. All diseased or dead animals should be removed from the enclosure as soon as they are discovered. (remember to include free ranging wildlife and pest species). Care should be taken to control risk of spillages of infected material (body fluids or faeces) when moving the animal.

33. Food dishes and feeding areas should be out of reach of the visitors. Any uneaten food that could have become contaminated by animal body fluids should be removed from the enclosure at least daily.

34. Where animal contact is specifically encouraged, this should be done in an area that is easy to clean and disinfect to control the build up faecal material and close to hand washing facilities. If there are to be exceptions to this rule, clear justification must be given and additional hygienic measures must be taken to reduce any risk of contamination to the visitors own clothing and footwear. (e.g. by preventing entry to the animals environment and allowing touching by hand only or by requiring visitors to wear protective clothing and footwear in the enclosure that is removed/decontaminated on exit).

35. Kissing or any other type of facial contact with the animals must be actively discouraged.

36. If animal feeding is allowed this must be carefully supervised. Visitors should be discouraged from picking up dropped food from the floor and re-feeding (more likely to be contaminated with saliva and faeces than fresh food. After the feeding session, any feeding equipment used should be decontaminated and any uneaten food disposed of immediately.

37. A regular cleaning regime must also be put in place for all enclosures/animal areas to which visitors are given access. The frequency and type of cleaning carried out will depend on the animals and their specific management needs. For example, a cleaning regime may be needed that balances the need for cleanliness with the need to allow animals to mark territory. Where cleaning may disrupt the scent marking behaviour of a particular species, areas of the enclosure should be cleaned in rotation and/or known scent marking areas cordoned off.

38. The substrate of indoor enclosures should be cleaned and replaced on an appropriate cycle. Natural substrates can be used in enclosures to which visitors are given access. In these circumstances there should be designated visitor pathways that can be kept clear of faecal contamination.

39. Particular attention should be paid to cleaning and, where practicable disinfection of signage, artifacts, barriers, handrails, seating and other items a visitor is likely to come in contact with.

40. In designated animal contact areas e.g. children's farm areas, class rooms etc, removal of any obvious excreta/secreta areas should take place as soon as possible and definitely after each contact session. The area should also be thoroughly cleaned when the animals are returned to their quarters at the end of the working day.

41. Systems should be in place to allow cleaning/decontamination of enclosures following the diagnosis of a potentially zoonotic disease. If this is not possible, the enclosure will have to remain closed to visitors until such time as the micro-organisms in question will no longer be surviving in the animals or the environment.

42. Cleaning agents that are safe for use in animal enclosures/contact areas should be used and cleaning should be carried out in such a way so as to limit spread/exposure of any zoonotic agent that might be present e.g. wet mopping rather than dry brushing, damping-down of bedding and other material before removal, low pressure rather than high pressure hoses.

Controlling the risk of visitor infection

C: Good personal hygiene measures:

43. Despite all the measures outlined above it is inevitable that visitors will at some point come in contact with potentially harmful micro-organisms. Good personal hygiene is the key to controlling the risks from contamination by infectious micro-organisms.

44. Ingestion is a key route by which many organisms can enter the body. Measures taken to reduce the chance of ingestion include:

- Excluding zoo animals from designated eating and drinking areas
- Not allowing eating and drinking in enclosures - this should be indicated by signage at the entrance to exhibits
- Providing adequate/appropriate hand-washing facilities in areas where contact may or will take place e.g. where feeding is allowed, contact sessions
- See also Appendix 2 – Hand-washing – when, where, and how? for more guidance
- Providing facilities for cleaning of soiled clothing/footwear/belongings before leaving the zoo

45. It is also important to provide information to visitors about the risks of acquiring zoonotic infection and the hygienic measures they can take to reduce these risks. This should include information about hand hygiene, what to do if bitten or scratched so that injury is reported and is treated properly and the need to provide adequate supervision to children or other groups who may be more likely to put contaminated materials in their mouths. Information should also be available on any additional measures to be considered by high risk groups such as the very young, pregnant women and the immunosuppressed.

46. Information can be conveyed in many ways including:

- Written information in the form of signage, leaflets or electronic format (such as websites). Zoos that have a significant proportion of visitors for whom English is not their first language should consider multilingual or pictorial material.

- Oral instruction by a member of staff or a recorded briefing e.g. an attendant at an animal feeding session
- Direct supervision by a member of staff e.g. hand washing following a class room session.

47. The form in which it is supplied will depend on the activity and type of contact the visitor may have. e.g. signage should be posted at the entrance to all designated contact areas, school and organized groups should be provided with written material prior to their visit.

Supplementary measures for specific enclosure types

Indoor bird enclosures

48. Consider:

- Ventilation arrangements – ventilation will be needed to provide fresh air, remove stale air, to help control temperature and humidity and to remove dust.
- Whether ventilation system is closed or open. Open systems must ensure a good flow of fresh air so that stale/contaminated air cannot build up. If closed or re-circulating systems are used, they will need some means of filtration to remove any airborne micro-organisms. These can be protected with rough filters to remove any large airborne particulates. Consideration should be given to filtration of incoming air, depending on the immediate external environment e.g. presence of other captive birds or wild relatives.
- Positioning of fans, inlets and outlets needs to be considered so as to avoid dead space which may lead to pockets of stagnation.
- Presence of other environmental controls e.g. for humidity and temperature. Tropical environments where temperature and humidity are high may increase likelihood of growth of certain disease causing environmental micro-organisms such as fungi (e.g. *Aspergillus* species). Regular removal of rotting plant material and other organic debris e.g. uneaten bird food may help control levels.
- Where sprays and misters are used to control humidity, measures should be in place to control the growth of *Legionella* bacteria.

Touch pools

49. Consider:

- Whether pool is stand-alone or linked to other systems/exhibits. Linked systems could potentially increase the risk of disease entering the water especially if linked systems contain mammals (including divers).
- Water treatment used – water is likely to be treated so as to maintain animal health. Additional measures may be need to provide assurance i.e. to control any external contamination e.g. UV treatment of water especially if re-circulated back into other systems or exhibits.
- As with other formal contact areas, visitors should wash hands after touching fish. Visitors with obvious cuts/grazes on hands should be advised not to put hands in water/touch the animals.

Domestic animal petting areas

50. The risk assessment approach outlined in this document is equally applicable to domestic animal contact areas. However zoo managers should also be familiar with specific guidance produced by the

HSE in their document ASI23 Preventing or controlling ill health from animal contact at visitor attractions – with supplement for teachers and other who organize visits for children[7].

What next?

51. You need to put the results of your risk assessment into practice i.e. implement the controls – this is a specific requirement of COSHH.

52. There is a template for risk assessment in Appendix 5. Most zoos will have more than 5 employees so therefore have a legal requirement to write down the results of the risk assessment. But this also allows you to share the results with other, including external enforcement agencies and it provides you with a record so that you can review it at a later date if, for example, something changes.

53. It should be remembered that risk assessment is not just a paper exercise and that any changes to the activity, e.g. introduction of a new animal species or information about a new zoonosis need to be reflected in the assessment. It is also good practice to set a review schedule for assessments to ensure they are formally reviewed periodically e.g. on an annual basis to make sure they are still fit for purpose, you should take into account, for example, any accidents or incidents that have occurred or feedback from visitors about the controls you have put in place .

[7] http://www.hse.gov.uk/pubns/ais23.pdf

Appendix 1 – Monitoring and screening for disease

1. Any screening or monitoring programme needs to take into account the costs associated with such a test programme as compared to any likely benefits (to human visitors and the animals being tested).

2. Consideration should also be given to the validity of the test regime in the species in question and what action would be taken in the event of a positive test result.

3. Routine screening of animals that may be infected with endemic infections such as *E. coli* O157, *Campylobacter* or *Salmonella* is unlikely to be of any benefit. In addition, for some infections it may not always be possible to prove with any certainty that a particular animal is "negative" so all should be treated as potential carriers since excretion can be intermittent, the organism may survive in the environment. Therefore, the focus should be on controlling the risk of infection through good personal hygiene measures and good environmental hygiene and design. Screening for endemic infections may be of value in the event of a local outbreak of disease as part of the epidemiological investigations carried out by public and animal health officials. DEFRA may require zoos to monitor for certain diseases in the event of an outbreak of animal disease in the general environment e.g. highly pathogenic avian influenza.

4. Screening would be better focused on the higher hazard, but rarer, infectious diseases that may be associated with certain animals. Screening is likely to be opportunistic, for example when an animal is undergoing veterinary treatment or checks or else by means of pooled samples from the environment. Such screening gives an indication of the likelihood of public exposure to certain infections which will help inform the risk assessment. For example, testing for European Bat Lyssavirus in a walk-though bat exhibit containing fruit bats is likely to provide the reassurance that even if there is contact between bats and visitors, the risk of infection is negligible.

5. Screening animals prior to import and during quarantine is highly recommended as it will reduce the chance of bringing in new potentially zoonotic micro-organisms which would be difficult and costly to eradicate once introduced to your collection. Guidelines for minimizing the risk of disease transfer between UK zoos can be found in appendix 5 of BIAZA's animal transaction policy[8]. Screening regimes for animals from other sources should be devised by the zoo's veterinary surgeon on a case by case basis following a risk assessment.

[8] http://www.biaza.org.uk/resources/library/images/ATP09.pdf

Appendix 2 – Hand-washing – when, where, and how?

1. Hand-washing is one of the most important means of controlling the spread of infection. However, concerns have been raised recently about the reliance on this as a control method because of the failure of individuals, especially children, to comply.

2. The use of soap and warm, running water to wash hands has been reinforced following recent outbreaks of O157 on open farms; the use of hand hygiene gels alone is not seen as sufficient to remove infectious agents such as cryptosporidial oocysts that may be present on soiled hands.

3. Although some animal contact in zoos could be viewed as similar to that on open farms, for example in petting areas that have farm animal species present, there are some significant differences in that the zoo is not a working farm so the density of animals present and the extent of contamination is likely to be far less than in a farm environment. Some types of animal contact may take place in clean, classroom environments and will be minimal, and therefore the use of hand-hygiene gels may be appropriate subject to assessment.

4. **When?**

   - Hands must be washed after any known animal contact.
   - Hands should also be washed before eating and drinking even if formal animal contact has not taken place.

5. **Where?**

   - Hand-washing facilities should be located immediately adjacent to the exit of an area where there is known/supervised animal contact if there is a one-way flow of visitors through the area. If there is a two-way flow of visitors they should be provided immediately adjacent to entrances and exits. A one-way system may help to ensure that washing facilities are properly used.
   - Appropriate signage should direct visitors to use the hand-washing facilities as they leave animal contact areas.
   - It is recommended that hand-washing facilities are also located adjacent to, or at the entrance of permanent catering facilities (i.e. not just in toilets that might be located in such establishments) and, where possible near picnic areas to prompt the washing of hands before eating and drinking. If it is not possible to site near picnic areas, signage should indicate where the nearest facilities are located.
   - Visitors should be informed about the need to wash hands and the locations of all hand-washing facilities e.g. on zoo maps. Adults should be reminded of the need to supervise children when washing hands.

6. **How?**

   - Hands should be washed with warm, running water and soap and dried using paper towels or hand driers. Warm water is preferable, but if facilities are supplied with cold water only, a soap that emulsifies easily in cold water should be provided.
   - Bins supplied for the disposal of paper towels should either have no lid or else a lid opened by means of a foot pedal.

- Sufficient facilities should be available, especially at formal animal contact areas; numbers will depend on local knowledge of visitor throughput during a typical day.
- Hand-washing facilities could comprise a number of individual basins or else multi-station wash troughs (similar to surgeon's scrub sinks); communal sinks where the water is used by more than one person are not suitable – multi-station troughs have a number of taps that can be used on an individual basis.
- Facilities should be designed so as to be accessible by all i.e. some need to be positioned at heights suitable for use by children and wheelchair users.
- Running water should be of sufficient volume and pressure to remove any contamination from hands. Volume and pressure might be reduced if the water supply is supplied from a holding tank; therefore, a permanent pressurised water supply is preferable. However, where it is not possible to install permanently plumbed-in facilities especially at more remote locations on site, the use of portable/mobile washing facilities should be considered (a power supply will be need to heat water, but cold only devices are available).
- It is recommended that facilities should be designed so that both hands are free for hand washing e.g. operating taps with a foot pedal or water that stays on after taps turned on.
- It is recommend that liquid soap dispensed by a hand or foot pump is used.
- Facilities should be cleaned on a regular basis and checked to ensure that there an adequate supply of paper towels and soap at all times.

7. **What else?**

- Cleaning of other contaminated articles – facilities should be available to clean footwear, wheels of pushchairs and wheelchairs so as to reduce the chance of contamination being transferred to visitors' cars or homes. Facilities should be sited near the exit of the zoo. Hand-washing facilities should also be available here for use after cleaning shoes etc.
- Signage and other information – it is recommended that the signage used to indicate the need to wash hands is based on the mandatory sign in the Health and Safety (Safety Signs and Signals) Regulations 1996. This should be supplemented by signs prohibiting eating in animal contact areas (see below), and posters showing how to wash hands properly (examples can be found on the Health Protection Agency Website [9] on many hospital websites).

- Use of hand-hygiene gels – Although washing with soap and water should be the primary method of cleaning hands, in certain circumstances gels could be used, on the basis of a risk assessment, taking into account the following factors:

[9] http://www.hpa.org.uk/web/HPAwebFile/HPAweb_C/1194947399200

- Alcohol-based hand-hygiene gels (concentration of 60-80%) are effective against multiple common disease agents (e.g., Shiga toxin-producing *Escherichia coli*, *Salmonella* species, and *Campylobacter* species). However, they are ineffective against some organisms (e.g. bacterial spores, *Cryptosporidium* species, and certain viruses).

- In addition these gels are less effective on visibly soiled hands. Therefore, as much visible contamination and dirt as possible should be removed before using hand gels.

- There are gels available containing active ingredients other than alcohols which are effective against other disease causing agents but it should be noted that none are effective against spore forming bacteria at the concentrations used in such preparations. You need to check whether a particular formulation is effective against the micro-organism(s) of concern. Some information will be available from the manufacturer but you should also check the peer reviewed literature if possible. There is a useful summary of antimicrobial activity and summary of properties of antiseptics used in hand hygiene in the WHO Guidelines on Hand Hygiene in Health Care (see http://whqlibdoc.who.int/publications/2009/9789241597906_eng.pdf).

Example assessment: (see also Appendix 5 for an expanded version)

A zoo provides a class-room based educational session with reptiles where there is an opportunity to handle animals. Each session lasts 30 minutes but there are only 10 minutes between each session. There is currently only one hand wash basin available. The main infectious agents of concern are Salmonella species and it is known that an alcohol based products are effective against this agent. It is decided to only allow individuals with visually clean hands to handle animals and since this takes place in a clean environment, the use of a gel allows appropriate cleaning of hands in a timely manner.

Appendix 3 – Notifiable animal diseases[10]

Disease	Species affected
African Horse Sickness	Horses
African Swine Fever	Pigs
Anthrax*	Cattle and other mammals
Aujeszky's Disease	Pigs and other mammals
Avian Influenza (Bird flu)*	Poultry
Bovine Spongiform Encephalopathy*	Cattle
Bluetongue	All ruminants and camelids
Brucellosis (Brucella abortus)*	Cattle
Brucellosis (Brucella melitensis)*	Sheep and Goats
Classical Swine Fever	Pigs
Contagious agalactia	Sheep and Goats
Contagious Bovine Pleuro-pneumonia	Cattle
Contagious Epididymitis (Brucella ovis)	Sheep and Goats
Contagious Equine Metritis	Horses
Dourine	Horses
Enzootic Bovine Leucosis	Cattle
Epizootic Haemorrhagic Virus Disease	Deer
Epizootic Lymphangitis	Horses
Equine Infectious Anaemia	Horses
Equine Viral Encephalomyelitis*	Horses
European Bat Lyssavirus (EBLV)*	Bats
Foot and Mouth Disease•	Cattle, sheep, pigs and other cloven hoofed animals
Glanders and Farcy*	Horses
Goat Pox	Goats
Lumpy Skin Disease	Cattle
Newcastle Disease•	Poultry
Paramyxovirus of pigeons	Pigeons
Pest des Petits Ruminants	Sheep and Goats
Rabies (Classical)	Dogs and other mammals
Rift Valley Fever*	Cattle, Sheep and Goats
Rinderpest (Cattle plague)	Cattle
Scrapie	Sheep and goats
Sheep pox	Sheep
Swine Vesicular Disease	Pigs
Teschen Disease (Porcine enterovirus encephalomyelitis)	Pigs
Tuberculosis (Bovine TB)*	Cattle and deer
Vesicular Stomatitis	Cattle, pigs and horses
Warble fly	Cattle, (also deer and horses)
West Nile Virus*	Horses

**zoonotic disease; •can under exceptional circumstances cause infection in humans*

[10] See www.defra.gov.uk/foodfarm/farmanimal/diseases/atoz/notifiable.htm

Appendix 4 – Notifiable disease in humans[11]

Acute encephalitis
Acute meningitis
Acute poliomyelitis
Acute infectious hepatitis
Anthrax
Botulism
Brucellosis
Cholera
Diphtheria
Enteric fever (typhoid or paratyphoid fever)
Food poisoning
Haemolytic uraemic syndrome (HUS)
Infectious bloody diarrhoea
Invasive group A streptococcal disease and scarlet fever
Legionnaires' Disease
Leprosy
Malaria
Measles
Meningococcal septicaemia
Mumps
Plague
Rabies
Rubella
SARS
Smallpox
Tetanus
Tuberculosis
Typhus
Viral haemorrhagic fever (VHF)
Whooping cough
Yellow fever

[11] See www.hpa.org.uk/Topics/InfectiousDiseases/InfectionsAZ/NotificationsOfInfectiousDiseases/ListOfNotifiableDiseases/

Appendix 5 – Risk assessment – template and example risk assessments

DRAFT RISK ASSESSMENT for Visitors entering animal enclosures – ***guidance notes on filling in*** *the form are in italics.*

Note areas in blue can be filled in by zoo manager/health and safety officer. Areas in yellow are likely to require input from the zoo's veterinary surgeon.

Name of Organisation	
Activity to be assessed	*Type of enclosure (including type of access)*
Location	*enclosure name*
People at risk	*include whether free or restricted access, supervised or unsupervised and likely numbers per day*
Zoo animals involved (taxonomic groups)	*species or taxonomic groupings (may be multiple)*
Other animal risks	*e.g. rodent / invertebrate pests / free ranging wildlife*

Sources of infection	Transmission route	Likelihood
EG: • *Body fluids (Blood, placenta, body parts)* • *Waste (faeces, urine, vomit)* • *Direct skin contact* • *Aerosol*	*route e.g. inhalation, ingestion etc*	*Would need to give guidance on terminology (i.e. what does low or moderate or high mean). This section should also give a brief justification for the score given*

Control Measures to minimise transmission risk	*Safe working practices that zoo managers should be able to come up with as a result of knowing the animals, their enclosure and assessing potential sources of infection and transmission routes alone*

Biological agents of primary concern	Source of infection	Harm to humans	Likelihood of occurrence at zoo
Check relevant literature/handbooks for each animal species being considered	*should tally with the ones in the blue section*	*Consider severity of disease caused in humans, whether it can be easily treated and whether it can spread easily from person to person*	*Vet should base this decision on factors such as the previous history of disease in zoo population, whether disease could be introduced into zoo animals*

Control measures to minimize contamination risk	*Measures directed at reducing the likelihood of the animals contracting the organisms listed and to controlling spread / contamination of the enclosure if these agents are suspected/ confirmed. This should be within the capability of the collection's vet who could fill this in without knowing the details of how the enclosure is managed (most zoo vets are not on staff and hence would not be capable of filling in the blue part). The zoo manager would not be able to fill in the yellow section as it requires specialist knowledge both microbiological and the disease history of the collection/animals concerned.*

Further information/ notes	*Any further notes (e.g. justification why things added or not included)*		
Assessor (facility manager)	*Two assessors required as in most zoos, no one person will have sufficient knowledge to complete both parts.*	Assessor (microbiological)	*Two assessors required as in most zoos, no one person will have sufficient knowledge to complete both parts.*
Date		Date	

Postmortem submission

SOUTH LAKES SAFARI ZOO

Animal found dead or euthanased

↓

Isolate animal from view & contact by other animals if safe to do so

- remove carcass from enclosure using suitable PPE OR
- if animal is too big or it is unsafe to enter the enclosure then leave the carcasss where it is but move any living animals into separate living accomodation

CARCASS SUBMISSION

INTERNAL

Double bag in a suitable labelled leak proof container or bag

For large carcasses consult with the veterinarian or pathologist on how best to safely move any carcasses to a specified location

EXTERNAL

Double bag in a suitable labelled leak proof container or bag

SUBMISSION FORM

For all submissions a Post Mortem Submission Form MUST be filled in:

- Form available from the vet room or on the shared drive
- All fields must be completed or if information is unknown then stirke through the box

↓

Securely affix Post Mortem Submission Form to bag

↓

EMAIL

Contact the Veterinary Coordinator or veterinarian to inform them that the carcass is to be submitted for post mortem and when to expect it to arrive at destination

↓

Place in PM fridge in the vet room

↓

If INTERNAL route not possible due to holiday or away from site then:

OR →

Inform AV and deliver to local vet practice

Send in legislatively compliant packaging to external laboratory (IZVG)

Undertake screening post mortem:

- Take photographs of lesions
- Open abdomen and thorax
- Swab with transport swab any abscesses
- Remove abdominal and thoracic contents and place into 10% Formalin available in the vet room
- Email pathologist photographs for his return

NOTE: Frozen or old carcasses can provide information and should be submitted but are not as useful as freshly dead specimens

Post mortem submission form

SOUTH LAKES SAFARI ZOO

Species:

Species:

Sex: | Age or DOB: | or wild ☐

Name: | ARKS ID: | or wild ☐

Microchip: Yes / No | location: | MC number:

Weight: g / kg | Enclosure:

Date of death: | Time found:

Submitted by: | Storage (circle): none / chiller / freezer / external

Describe how and where the animal was found (including which side laid on when found), include any recent history, treatment or clinical signs that you consider relevant:

Details of recent treatment (if any):

Post mortem requests

Internal:	☐	Full:	☐
External (RB):	☐	Cursory:	☐
External (Other):	☐	None:	☐

Vet Department use only

Histology:	Yes ☐	No ☐
Culture:	Yes ☐	No ☐
Other:	Yes ☐	No ☐

P650 PACKAGING INSTRUCTION P650

This packing instruction applies to Un No. 3373 (Diagnostic Specimens)

1. The packaging shall be of good quality, strong enough to withstand the shocks and loadings normally encountered during carriage, including transhipment between vehicles or containers and between vehicles or containers and warehouse as any removal from a pallet or over pack for subsequent manual or mechanical handling. Packaging shall be constructed and closed to prevent any loss if contents that might be caused under normal conditions of carriage by vibration or by changes in temperature, humidity or pressure.

2. The packaging shall consist of three components

    a) a primary receptacle;
    b) a secondary packaging; and
    c) an outer packing.

3. Primary receptacles shall be packed in secondary packaging in such a way that, under normal conditions of carriage, they cannot break, be punctured or leak their contents into the secondary packaging. Secondary packaging shall be secured in outer packaging with suitable cushioning material. Any leakage of the contents shall not compromise the integrity of the cushioning material or of the outer packaging.

4. For carriage, the mark illustrated below shall be displayed on the external surface of the outer packaging on a background of a contrasting colour and shall be clearly visible and legible. The width of the line shall be at least 2mm; the letters and numbers shall be at least 6mm high.

5. The completed package shall be capable of successfully passing the drop test in 6.3.2.5. as specified in 6.3.2.3. and 6.3.2.4. except that the height of the drop shall not be less that 1.2m. The smallest external dimension of outer packaging shall be not less than 100mm.

6. For liquid substance:
    a) The primary receptacle(s) shall be leak proof;
    b) The secondary packaging shall be leak proof;
    c) If multiple fragile primary receptacles are placed in a single secondary packaging, they shall be either individually wrapped or separated to prevent contact between them;
    d) Absorbent material shall be placed between the primary receptacles(s) and the secondary packaging. The absorbent material shall be in quantity sufficient to absorb the entire contents of the primary receptacle(s) so that any release of the liquid substance will not compromise the integrity of the cushioning material or of the outer packaging;
    e) The primary receptacle or the secondary packaging shall be capable of withstanding, without leakage, an internal pressure of 95 kPa (0.95 bar).

7. For solid substances:
    a) The primary receptacle(s) shall be sift proof;
    b) The secondary packaging shall be sift proof;
    c) If multiple fragile primary receptacles are placed in a single secondary packaging, they shall be either individually wrapped or separated to prevent contact between them.

8. Refrigerated or frozen specimens: Ice, dry ice and liquid nitrogen
    a) When dry ice or liquid nitrogen is used to keep specimens cold, all applicable requirements of ADR shall be met. When used, ice or dry ice shall be placed outside the secondary packaging or in the outer packaging or an over pack. Interior supports shall be provided to secure the secondary packaging in the original position after the ice or dry ice has dissipated. If ice is used, the outside packaging or over pack shall be leak proof. If carbon dioxide, solid (dry ice) is used, the packaging shall be designed and constructed to permit the release of carbon dioxide gas to prevent a build up of pressure that could rupture the packaging and the package (the outer packaging or the over pack) shall be marked "Carbon dioxide, solid" or "Dry ice".
    b) The primary receptacle and the secondary packaging shall maintain their integrity at the temperature of the refrigerant used as well as the temperatures and the pressures, which could result if refrigeration were lost.

9. Infectious substances assigned to UN No. 3373 which are packed and packages which are marked in accordance with this packing instruction are not subject to any other requirement in ADR.

10. Clear instructions on filling and closing such packages shall be provided by packaging manufacturers and subsequent distribution to the consignor or to the

person who prepares the package (e.g. patient) to enable the package to be correctly prepared for carriage.

11. If any substance has leaked and has been spilled in a vehicle or container, it may not be reused until after it has been thoroughly cleaned and, if necessary, disinfected or decontaminated. Any other goods and articles carried in the same vehicle or container shall be examined for possible contamination.

Royal Mail requirements

Royal Mail will only carry UN3373 Diagnostic Specimens if they are packed following Packaging Instruction P650, and:

- Are sent by first class post or Special Delivery and to inland addresses only
- The packet is marked with the sender's name, telephone number and address

TNT (Courier) requirements

- The "Nature and Quantity of Goods" box must contain the text "Biological Substance, Category B" and "UN3373" on the Consignment note/Air Waybill.
- The Dangerous Goods "YES" box must be ticked.
- The name and telephone number of a "responsible person" must be written on the consignment note or on the package.
- The package must carry the warning symbol bearing the text UN3373, and the words "Biological Substance, Category B".

ANIMAL KEEPER ZOONOSIS RISK LETTER

To Whom It Maty Concern:

Re: ANIMAL KEEPER ZOONOTIC DISEASE RISK

This letter confirms that the patient attending your clinic today is a member of the animal keeping team here at Safari Zoo. Whilst the disease presentation maybe unrelated to an occupational health disease we would like to inform you that this member of staff works with a range of wild animals and potentially zoonotic diseases.

The range of species includes non-human primates, parrots (psittacines), waterfowl, carnivores and a range of other species.

There is a comprehensive biosecurity programme at Safari Zoo and potential zoonoses are rare. However in the last ten years there have been isolated, confirmed cases of chlamydiosis, salmonellosis, *Hymenolepis* and *Yersinia pseudotuberculosis.*

Please do not hesitate to contact us if you need any further information that may be pertinent to this case.

Yours sincerely

Management Team at Safari Zoo