3.4 QUARANTINE EXAMINATION PROCEDURES

W.Boardman, E.Dubois, and S.Unwin (Certain templates based on material from NEZS)

- Quarantine is the separation of newly received primates from those already in the facility until their health can be evaluated.
- The purpose of such isolation is to prevent the introduction of infectious disease to the resident population e.g. parasitic, fungal, protozoal, viral or bacterial.
- In addition, during this period new primate can become accustomed to their new diets and housing, and baseline medical data can be gathered.
- Quarantine procedures must be applied rigorously.
- An all in all out policy is the most effective procedure.
- Given that the origin of primates coming into the captive group has usually involved close contact with man for (often) prolonged periods, the potential for disease is high.
- Furthermore, the purpose of the project maybe to provide primates for release into the wild. Thus, any disease present in the captive group may be transmitted to wild primate populations with potentially devastating consequences.
- The protocols described therefore represent an ideal situation towards which the project should aim.
- Quarantine facilities should be as physically isolated as possible from the other enclosures – minimum of 20m with a physical barrier is best.
- Facilities should be sited downwind and downstream of the resident groups.
- Personnel working with quarantined primates must observe established procedures to prevent cross-contamination to resident primates (see below).
- These procedures include personal hygiene, the use of separate equipment (such as feeding bottles, cleaning brushes etc), footwear and clothing for quarantined primates and the thorough disinfection of all such items after use each day.
- Ideally, staff would care for quarantined primates exclusively.
- At least contact with quarantined primates should always follow contact with resident primates and never vice-versa. (e.g. feed and clean resident primates, then feed and clean quarantined primates, then wash thoroughly.)
- Such isolation procedures should also be applied to any primates in the resident groups that becomes ill and requires treatment.

**A minimum quarantine period of 90 days is recommended.** This is the minimum time required to test for the diseases of concern, as well as the time required for those animals infected with any disease of concern to manifest clinical signs.

- In certain circumstances it may be wise to increase this period to 6 months (e.g. for any primates which are known to have been in contact with tuberculosis).
At the end of the quarantine period, the enclosure should be thoroughly disinfected with an appropriate disinfectant (based upon diseases detected e.g. viricidal).

Ideally the facilities should then be unused for a period of 7-10 days.

STABILIZATION PERIOD

A period of between 1 day to 7 days (dependant on the individual primate in question) should be allowed for "settling in".

During this time, the primate may adjust to its new environment, food preferences and behavioural patterns can be assessed and a medical record established.

Current medical problems will require immediate attention during the first week.

FULL PHYSICAL EXAMINATION UNDER GENERAL ANAESTHESIA

This should include an assessment of general health & condition, age, weight, dental health, external parasite burden, previous injuries etc.

Animals should be permanently identified (e.g. subcutaneous microchip transponder)

Refer to the Biological sampling section (3.17) but as a guide:

Blood and serum samples should be taken for routine haematology (including screening for anaemia & blood parasites - especially malaria) and serum biochemistry, hepatitis A, B and C tests (serum) and serological testing for SIV (Simian Immunodeficiency Virus) and HIV infection. Other diseases for testing will depend on each sanctuaries’ diseases of concern list.

It is also wise to submit serum/ plasma/ whole blood to test for a panel of other human and primate viruses.

Additional serum should be taken and stored at minus 20°C (preferably −70°C) for a serum bank for future reference

Ideally cells for DNA isolation should be stored (e.g. hair follicles – which can be stored in DMSO for improved long term viability). See the section on Sample Collection.

- Haematology profile: Complete Blood Count, Fibrinogen
- Biochemistry profile:
  - Sodium
  - Urea
  - Creatinine
  - ALT
  - Gamma GT
  - AST
  - Albumin
  - Calcium
  - Cholesterol
  - LDH
  - Potassium
  - CPK
  - Glucose
  - Total bilirubin
  - Alk. Phos.
  - Protein
  - Globulin
  - Phosphate
  - Triglyceride
  - CPK
• Urinalysis: using a dip stick plus possible submission to laboratory for cytology

FAECAL EXAMINATION
Refer to Parasitology section 3.10

Faecal samples should be examined by direct microscopy and by a centrifugation technique internal parasites and cultured for Salmonella, Campylobacter, Shigella and other pathogenic bacteria on at least three occasions during the quarantine period. Faeces for culture should be collected in transport media using swabs. Salmonella, Campylobacter and Yersinia should be serotyped if possible. If not, note only as carriers (i.e. don’t treat) UNLESS the animal is showing signs of clinical disease. A generalised faecal culture also provides a good baseline of normal bacterial flora. Refer to section 5.5 for information on how to set up a bacterial field lab.

Where parasites have been detected and subsequently treated, further tests should be carried out during quarantine.

The numbers of helminth eggs per gram of faeces examined is often directly related to the clinical severity of infestation. However, in severe diarrhoea, due to a dilution effect large numbers may not be seen. This is not the case for protozoa. Therefore, in the case of primates with diarrhoea and a high faecal protozoal count, it is wise to consider other primary causes before ascribing the problem solely to the protozoan identified.

Deworming

- Ivermectin/Milbemycin/Moxidectin should be administered every 2-4 weeks during quarantine. (However if lice or scabies are detected then dosing at 2 week intervals is preferred).
- Pyrantel/Mebendazole/Albendazole should also be given early in the quarantine period, (hookworms and ascarids may not be susceptible to Ivermectin//Milbemycin/Moxidectin) and if parasites are confirmed on faecal examination, treatment should be repeated in 2-3 weeks.
- Praziquantel can be used if tapeworms are confirmed.
- Deworming every 6-12 months should occur regardless for all primates.
TUBERCULOSIS TESTING
Refer to Tuberculosis section 4.3

- Should tuberculosis be introduced it may be extremely difficult to eradicate and the long-term consequences could be disastrous.
- Each primate should therefore be tested AT LEAST TWICE for tuberculosis within the quarantine period.
- If using the intradermal skin test method, there should be at least 42 days between tests to avoid false positives on subsequent testing.
- An intradermal injection of 0.1ml Mammalian Old Tuberculin (MOT) into the skin of an upper eyelid (alternating sides on successive tests) under sedation, and observation of the local reaction at 24hrs, 48hrs and 72hrs.
- A comparative test using 0.1ml of avian tuberculin 25 000 iu/ml is given intradermally in the skin of the right eyelid and 0.1ml of bovine tuberculin 25 000iu/ml is given intradermally into the skin of the left eyelid can also be employed. Observation is done at 24, 48 and 72hrs. An increased swelling on the left eyelid (bovine) in comparison to the right eye (avian) indicates a suspicious result.
- Other sites can be used like the abdomen and the medial forearm. The sites can be circled with an indelible marker.
- There is a possibility of obtaining false positive results; definitive diagnosis is therefore based on repeated positive results and further diagnostic procedures. The intradermal comparative skin test is however a valuable tool in definitively eliminating those individuals which test negative from further suspicion.
- FOR INTRADERMAL SKIN TESTING INTERPRETATION, PLEASE REFER TO THE TUBERCULOSIS SECTION 4.3
- For other tests for tuberculosis, also refer to the tuberculosis section 4.3.
- NB: Intradermal testing of juveniles < 1 year old may not be accurate due to immaturity of the immune system.
- Incoming primates that clear these tests are considered free of tuberculosis and can be introduced into the resident group after all other quarantine procedures have been carried out.
- Primates suffering from the later stages of clinical tuberculosis may skin test negative due to an immunologically depressed state known as anergy. Thus any very thin or weak primates, or one suffering from a chronic respiratory condition should be treated with extreme caution and suspicion.
- Primate testing positive: see "Tuberculosis section 4.3.

VACCINATION
Refer to Vaccination section 3.12

Vaccinations should be given during the quarantine period provided that the routine haematology/biochemistry described during the clinical examination demonstrate no current disease. It is important not to vaccinate against measles when TB testing
NECROPSY
Refer to Necropsy section 3.18

All primates who die during the quarantine period must be necropsied (Refer to 3.18).

What follows is an example of a primate quarantine procedure, with associated suggestions on signs and labels. You can use this as a template for your own Quarantine facility.

All quarantine personnel must sign to say that they have read and fully understood the information given in this document and that they undertake to follow the working practices set out there in.

Danger of Disease
Severe and often fatal diseases can be spread between humans and animals, especially non-human primates. This spread can be by direct contact, or in the air or from contamination by bodily fluids such as blood and saliva. Infected animals and humans can incubate disease, without showing clinical signs for days or months, depending on the disease.

Purpose of quarantine
Precautions designed to
1. prevent cross infection
2. prevent escape and unauthorised entry

Quarantine Premises
All premises must be of strong permanent construction and designed so as to prevent the escape of the quarantined animals or access by other animals or unauthorised persons. Premises must be maintained in a good state of repair, have adequate fire precautions and washing facilities for staff. All entrances to the quarantine area must have an outer and inner door forming a trap to prevent animals escaping. Both doors must open inwards and be self-closing if at all possible. Adequate amounts of natural daylight + sufficient artificial lighting for proper cleansing of caging and safe handling of animals. Fresh air, drinking water, cool areas/ shade and heating required (as appropriate for the species).

Quarantine Period
This will depend on the species and diseases of concern, but must not be less than 90 days for primates or 30 days for other species. Animals arriving within 48hrs of each other may be considered as one consignment. Another batch of animals arriving after this period will be considered as a separate
consignment and must be isolated throughout the quarantine period. Discretion can be made to begin quarantine periods again, if the social requirements of the new arrivals need to be met.

Quarantine period may be extended if:
1. An outbreak of rabies is suspected or confirmed.
2. An animal sharing the same quarters dies or becomes ill towards the end of the detention period.

**Quarantine Personnel**
Only authorised personnel may work in the quarantine area.
These include:
1. the veterinary supervisor and authorised deputy
2. assigned keeping staff
3. a person authorised by and assisting 1 or 2 in their duties

The daily routine should allow the frequency of movement of personnel between quarantine and non quarantine areas to be minimised. This limits the potential spread of disease to non quarantine animals kept at the same sanctuary.

**Protective clothing and hygiene measures**
All personnel must wear the overalls and boots provided. They must be kept clean and only be worn in the quarantine areas.
Visors, masks and gloves should also be available.
A disinfectant (e.g F10, bleach etc) should be chosen.
Separate utensils, food bowls etc should be used in quarantine and non quarantine areas.
Provision must be made for incineration of all soiled bedding and waste food if this option is available.
Arrival crates must be thoroughly disinfected before leaving the quarantine premises.

**Animal Security**
Animals in quarantine must not be removed from their cages unless under the express permission of the veterinarian or primary care giver. Movement will only be allowed for essential medical or welfare reasons.
Staff are obliged to report to the veterinarian, senior keeper or manager any animal escape (either from its cage or from the quarantine area).

**Animal Health Care**
Quarantine premises must be visited by the veterinarian or appointed deputy at least once weekly during the quarantine period. Health reports must be submitted to sanctuary management by the veterinarian at least monthly.
Animals in quarantine may only be treated by the veterinarian or the authorised deputy or deputies.
Any suspicion of illness and/or change of behaviour must be recorded in the diary by the keeping personnel and the veterinarian informed.
Animals must not be removed from the premises during the quarantine period for any purpose whatever unless previously authorised by the veterinarian, or
Government veterinarian/equivalent. This includes removal to a veterinary facility for treatment and removal after death. Provision should be made so that clinical examination, post-mortem examination, routine medical treatment, anaesthesia and isolation of sick animals can be carried out within the quarantine area if required.

Human health: Bites and Scratches

First aid:
If you are bitten or scratched by an animal in quarantine:
1. flush and wash of wound thoroughly with water and detergent (viruses are often susceptible to detergents)
2. Apply 40-70% alcohol
Or tincture/aqueous solutions of iodine
Or 0.1% quaternary ammonium compounds (make sure all traces of soap washed away first)

Notification
You MUST then:
1. Record incident in the quarantine accident book
2. Notify veterinarian/head keeper/sanctuary manager
3. Contact medical assistance if required.

Record Keeping

Records to be available at all times
1. The licence, confiscation notice or order under which the animals were obtained.
2. In house records stating date, species and number of animals
   moved into quarantine and their origin
   moved out of quarantine and their destination
   Born on the premises
   Died on the premises
   Removed from their cages for medical welfare or other essential reasons.
New arrivals added to the animals undergoing quarantine.
Medical records.
3. Accident records

Authorised Personnel:

<table>
<thead>
<tr>
<th>Authorised Personnel</th>
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<tr>
<td>SANCTUARY manager</td>
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<td>Authorised Keepers / animal care staff</td>
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<td>Veterinarian</td>
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<td>Vet Nurse (when required to assist vet staff)</td>
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QUARANTINE
RULES FOR WASTE AND EQUIPMENT

Waste = soiled bedding, uneaten food, etc
Equipment = tools, wheelbarrows, food dishes, bear crates etc.

• Only take into quarantine what you absolutely need.

• Nothing comes out of quarantine unless:
  1. It is in a bag – to be incinerated.
  2. It is thoroughly scrubbed and then disinfected with (E.G) Virkon, bleach etc..

Disposal of waste bags:

• Fill bags to 2/3 full only.
• Tie bags with cable ties provided. – then place in a clean bag and tie this also. Write on the bags with permanent marker “ infectious waste”
• Store bags in quarantine until It can be safely disposed of
• Any problems contact the Veterinarian or the sanctuary manager
Quarantine Check List ______________

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<tr>
<th>Vet Responsibility</th>
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<tr>
<td>Quarantine Procedures and Authorised Personnel</td>
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<td>Quarantine Sign/s</td>
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<td>Waste Disposal Instructions</td>
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<td>First Aid Instructions</td>
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<td>Yellow Bags and Ties</td>
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<td>First Aid Kit- Povidone-Iodine Surgical Scrub &amp; Desderman N</td>
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<td>Foot Bath</td>
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| Animal Care Team Responsibility      |   |
| Safe Working Practices              |   |
| Training- ie sign off on SWPs       |   |
| Quarantine Book - for recording visitors, daily notes etc |   |
| Accident Book                       |   |

| Management responsibility            |   |
| Overalls                              |   |
| Wellies                              |   |
| Disinfectant                         |   |
| Gloves etc.                          |   |
Quarantine Area

No Admission to Unauthorised Persons
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SURGICAL SPIRIT
Warning:
HIGHLY FLAMMABLE
HARMFUL

PEVIDENE ANTISEPTIC
SOLUTION
Povidone Iodine Solution
1% w/v available Iodine
AVOID CONTACT WITH EYES

PEVIDENE SURGICAL SCRUB
0.75% w/v available Iodine
EXTERNAL USE ONLY
AVOID CONTACT WITH EYES

PEVIDENE ANTISEPTIC
SOLUTION
Povidone Iodine Solution
1% w/v available Iodine
AVOID CONTACT WITH EYES

DO NOT INHALE VAPOURS
KEEP AWAY FROM SOURCES OF HEAT AND SPARKS
AVOID CONTACT WITH BODY

PEVIDENE SURGICAL SCRUB
0.75% w/v available Iodine
EXTERNAL USE ONLY
AVOID CONTACT WITH EYES

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