

# Illness and injury prevention: A Handbook for New Zealand vets

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This document contains excerpts from the Illness and Injury Prevention Handbook 2012. The Handbook provides information about how veterinarians can make changes to their environment and their processes to maximise their health and safety.

## **About the Handbook**

### **Who I am**

In Nature, there are no rewards or punishments, there are only consequences. My name is Andrew Buckley and I am a qualified Osteopath, Ergonomist and Human Factors professional. Ergonomics is the scientific analysis of how people interact with their environment, including tools, systems and other people. Ergonomics requires a broad approach to analysing the person's environment, and a depth of understanding of the various elements.

### **Why I wrote the illness and injury prevention Handbook**

I wrote the Handbook because I am passionate about empowering people to be able to go about their day-to-day business without sustaining illness or injury. I wrote the Handbook with the aim of passing on knowledge, not instructions. This allows people to think about how they are interacting with their environment and take the necessary steps to avoid injury and ill health. I encourage all of my clients to become critical thinkers and dynamic adaptors.

This document provides a selection of excerpts from the full-length Handbook, available free of charge to all vets from July 2012.

### **What I want you get from the Handbook**

Through using the Handbook I hope that you will achieve a number of outcomes:

- An understanding of what causes injury and illness in the veterinary professions.
- A basic awareness of the part that ergonomics plays in our daily activities.
- General knowledge about how to prevent injury and illness through modifications to your environment, your tools and your processes.

### **Acknowledgments**

The inspiration for the Handbook originally came from treating a great many patients who are performing some or all of the tasks of vets. These include veterinarians, animal technicians, nurses, farmers, SPCA staff, dog trainers, and people who provide services to rural communities.

Much of the data presented in this Handbook has been compiled by Andrew Scuffham and his colleagues during the course of literature reviews and primary research on the nature and prevalence of Musculoskeletal disorders experienced by vets. I have found this research to be of great value as it confirms what I deal with clinically on a daily basis. It also gives scientific validity to the treatment of injury using a two-pronged approach: treat the person AND modify the environment that has caused the injury. Please refer to the Appendix for a list of references for the statistics used in document.

## **Illness and injuries sustained by New Zealand vets**

### **How many vets experience illness and injury?**

In studies carried out by Scuffham *et al.* 67% of respondents stated that their normal activities had been affected by one or more Musculoskeletal Disorders (MSDs), whilst a stunning 96% reported some type of incidence of a disorder. 18% of respondents reported some level of absence from work. The cost of disorders includes absenteeism, reduced productivity and personal costs such as job dissatisfaction and increased levels of stress.

### **Types of injury**

Vets are at risk of sustaining injury to a number of body sites. The studies carried out by Scuffham identified the types and prevalence of MSDs reported by survey respondents. The top five MSDs experienced by vets are lower back problems, neck problems, shoulder problems, lower arm problems and elbow problems.

### **Causes of injury**

The causes of MSDs experienced by vets are similar to those experienced in the wider population. MSDs reported by vets are generally caused by handling heavy weights, awkward postures, prolonged static postures, vibration, repetitive tasks, sedentary tasks and animal behaviour.

### **Preventing injury**

In addition to researching the prevalence and cause of musculoskeletal disorders, Scuffham and his colleagues also studied the level of awareness of injury prevention among vets. The conclusion of this research was that vets are well aware of the steps that need to be taken to avoid injury, them having identified a great many strategies to avoid injury.

### **Conclusion**

What the research shows is that vets are at high risk of suffering from a musculoskeletal disorder, and that such a disorder will have a negative effect on both their personal and professional lives. In addition to understanding the specific types of injuries sustained, we also know that vets have a good awareness of the principal types of injury prevention that can be applied. That said the question remains: with a high level of awareness why is it that vets continue to suffer injuries at such a high rate?

## **A model for injury prevention**

As the previous section demonstrated, vets have a high rate of injury but they also have a good awareness of the task-specific cause of their injuries. This Handbook provides a link between knowledge about the incidence of injury and illness and task-specific advice on modification of posture, technique or modification of the tools that they use to accommodate recovery and minimise risk of future, similar events. The challenge, therefore, is to ensure that vets apply specific knowledge to their daily activities in order to avoid injury and the negative implications thereof.

The solution to preventing injury sustained by vets lies in applying Ergonomic principles to the tasks completed by vets and the environment in which they take place. Ergonomics is a scientific discipline with well-proven benefits for the individual and the organization if the principles are applied. If our work is broken down into the specific tasks we do, ergonomics is the science of how we do it. The outcome of a given task is that the task has been completed, but the unintended consequence of how the task was completed can be a negative effect on our wellbeing, and a negative effect on our organisation resulting from absences from work, increased insurance premiums or the extra cost of recruitment and orientation of replacement staff.

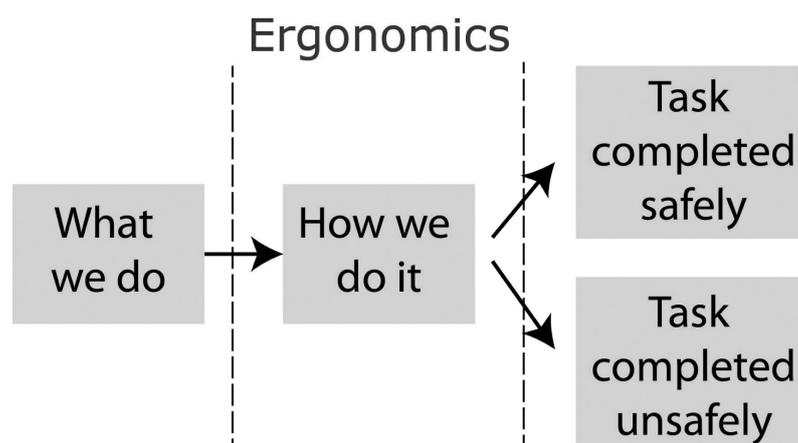


Figure 1. The role of ergonomics in task design

### Applying ergonomics in the vet's workplace

The breadth and depth of physical demands of animal health practitioners in action is vast. However, whether the vet or technician is opening the mouth of a cow, lifting the hind leg of a horse, performing rectal palpation, birthing a calf, performing surgery or autopsy, handling tools and equipment from the vehicle or performing office tasks, the same muscles, tendons and joints are used. It is therefore necessary to understand the generic constructs of safe actions and postures so that each individual can apply them in their own environment based on their unique and dynamic circumstances.

An ergonomic analysis of a vet's environment must include all of the different aspects of their daily experience along with the percentage of time and effort spent at each task. The tasks will naturally vary between different vet's duties based on factors such as personal preferences and clinic location. Variations may include work on large or small animals, farm visits, pregnancy diagnosing, birthing, autopsy and surgery. Tasks can also be seasonal, for example, birthing, pregnancy diagnosing, and TB testing. Tasks also include driving, lifting from a vehicle, office work, handling stores, and cleaning of equipment.

An ergonomic assessment of a vet's practice would include the following steps:

- Initial summary assessment.
- Detailed assessment of issues identified.
- Photography of tasks, tools and environments.
- Measurements relevant to the safe completion of tasks.
- Assessment of individuals as they complete their daily tasks.
- Presentation of results and recommendations.

Throughout the assessment process there is an iterative improvement in knowledge and learning. During the assessment process staff learn about the ergonomics of their tasks, tools and environments. They are provided with advice and information which they can apply themselves in order to prevent future illness and injury without the ergonomist's advice or prompting. The end result should be benefit to the individual staff and also to the overall improvement in performance of individuals and all the company stakeholders

### Beyond the workplace

Whilst this manual is intended to improve the health and safety of vets in their workplace, we must remember that each individual is completely unique, and they exist in uniquely different circumstances. Each person experiences a unique combination of activities and events in their lives: work demands, recreational activities and demands of the domestic environment. The Ergonomist considers the entirety of a person's life and history when analysing how best to improve their environment to avoid problems. Please consider the illustration below:

<p>Sally: 32yo, 5ft 1in, 49kg                  Works: In a clinic                  Drives: Station wagon                  Exercise: Never                  On the weekend: Cleans house                  Lives: With husband and four young children</p>	<p>Bruce: 48yo, 6ft 2in, 75kg                  Works: Mostly in the field with horses                  Drives: 4x4 utility                  Exercise: Walks 4km every night                  On the weekend: Restores cars                  Lives: Alone</p>
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As we can see from the illustration above, ‘Bruce’ and ‘Sally’ live very different lives, and are therefore influenced not just by the different environments in which they operate, but also by the very nature of their different physiques.

### The vet’s environment

The environment encountered by vets in their day-to-day lives can be extremely varied. Some vets are working at hip level when operating on animals, others are standing when working with large animals, whilst the need to work on a heavy animal in a prone position often occurs. The list below describes just some of variables that can have an effect on the safe and healthy execution of tasks during a vet’s day:

- **The Vet** – Are they female or male? Tall or short? Strong or not-so-strong?
- **The Animal** – Is it young or old? Tall or short? Quiet or unruly?
- **The Cow Shed** – Rotary clockwise or anti-clockwise? Herringbone left or right? Covered yard or an open yard?
- **The Vehicle** – High or low entry? Tailgate or car boot? Access to drawers?
- **The Paperwork** – Laptop or desktop computer? Office desk and chair or couch?

The research carried here in New Zealand and overseas reveals a high degree of risk of illness and injury faced by vets and others working in alongside them. These risks fall into many categories from ranging from bites and skin reactions to broken bones and crush injuries. Some problems are caused by overuse or overexposure whereas others are caused by one-off events. The types of injuries sustained by vets include:

- Intervertebral disc prolapses.
- Surgical grade tears of rotator cuff tendons in the shoulder.
- Fractures and sprains of the bones in the elbow and hand.
- Carpal Tunnel Syndrome.

These are just four examples of the literally dozens of injuries that can be sustained by vets. The severity, period of reduced performance and the psychological toll of each injury differs, but they can also carry the inherent risk of secondary problems such as medication side effects, stress, raised blood pressure, increased blood cholesterol, psoriasis and the risk of stomach injury from prolonged use of anti-inflammatories.

We must also consider the psychosocial complications arising from protracted problems. Frustration and anger can be at elevated levels, at the workplace, socially and in the family arena. Also, people may be challenged to change from their more interesting work to more clerical tasks, or may indeed be challenged to leave the profession altogether.

It must also be remembered that serious, high-grade and very problematic conditions can arise from the overuse-type injuries. For example, a vet with medial epicondylitis at the elbow from prolonged exposure to hand palpation of bovine uterus, can develop a compromise of the nearby ulnar nerve. This can cause neurological compromise and require surgical attention. Similarly, a vet with a prolapsed lumbar disc from a heavy lifting event or a fall onto the backside can have secondary nerve root compression (femoralgia/sciatica), also requiring surgical decompression.

The same risk factors apply to the lower grade problems as to the injuries of high severity and secondary complications. It is imperative, therefore, that there is logical need to address all symptoms and signs of low-grade irritation so that measures can be taken to minimise risk of ALL injuries, whatever the severity, whether structural or functional, primary or secondary issues.

## About the illness and injury prevention Handbook

The primary purpose of the Illness and Injury Prevention Handbook is to provide vets with a good breadth and depth of information on preventing illness and injury. Following are excerpts from the Handbook to provide the reader of this document with a basic understanding of the subjects covered.

### Categories of illnesses and injuries covered

The illnesses and injuries covered in the Handbook are those identified by Scuffham as being the most prevalent in the veterinary profession. They are:

- Lower back injuries.
- Neck injuries.
- Shoulders.
- Lower arm injuries.
- Elbows.
- Hips.
- Knees.
- Lower leg injuries.

Excerpts covering the first five body sites mentioned above appear in the pages that follow in this excerpted version of the Handbook.

### The nature of illnesses and injuries

Through the use of x-rays and other illustrations, the Illness and Injury Prevention Handbook provides vets with a clinical description of the specific types of injuries that can occur to a given part of the body. The purpose of such illustrative material is to provide a good depth of anatomical information to encourage greater understanding of the threat to specific body sites arising from veterinary work.

### Identifying risks

This section will identify specific risks faced by vets in their work, and the medical implications of things going wrong.

### Mitigating risks

Having identified the risks the Handbook then describes how to mitigate the risks. It should be remembered that the guidance in this manual is necessarily general in order to be useful for most readers. It is only through a personal assessment that the particular environment of an individual can be assessed and strategies developed to avoid illness and injury. This section also contains advice for people managing an existing injury of this type.

#### Lower back injuries

This is an area of frequent injury, in the general population and, as highlighted by research, in the communities of animal health practitioners. Problems of this area are well recognised as very expensive to industry as a result of lost time due to absence and reduced productivity.

Very large biomechanical forces are applied to this area of the trunk, particularly the spinal column and most importantly the intervertebral discs. Even in the erect position, whether seated or standing, approximately 60% of the full body weight is borne through this area. Therefore in a person weighing 90kg, approximately 55kg is borne through the intervertebral discs which are approximately 4cm in diameter and only 8mm in thickness. It is easy to see, therefore, how it can be difficult to prevent injury or to recover from an existing injury while maintaining function at tasks which involve bending, stooping, twisting and lifting pushing or pulling weights.

Possibly the most problematic injuries which affect the lumbar spine are intervertebral disk compression injuries. These are caused by axial compression forces either through lifting, pulling or pushing heavy weights, particularly when posture is compromised from the neutral anatomical lumbar lordosis, or through a fall onto the backside or hip areas.

Any event that involves lifting, pulling or pushing weights can cause lower back injury. The risk is obviously increased if the weights or forces involved are heavy or if posture has been compromised, resulting in excessive bending or twisting. As mentioned previously, a fall onto the backside can also cause lower back injury.

In the area of animal health care there are many situations that impose these stresses upon the lumbar area. Some situations would include lifting equipment from a vehicle, lifting animals onto tables, assisting at large animal births, and lifting large animal limbs.

To avoid injury to lumbar spinal discs it is important to minimise excessive compression forces and spinal postures which vary too far from the vertical, neutral anatomical shape. There are a number of considerations that vets should bear in mind to minimise the risk of lower back injury:

- Reach envelope.
- Minimising stoop.
- Pulling heavy weights.
- Lifting heavy weights.

If you have previously experienced a lower back injury and you are trying to continue to work whilst managing the injury, here are some general tips to help cope:

- Use a back support belt – these can be purchased from an industrial safety outlet.
- At work, at the gym, in the garden, – reduce lifting, pulling, stooping actions until you have recovered. Then, gradually reintroduce these types of actions as you become stronger.

### Neck injuries

The range of movement required of the cervical spine is far greater than that of the lumbar spine. This is necessary so that the eyes can be oriented to view in many directions. 50% of cervical rotation occurs at the upper two joints, Occiput-C1 and C2, referred to as the 'upper complex'. At these levels also there are no intervertebral discs, only articular cartilage. This area is therefore very prone to injury resulting from whiplash type events such as a motor vehicle accident or a fall onto the head. In contrast to the lumbar spine, the cervical spinal cord occupies much of the central spinal canal. The upper cervical spine houses the brain stem and the proximal spinal cord. An injury to the cervical cord at this level will most likely result in death. Pulmonary respiration depends on the integrity of the spinal cord at this level and as students we learnt, with regard to innervation of the diaphragm, that 'C3, 4 and 5 keep the diaphragm alive'.

The most problematic injury that occurs in the neck area is spinal intervertebral disc injury. Such an injury may or may not come with secondary complications such as nerve root compression. These injuries are mostly caused by lifting or pulling events or from knocking of the head on a solid object. Lifting or pulling injuries usually result in injury at lower cervical level while knocking the head usually results in upper cervical injury. Impact injuries, such would be sustained in a motor vehicle accident, can cause one or any number of injuries, dependent on the direction and magnitude of the force of impact.

All knocks to the head result in the force being conducted by the bony skull to the cervical spine. Any injury will depend on the degree of force and the angle, relative to the spinal axis. A knock to the vertex of the head will result in the full force causing axial compression through the spinal column whereas knocks to the side will result in more 'whiplash' type injuries.

Possible causes of cervical injuries in the animal health sector are listed below. The extent of any particular injury will depend on the heaviness of the weight and the height it is lifted from, relative to the lifter.

- Lifting animals onto a relatively high table.
- Lifting heavy stock items such as bags of dog food from floor level, or lifting from a high shelf.
- Lifting and holding cow's tail for rectal palpation.

From a work-related point of view, tall people should monitor their changing environment, particularly when visiting farms and so on for physical hazards that they may knock against. For example, pipes in milking sheds are an ever-present hazard. Also, baseball hats increase the risk of injury when working indoors, under trees and in other places with low obstacles, as the long peak will act as a visual barrier and increase the risk of contact.

Working at the correct surface height is important, particularly if lifting weights. The correct working height is generally agreed to be at elbow height, with shoulders relaxed. If working at a higher level, the

shoulders are held raised up. This working posture does not cause significant structural injury but can cause musculogenic headaches.

Carrying heavy objects or lifting them onto a work surface can cause neck injury. You should get help to carry excessively heavy weights (different for different body sizes) and pre-arrange steps or platforms to prevent having to lift a weight to a high level. When pulling on a rope to assist at large animal births pull downward when possible.

### Shoulder injuries

From a functional point of view, when discussing the shoulder we are referring to the Gleno-Humeral (GH) joint area, the Acromio-Clavicular (AC) joint area plus the Scapula-Thoracic 'joint' and associated muscles. All of these structures act in harmony (unless injured) to achieve the enormous reach envelope and postural dexterity which we utilise as we perform many of our tasks. If there is injury to one of these elements, there is increased functional demand placed on the other structures – or the cervical spine.

Falls are the primary cause of many shoulder injuries including fractures, labrum tears, tendon and bursa injuries. The results of such an event may include:

- Dislocation of GH joint.
- Tear of one or more of the 'rotator cuff' group of tendons.
- Adhesive Capsulitis 'Rotator Cuff Syndrome'.
- Rupture of biceps tendon.
- Sub Acromion bursitis.
- Dislocation of AC joint and/or fractured clavicle.
- Muscle Tear, other than rotator cuff muscle.

Actions and postures that involve excessive weights or reach envelopes can cause injury to tendons. These include tasks such as lifting heavy equipment from vehicles, restraining large animals, and heavy lifting work in stores. People with hypermobility syndrome can have GH dislocation events when forceful events cause movement beyond the limiting integrity of the joint ligaments/capsule. Prolonged exposure of postures where the arm is held out from the body can cause tendon overuse strain. These issues can be quite problematic and as painful as if there was structural injury, but there has been little or no structural injury when investigated.

The best way to avoid a shoulder injury is to avoid falling over! That will help avoid some nasty consequences ranging from minor tendon or bursa problems to fractures, dislocations, labrum tears or high-grade tendon lesions.

Don't lift heavy objects too high or too far. The further the reach, the greater the leverage and therefore the greater the risk of injury. This also increases the potential severity of an injury sustained. The most important aspect is to understand how to assess each situation and design the environment and technique so that there is the least likelihood of shoulder injury.

To help cope with a shoulder injury, try some of the following:

- Minimise or avoid painful reach envelopes.
- Minimise lifting or repetitive tasks that cause or increase pain.
- Use cold packs over the area of inflammation or injury and apply pressure.

### Elbow injuries

The elbow joint comprises two joints within the same joint capsule. The Humero-Ulnar joint provides for flexion and extension of the elbow and therefore controls the opening and closing of the angle at the front of the elbow. The other joint is the proximal Radio-Ulnar joint. This provides for pronation and supination, resulting in the ability to turn the palm of the hand up and down with the elbow bent. This joint is also involved in elbow flexion and extension via the Humero-Radial joint but this is not the primary function.

Overall, the elbow is a stable joint and links the complex shoulder and wrist areas. The function of the elbow joint is to move the wrist and hand toward or away from the trunk and also to assist in hand orientation when the elbow is bent. Hand orientation function is enhanced at the shoulder when the elbow is straight.

There are a number of injuries that can be sustained by the elbow region. These include tendon/tendon attachment injury, cartilage injury and bursitis. Some of the most common injuries are as follows:

- Hyperextension strain, causing acute cartilage or ligament injury.
- Tendon tears.
- Epicondylitis – Medial/Lateral problems.
- Ulnar nerve entrapment.
- Bursitis.
- Osteoarthritis.

Vets and others working in this field are exposed to a wide range of activities that could cause an elbow injury. These includes hyperextension during rectal palpation, falls resulting in fractures, knocking the elbow causing bursitis or epicondylitis, and tendon or muscle tears arising from prolonged or excessive gripping force.

Vets can avoid injury by completing activities as follows:

- When rectal palpating, ensure that the elbow joint is inserted into the animal so that movement is then managed by the shoulder joint.
- Ensure that weight-bearing leaning with elbow contact on hard surfaces is minimised.
- When working close to metal pipes or wooden rails, such as when pregnancy diagnosing a large number of animals wear elbow protection made of neoprene or similar. This should minimise the injurious effect of knocking the elbow against a hard surface.
- Ensure that cutting tools are sharp and use person-appropriate grip size. This will help prevent injury from excessive squeezing forces. Also, try to vary tasks and vary which hand is used to minimise strain, particularly overuse epicondylitis. Minimise power grip and have appropriate size of handles on tools. Handles should not be too large for the user's hand. In the office ensure appropriate mouse and keyboard posture: elbows relaxed by the user's side, and use a gel wrist support.

#### Wrist/hand injuries

This area contains a group of small joints. It is a complex area with high functional demands placed upon it in terms of both of strength and flexibility. Functionally, the wrist is divided into rows - the Radio-Carpal joint (proximally) and the Mid Carpal joint. Most of the wrist flexion occurs at the radio-carpal level and most extension occurs at the mid-carpal level. There is only limited radial and ulnar deviation.

The most common injuries (apart from reactive dermatitis, crush injuries, puncture wounds and lacerations) are ligament sprains, bone fractures and tendon injuries. Specific injuries include:

- Falls onto an outstretched hand is a common cause of fractures in the wrist and forearm.
- A relatively common problem is De Quervain's Tenosynovitis. This is a problem where the tendons of extensor pollicis brevis and abductor pollicis longus muscles become inflamed within their tendon sheaths, restrained by associated retinaculum.
- Secondary problems such as Carpal Tunnel Syndrome (CTS). CTS is a tendon problem, with nerve symptoms, of the Median nerve. A forceful gripping action (enhanced if vibration is involved) can result in inflammation of the tendons within the carpal tunnel.
- In the palm, a tendon crush injury can cause the tendon to become thickened within its sheath. The clinical picture is a 'trigger finger' where the tendon may form a nodule within its sheath, resulting in much pain and dysfunction.
- Rheumatoid Arthritis frequently involves the wrist and hand joints, particularly the metacarpophalangeal (MCP) joints of the hand. This can be very debilitating and usually culminates in advanced degenerative arthritis, with the familiar ulnar deviation at the MCP joints.

A fall onto an outstretched hand is a common cause of injury in this area. Injuries can include bone fractures and ligament and tendon damage. One of the easiest ways to avoid such falls in the workplace is to ensure that walkways are kept clear of hazards.

When manipulating hand tools, situations that involve high amount of wrist movement when gripping, as in dental procedures, foot trimming, injecting and rectal palpation, can result in tendon or tendon sheath irritation.

Because of the awkward wrist posture, rectal ultrasound scanning when assessing bovine pregnancy status can compromise wrist area tendons, whereas using a probe is more likely to result in shoulder injury.

- To reduce the risk of injury to the wrist/hand area vets can:
- Ensure adequate grip on soles of footwear and keep walkways clear of obstructions.
- Modify grip to minimise postures that deviate excessively from neutral.
- Avoid forceful actions such as prising off lids of cans with a screwdriver.

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The research information appearing in this document was obtained from the following papers:

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