First aid and husbandry of native New Zealand birds

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Appropriate initial treatment and stabilisation combined with supportive husbandry care is imperative to increase the survival of the avian patient.

Why intervene?
- Species importance
- Ethical responsibility – animal welfare
- Altruism – 'feel good' factor
- Education and experience – treatment of more common species enables application to more endangered species

Considerations in deciding to treat
- Species importance
- Potential outcome for that particular animal
  - Successful release back into the wild (i.e. able to breed, find food, etc.)
  - Captive placement if non-releasable
- Extent of injury and expected prognosis – requires experience and expertise
- Post-injury complications which may affect the animal later in life e.g. arthritis
- Who pays?
- Experience/expertise available
- Hospital facilities available
- Rehabilitation facilities (e.g. flight aviary) available

Legal issues

Who can legally care for injured birds?
To rehabilitate native species you must hold a permit issued by the Department of Conservation (see next page, or www.doc.govt.nz). Birds may be kept in a veterinary clinic if they are under direct veterinary treatment, but not in a rehabilitatory capacity unless the vet clinic has a permit.

Wild birds in permanent care require a separate permit. See your local Department of Conservation office for further details

First aid key points

Initial assessment	Stabilisation and critical care
· History taking	· Warmth
· Distance Examination	· Fluids
· Initial physical exam	· Pain Management
	· Nutrition
	· Reduce stress

No matter the prevention the basic initial critical care will be generic. Stabilisation first with warmth, fluids, nutrition, pain management, and reduce stress with the most important initial step being stabilisation.

It should be assumed that all wildlife casualties will be hypothermic, dehydrated, malnourished and may be in pain. Initial first aid treatment is aimed at attempting to rectify these problems. Injured or sick birds are unable to maintain their core body temperature. It is necessary to provide an ambient temperature range between 28-30°C. We will look at each step and give some examples of what can be provided

Warmth

There are lot of ways to provide warmth to the avian patient but some consideration needs to be given to the species differences. Warmth can be given in a controlled way with ICU and humidicribs. These are great because the temperature can be set and the humidity provided and controlled. Be aware of the larger parrot patient that can systematically destroy this piece of equipment for you.

Heat lamps are another piece of equipment that can be used as long as the patient can move away from the heat if they need to and this method is not suitable for the recumbent patient.

Wheat packs are another alternative along with hot water bottles. These are ok if there is nothing else available but of course they get cold relatively quickly and there is the potential for the avian patient to eat it or burst it. The other issue with this kind of heating is that to maintain the heat you will have to change it relatively often and in doing that you will disturb the patient and that is not the ideal situation for the wildlife patients.

Fluids

Signs of dehydration in birds include tacky wrinkled skin (test the skin above the eye) and sunken dull eyes. However, it is safest to assume that all sick or injured birds are 10% dehydrated. A simple method of establishing the fluid needs for any sized bird is to calculate using bodyweight as a guide.

Our maintenance rate is 50ml/kg/day our surgical rates are 15ml/kg/hour

Types of fluids
Hartmann's solution (Lactated Ringers Solution) or 0.9% saline. Glucose can be added to fluids to give a rapid but short-lived supply of glucose; however it should never be used subcutaneously as this can cause tissue damage.

A mix of Hartmann's and 2.5% glucose is a good choice of fluid to give to birds orally or intravenously. This can be made up by the addition of 50ml of 50% glucose to a one-litre bag of Hartmann's solution.

Methods of fluid administration

Oral	Oral administration should **be ad lib and is** the simplest method of fluid administration. Don't assume that your wild patient will drink from a bowl, be prepared to crop tube.
Crop tube	This involves passage of a tube down the oesophagus into the crop, or proventriculus/ gizzard in those birds without a crop. It allows the direct delivery of food and fluids, reducing the risk of aspiration. The type of tube used will depend on the bird you are feeding. A metal, round-ended crop needle should be used in parrots as their strong beaks can chew through plastic or rubber tubing. A tube, preferably rubber or silicone, can be used in birds that are unable to bite through it. With the head well restrained, pass the tube beside the tongue on either the left or right side of the oral cavity, avoiding the glottis (opening to the trachea) then down the oesophagus. In many species (e.g. harrier, kereru), the glottis is very visible if the mouth is opened wide enough. However, the large muscular tongues of parrots limits visibility of the glottis. It is worthwhile checking that the tube is in the right place by feeling for both the cartilaginous trachea and the metal or plastic tube within the oesophagus. These can be palpated over the neck. Identifying both these solid structures independent of each other is confirmation that the tube is in the oesophagus and not down the trachea. If at all unsure where the tube is, gently withdraw and try again. When you are confident the tube is in the oesophagus, slowly syringe the fluid in. Watch the back of the mouth for any fluid welling up or reflux. If this happens, remove the crop tube and allow the bird to swallow.
Subcutaneous (SQ)	Useful when the oral route of administration is not a safe method of giving fluids, or when larger volumes are required. Injection of subcutaneous fluids involves passing a hypodermic needle under the skin and injecting fluids. Fluids should be warmed to body temperature (approximately 40°). Always use a new needle and syringe - sterility is important. The gauge of needle used will depend on the volume of fluids being given and size of bird. For smaller birds (50g-300g) a 25 gauge needle would be adequate, and for larger birds a 22 gauge needle. Butterfly catheters are useful as they allow some movement of the bird while being given SQ fluids. The fluids need to be given in an area where there is loose skin to accommodate the volume. These include the inguinal fold and between the shoulders. The total volume of fluids may need to be given in several sites. We recommended giving no more than 10ml/kg body weight of fluids per site.
Intravenous	Intravenous catheters to allow fluid administration can be placed into the medial metatarsal vein of the leg, or into the brachial vein of the wing, or the right jugular.
Intraosseus	Intraosseus fluid administration involves the placement of a catheter directly into the bone marrow. This allows for rapid rehydration in severely shocked patients with very low blood pressure that doesn't allow for intravenous catheter placement. Fluids cannot be given into the humerus or femur as these bones are in direct contact with the air sacs. This should be done under a general anaesthetic (GA) as it is a painful procedure.

Pain management

All birds and wild birds in particular show a protective reflex to hide signs of pain or illness when they feel they are being observed. In the wild this reduces the chance of them being singled out by predators and losing status within the flock. It is best to assume that any injury or procedure that would cause pain in people would cause pain in birds. Non-steroidal anti-inflammatory drugs (NSAIDs) or certain opoids (butorphanol) can be used. The use of NSAIDs requires vigilant fluid therapy as they may cause kidney or gut damage.

Bandaging
Bandages are necessary to stabilise fractures and thus reduce pain. Supporting fractured limbs with bandages will also help to maintain vascular and nervous supply to damaged tissue.

Nutrition

When animals are not eating they are using up their reserves of fat and protein. Smaller birds that go without food for 24 hours may exhaust their reserves and die from starvation. Nectivorous birds such as Tuis have extremely fast metabolisms and can become dangerously hypoglycaemic within hours. Debilitated birds may require supplementary feeding by crop tube until they are eating on their own. If a bird is eating voluntarily and maintaining or gaining weight, then there is no need to tube feed it. Once the patient is stabilised further diagnostic testing is required – blood, radiographs.

Reducing stress

Stress should be kept to a minimum. Stress releases corticosterone in birds. Increased corticosterone slows wound healing and lowers immunity, making birds more susceptible to secondary infections such as aspergillosis.

Methods to reduce stress in birds include the use of quiet dark rooms, keeping handling to a minimum, reducing visitors and general traffic, and keeping all pets away. Even quiet pets with no predatory intent adversely affect wild birds by increasing stress, potentially spreading disease and habituating them to potential predators upon return to the wild.

What to do next

In general, we would advise a period of at least 24 hours of stabilisation of the patient before attempting further diagnostics. The patient should be kept in a warm (30°C), dark and quiet area, with minimal stimulation. However, intervention will most likely be necessary to provide further fluid and nutritional support over this period, as well as to administer further pain relief and perhaps anti-infective medication.

Husbandry

In addition to the medical, surgical and supportive things that are required for your patient some care will be needed for the husbandry of the birds. It can be challenging as every species in your care will have a different requirement. I always feel that this is one area that we can really help our patients. It is often just handling them well, having the right cage set up for the species, offering the food in the correct way and dealing with the patient in an efficient but calm manner, you can make a difference. In some ways it is really hard to nurse an avian patient because all the things you would normally do – you cannot. There is no paw holding stroking and taking for walks with the wild avian patient. It is a hands off approach and that often goes against the grain of what we have trained for and got into nursing in the first place.

Husbandry key points

- Know the natural diet of the species in your care and attempt to simulate the natural diet as much as possible
- Provide a balanced diet where you can and management the Calcium : Phosphorus ratio
- Good quality artificial diets and supplements are available
- Fresh food in clean bowls (daily, twice daily change)
- Force feed if necessary – gain good crop tubing skills
- Small steps, minimal handling

Husbandry of wild birds

The husbandry requirements of wild birds differ greatly from that of pet birds and other domestic pets. Excessive stress may result from inappropriate housing of wild birds. People talking loudly, television, barking dogs, human traffic, excessive handling and seeing potential predators with no escape are examples of avoidable stressors. In general, birds should be placed in a quiet location that is not in a high traffic area. Housing should be appropriate for the species and its condition. Covers should be placed over cages or hiding boxes should be provided. Birds tend to be much calmer in the dark. Wild birds should be handled quietly and gently and as infrequently as possible, not only to reduce stress, but also to reduce their contact with people.

Housing

Wild birds in hospital need to be housed away from cats and dogs (noise and sight/smells of predators) and pet birds (disease risk). They should be placed in a warm, quiet place. Cages need to be appropriate for the size of the bird. Perching birds should be able to perch and stretch their wings. They should be easily accessible to the handler without risk of the bird escaping. Small birdcages may be suitable for some of the smaller species. Food and water bowls should be able to fit comfortably enabling the bird to move around and feed. Food and water bowls should be used that are fixed in place, or of a type that doesn't tip over.

Some smaller birds such as robins may feel exposed in bare cages and should be given some foliage allow them to 'hide', so long as this does not unduly increase the ability of the carer to monitor and access the bird

The housing requirements of patients may change during their time in care. For example a bird with a broken wing will need housing for the initial trauma and surgical repair stage, a restricted movement stage for repair of the fracture and then some time in a flight aviary to exercise and gain flight fitness for release.

Restricted movement

Birds that are unable to fly or are recovering from illness or injury may need to be kept in a small cage to restrict their movement. A cockatiel-sized birdcage is suitable for smaller birds such as kingfishers, tui and robins. Larger cages are required for larger birds such as harriers. The cage should be large enough for the bird to perch without its tail feathers touching the ground and there should be room for the bird to move around and feed. Waterbirds need to be provided with enough room to stretch their wings out and to enable the provision of a suitable pool. The bird should have a hiding place in the cage – this can be provided by draping a towel over the cage, and/or placing a box inside. The cage needs to enable easy access to the bird for medicating and/or force feeding, and should be easy to clean or disposable.

Flight exercise

When a bird is ready to be prepared for release (i.e. injuries have healed and it is able to feed on its own), it can be moved into a flight aviary. Birds that have been in care for longer than about a week will need to regain their flight strength. The time spent in the flight aviary before release will depend on the injury the birds suffered and the amount of time it has not been flying. Aviary size is dependant on bird size, but it should be big enough to enable the bird to fly rather than 'hop' from perch to perch. At this stage, social birds of the same species may be housed together providing suitable disease screening has been performed to ensure that they are not going to

spread disease (particularly parasites). The aviary should be designed to keep rodents out.

Aviaries are ideal for starting to add in natural stimuli for the birds. Where possible, branches should be used as perches to provide a variety of sizes and surfaces for the birds to use. A covered area and hiding boxes should be provided for the birds to escape the elements and for nocturnal species to sleep.

Fresh browse (branches with flowers and fruits) suitable for the species should be provided in the aviary. This will not only provide cover, but also insects and nectar.

Bowls of food and water should be placed at the appropriate level for the species. For example, harriers will happily feed from the ground, whereas kereru usually prefer to feed up high. If there is more than one bird in the aviary, multiple feeding stations should be provided.

Temperature

The optimal temperature range for sick bird is variable depending on the species in your care. A suggested temperature range is around (28°C-30°C). Some species, such as Kiwi, require a lower optimum temperature (25°C-27°C). Heat can be provided using a temperature regulated intensive care unit, a heat lamp, heat pad or hot water bottle/wheat pack. It is very important to monitor the temperature to avoid overheating the patient, and to ensure the heat source does not cause thermal burns. Once the bird is past the treatments stage and is being exercised in flight cages prior to release, supplementary heating should not be required.

Feather care

Birds in small cages frequently damage and dirty their primary feathers. This is particularly common in raptors. Damaged feathers can take up to twelve months to moult and regrow or if plucked up to six weeks. For this reason it is much better to prevent feather damage than to try and repair it. Tail covers should be placed at admission to protect the feathers from damage and dirt. These can be made from plastic bags or x-ray film and stapled to the feathers.

Perching birds should have perches provided to keep feathers off the ground. Wire cages can cause feather damage, and cages with perspex fronts are ideal.

Regular cleaning reduces faecal soiling of feathers. Giving the birds the space and opportunity to preen is vital in maintaining feather structure.

The use of non-adhesive bandages is especially important in birds as the adhesives will either pull feathers out when removed or destroy their waterproofing qualities with their adhesive. Avoid oils and creams as birds will tend to preen these through their feathers, resulting in a loss of waterproofing and thermoregulatory ability.

Bumblefoot

Bumblefoot is a term to describe any inflammatory or degenerative condition of the avian foot. It is usually a condition of poor husbandry, and can be likened to bed sores of the feet. Bumblefoot is caused by inappropriate pressure on the underside of the feet. It often occurs in those large seabirds kept in captivity for periods of time as these birds are not designed to spend long periods of time on the land. Fractures of the toes and soft tissue injuries to the feet predispose the bird to bumblefoot. This is often evident on the opposite foot than the one injured. Bumblefoot is

extremely difficult to treat, and treatment itself requires the bird to be in captivity, further exposing it to those factors that initially predisposed the bird to the disease. Prevention of bumblefoot includes provision of appropriate/various sized perches and/or soft floor substrate (e.g. sheets of closed-cell foam or tubular rubber matting). Good nutrition, general good health and hygiene also play a part in prevention of bumblefoot.

Imprinting

In the wild, imprinting is used to enable young birds to learn important behaviours including sexual and foraging. The young birds learn to recognise certain images, sounds and foods that are important for their survival. Precocial birds (those that are feathered and walk from birth) that are cared for by their parents (eg waterbirds) imprint very quickly. This is why ducklings that hatch and see humans straight away may think that humans are their 'mother'. Altricial birds (those that are hatched featherless with closed eyes) take a little more time to imprint. Imprinting is used extensively in the pet bird trade where young are removed from their parents and hand raised by humans to make them better pets.

As a carer of wild birds, it is essential to avoid, wherever possible, imprinting of the birds in your care. Birds that are imprinted to humans and the associated sights smells and noises are said to be 'humanised' and are not suitable candidates for release. Imprinted birds are less likely to exhibit predator avoidance or suitable mate selection, and may not forage properly.

Imprinting is particularly a problem with young birds in care, but may also be an issue with older birds that are in care for long periods of time. Humans become recognised as a source of food, and upon release, these birds may seek out humans. Young harriers that have imprinted can be dangerous.

Hygiene

Sick or stressed birds are much more susceptible to disease than a healthy bird in the wild. Care must be taken to avoid spreading disease between birds by housing them separately and cleaning cages, bowls and perches frequently. Droppings and old food containing bacteria and parasites can build up very quickly in small cages.

Disease

Wild birds can carry many diseases that are normally sub-clinical (are not making the bird obviously sick). These diseases may become clinical, or may spread to other birds in care without careful hygiene. Some diseases (e.g. salmonella, psittacosis/"parrot fever") can also be spread to humans. It is important to follow some simple guidelines when caring for birds (or any animal) to help reduce the chance of disease spread:

- Wash hands after handling birds and in-between patients
- Do not eat when handling birds
- Cages must be cleaned once a day
- Cages must be cleaned and disinfected between animals
- Food should be prepared fresh daily
- Food and water should be offered in clean bowls daily
- Perches should not be placed directly over food and water bowls
- Disinfect or replace perches between birds
- Wash and disinfect bedding between birds

Cleaning

It is important to use a disinfectant that is antibacterial, antifungal and antiviral (e.g. "Trigene", "Virkon", F10). Organic material (faeces, food) should be mechanically removed, before using a detergent/disinfectant, as these do not work when there is organic material present. The detergent/disinfectant must be effective but also safe for people and birds. Some products need contact time on the surface to be effective. It is a good idea to rinse all cleaned surfaces with water to remove any residue. This is particularly important for feeding equipment. Some disinfectants have different dilutions for cleaning cages and cleaning food bowls. It is important to follow the manufacturers' instructions. As some disinfectants can act as an irritant to the respiratory tract, allow a period of more than 24 hours between cleaning cages and putting birds back into them.

Handling a wild bird

When deciding how to capture and restrain a wild bird, your safety must come first. Always take a moment to consider the risks the particular species poses to you, and how you can catch the bird without injuring it or yourself.

Any wild bird that allows itself to be caught should be considered to be debilitated. It may be suffering from shock, exhaustion, starvation, dehydration, disease and/or trauma. For this reason, handling must be gentle but efficient. Catching the bird in a net is ideal. However, a large towel or sheet to throw over the bird is adequate to stop it running away and to reduce damage to the feathers. Once you have caught the bird, put it into a dark box with holes for ventilation and a padded base (e.g. an old towel) until you get somewhere that the bird can be examined and treated. Try not to use wire cat carry cages as the wire can cause feather damage. Beware of transporting kiwi in cardboard cat carry cages as they can poke their bill out of the ventilation holes and get damaged. In the case for larger or potentially dangerous birds, try to use a carry box with a large opening as this makes it much easier to remove the bird for further assessment. For smaller birds this may increase the chance of escape.

The avian respiratory system is comprised of lungs and air sacs. The air sacs do not participate in gaseous exchange. Instead, they act as bellows, allowing the segregation of ventilation and gas exchange in order to increase the total gas exchange surface area. This system allows continuous gas flow as opposed to the "in and out" tidal flow of mammals. This allows for the absorption of up to 10 times more oxygen. The air sacs extend from the body cavity into the several bones. Birds do not have a muscular diaphragm and instead rely entirely on the movement of rib muscles to expand their chest. For this reason, it is important not to put too much pressure around the bird's chest as this can restrict the bird's ability to breathe.

There are different levels of husbandry care

Initial care	Initially it is important to assess the health status of the bird and administer first aid care.
Intensive care	Very sick, debilitated birds and those recovering from anaesthesia may need to be housed in an intensive care situation. Ideally, an intensive care unit with temperature and humidity controls should be used, but if not available, small cages, or even a cardboard box can be warmed with specially designed heat lamps, heat pads or hot water bottles. As mentioned earlier, care must be taken not to overheat or cause thermal burns to the patient. In the case of hot water bottles, care must be taken to avoid them becoming cold and chilling the patient. In standard hospital cages with a wire front, a towel can be placed over the front to reduce visual stimulation and provide darkness. Birds requiring intensive care are typically unable or unwilling to feed themselves. Suitable food should be force-fed. Slurries of blended food may be absorbed better by a compromised system for the first few days e.g. Chick slurry for harriers, fish slurry for seabirds. Sometimes placement of a feeding tube may be required or placed to make regular feeding easier for the carer and less stressful for the bird.
Short-term care (A few days):	Although preferable, it is not essential to provide completely balanced nutrition for animals that are in care for only a few days. For example, mealworms and ox-heart is not a balanced diet for a kingfisher, but is adequate for a short period.
Medium-Long-term care (greater than a week):	It is important that food fed over the medium-to-long term is nutritionally balanced to avoid nutritional deficiencies, e.g.: harriers fed plain meat will develop calcium and phosphorus imbalances that may lead to metabolic bone disease. While they are in care, it is very difficult to provide most birds with their nutritional needs in the form of their natural diet. However, this should not mean they are not offered components of their natural diet. This is very important for young birds, browsing birds and for birds that are going to be in captivity long-term.

A note on food presentation

Wild birds may not recognise a captive diet in a bowl as food. Presentation of food may assist in encouraging self-feeding. Birds that are not eating must be force feed with food of suitable nutritional and energy balance to maintain or gain weight.

Zoonoses

Zoonoses are diseases that are transmitted between vertebrate animals and humans. This list is not complete but here are some to be aware of:

Bacterial (*Chlamydophila*)	Know as psittacosis or parrot fever in humans (previously as Chlamydia). Causes an interstitial pneumonia and flu-like symptoms. Can be mild (chronic cough) or severe (requiring hospitalization and potentially fatal). Usually a disease of parrots and pigeons, although it has been diagnosed in many other species.
Other bacterial diseases: (*Yersinia, salmonella, campylobacter*)	These organisms may be shed in the faeces of birds. These bacteria can cause severe vomiting and diarrhoea in people. Good hygiene, particularly hand washing and not eating while handling birds can help avoid infection.
Fungal: (*Aspergillosis*)	This disease is usually picked up from the environment, however if a postmortem is performed on a bird with aspergillosis and spores are inhaled, a fungal pneumonia can result.

Viral (Pathogenic Avian Influenza (exotic to New Zealand)	This disease can cause systemic infections in people with disease ranging from non-clinical to death. It is usually only spread through close and prolonged contact between a human and an infected bird (usually domestic fowl)

So to conclude: appropriate initial treatment and stabilisation combined with supportive husbandry care is imperative to increase the survival of the avian patient.

References

Bernard JB, Allen ME. Feeding Captive Piscivorous animals: Nutritional Aspects of fish as a food, *Nutrition Advisory Group Handbook – Penguins nutrition and dietary husbandry* Fact Sheet 005, 1997

Crissey SD. Handling Fish Fed to Fish-Eating Animals*: A Manual of Standard Operating Procedures.* United States Department of Agriculture, Agricultural Resources and Services, National. Agriculture Library, Beltsville, MD, 1998

Degernes LA. *Trauma Medicine*. In Ritchie BW, Harrison GJ, Harrison LR (Eds.)**.** Avian Medicine: Principles and Application*,* 417-433, Florida Wingers Publishing Ltd, 1994

Fowler GS. Behavioural and hormonal responses of Magellanic penguins (*Spheniscus magellanicus*) to tourism and nest site visitation. *Biological Conservation* 90, 143-149, 1999

Gerrci JR. Nutrition of Piscivorous Animals. *Proceedings of the Fabian Fay Course for Veterinarian 335.* University of Sydney, Post Graduate Foundation in Veterinary Science*,* 2000

Hall L. Transport Handling and Husbandry of Seabirds Husbandry and Nutrition. *Proceedings of the Fabian Fay Course for Veterinarians 335.* University of Sydney, Post Graduate Foundation in Veterinary Science, 2000

Simcock D. *Essentials of mammalian biology and physiology*. Course material, College of Sciences, Massey University, Palmerston North, New Zealand, 194-241, 2009

Villiers M, Cooper J, Ryan P. Individual variability of behavioural responses by Wandering Albatrosses (Diomedea exulans) to human disturbance. *Polar Biology* 28, 255-260, 2005

Vogelnest L. Penguins: nutrition and dietary husbandry. *Proceedings of the Fabian Fay Course for Veterinarians 335.* University of Sydney, Post Graduate Foundation in Veterinary Science, 2000

Walraven E, 2004. *Field* Manual Rescue and Rehabilitation of Oiled Birds, Causes of stress in birds. *New South Wales, Zoological Parks Board of New South Wales*

Young BA, Walker B, Dixon AE, Walker VA. Physiological Adaptation to the Environment. *Journal of Animal Science* 67, 2426-2432, 1989

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