

*British Hedgehog  
Preservation Society*

**Care and Treatment of  
Sick and Injured Hedgehogs**



**Part of the**

**Know your Hedgehog**

**series**

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**Note for Hedgehog Carers:** it is vital to establish a good relationship with a vet who is happy to treat hedgehogs and to ascertain their practice policy regarding wildlife from the outset. If your vet is not very experienced but interested in treating hedgehogs, a copy of this booklet would be helpful.

**Note for Vets new to treating hedgehogs:** keep an open mind, go back to basic medical and surgical procedures, remove any orthopaedic implants before release, draw on the experienced carers knowledge of hedgehog behaviour. “Veterinary Care of the Hedgehog” by Ian Robinson and Andrew Routh of the RSPCA, published in ‘In Practice’ March 1999 is very informative, copies available from BHPS on request.

## ***ACKNOWLEDGMENTS***

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The publication “Igel in der Tierarztpraxis” produced by the Pro Igel has been of great assistance in drafting this leaflet and special acknowledgement is also made of the work on hedgehog parasites by Dora Lambert of Arbeitskreis Igelschutz Berlin eV from whom a wide selection of Photomicrographs can be obtained to help with identification. Details of good hedgehog care and homoeopathic and natural remedies are to be found in “The Natural Hedgehog” by Lenni Sykes with Jane Durrant. (See Appendix 3.) The drawings of worms and mites have also been taken, with permission, from “The Natural Hedgehog”. St Tiggywinkles’ “Medication for the use in the Treatment of Hedgehogs” and “Medication & Dosages for Hedgehogs” from the Vale Wildlife Hospital website ([www.valewildlife.org.uk](http://www.valewildlife.org.uk)) are useful guides and helped in the compilation of Appendix 2 of this booklet. Background biological information is taken from “Hedgehogs” by Nigel Reeve.

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The British Hedgehog Preservation Society does not take any responsibility for matters arising from the guidance given in this booklet.

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## **HEDGEHOGS THAT NEED HELP ARE:**

Orphaned hoglets- found out of the nest in day, or when the nest has been destroyed and the mother killed or injured.

Injured hedgehogs - with open wounds, fractures, bites, burns, or trapped in some way.

Sick hedgehogs- usually found out in the day, thin, dehydrated, possibly poisoned, or with breathing problems.

Hedgehogs that are unsteady on their feet (wobbling, rocking) and ones with flies around them.

Autumn juveniles – young hedgehogs born late in the year, See leaflet ‘Autumn Juveniles’.

It is normal for healthy hedgehogs to arouse from hibernation for short periods even in cold winter weather, do not assume these hedgehogs need help unless they are underweight or obviously unwell.

## **HEDGEHOGS THAT SHOULD BE LEFT ALONE:**

Adult females in summer uninjured but found out in daylight (these can be nursing mothers), any large uninjured hedgehogs found (eg. crossing the road) and picked up “for safety” by well meaning people should be put back away from the road but near where found.

## **RELEASING HEDGEHOGS AFTER A PERIOD IN CARE**

Choose a release site as near to where the hedgehog was found as is practicable, make sure it is: already inhabited by hedgehogs, away from main roads, badger setts and other hazards. Warm damp weather is best, the provision of food and water for the first few nights might help inexperienced hedgehogs. Further advice on release can be found in the BHPS’s “Rearing Hoglets” leaflet. Consideration could be given to marking or tagging hedgehogs that have been in care. With public co-operation, this can provide information on what happens to them after release and also facilitates identification of returning patients.

## ***1. CARE***

### **INITIAL EXAMINATION**

Very sick hedgehogs may not be rolled up but laying flat and easier to examine thoroughly for wounds, injuries and ectoparasites. If stressed or in pain they may bite, jump and/or hiss/snort. Their spines are often dirty, take care to avoid infection if they break your skin, so it is recommended that you wear (rubber) gloves. They may shriek if in pain or may self anoint - froth at the mouth and put this saliva over their backs when confronting strange smells or tastes. Self-anointing is normal behaviour.

Even severely injured hedgehogs can stay in a ball and may need anaesthesia for a proper examination. Some suggestions on how to unroll a hedgehog: a) put on heat pad and wait, b) gently stroke its back (as you would a cat) but exerting gentle pressure towards the rear with each stroke to get it to flatten out, c) put on table and wait d) gently rock it to and fro. Once unrolled, hold onto its back legs and lift its rear end into a “wheelbarrow” position, with the front feet still on the table, this should enable an inspection of its underside. However care must be taken to ensure that further pain and distress is not caused or that any injuries are not aggravated.

Assessment of general conditions: Is it dehydrated? If you pull up a few spines, does the skin spring back into place when you let go or do they stay put? If the skin does not spring back then it may be dehydrated. Is it well nourished? Is it rounded at the rear end? (well fed) or more like a rugby ball and you can see two lumps where its hip bones are? (very thin). Are its eyes sunk/bright? Are its spines/fur shiny/dull etc? Does it smell –if so it may be hiding an infected wound or have rotten teeth. Decide if /when to see a vet.

### **PHYSIOLOGICAL PARAMETERS**

**Body Temperature** - 35°C +/- 1°C - much lower in hibernation

**Heart Rate** - 200 - 280bpm (Rates as low as 2 - 48bpm are reported during hibernation).

**Respiratory Rate** - 25 - 50/min depending on activity (In hibernation it is possible that hedgehogs may be apnoeic for 1 hour).

## **WARMTH AND FLUIDS ARE ESSENTIAL**

Warmth: heat pad, heat lamp or warm, well wrapped, hot water bottle (needs to be frequently filled). Fluids (all given at normal body temperature): orally: Lectade, Duphalyte, Dioralyte, glucose/honey in warm water. International Rehydrating Fluid Recipe: 1 tablespoon sugar. 1 teaspoon salt in 1 litre of warm water fed by syringe into the mouth and also left in bowl instead of water. However when giving fluids orally it is essential that the hedgehog is warm and responsive enough to be able to swallow. Alternatively sterile intra venous fluids can be injected, see Appendix 1. Vitamins are essential if the hedgehog is in poor condition, is not eating or may have been exposed to toxins. Homeopathy can also be used to treat shock and trauma see Appendix 3.

## **ACCOMMODATION, HYGIENE AND DIET**

Housing: All hedgehogs should be provided with a high sided box and nest material (ripped up newspaper) or a towel, with no holes or loose threads, to hide in. This will reduce stress; they should be kept in individual pens/cages, unless found as nestlings with their littermates. White or pale plain towels can be used initially as these will show up any blood or discharge stains previously missed. Hygiene is very important; hedgehogs must be given clean newspaper and bedding at least once a day. Cages/pens should be disinfected at least once a week. Wash your hands before and after handling each hedgehog. Sterilise all utensils and feeding bowls every day.

Food & Water: Hedgehogs need to have water in a non-tippable bowl NEVER give cow's milk, they cannot digest the lactose. Feed specialist hedgehog food or meat based tinned cat or dog food (chicken, turkey, rabbit and lamb "supermeats") mixed with unsweetened cereal (crushed Weetabix, oats or bran). A little cooked chicken, raw liver or mince, or fresh fruit or sultanas can be given

as treats. Complete dry meat based cat foods are good for teeth and gums. Dried insect bird food (Haiths Prosecto or Bogena Mynah Bird Food) can also be added to the tinned food.

Weighing: The hedgehog will need to be weighed accurately before any dose rates can be calculated. This will also give you a good indication of how it is doing on a day-to-day basis. Keep records of the progress and treatment. Disinfect scale pan and work surfaces etc after each hedgehog.

**HAND FEEDING:** Adult or weaned juvenile hedgehogs which will not eat for themselves need to be hand fed, either on their back, in a sitting position in your hand, or standing normally on your lap on a (well covered) heat pad. Fluids should be given at body temperature. Very slowly insert the syringe containing either electrolyte replacement fluid (see above) and/or liquid feed into the side of the mouth. This can be a prepared formula from your vet: Hills Prescription Diet A/D, or Reanimyl, Liquivite, Waltham Concentration Diet or you can make your own “glop” by liquidising with water some tinned cat or puppy food mixed with baby rusks or cereal with vitamins and pro biotic powder (See appendix 3). Sterilise blender goblet after each use. Depending on the size of the hedgehog give 4-5 feeds per day of 10-30ml. This is calculated as follows: 25% of bodyweight (in grammes) in ml per 24 hours ie a 300g hog would need approx 75ml over 24hrs to gain the ideal of 10g per day. Gradually reduce the hand feeds as it begins to eat enough to gain weight.

Unweaned hoglets should be given 2/3 goats milk , 1/3 goats colostrum or a puppy replacement milk at body temperature, 2-4 hourly depending on age and gain about 4g per day. Stimulation of the ano-genital area is vital so they empty their bladder at each feed. See BHPS leaflet Caring for Hoglets.

A list of useful items to have when caring for hedgehogs is to be found on the inside back cover.

## ECTOPARASITES AND OTHER SKIN PROBLEMS

**Fleas:** some wild hedgehogs carry large numbers of specific hedgehog fleas (*Archaeopsylla erinacei*), these do not appear to harm healthy hedgehogs and will not stay on humans, pets or infest your house, as they breed in the hedgehog's nest. Sick, hypothermic, hedgehogs do not seem to have large number of fleas as they hop off in search of warmth. Severe infestation can cause anaemia. Hedgehogs with flea problems can be dusted with pyrethrum based flea powder or Johnsons Insecticidal powder on arrival, this single treatment should be all that is needed. Most of the aerosol sprays used on cats and dogs should not be used as they may be too toxic to the hedgehog.

**Ticks:** can be found anywhere on a hedgehog's body, particularly around the eyes, ears and tail. Severe infestation can cause anaemia. *Ixodes hexagonus* is the most common species found on hedgehogs. They suck blood and drop off into the nest when fully fed. Care is needed in removing them. See notes on tick removal on our website or request our "Notes on Tick Removal". Clean the area with Calendula or disinfectant after removal.

**Maggots and fly eggs (Myiasis):** found usually in warm weather in wounds but also on weak, sick, uninjured hedgehogs. Check all orifices, eyes, ears, nose, mouth, anus, and around the tops of the legs. Maggots should be removed with tweezers, or from wounds with a dental water-jet. A 1:250 concentration of F10™ Antiseptic Solution (concentrate) can be applied topically. All dead maggots must be removed from wounds. Fly eggs can be brushed off the spines with a toothbrush and removed from fur with a flea comb, flushed from ears, mouth, anus etc with salt water in a syringe (dissolve 1 teaspoon of salt in a pint of hot water and allow to cool). Use Optrex or similar to flush the eyes. If there may be maggots left in the ears some olive oil might bring them to the surface.

**Mites:** Hedgehogs may suffer with several species of mites. They may look like dust particles and cause the skin to become flaky, scabby or crusty and spines and/or fur may fall out.

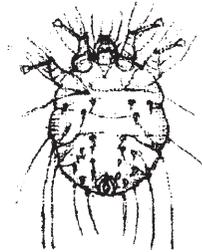
**Surface mites** (Caparinia tripilis, Chorioptes spp., Notoedres cati etc) : Pyrethrum powder, cleaning bedding and vitamin supplements may be all that is needed.

**Deep skin mites** (Demodex erinacei and Sarcoptes spp.) : Ivomec 0.3ml/kg weekly for 4 weeks or Ivomec solution 1:30 topically or Amitraz bath x 2-4 treatments at 10 day intervals. Deep infestations like Demodex do not respond well to drug treatments. Homeopathy can also be tried. See Appendix 3.

Below are two different types of mange mites that might be found on a hedgehog when using a microscope.



Demodex



Sarcoptes

**Ear mites:** use Canaural drops or Otodex (homoeopathy as for other mites)

**FUNGAL INFECTIONS: Ringworm:** Dry white flaky skin, especially round the face, thickened “cauliflower” ears may be signs, of hedgehog ringworm Trichophyton mentagrophytes or erinacei, which does not fluoresce under a Woods lamp and needs to be diagnosed by culturing a sample. Note this fungus can be transmitted to humans, so proper precautions should be taken (eg gloves).

Imaverol baths x 2, 1ml/50ml water 10 days apart, Mycophyt baths x 2, 10 days apart (See Appendix 2). Homeopathy has been used successfully, garlic juice or tea tree oil is said to kill ringworm spores. Similar natural remedies for ringworm as for mites see Appendix 3. Vitamin supplements, particularly Vitamin A with Zinc (Vitamin + Zinc) and Evening Primrose Oil for falling spines, wheat germ oil to boost the hedgehog’s general condition. Ringworm can take up to 6 weeks to clear up.

## ENDOPARASITES

Strong hedgehogs live with a moderate number of parasites in the wild, but in a young or weak animal they can lead to death. Often hedgehogs get worms by eating infected prey, eg snails, slugs and earthworms so it is inadvisable to feed captive hedgehogs with 'wild' food; live mealworms, beetles etc can be obtained from pet shops or mail order. The aim is to release with a "background level" of internal parasites that the hedgehog can cope with, a "squeaky clean" juvenile will quickly become heavily infested once back in the wild and may not be able to cope with such a sudden burden. Capillaria can be transmitted directly from faeces without an intermediate host, this is also true of Coccidia, so hygiene is very important. A microscope is essential to determine which endoparasites are present. See Appendix 1 for techniques. Mixed parasite infestations are frequent and may vary according to region/ climate/weather. In cases of severe infestations, antibiotic cover should accompany any worming. Dosages and choice of wormers and antibiotics vary. Under veterinary supervision choose a regime that works for your hedgehogs.

It should be remembered that there is not a worming drug that kills all the worms that hedgehogs are likely to have. Some drugs are more effective in killing some worms and less effective with others. Fenbendazole (Panacur) can be used for flukes, Nematodes, Tapeworms and Capillaria (lungworms) but is not very effective. Mebedazole (Telmin) is effective for flukes, Nematodes, Capillaria and Crenosoma but is less effective against Tapeworms. Praziquantel (Droncit) is effective for treating Fluke, Tapeworm and Thorny Headed Worm. Levamisole (Levacide) is most effective against Crenosoma, Nematodes and Thorny Headed Worm but less effective against Capillaria. Ivermectin (Ivomec/Panomec) is effective against Capillaria. In most cases it is not necessary to kill all the worms just to get them down to a level that the hedgehog can cope with - once in the wild (or if fed on natural food like earthworms, slugs and snails) it will become re-infected.

## LUNGWORM

*Crenosoma striatum* (lungworm) and *Capillaria aerophila* (lung threadworm) cause wheezing, coughing, gurgling, snuffling, respiratory distress and loss of appetite and weight. Frequently linked to secondary bacterial infection and profuse mucus secretion in airways, dead worms, eggs and larvae must be coughed up or they will block the airways and may cause death. *Crenosoma striatum* is reported to be a major cause of mortality in Europe.

Breathing difficulties can also be caused by nose injuries, or rhinitis. As a very general guide noise on inspiration will be related to disease of upper airways eg nose, trachea and noise on expiration is more likely to relate to disease of lungs and lower airways.

The following wormers are used widely in Europe for lungworm and seem to work, see Appendix 2 for alternative dose regimes.

Levamisole: (Levacide) 27mg/kg 2 injections sub.cut. 48 hours apart. Dilute 1 part in 4 parts sterile water (otherwise it really stings) and use this dilution at 1.33ml/kg. Do not inject near the head, or give to pregnant hedgehogs or to unweaned babies. With young/weak hedgehogs under 300g split the daily dose into 2 and give half in the morning and half in the evening. (Pro Igel)

Mebendazole (Telmin KH) (may cause diarrhoea in weak hedgehogs) for 5 days crushed on food or in liquid feed: <200g 1/8 tablet; 200-500g 1/4 tablet; 500g-1kg 1/2 tablet;

Fenbendazole (Panacur) dosages vary-very gentle wormer, not particularly effective.

Ivermectin is effective against capillaria.

As lungworm infestation is nearly always associated with bacterial infection appropriate antibiotic cover should be given under veterinary supervision (see Appendix 2).

Milophyline sub cut (Appendix 2) and Bisolvon powder (pinch per day) in liquid feed or on food for up to 14 days may also be useful to dissolve mucus and bring up dead worms. Steroids may have a limited use under veterinary advice. (Appendix 2).

## INTESTINAL WORMS

Capillaria erinacei, ovoreticulata – intestinal threadworms

Brachylaemus erinacei – hedgehog intestinal fluke

Hymenolepis erinacei – tapeworm

Acanthocephala – thorny headed worm

All cause loss of appetite and weight, diarrhoea, anaemia, possibly enteritis with blood in droppings. Fluid and electrolyte replacement therapy will be necessary in hedgehogs with no appetite. Fluke can cause extreme hyperactivity and lead to death, as can Coccidia, mixed infestations are common.

### **Wormers for intestinal worms:**

If possible a faecal examination should be undertaken first to determine what parasites are present. If this is not possible try the Levamisole doses suggested below initially and if the hedgehog does not respond start the Ivermectin. It may be possible for a large wildlife centre to check droppings if you have no other option, contact BHPS for details if necessary.

Intestinal Capillaria: Levamisole, Mebendazole, Fenbendazole dosage as for lungworm above. Fluke/Tapeworm/Thorny headed worm: Praziquantel (Droncit) <200g 1/8 tablet, <500g 1/4 tablet, >500g 1/2 tablet or injectable, or <200g 0.1ml, >200g 0.2ml, >500g 0.4ml – 0.5ml/kg one dose – may be needed to be repeated in stubborn cases.

As with lungworm infestations, intestinal worms are frequently associated with bacterial infections of the gut, antibiotic cover is recommended see below Intestinal Bacterial Infections.

### **Suggested Autumn Juvenile worming regime:**

If possible a faecal examination should be undertaken first to determine what parasites are present. If this is not possible try the Levamisole doses suggested below initially and if the hedgehog does not respond start the Ivermectin. It may be possible for a large wildlife centre to check droppings if you have no other option, contact BHPS for details if necessary.

In the wild there is a high mortality amongst autumn juvenile hedgehogs. Consequently some hedgehog rehabilitators are choosing to routinely worm autumn juveniles on arrival. There is some debate on whether this is the best policy and we would certainly not expand this routine policy to hedgehogs at other times of the year unless they are showing symptoms or when dropping samples show heavy worm burdens.

If you don't like routinely treating you could check dropping samples under a microscope for eggs or larvae. It seems most autumn juveniles samples that are being checked do have eggs or larvae present, however if the infestation is recent the worms may not have reached the stage where the eggs or larvae are being passed in the faeces so samples may be negative even though worms are present. Check samples on arrival and every other day for the 2 weeks following the last worming dose then weekly thereafter, unless the hedgehog's condition deteriorates in which case check again.

Lungworm can cause wheezing, coughing, gurgling, snuffling, respiratory distress and loss of appetite and weight. Frequently linked to a secondary bacterial infection and profuse mucus secretion in airways, dead worms, eggs and larvae must be coughed up or they will block the airways and may cause death.

There are a number of different worming regimes that rehabilitators use, this may be because certain worms are more prevalent in certain areas so different regimes have been developed to cope with local variations.

**The following is widely used and currently appears to work:**

If *Crenosoma* (larvae) are found in a sample, give Levamisole: (Levacide) 27mg/kg (0.35mls/kg) sc daily for 3 days. Some carers prefer to dilute 1 part in 4 parts sterile water, as the concentrated solution really stings - use this dilution at 1.33ml/kg. Do not inject near the head, or give to pregnant hedgehogs or to unweaned babies. With young or weak hedgehogs under 300gms split the daily dose into 2 and give half in the morning and half in the evening and give

on day 1 and day 3. Slightly different doses and repeat times are also being used successfully. It is for your vet to decide which dose they use. Repeat the levamisole doses 10 days after the previous course has ended (remember to re weigh and calculate the dose as hopefully the hedgehog will have put on weight). It is not usually necessary to repeat any of the other drugs unless symptoms suggest this is required. This also is the drug and dose to use for the increasingly common 'Thorny-headed' worm.

If *Capillaria* (eggs) are found in a sample, Ivomec/Panomec should be given on Days 1, 8 & 15 @ 0.4ml/kg sc. However if the hedgehog is weak and both eggs and larvae are found wait until day 4 or 5 of the treatment before starting this part of the drug regime.

As lungworm infestation is frequently associated with a bacterial infection appropriate antibiotic cover should be given under veterinary supervision. For example Marbocyl 2% @ 0.4ml/kg s/c for 7 days or Baytril 2.5% @ 0.8ml/kg twice daily sc or im for 7 days and if Coccidiosis is suspected Baycox 75mg/kg orally single dose repeat in 10 days or Tribissen injection (0.5ml/kg) for 7 days.

Bisolvon should also be used to shift mucus and bring up dead worms – this can be given either orally (a pinch daily) or by injection @ 1ml/kg s/c for 7 days.

Recent studies at Vale Wildlife Hospital have shown a greater success rate when Dexadresen (a short acting anti inflammatory drug) is used when there is a heavy burden or the hedgehog has a problem breathing, at a rate of 0.5ml/kg twice daily for 3 days. If available Millophyline (Etamiphylline) can also be given if the hedgehog's breathing is laboured.

For Fluke, Profender Spot-on for cats at 0.4ml/kg on skin once a week for 3 weeks can be used. Alternatively, Flukiver oral suspension can be given at 3ml/kg mixed in a little food, repeated after 2 weeks.

Throughout the treatment the hedgehogs should be kept on a heat mat and in most cases fluid therapy and hand feeding will also be required. Do not feed hedgehogs on their natural food as this can result in re-infection. Use mealworms, beetles, etc from a reputable source if you want to use live foods.

Note the hedgehog may cough more after worming than it was before – this usually means that the worms are dying and being coughed up which is what you want – it does not necessarily mean that the hedgehog is getting worse.

## **INTESTINAL BACTERIAL INFECTIONS**

Many different types of bacteria are associated with intestinal infections including E Coli, Salmonellae, Klebisiella, Leptospira, Campylobacter and Proteus. NB many of these are transmittable to humans – good hygiene is essential! Some of these bacteria can be very resistant and sensitivity testing is recommended.

Antibiotics: Potentiated sulphonamides or enrofloxacin, amoxycillin/clavulanate (Suggested doses in Appendix 2) accompanied by Buscopan for cramps/squealing fluid therapy essential, Pro biotic powder, digestive enzyme, vitamins, Kaolin.

PROTOZOA – Coccidiosis – *Isoospora rastegaivae* is the most common in hedgehogs. Can be brought on by stress, is infectious to the same or other hedgehogs from faeces in 48hrs if sporulated otherwise 6-10 days. Hygiene is very important. Distinctive dark green droppings sometimes with blood, also restlessness and spine/fur loss.

Treatment: Sulphadimidine or potentiated sulphonamides (See Appendix 2) in persistent cases a 15 day course of 5 x Sulphadimidine, 5 x potentiated Sulphonamide, 5 x Sulphadimidine may work. Baycox is also being used.

**VIRUSES:** German literature suggests that feline parvoviruses may be transmissible to hedgehogs in rescue centres where cats and hedgehogs are cared for in close proximity, good hygiene will prevent this.

**URINARY PROBLEMS:** appear to be relatively uncommon in hedgehogs but kidney failure has been seen in older animals. These will appear to drink a lot and pass copious amounts of urine. They are difficult to treat but a lower protein diet and antibiotics, cephalexin, or trimethoprim potentiated sulphonamides may be helpful. Lower urinary tract infections also occur, symptoms may be thick, discoloured urine and the hedgehog may squeal while urinating. Treatment can include cephalexin, trimethoprim potentiated sulphonamides and pain relief/anti inflammatories.

## 2. VETERINARY TREATMENT

### WOUNDS, INJURIES, FRACTURES, AMPUTATION

For anything other than surface wounds veterinary treatment or advice will probably be necessary. With any serious injuries, consideration must be given as to whether the hedgehog will be fit enough to be released after treatment.

**Open wounds:** first aid: clean wound (dissolve a teaspoon of salt in a pint of hot water, allow to cool) and remove fly eggs and maggots. Flush several times with sterile saline, use Intrasilite gel or Aloe Vera Jelly for dressing. Veterinary treatment may include, cleaning, debriding and suturing. When cleaning and debriding wounds it is important to clip enough spines to allow proper cleaning but it should be kept in mind that the spines will only regrow after the base of the old spines falls out. If large areas are clipped the hedgehog will be vulnerable to predators until they regrow. Antibiotic cover: clavulanate potentiated amoxicillin, cephalixin, enrofloxacin. Fluid therapy as required. It is very common in hedgehogs for wounds to “track” beneath the skin because of loose connective tissue. Catheters may be required to flush the full extent of these wounds.

**Ligatures:** wire, netting, string, elastic bands, plastic all seem to trap hedgehogs, even if there is no obvious wound, pressure necrosis can occur and infection can break through the skin at a later date so keep in for observation for at least a week. Ligature wounds should generally not be sutured but cleaned and allowed to granulate and heal. Watch out for self mutilation as the feeling returns to the limb.

**Balloon Syndrome:** Hedgehog has blown up appearance, subcutaneous emphysema. There is no single cause for this condition. The air can be removed by incising or aspirating through the skin over the back. Antibiotic cover should be given. This may be associated with lung/chest wall damage or a small external wound acting like a valve or a clostridium type infection.

**Pop-off Syndrome:** A condition so named by Les Stocker of St Tiggywinkles, “when the spiny skin is pushed up over the hedgehog’s haunches with the orbicularis muscle springing tight and preventing the skin from returning to its normal position. When this happens the hedgehog’s legs are forced sideways, and anal orifice and tail are pulled up over the back and the hedgehog is completely helpless. Check that the hedgehog does not have a spinal injury by pinching its toes, if there is no reaction an X ray will be necessary. If it flinches, the orbicularis muscle can be pulled back into position under anaesthetic. Note this is not a life threatening condition so treat for shock, hypothermia and dehydration before administering an anaesthetic. This can occur when the hedgehog gets trapped and in its efforts to free itself, the orbicularis muscle pops over the pelvis and the hedgehog cannot get it back in place itself.

**Leg Fractures:** Simple fractures may be put in plaster. Treatment for more complicated fractures can include excision arthroplasty, or internal and external fixation.

Sometimes the leg is so badly infected that amputation is the only solution. Amputations should be performed in the proximal limb e.g. proximal third of the femur, proximal third of the humerus or shoulder joint because stumps are easily traumatised. Hedgehogs with limb amputations are generally considered as candidates for life in an enclosed garden (contact the BHPS for up to date information on this). There are some concerns that hind limb amputees are unable to groom properly and are more subject to mite infestations, while front leg amputees can have mobility problems. Some vets prefer to euthanase rather than condemn a wild animal to a life of captivity.

**Paralysis, spinal fractures:** The spines may be lying flat across the back from the point of injury, hind limb paralysis may be evident. Nerve or muscle damage may correct itself in time; treatment is the same as for spinal injuries in other species. Where a decision is made to treat these cases manual bladder emptying will be necessary if the hedgehog is unable to urinate – it is essential to monitor both the urine and faeces output. Some time limit should be set if conservative treatment is not working. Female hedgehogs with

pelvic damage may have problems giving birth. Discuss this with your vet before considering release. A demyelination disorder has been recorded in hedgehogs “Paralysis in hedgehogs associated with demyelination” Veterinary Record (1998) 143 .550-552.

**Head injuries:** frequently affect eyes, nose, ears and jaws. Blind hedgehogs should be kept in captivity provided they settle into an escape proof garden. The decision should be made with your vet, taking into account the overall condition, age and sex of the hedgehog. Male hedgehogs may be less tolerant of captivity. Surgical removal of damaged eyes is possible.

**Circling:** can be due to central nervous disease or more commonly middle ear infection. Blind hedgehogs may also circle.

**Nose injuries:** caused by trimmers etc or bites, permanently reduced sense of smell due to damaged turbinate bones may inhibit foraging ability in the wild. Give fluids sc until the hedgehog can accept liquid feed, hand feed until it can smell enough to eat for itself. Olbas oil and inhalations (eucalyptus and menthol) to ease breathing. Carprofen to reduce swelling and antibiotic cover. Surgery to repair nasal wounds should be undertaken with care, hedgehogs appear to get very swollen nasal mucus membranes even after quite minor surgery and have reluctance or inability to breath well thorough their mouths as a result they can be very dyspnoeic and even die following nasal surgery. Nose injuries are very painful and often those involving the nasal cavity either do not heal or take a long time to heal.

**Fractured jaw:** it is possible to repair some jaw fractures by wiring, hand feeding will be necessary.

**Teeth:** Juvenile hedgehogs can stop eating and appear to “lose” an eye due to persistent milk teeth, when removed the hedgehog quickly returns to normal. Prolonged captivity may result in a build up of tartar and gum disease, however, varied diet including some hard cat biscuits (complete food) may help reduce this problem. Adults brought in from the wild can have horrible dental problems.

## **ANAESTHESIA AND ANALGESIA:**

The preferred method of anaesthetising hedgehogs is in a small animal anaesthetic chamber using Isoflurane. Halothane is also used but appears to have a smaller safety margin. If the hedgehog will partially unroll it is often possible to anaesthetise it using a small mammal mask or a soft wide anaesthetic tube over nose and mouth.

Endotracheal intubation is possible following induction with injectable agents or in a chamber, using a stylet and an uncuffed tube (2.0mm/2.5mm/3.0mm/3.5mm –depending on size of hedgehog). This is preferable for longer procedures and for surgery on nose or mouth, and is easier than endotracheal intubation in rabbits.

For minor procedures and induction Ketamine is useful in combination with Diazepam, Midazolam, Medetomidine or Xylazine – See Appendix 2 for doses. NB Many hedgehogs have lungworm and pulmonary infections/abscesses that may not be initially obvious and respiratory depression associated with Fluanisone+Fentanyl or Medetomidine/Xylazine can lead to complications.

**Analgesia:** Carprofen (Rimadyl) Pfizer, Buprenorphine (Temgesic). Lignocaine 2% + Adrenaline various small volumes for local anaesthesia – See Appendix 2 for doses.

**POISONING:** Hedgehogs are liable to encounter the same poisons as cats and dogs and are treated the same. Vitamin K for Warfarin poisoning. The German literature suggests Vitamin K for 5 days at 10mg/animal. Pesticide poisoning is hard to diagnose unless the agent can be identified and a specific antidote administered or a nosode made up by a Homoeopath. Metaldehyde – charcoal and anaesthesia, intrapeitoneal/intraosseous fluids and calcium gluconate. Atropine can be given to counteract anticholinesterase products, and no milk or oils to be given. Strychnine – anaesthesia. Thallium - diphenylthiocarbazone (70mg orally).

**OIL, TAR, BURNS:** Oil can be removed with warm water and washing up liquid, absorb with Fullers Earth powder, keep warm until dry. Tar can be removed with Swarfega. Burns – apply clean cold wet towels and go the vet. Fluid therapy is also vital – keep hedgehog warm against shock. Chemical burns – wash well. Alkali burns eg lime – water/vinegar 50/50; acid burns 3 tbs baking soda in 2¼ litres warm water, cover with sterile gauze dressing and give electrolyte replacement and antibiotics.

**CONGESTIVE HEART FAILURE:** This does occur in hedgehogs. Systolic murmurs can be heard if the rest of the respiratory sounds are not too loud. Frusemide and ACE inhibitors have been used with some success to treat pulmonary oedema or ascites Endocardiosis of the A-V valves is the most frequent finding in Jersey on those that have had a post mortem examination. A-V valve dysphasia has also been found on one occasion.

**Hedgehog Rehabilitation** is an excellent book, written by Kay Bullen and published by the British Hedgehog Preservation Society.

It is a guide to the rescue, rearing, nursing, care, diagnosis, treatment, welfare and release of the hedgehog *Erinaceus europaeus*.

The book is available for £12 + £2 P&P (per copy).

To order please Contact BHPS

## APPENDIX 1: TECHNIQUES

**INJECTIONS:** Carers should learn the technique under veterinary supervision. Subcutaneous injections: lift a small fold of spiny skin on the back or flank and inject into the connective tissue at the base of the “pleat” formed, parallel to the body. Intramuscular injections into the front of thigh (quadriceps group). Injections into the back of the thigh can cause irreversible nerve damage. Intramuscular injections can also be made into the orbicularis muscle. Performing any invasive procedure on an animal is governed by legislation. Any carer considering this should discuss it with their veterinary surgeon.

**FLUID THERAPY:** Fluids should be given at body temperature.

Oral fluids via a syringe – always give time for hedgehog to swallow. Fairly well tolerated if fluid/food is palatable.

The following methods should be carried out by a veterinary surgeon unless the rehabilitator has been properly trained in the techniques.

Subcutaneous fluids – relatively easy – 2-3ml for small hedgehogs and up to 10ml for larger hedgehogs at any one site.

Intravenous fluid therapy is difficult- jugular or femoral veins in collapsed hedgehogs. In larger hedgehogs it is occasionally possible to establish an i/v line in the cephalic vein. If this is done the propofol can be used for anaesthetic induction – see Appendix 2.

Intraosseous fluids –via tibia –many other sites eg. trochanteric fossa of the femur are covered by spines and not easily accessed.

Intraperitoneal fluid – relatively easy – via posterior left or right quadrant of abdomen.

Nasogastric tube - these appear to be fairly well tolerated but need to be securely fixed. Technique as for a cat.

## FLUID REPLACEMENT CHART (50ml/kg)

WEIGHT (gms)	DAILY MAINTENANCE (mls)	+	FLUID DEFICIT 5%	FLUID DEFICIT 10%	FLUID DEFICIT 15%
		add to			
50	2.5mls	+	2.5mls	5mls	7.5mls
100	5	+	5	10	15
150	7.5mls	+	7.5mls	15	22.5mls
200	10	+	10	20	30
250	12.5mls	+	12.5mls	25	37.5mls
300	15	+	15	30	45
350	17.5mls	+	17.5mls	35	52.5mls
400	20	+	20	40	60
450	22.5mls	+	22.5mls	45	67.5mls
500	25	+	25	50	75
550	27.5mls	+	27.5mls	55	82.5mls
600	30	+	30	60	90
650	32.5mls	+	32.5mls	65	97.5mls
700	35	+	35	70	105
750	37.5mls	+	37.5mls	75	112.5mls
800	40	+	40	80	120
850	42.5mls	+	42.5mls	85	127.5mls
900	45	+	45	90	135
950	47.5mls	+	47.5mls	95	142.5mls
1KG	50	+	50	100	150

*Grateful thanks to Vale Wildlife Rescue for their permission to use the fluid replacement chart.*

Amounts to give:

**It must be remembered that the amount of fluids you administer has to be an amount to counteract dehydration/fluid loss PLUS the normal daily amount required (maintenance rate).**

In order to work out the correct amount the hedgehog must be weighed accurately.

To work out the amount of fluids needed you first need to assess the degree of dehydration.

Clinical signs for varying degrees of dehydration include:

5% dehydration – some minor tenting of the skin, dry lips and gums, slightly sunken eyes

10% dehydration – prolonged skin tenting, dry lips and gums, pale gums and prolonged Capillary Refill Time CRT (press the gum and see how long it takes for the white gum to turn pink). Try it on your own gums.

15% dehydration – collapse, severe shock, death imminent.

The chart gives a daily dose over a 24 hour period. After 24 hours reassess the degree of dehydration and re weigh the casualty so you can adjust the dose for the next 24 hours accordingly.

The hedgehog may require fluids 5 or 6 times a day to give the full 24 hour requirement. It is probably best to keep the total fluid injected at one site to around 10mls at a time for the smaller hedgehogs although very small hedgehogs should have less and larger ones can take more.

If a hedgehog is presented in a debilitated state assume it has lost 15% of its total body fluids.

However, if in doubt, assume all casualties require fluid therapy even if at first they do not appear dehydrated. One exception might be a young female about to give birth as they sometimes come out in the day not knowing what is happening and are picked up and taken into care.

**BLOOD SAMPLING:** This is not an easy technique. The jugular or femoral vein can be used in the anaesthetised hedgehog. Enough blood for a smear can be obtained from a nail.

<b>Haematology</b>	Range	Units
RBC	4.49 – 6.41	10 <sup>6</sup> /mm <sup>3</sup>
PCV	0.30 – 0.45	%
Haemaglobin	9.9 – 16.3	mg/dl
WBC	5.5 – 17.1	x 10 <sup>3</sup> /mm <sup>3</sup>
Neutrophils	1.43 – 11.7	%
Lymphocytes	2.3 – 5.1	%
Eosinophils	0.47 – 1.87	%
Monocytes	0.06 – 0.58	%
Basophils	0.07 – 0.69	%
Reticulocytes	<0.8	x 10 <sup>3</sup> /mm <sup>3</sup>

### **Biochemistry**

Total protein	44 – 62	g/l
Albumin	21 – 31	g/l
Globulin	16 – 32	g/l
Glucose	1.3 – 5.9	mmol/l
Urea	2.9 – 12.7	mmol/l
Creatinine	0 – 71	umol/l
Bilirubin – total	<7	umol/l
Cholesterol	2.7 – 3.9	mmol/l
Calcium	1.45 – 2.55	mmol/l
Phosphorus	1.07 – 2.17	mmol/l
Sodium	121 – 141	mmol/l
Potassium	3.0 – 6.0	mmol/l
Chloride	90 – 106	mmol/l
Alk Phos	20 80	IU/L
AST	1.0 – 79.0	IU/L
ALT	22 – 70	IU/L
Amylase	<1500	IU/L
CK	<360	IU/L
LDH	<490	IU/L

(Values provided by Greendale Labs Ltd)

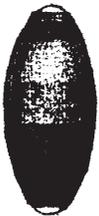
# FAECAL EXAMINATION

The quickest and easiest method is a direct smear of faeces onto a microscope slide with a drop of tap water spread out to the size of the cover slip and examine microscopically. Any sick hedgehog will have such a heavy parasite burden that this method is adequate to ascertain what treatment to give. Faeces should be checked on arrival and every other day for 2 weeks, thereafter weekly unless condition deteriorates.

Concentration methods are described in laboratory technique manuals. Dora Lambert has compiled this summary to show what method to use to find hedgehog endoparasites.

Procedure:	to find:
Sedimentation	Brachylaemus eggs Capillaria eggs Acanthocephala eggs
Flotation	Capillaria eggs Coccidia Oocysts Crenosoma larvae Tapeworm eggs
Baermann funnel	Crenosoma larvae

The following are pictures of parasitic evidence you might see under the microscope:



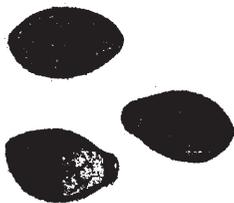
(egg x 450 approx)



Larvae

Capillaria worm eggs and  
Crenosoma larvae.

Brachylaemus (fluke)



Eggs (x480 approx)

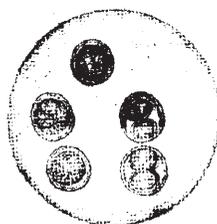
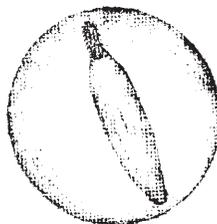


Female (x8 approx) Coiled female (x8 approx)



Thorny headed worm - below

*Acanthocephala*  
(x5 approx)



*Isopora* (x300 approx)

Visible objects like small grains of rice may be tape worm egg sacs.

**FORMULARY**

The dose rates in this Formulary have been gained from practical experience from a number of sources. The drugs at these dose rates appear to have therapeutic effects without causing adverse reactions. However, none of these preparations have a product licence for use in hedgehogs. The British Veterinary Association cascade should be adhered to when using the Formulary.

**APPENDIX 2**

Generic name	Trade name	Manufacturer	Dose	Frequency	Route	Source
<i>Antibiotics/Antibacterial drugs</i>						
Ampicillin	various	various	10mg/kg	bid	im	JHPG can cause diarrhoea
Amoxicillin	Clamoxyl Palatable Drops	Pfizer	40mg/kg	twice daily	oral	
Amoxicillin 15%	various	various	150mg/kg	sid 5days	sc	Pro Igel
Amoxicillin L/A	various	various	150mg/kg	ev 2 days	sc im	St Tigs
Amoxicillin L/A (150mg/ml)	Clamoxyl	Pfizer	100mg/kg	every other day	sc im	
Amoxicillin/Clavulanate	Synulox	Pfizer	30-50mg/kg	bid	oral im sc	IR/AR
			100mg/kg	sid	sc im	St Tigs
			150mg/kg	bid	oral	St Tigs
Cephalexin	Ceporex	Intervet	36mg/kg	sid	sc	JHPG
			30mg/kg	daily for 7 days	oral sc im	
Clindamycin	Antirobe	Pfizer	5-10mg/kg	bid	oral	IR/AR
			20mg/kg	bid	oral	ST Tigs
			25mg/kg	daily for 7 days	oral	Vale
Enrofloxacin	Cleorobe 25mg	Upjohn	12.5mg/kg	daily for 5 days	oral	
			10mg/kg	bid	sc im oral	IR/AR
			20mg/kg	bid 7 days	sc im	Vale
Marboploxacin (comes in 1% + 2% solns)	Baytril	Bayer	12.5mg/kg	daily for 5 days	sc	Pro Igel infected wounds
			25mg/kg	sid 3-5 days	sc	Pro Igel chest infections
			4mg/kg	sid	oral im	KB
Metronidazole	Marbocyl	Vetoquinol	8mg/kg	daily for 7 days	sc	
			1/2 tab/kg	sid	oral	St Tigs dental conditions
			40mg/kg	daily for 5-10days	oral sc im	
Oxytetracycline (if using a 10% solution dilute to 5% before injecting ie mix 50:50 with sterile water)	Engemycin 5%	Intervet	50mg/kg	twice daily for 7days	oral sc im	Pro Igel
			50-100mg/kg	sid 5 days	sc	JHPG
Sulphadiazine/Trimethoprim	Tribrissen 24%	Schering-Plough	30mg/kg	sid 5-8 days	im sc	JHPG
			60mg/kg	daily	oral sc	
Tylosin	Tylan	Elanco Animal Health	10mg/kg	sid	im	JHPG
			20mg/kg	daily for 7 days	sc im	Vale

Generic name	Trade name	Manufacturer	Dose	Frequency	Route	Source
<i>Anti-parasitic drugs</i>	see note at the end of this appendix					
Endoparasiticides	see also paragraphs on worms and Coccidia pages 7-10			daily for 5 days		
Fenbendazole (found not to be particularly effective)	Panacur	Intervet	100mg/kg	repeat in 10 days	oral	
			100mg/kg	sid 5-7 days	oral	IR/AR
			220mg/kg	divide over 5-7 days interval	oral	JD
			220mg/kg	x3 doses 2 weeks apart	oral	BHPS
Flubendazole	Flubenol 5% (powder)	Janssen Health	<500gms 1gm	sid 5 days	oral	Pro Igel
			>500gms 2gm	sid 5 days	oral	Pro Igel
Levamisole (see notes at the end of appendix and page 10 autumn juvenile worming regime) Alternatively dilute 1 part with 4 parts sterile water	Levacide	Norbrook	20mg/kg	x3 1 wk apart with bronchial dilators	sc	St Tigs
			27mg/kg	x3 24hrly intervals	sc	IR/AR
			27mg/kg	x3 24hrly intervals	sc	IR/AR
			1.33mls/kg	as above	sc	
Mebendazole	Telmin KH	Janssen	100mg/kg	x5 days - repeat in 10 days	oral	BHPS/JD
			100mg/kg	5-7 days	oral	IR/AR
			<200gms give 1 eighth tablet	for 5 days may cause diarrhoea		
			200-500gms give 1/4 tablet			
			500-1kg give 1/2 tablet			
Praziquantel	Droncit inj.	Bayer	7.5mg/kg	x1	im	St Tigs
	Droncit inj.		28.4mg/kg	x1	sc	Pro Igel
			0.4ml=22.72mg	x1	sc	JHPG (repeat if necessary)
			10mg/kg	x1	sc	BHPS for tapeworm
	Droncit 50mg tab		25mg/kg	x1	oral	Pro Igel
	Droncit		15mg/kg	repeat in 10-14 days	oral sc im	
Sulphadimidine (dilute to 11% before injecting by adding sterile water - 1 part Intradine to 2 parts sterile water)	Intradine 33.3%	Norbrook	Dose = 110mg/kg	sid on day 1 then 55mg/kg sid 2-5 and 11-15	sc	JHPG
Toltrazuril	Baycox	Bayer	75mg/kg	Single dose - repeat in 10 days	oral	Vale
Ectoparasiticides	See also paragraphs on Ectoparasites pages 5-7 and note at the end of this appendix					
Amitraz	Ectodex bath	Hoechst Roussel		2 baths 10 days apart		Pro Igel
Amitraz	Aludex	Various	0.3% solution	once a week for 2-3 weeks	topical	JHPG
F10			1:250 concentration	max of 5 applications per animal		1-2 trigger pulls (1-2ml per wound) repeat as necessary
			spray over the site	with multiple wounds		
Ivermectin - see notes at end of appendix	Ivomec	MSD	0.2-0.4 mg/kg x3 weekly	0.4ml/kg diute 1:9 propylene glycol	sc	St Tigs
			use sparingly mix 1:9 with water for maggots		topical	St Tigs
	Panomec	Merial	3mg/kg	for mange not lungworm	sc	IR/AR
			1:9 dilute	few drops	topical	IR/AR
		MSD	10mg/ml- 1:30 diute	spray sparingly once		Pro Igel
			3mg/kg	only stable hogs x1	sc	Pro Igel
			<500gms = 0.05 ml, or >500 gms = 0.1	3 injections 1 week apart	sc	for lungworm
				1-3 drops depending on size directly on skin on back		for mites
Permethrin Pyrethins/Pipeonyl Butoxide or any simular drugs used on small caged birds should be a safe treatment for hedgehog fleas and biting (visible) mites.	Insecticidal powder	Johnsons	one light dusting	topical		BHPS

Generic name	Trade name	Manufacturer	Dose	Frequency	Route	Source
<i>Anti-Fungal Drugs</i>						
Clotrimazole	Canesten cream	Bayer	apply to skin	bid/tid	topical	JHPG
Enilconazole	Imaverol	Janssen	dilute & use as directed		topical	JHPG
mixture will keep for 6 weeks, use a house plant sprayer to apply						
Fluconazole	Diflucan oral	Pfizer	dilute 1:50 with water	spray daily	topical	St Tigs
Itraconazole	Sporanox	Janssen	10mg/kg	daily for 14days	oral	
Itraconazole 10mg/ml	Itrafungol		20mg/kg	twice daily	oral	St Tigs
			1.5ml/kg	daily for 7 days	oral	JHPG
				repeat after 7 days		
Ketoconazole	various	various	10mg/kg	Daily	oral	JHPG
Natamycin	Mycophyt		dilute and use as directed		topical	JHPG
<i>Anaesthetic/Analgesic drugs</i>						
Atipamezole - reverses Medetomidine	Antisedan	Pfizer	300-500 mcg/kg		im only	St Tigs
			reverse Medetomidine with equal volume Atipamezole		im sc	JHPG, Pro Igel
			1mg/kg to reverse Xylazine		im sc	JHPG
Buprenorphine	Temgesic	Schering-Plough	0.05-0.1 mg/kg	8-12 hours	im	JHPG
	Vetergesic		0.03-0.05 mg/kg	every 6-12 hours	sc im	
			can be used when Corticosteroids are also given			Vale
Butorphanol	Torbugesic	Fort Dodge	0.4mg/kg		im sc	JHPG
			0.5mg/kg	4 times daily for up to 2 days	sc im	Vale
Carprofen	Rimadly	Pfizer	5mg/kg	sid for up to 5 days	sc	St Tigs
			4mg/kg	sid 3days	sc	IR/AR
			4mg/kg	24-36hrly	sc	JHPG
Diazepam	Valium	Roche	1-3mg/kg	every 6-8 hrs	oral im iv	JHPG
Fentanyl/Fluanisone	Hypnorm	Crown, Janssen	1ml/kg		im sc	JHPG
Halothane (in oxygen)	Halothane	M&B	5% - 2.4%	induce at 5% maintain at 2-4%		St Tigs
Isoflurane (in oxygen)	Isoflurane	Abbots Labs	5% - 1-3%	induce at 5% maintain at 1-3%		St Tigs
Isoflurane (anaesthetic of choice)	various	various	3-5% induction	<b>anaesthetic of choice</b>		JHPG
			0.5-3% maintenance			
Ketamine hydrochloride	various		80mg/kg		im	IR/AR
			5mg/kg - with Medetomidine		im	St Tigs
Ketamine - better in combination see below			5-30mg/kg sedation/anaesthesia		im	JHPG
Lignocaine 2%	various	various	0.05-0.2ml		sc	JHPG
Medetomine - *see combinations below	Domitor	Pfizer	100mcg/kg		im	St Tigs
			0.1-0.2ml/hog		im	Pro Igel
			0.1mg/kg		im	JHPG sedation
Melexicam	Metacam	Boehringer Ingelheim	0.1mg/kg	sid	oral sc	JHPG
			0.5mg/kg	for up to 3 days	oral sc	Vale

Generic name	Trade name	Manufacturer	Dose	Frequency	Route	Source
Midazolam - * see combinations below	Hynovel		1-2mg/kg		im	JHPG sedation
Propofol	Rapinovet & Others	Schering-Plough & other companies	10mg/kg		iv	JHPG
Xylazine* - * see combinations below	Rompun	Bayer	1-2.5mg/kg		im	JHPG sedation
<i>*Sedative and anaesthetic combinations:</i>						
Fentanyl/Fluanisone	Hypnorm	Crown, Janssen Tranquilizer/neuroleptanalgesic can partially reverse with Buprenorphine or Butorphanol	1ml/kg		im sc	JHPG
Medetomidine}			0.1mg/kg	Anaesthesia-reverse Medetomidine with Atipamezole		300-500mcg
Ketamine}			5-15mg/kg		im	
Midazolam}			1-2mg/kg	sedation	im	
Ketamine}			5-15mg/kg		im	
Xylazine}			1-2.5mg/kg	Anaesthesia -reverse Xylazine with Atipamezole		1mg/kg
Ketamine}			5-15mg/kg		im	
<i>Various oral and injectable drugs not included in previous categories</i>						
Bromhexidine hydrochloride	Bisolvon	Boehringer	1-3 mg/kg	tid	im	St Tigs
			3 mg/kg	daily for 7-10 days	sc im	Vale
	Bisolvon powder		1 pinch	14 days as nec on food	oral	JHPG
Clenbuterol hydrochloride	Ventipulmin	Boehringer	0.6mcg/kg	sid	im	St Tigs
Clenbuterol	Planipart	Boehringer	0.5ml/kg	bid up to 3 days	sc	Pro Igel
Dexamethasone	Dexadreson	Intervet	0.1-0.04mg/kg	sid - reducing doses	im sc	St Tigs
Dexamethasone (2mg/ml)		Inflammation - Shock - Head or spinal trauma -	1mg/kg		sc	Vale
			5mg/kg		sc	Vale
			5mg/kg 1st dose then 2.5mg/kg		bid sc	Vale
			0.05-0.15mg/kg	sid x 5 days	sc	JHPG
Etamiphyline camsylate	Millophyline	Arnolds	28mg/kg	x2 1 wk apart with Levamisol	sc	St Tigs
			28mg/kg	sid up to 14 days, bid if necessary	sc	JHPG St Tigs
			50mg/kg	twice daily	sc im	Vale
Flunixin meglumine	Finadyne injection	Schering-Plough	2mg/kg	sid (max 5 days)	im	St Tigs
Frusemide	Dimazon	Hoechst	5-10mg/kg	twice daily	oral sc im iv	Vale
	Lasix 5%		2mg/kg	bid/sid	sc im	
		Boehringer	2.5-5mg/kg	tid	im sc	JHPG
Hyoscine-N-butyl-bromide/dipyrone	Buscopan	Protexin veterinary	0.1-0.2ml/kg	8 hrly max, not prolonged use	sc im	St Tigs
Kaolin/Probiotic	Prokolin Syringe	Upjohn	1ml	tid	oral	JHPG
Methylprednisolone	Depo-Medrone V	Intervet	0.1ml/0.05ml	one with 1st Levamisole	sc	JHPG
Nandrolone laurate	Laurabolin	Intervet	2mg/kg	every 3 weeks	im	St Tigs
Propentofylline	Vivitonin		12mg/kg	half hour before food		St Tigs
<i>Vitamins</i>						
B Vitamins	Annit 4BC	Animalcare Vetark	1ml/kg	sid x5	sc	JHPG
Multivitamins	Arkvits		1 pinch/kg	sid	oral	JHPG

Generic name	Trade name	Manufacturer	Dose	Frequency	Route	Source
<i>Oral rehydration packs</i>						
Electrolytes & Glucose	various	various	up to 25ml/kg	tid	oral	JHPG
Sterile Intravenous fluid packs	Aquapharm	Animalcare	No 1	saline- correct dehydration & flush wounds		JHPG
			No 3	correct dehydration if energy depleted		JHPG
			No 11	Dehydration associated with diarrhoea		JHPG
			No 18	maintenance fluid & after prolonged dehydration		JHPG
Amino acids glucose etc.	Duphalyte	Fort Dodge	as 10% of fluid 12ml/kg	replacement up to 10ml/kg daily	oral iv sc ip sc	JHPG St Tigs
Probiotic powder	Protexin	Probiotics Int Ltd	1 pinch	sid	oral	JHPG
Lactobacillus, acidophilus, bifidus	Acidobifidus powder	Higher Nature	1 pinch	sid	oral	JHPG
Lipase, amylase, protease, cellulase, electrolytes, vitamins	Avipro	Vetark	1 pinch	sid	oral	St Tigs

*Topical preparations not included in previous categories*

*Eye Preparations*

Betamethasone + neomycin	Betsolan eye/ear drops	Pitman-Moore	1 drop	E6-8 hrs - topical (not if corneal ulceration suspected)		
Chloramphenicol eye drops 0.5%	various	various	1 drop	E 6-8 hrs	topical	
Chloramphenicol eye ointment 1%	various	various	1 application	tid	topical	
Fusidic acid	Fucithalmic	Leo	1 drop	E 12-24 hrs	topical	
Hypromellose 0.3%	Hypromellose	various	1 drop	as directed	topical	
Ofloxacin	Exocin Ophthalmic solution	Bayer	2 drops	4 times daily	topical	St Tigs
Polymixin B + neomycin + dexamethasone	Maxitrol eye drops	Alcon	1 drop	E 6-8 hrs topical (not if corneal ulceration suspected)		

*Ear Drops*

Framycetin, nystatin, prednisolone dianolamine fusidate	Canaural ear drops	Leo	1-2 drops	bid	topical	
Polymixin B, miconazole, prednisolone	Surolan	Janssen	1-2 drops	bid/tid	topical	
Phenoxyethanol & chlorbutol	Otodex vet ear drops	Petlife International	3-4 drops	sid	topical	

Generic name	Trade name	Manufacturer	Dose	Frequency	route	source
<i>Skin Preparations</i>						
Fusidic acid + betamethasone	Fuciderm Gel	Leo	apply to skin	bid	topical	
Propylene glycol, malic acid, benzoic acid, salicylic acid	Dermisol cream	Pfizer	apply to skin	bid	topical	
Propylene glycol, malic acid, benzoic acid, salicylic acid	Dermisol solution	Pfizer	liquid cleanser		topical	
Hibitane chlorhexidine gluconate 4%	Hibiscrub	Pitman-Moore	dilute 1:4 for cleaning wounds		topical	
	IntraSite gel	Smith & Nephew	wound dressing		topical	

**KEY:**

**Dose rates:** sid = once daily; bid = twice daily; tid = 3 times daily.

**Routes:** po = oral; sc = subcutaneous; im = intramuscular; iv = intravenous; io = intraosseous; ip = intraperitoneal

**Sources of information:** JHPG = Hugh Forshaw, Jersey Hedgehog Preservation Group; IR/AR - Ian Robinson & Andrew Routh, RSPCA Wildlife Hospitals; St Tigs = Les Stocker, Wildlife Hospital Trust; Pro Igel = Igel in der Tierarztpraxis (The Hedgehog in the Vet's Practice - hedgehog treatment manual); JD = Jane Durrant, Welsh Hedgehog Hospital; KB = Kay Bullen, Hedgehog Helpline, BHPS = British Hedgehog Preservation Society, Vale = Vale Wildlife Hospital (**regularly update dose suggestions on [www.valewildlife.org](http://www.valewildlife.org)**).

NOTES:

**It is suggested** that when injecting **Levamisole** or **Ivermectin** the injection site used is away from the head and that injecting into the abdominal cavity is avoided.

**Ivermectin** can be diluted 1:9 with sterile propylene glycol for injection (this solution is stable for 30 days) or it can be mixed 1:9 with water for topical use (this solution is not stable).

**Treatments for maggots** F10 is currently being used by some carers.

**The above doses** are taken from the most recent sources, however it should be borne in mind that dosages may change and drugs go out of manufacture. The above is intended as a guide only.

**If you have used** any drugs on hedgehogs with repeated success that are not included in the above please let the British Hedgehog Preservation Society (BHPS) know the details so consideration can be given to including them in any revised editions. The BHPS will keep notes of any amendments made to the above formulary. If you have any doubts on whether a drug is still being used or whether the dose quoted still applies (or is correct) for hedgehogs or any other queries the BHPS can be contacted on 01584 890801

## APPENDIX 3

EXTRACT OF HOMOEOPATHIC AND HERBAL REMEDIES for more detail see “**The Natural Hedgehog**” by Lenni Sykes with Jane Durrant.

Homeopathy will not interfere with positive effects of drugs. For the Homeopathic vet, hedgehogs respond well to remedies, dosages and indications as for other small animals.

**Aconite:** hypothermia, shock, loss of appetite, diarrhoea, chest infections

**Ant tart:** pneumonia, rattling in chest, diarrhoea

**Apis mel:** hot painful swelling, urinary problems, if shrieks with pain

**Arnica:** main shock remedy, injury, bruising of soft tissue

**Arsen alb:** first remedy for thin restless hedgehogs with digestive problems, diarrhoea, cystitis, passing blood.

**Bacillinum:** ringworm

**Belladonna:** to reduce temperature, sunstroke, fits

**Bryonia:** dry coughs, constipation abscesses, for irritable hedgehogs

**Calc carb:** Sour discharges and stools, digestive upsets, dehydration

**Calendula:** cleansing of surface wounds

**Cantharis:** cystitis, painful urination, bladder/kidney problems, burns, scalds, blisters

**Carbo veg:** for collapsed, weak, dehydrated, moribund hedgehogs with blue mouths, pneumonia

**Causticum:** main remedy for deep burns, also urinary problems and paralysis

**Chamomilla:** teething problems, diarrhoea and colic in hoglets

**Conium Mac:** for any type of paralysis, especially in older hedgehogs

**Euphrasia:** runny or sticky eyes, conjunctivitis – use in solution with sterile water to bathe eyes.

**Hepar sulph:** infected wounds, abscesses, respiratory problems with rattling in chest.

**Hypericum:** spinal or nerve injury, puncture wounds, stops pain eg after amputation. Use Hypercal (Hypericum/Calendula cream externally for wounds). Stops foot biting and mutilation

**Ignatia:** shock, orphans, stress, colic, lack of appetite

**Lachethis:** for septicemia, blood poisoning

**Ledum:** puncture wounds, bites, stings, eye injuries to prevent infection, if infected use Hypericum

**Lycopodium:** wind, digestive upsets, yellow droppings, hepatitis, urinary problems

**Nux vom:** diarrhoea, vomiting, blood in droppings/urine or coughing up blood, appetite loss

**Phosphorus:** respiratory problems, diarrhoea, dehydration

**Rhus tox:** sprains, stiffness, chills

**Ruta grav:** injuries to eyes, fibrous tissue, bruised bones, sprains, dislocations

**Silica:** digestive upsets, dehydration, respiratory problems, fungal infections and to expel foreign bodies. Give when hedgehog feels cold, to promote suppuration and bring abscess to a head.

**Sulphur:** (do not give after calc carb): to improve resistance to all parasites, for respiratory problems and coughs, diarrhoea, after exposure to toxins, to clarify symptoms to enable you to give correct remedy

**Symphytum:** (Knitbone) for fractures, face/eye and old injuries and after amputation

**Thuja:** ringworm, other skin conditions (crusty, warty growths and chronic problems) digestive upsets and urinary problems.

**Urtica urens:** apply in solution to burns

### **Natural remedies:**

Aromatherapy oils, such as Lavender, Rosemary, Chamomile, can be used on bedding to calm stressed hedgehogs.

Almond oil containing a few drops of Tea Tree oil painted to areas of ringworm will kill spores and bacteria.

Almond oil containing a few drops of Lavender Oil – as a massage for mobility/stiffness

Rescue Remedy: Bach Flower Remedies: first aid for stress and injury

Garlic juice: applied externally to ringworm and mange

Pro Biotic Powder: Protexin in sachets from the vet or Acidobifidus powder (Lactobacillus Acidophilus and Bidfidus bacteria) from health food shops to restore healthy gut flora after antibiotic or when digestive upsets occur.

Evening Primrose Oil: few drops on food to improve condition of skin/fur/spines

Wheatgerm Oil: to improve general condition

Olbas Oil or Eucalyptus oil: few drops on bedding to ease blocked noses (to encourage hedgehog to eat)

Abidec or multi-vitamins on food to improve appetite and condition.

Charcoal (medicinal) for trapped wind, toxins in gut and diarrhoea.

## APPENDIX 4 – USEFUL ADDRESSES and FURTHER READING

Useful addresses:

BHPS – see back cover.

Vale Wildlife Hospital - [www.valewildlife.org.uk](http://www.valewildlife.org.uk) update their rehab section and drug suggestions frequently.

Pro Igel e.V., Lilienweg 22, D-24536 Neumünster, Germany  
Web site [www.pro-igel.de](http://www.pro-igel.de) or email [Pro\\_igel@t-online.de](mailto:Pro_igel@t-online.de)

Dora Lambert, Arbeitskreis Igelschutz Berlin e.V. Basaltweg 25,  
D-12349 Berlin, Germany

Kay Bullen, Hedgehog Helpline, 5 Foreland Road, Whitchurch,  
Cardiff, CF14 7AR. Telephone 02920 623 985  
email: [kaybullen@sky.com](mailto:kaybullen@sky.com)

Jane Durrant, Welsh Hedgehog Hospital, Gwarffynnon,  
Llanddeiniol, Dyfed, SY23 5AR (Advice on natural remedies)  
Telephone 01974 241 381

Jane is unable to return calls because they often involve long and costly conversations, when her answerphone cuts in say you need advice about a hedgehog and if possible she will answer before you hang up. Otherwise try later. She will only return very urgent calls.

Live Foods Direct, Houghton Road, North Anston Trading Estate,  
Sheffield, S25 4JJ. Telephone 01909 518 888;  
Fax 01909 568666; email [sales@livefoodsdirect.co.uk](mailto:sales@livefoodsdirect.co.uk)

Spike's World, 1 Moorland Way, Lincoln LN6 7JW  
(Esbilac milk replacer & heat pads).  
Telephone 01522 688 300, email [info@spikesite.co.uk](mailto:info@spikesite.co.uk)

**“Hedgehog Rehabilitation”“Rearing Hoglets”“Know Your Hedgehog - The Basic Facts and Much More”The New Hedgehog BookEverything you want to know about HedgehogsHedgehogsThe Natural HedgehogThe Complete HedgehogHedgehog in your GardenVeterinary Care of the HedgehogMedication for use in the Treatment of Hedgehogs -**

## **USEFUL ITEMS TO HAVE WHEN CARING FOR HEDGEHOGS**

Small plastic bowl - For use as a bath.

Tweezers - Fine pointed if possible, for removal of maggots and fly eggs.

Small sharp scissors - For cutting spines.

Cotton buds - Ideal for wounds, applying cream, disinfectant etc.

Kitchen roll.

Cotton wool.

Disposable plastic gloves - Hygiene is vital.

Scales - Weight checking is important.

Hot water bottles - Vital for providing heat to hypothermic hedgehogs.

Clean towels - To use as bedding for hoglets or sick injured hedgehogs.

Newspapers - For lining hutches and pens or as bedding for convalescing adult hedgehogs. Do not use shredded paper.

Syringes or Droppers - For feeding hoglets and administering medications.

Tinned cat, dog or hedgehog food - White meat flavours such as chicken, turkey or rabbit.

Dried hedgehog foods or cat or small dog biscuits - To help keep teeth clean.

Small pack of Lectade - Rehydration fluid essential for sickly hedgehogs in shock.

Multivitamins

Washing up Liquid - 2% solution good for cleaning off oil, paints etc.

Salt - Diluted in warm water, used for cleaning wounds.

Sterilising tablets - To keep hoglets' feeding equipment infection free.

Arnica - Homeopathic remedy for shock, powerful internal antiseptic.

Bach's Rescue remedy - Good for calming down stressed hedgehogs.

Feeding dishes - Shallow, straight sided heavy dishes for adults, jam jar lids for hoglets.

Electric Heat Pads - To provide 24 hour constant heat. The BHPS has tried to ensure that every carer on its contacts list has one of these heat pads.

Additional pads can be purchased from Spikes World (Appendix 4) or from vets.

Olive Oil - for flushing maggots out of ears.

Tick remover - see notes on tick removal on our website or request our 'Notes on tick removal'

**A space for your notes**

**The Aims of the Society are:**

To encourage and give advice to the public about the care of hedgehogs, particularly when injured, orphaned, treated cruelly or in any other danger.

To encourage the younger generation to value and respect our natural wildlife and, by supplying information and giving lectures, to foster their interest in hedgehogs.

To fund research into the habits of hedgehogs (which involves no deliberate cruelty) and to ascertain the best method of their survival.

*For further information please send a s.a.e to:-  
British Hedgehog Preservation Society,  
Hedgehog House, Dhustone,  
Ludlow, Shropshire SY8 3PL*

*Email: [info@britishhedgehogs.org.uk](mailto:info@britishhedgehogs.org.uk)  
Web-site: [www.britishhedgehogs.org.uk](http://www.britishhedgehogs.org.uk)*

*For urgent advice call 01584 890801*

