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Minor farm injuries

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BACKGROUND

AGRICULTURE, forestry and fishing workers have the highest rate of workplace fatalities compared with other occupations in Australia.[1] This is coupled with long distances to both health services and for ambulance assistance.

In Australia, the medical system relies on rural GPs and ED personnel to provide frontline services in most of the areas where agricultural workers and farmers are based. It is incumbent on these centres to provide appropriate education on training and safety so personnel are aware of current treatment protocols. It is also imperative to ensure reporting of adverse events.

A 2018 Australian study identified and documented the types and causes of farm injuries and compared these with other injuries presenting to a regional hospital. [2] The aim of this work was to improve both prevention and post-injury care.[2] The most common injuries (91%) were related to non-intentional harm accidents. The most common place of injury was the homestead (49%) and one in 12 (8%, n= 3314) patients identified the place of injury as 'on-farm'.

The most common cause of on-farm injuries were animals (24%), fall from a farm vehicle (11%), and materials (11%) such as nails, needlesticks and timber. Non-intentional harm was more commonly identified among people injured on-farm (99%) compared with those injured in other places (91%).[2] Additionally, patients who were injured on-farm were more likely to be male than those injured in other places (75% vs 58%).[2]

The National Centre for Farmer Health is a partnership between Western District Health Service and Deakin University. During workshops undertaken by the centre with livestock farmers across Australia, more than 80% indicated that they had incurred a needlestick injury at some time (according to personal communication with Professor Brumby).

This How to Treat reflects the experience of the authors in a rural/farming area serviced by a regional hospital with facilities for level two injuries, trauma and services.

This article highlights the importance of a thorough and quick response to injuries in the agricultural setting, the importance of prevention and the need to follow protocols.

NEEDLESTICK INJURY

NEEDLESTICK injuries in agricultural and veterinarian settings have been documented in Australia and internationally. These injuries, while unintentional, appear to have several factors in common. These include the use of vaccines with mineral oil adjuvants, unpredictability of animals (see figure 1) and poor animal restraint, dangerous vaccination ▸

INSIDE

Figure 1. Bulls to be vaccinated.

technique, inappropriate medical treatment, difficulty finding first aid information on vaccines or material safety data sheets, and treatment delay resulting in various complications.[3-11]

There are a variety of injected products used in production animals, including vitamins, vaccines, antibiotics and hormones. Accidental injuries or exposures to products can result in mild to severe injuries to the person administering the injection, depending on the injection type and the adjuvant used in the vaccine.[3-7]

Needlestick injuries can cause serious harm including loss of finger, miscarriage and death.[3,4,7] Published research documents the consequences of human exposure and first aid treatment of livestock-injectable products, including needlestick injuries from vaccines with oil-based adjuvants. [4,8,9-12]

Delayed and incorrect treatment may lead to both short- and long-term complications.

Management

Prevention plays an important role in needlestick injury. There is a need for varied and comprehensive educational programs for agricultural workers, farmers and veterinarians to prevent needlestick injury occurring during livestock operations. [13-19]

Education around appropriate vaccination technique – such as keeping the non-vaccinating hand well away from needle, not tenting the skin, maintaining stability, adjusting depth of needle, not removing safety shrouds and having a tight race/enclosure with minimal stock movement (see figures 2 and 3) – will all reduce injury risk.[20]

It is important for medical and allied health personnel in agricultural regions to be knowledgeable about these risks, have access to correct and appropriate information, and to adhere to existing protocols and current best practice. This is made more difficult by differing degrees of labelling that highlight the risk when dealing with oil-based adjuvant substances.

Treatment following needlestick injuries with oil-based adjuvants is summarised in table 1.

It is important, and may be difficult, to distinguish between category 2 and category 3 injury when oil-based adjuvants are used. As such, treat for the more severe category. Additionally, farmers are often adamant that no vaccine substance has been transferred to them.

The surgical author expressed the following concerns regarding differentiating between category 2 and 3 needlestick injuries with oil-based adjuvants: "This relates to the cat 2. I have not seen a full inoculation although it probably has happened. All of the ones I have treated have been from a simple needlestick (with an oil-based adjuvant vaccine) and it is impossible to know the depth of penetration. The victims have mostly felt that the needle barely penetrated the skin, but the damage had extended deep into muscle and other structures.

"That said, this is a self-selected group given that I am probably not seeing some very superficial injuries that don't progress."

Delayed and incorrect treatment may lead to both short- and long-term complications. These include ongoing pain, chronic granulomatous reactions, loss of function, loss of digit, and related economic fallout for the individuals, some of whom are sole operators.[3,4,7]

Reporting

During the 10-week period between September and early December 2018, the ED at the Hamilton Regional Hospital saw five new cases of needlestick injury and several patients with unhealed needlestick injuries. Adverse reactions and experiences are typically underreported by farmers, veterinarians or health

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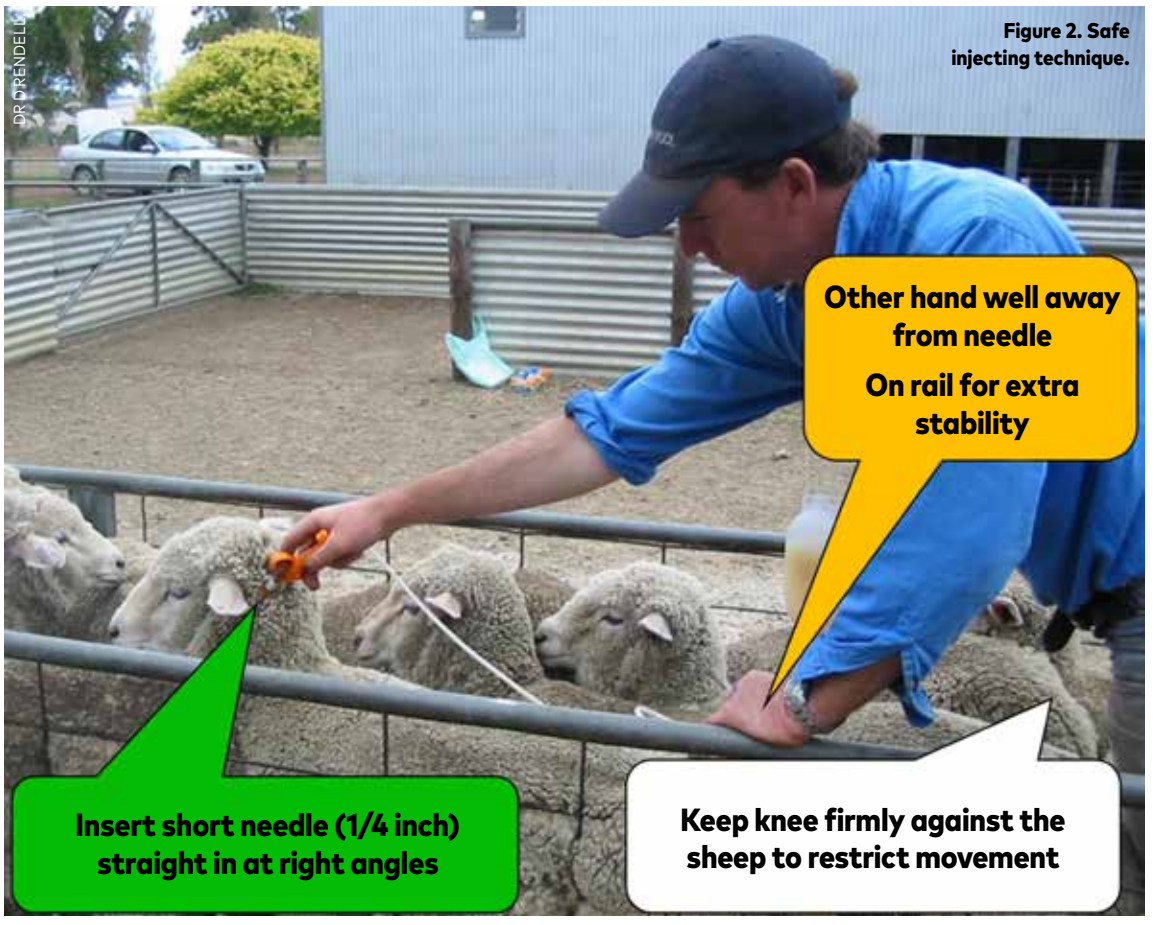

Figure 2. Safe injecting technique.

Figure 3. Safe injecting technique.

◂PAGE 16 personnel for a variety of reasons, despite the existence of the Australian Pesticides and Veterinary Authority Adverse Experience Reporting Program.

Anyone injured and/or inoculated by needlestick is required to report this to the Australian Pesticides and Veterinary Authority (APVMA), which hosts a database of adverse reactions or experiences related to pesticides and veterinary products.

Their October 2018 report notes 3515 adverse experiences in 2014 involving registered veterinary medicines.[18] Of these, 3% (around 100 each year) relate to adverse experiences in humans following needlestick injuries. The APVMA advises that underreporting of adverse events is very likely.

The APVMA commented as follows regarding the reporting of needlestick injuries that do not receive correct initial treatment: "It is valuable to present the package or insert at the time of consult, and healthcare professionals should consult the label and manufacturer for appropriate management as they (the manufacturer) hold detailed information in regard to the actives and adjuvants, and should be contacted in the first instance for information and subsequently to report adverse effects."[18]

EYE INJURIES

FARMERS and agricultural workers perform many tasks that expose them to flying particles, fragments, sparks, dust, hazardous substances or UV radiation. Other at-risk activities include cutting, drilling, spraying, smelting, sanding, chipping and chiselling. Field activities such as fencing, stock mustering or playing sport may cause eye injuries. Swooping magpies are known to cause eye injuries. Foreign material includes wood chips, metal filings, dust, insects, chemicals, sand and grain.

Flash burn or 'welders flash' occurs when the cornea is exposed to UV light from a welding torch.

Chemical burns occur when a liquid chemical makes contact with the eye. The injury is most likely to happen when a chemical splashes over the face.

Chemical burns may also result from rubbing the eyes after handling chemicals. Eyes are highly vascular and will absorb chemicals into the bloodstream more rapidly than when splashed on the skin. Depending on the chemical and degree of exposure the eye injury may range from temporary redness and irritation to blindness.

Advice on eye safety appears in box 1.

Bacterial keratitis

Bacterial keratitis can be acutely sight-threatening and can lead to serious complications, including corneal perforation.[22] Ideally, assess all anterior eye injuries using a slit lamp. Optometrists with expertise in managing anterior eye conditions can be valuable partners in assessing and managing these conditions, especially when access to an ophthalmologist is limited.

Avoid the temptation to treat all patients generically with chloramphenicol eye drops or ointment. There is an argument that all cases of suspected bacterial keratitis should have microbiological investigations to identify the organism, but this may delay treatment significantly.[23]

Table 1. Farmer needlestick injuries risk and recommended treatment

Livestock injection product	Operator exposure risk	Recommended treatment and first aid guidelines
Vaccines that contain mineral oil (also known as paraffin oil) adjuvants. Vaccines include: 1. Gudair (Sheep Johne's disease) 2. Silirium (Cattle Johne's disease) 3. Pilliguard (Cattle Pink Eye) 4. Roratvec Corona (Calf scour vaccines) 5. Vibrovax (Cattle Vibrio) 6. Bovillis MH & MH/IBR vaccines (Cattle respiratory diseases) 7. Bovillis S (Cattle Salmonella) 8. Ovillis Campyvac (Sheep abortion) Note: the adjuvant contained in vaccines 1- 5 can be referred to as Freunds. Note: vaccines 6-8 also contain mineral oil but is listed as "Emulsigen" which is an oil-in-water adjuvant.	**Mineral oil when injected into tissue is non-degradable and highly irritant.** Accidental self-injection of these vaccines (1-8) can cause serious local reactions both short and long term. Note: refer to surgeon or onto nearest hospital / emergency service with information on vaccine type. Emulsigen® oil in water— precise nature is not disclosed— is less irritant but can still cause serious local reactions. Note: elevation can increase pain intensity from spread of oil adjuvant due to gravity	**Recommended category treatment following self-inoculation of mineral oil or paraffin oil adjuvant vaccines*** First aid kit should be readily available, with eye bath. **Category 1 injury** (superficial skin exposure) Wash the contaminated area in warm soapy water. If vaccine material is splashed onto mucosal surfaces (e.g. eyes) there is greater risk and topical corticosteroids should be considered here. **Category 2 injury** (needlestick injuries without injection of any material) Allow the wound to bleed freely and do not squeeze or interfere with the injection site. Clean the wound thoroughly with soap and water and keep it clean and dry. Treat symptomatically (e.g. ensure appropriate tetanus cover; prescribe topical corticosteroids and oral antibiotics to prevent opportunistic infection). **Category 3 injury** (injection of vaccine material) Acute pain and inflammation are usually immediate, intense and persist for at least 24 hours. Perform early surgery and drainage to remove the oil-based vaccine material before it spreads or elicits a severe granulomatous reaction. **Category 4 injury** (needlestick injury that has progressed to necrosis or granulomatous ulceration) Perform surgical debridement to remove any residual vaccine material. Skin grafting may ultimately be required.

**Adapted from Richardson et al 2005*
Source: Rendell, D et al 2018 [13]

Box 1. Eye safety

- Have an eye review with an optometrist every two years
- Cover and protect eyes with non-ventilated goggles
- Rinse eye for 15 minutes if a splash occurs
- Always use a recommended Australian Standard welder's mask when welding
- Wear Australian Standard-approved safety glasses with UV protection when outdoors

Source: Safe Work Australia[21]

Box 2. Differential diagnoses of bacterial keratitis

- Fungal keratitis: consider this when the injury is from organic material, e.g., tree branch.
- Herpes simplex keratitis: the corneal epithelial defect is typically dendritic in appearance but may also appear non-dendritic in many cases.
- Acanthamoeba keratitis: contact lenses wearers have an increased risk especially when poorly adherent to lens disinfection.
- Marginal keratitis: this inflammatory reaction to staphylococcal antigens is non-infectious and self-limiting. It has significant overlap with signs and symptoms of early bacterial keratitis.

EVAN HERT/BIT.LY/2GUZYZI

Figure 4. Foreign body in eye.

Some organisms, for example, Acanthamoeba, are difficult to culture unless samples are obtained by a skilled operator. Consider specialist referral for microbiological investigations if there is no significant improvement following initial treatment or if the diagnosis is uncertain.[24]

The differential diagnosis of bacterial keratitis appears in box 2.

A useful mnemonic to help identify corneal ulcers that are more likely to be infectious in nature is PEDAL (see table 2).

Foreign body

Symptoms of a foreign body (see figures 4 and 5) can include pain, burning, irritation, scratchy feeling, blurred vision, loss of vision, and sensitivity to bright light.

Self-removal is not recommended as this may cause permanent damage as a result of scratching or embedding the object further. Immediate first aid includes flushing the eye with clean water under a tap or with a bottle.

If the particle does not rinse free after a few minutes, place a pad loosely over the eye and seek medical treatment. Rubbing the eye may compound the problem.

Complications of eye injuries can include infection and scarring, corneal scratches or abrasions or an ulcer that may affect vision or lead to abscess formation. A penetrating eye injury may result in blindness. Review based on initial presentation and symptoms. Most clinics and emergency departments have their own protocols.

Equipment required for foreign body removal is listed in box 3.

Flash burns

Flash burns, also called welder's flash, are common painful complaints following welding.[26] This occurs when the cornea is exposed to ultraviolet light and is comparable to sunburn in the eye. Sources of UV light include a welding torch, direct sunlight, reflection of the sun off water or snow, a sunlamp and other lamps, including halogen lamps.

Flash burn symptoms develop 5-10 hours after exposure. Symptoms include burning watery eyes, red eyes, blurred vision, sensitivity

Box 3. Equipment required or foreign body removal includes

- Snellen chart
- Bright light source
- Fluorescein strip or drops
- Topical anaesthetic drops
- Cobalt blue light, from an ophthalmoscope or Wood's lamp
- Sterile cotton tips
- Sterile normal saline
- Sterile 25G 16 mm hypodermic needle or 15 scalpel blade
- Eyelid speculum (optional)
- Loupes (if available)

Source: Fraenkel A et al[25]

Box 4. Treatment of flash burns

- Only use topical anaesthetic drops (e.g., proxymetacaine hydrochloride/oxybuprocaine hydrochloride) as an adjunct to allow adequate examination of the eye
- Do not use topical anaesthetic drops as treatment
- Lubricant eye drops PRN and frequently
- Infection is rare

Source: Industrial Safety and Hygiene News[26]

Box 5. Management of agricultural injuries

- Expedited administration of antibiotics and tetanus prophylaxis
- Aggressive irrigation
- Serial debridement
- Consider delayed wound closure in certain circumstances
- Reconstruction or replantation of amputated parts, where possible

Source: Victorian Government[29]

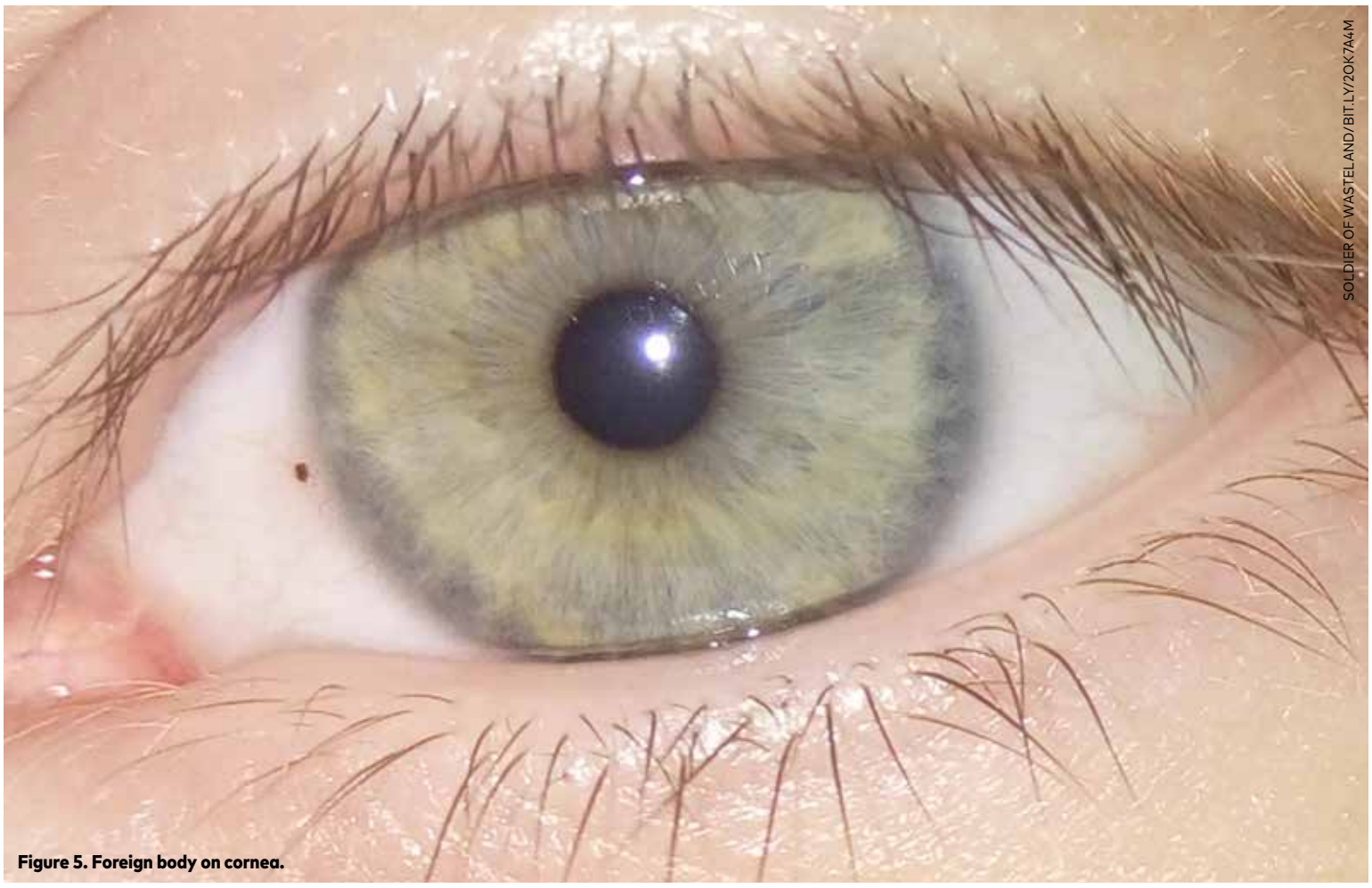

Figure 5. Foreign body on cornea.

Figure 6. Vaccine and vaccination gun

to light and the feeling that something has lodged in the eye. Pain can become severe. Treatment depends on severity (see box 4). If left untreated, there is an increased risk of vision impairment and loss. Refer for specialist care if symptoms are ongoing. Flash burns can be prevented by using a welder's mask.

INJURIES TO THE HAND AND UPPER EXTREMITY

AGRICULTURAL injuries involving the hand and upper extremity are common.[27] Most of these injuries are associated with machinery, which includes tractors, grain augers, combine harvesters, power take-off devices and hay balers. Animals can also be involved. People of all ages are impacted in farming communities.[28]

Most machinery-related injuries are crush injuries or amputation of the fingers or hands, and injuries can occur at any time when using machinery.[29] Each piece of machinery will produce a specific injury type, and a range of soft tissue and bony injuries may be seen.[29] Injuries include the loss of a limb or digit, infection, long-term loss of function and disability.[29]

The management of agricultural injuries appears in box 5. Suggestions for safe use of machinery and when close to livestock are in box 6. Suggestions for a farm safety emergency plan appear in box 7.

Perhaps the most important aspect of injuries is prevention.[29]

CASE STUDIES

Case study one

MIKE received a needlestick injury while vaccinating bulls with a product used to prevent infertility and abortion in cattle caused by vibriosis. This product contains a mineral oil (paraffin oil) adjuvant (see figure 6).

While Mike was vaccinating an animal, the animal suddenly lifted its head. The sudden movement drove the needle, coated with the product, into his left index finger. He was aware of some bleeding from the puncture site, and stiffening and swelling of the finger, but continued to inoculate the remaining animals.

Mike's property is remotely situated and mobile service is not available. Once the vaccinations were completed, around 3-4 hours later, Mike drove home.

Concerned about the swelling, he called the vaccine manufacturer and was advised to go straight to the emergency department.

At the base hospital, the finger ▸

Table 2. PEDAL: differentiating infectious and non-infectious corneal ulcers

	Infectious	Non-infectious
Pain	Severe	Mild
Epithelial defect	Deeper	More superficial
Discharge	Common	Less common
Anterior chamber reaction	More common	Less common
Location	Central	Peripheral

Source: Bourcier T et al[22]

Box 6. Suggestions for safety on the farm

Farm machinery safety suggestions

- Put up safety signs.
- Use equipment that conforms to current Australian Safety Standards.
- Buy equipment with safety features or install safety features.
- Be familiar with manuals and safety instructions and operate equipment in accordance with instructions.
- Ensure all workers can safely operate machinery,
- Do not remove or change safety features such as guards, and fit shields to all moving parts.
- Ensure machinery is well maintained, serviced and regularly checked.
- Make sure loose clothing and hair do not get caught in machinery.
- Switch off equipment before making adjustments.
- Try not to work alone, and if you do, let someone know where you are and what time to expect you.
- Keep children and visitors well away from equipment.
- Be careful when adding attachments to equipment to avoid crush injuries to the hands.
- Ensure emergency stops are located near intakes on equipment.

Livestock safety suggestions

- Do not work alone.
- A common injury occurs when a body part gets caught between an animal and a stockyard or crush.
- Make sure the animal knows you are approaching.
- Limit the time spent in an enclosure with animals.
- Frightened animals may charge to protect their young.
- Use appropriate equipment.
- Use separate yards for bulls during mating whenever possible.
- Install a vet gate into the cattle crush to enable ease of access.
- Do not put your arms through the railings when vaccinating or drenching, go over the top (see figures 2 and 3)

Source: Victorian Government[29]

Figure 7. A central area of necrosis and granulation surrounded by fibrous reaction required complete excision.

was cleaned and oral antibiotics initiated. After contact with a larger regional health service, review with private plastic surgeon was arranged for the following day. Mike underwent a washout procedure under general anaesthetic and IV antibiotics were given.

The day of discharge, despite a stiff and painful finger, Mike was back at work on the farm.

Troubled by ongoing swelling and pain, and unable to secure an appointment with the plastic surgeon, Mike returned to the base hospital where he was admitted and received only IV antibiotics. Disappointed with the lack of improvement, Mike discharged himself and sought treatment at a larger hospital.

At this hospital, he was treated with a raised arm and IV antibiotics, but no surgery. After two days and little improvement, Mike was discharged to the care of his GP, who prescribed further oral antibiotics. Two weeks after his injury, Mike's wife contacted the National Centre for Farmer Health and he was referred to a different surgeon. Two procedures, a month apart, were performed and small blebs of oil cleared (see figure 7). No further antibiotics were required.

Over the next 3-4 weeks, the finger improved steadily (see figure 8). Twelve months after the needlestick injury, Mike had limited flexion of the finger. However, today, 18 months after the accident, he has almost full flexion and the finger does not look markedly different compared with before the accident.

Case study two

Tim was working with a sheep contractor in southwest Victoria vaccinating sheep against Johne's disease, using a vaccine that had mineral oil adjuvant. The gun was an older style, stainless steel-shrouded vaccinating gun. Tim dropped a handful of sheep tags, and as he bent to pick them up, his stomach pushed the needle of the vaccine gun, which was in a canvas pouch around his waist, into his thigh. Tim was aware of being pricked but did not think it was enough to have administered a dose of the vaccine. He was behind with the lamb marking and did not want to make a fuss.

Box 7. Farm safety emergency plan

- Place well-stocked first aid kits around the farm and in vehicles where they are easily accessible.
- Have at least one farm worker current and trained in first aid.
- Ensure emergency contact numbers and the farm's official address in farm vehicles and next to telephones and on mobiles
- Install Emergency App on mobile phones.
- Know the best route to the nearest hospital emergency department.
- Make sure all on the farm know about the emergency plan.
- Make sure everyone knows what to do in an emergency.

Source: Victorian Government[29]

The following day, he noticed a red area about the size of a 50 cent coin around the needleprick site and was experiencing flu-like symptoms.

Tim attended an AgriSafe clinic and was advised to see a doctor or go to hospital immediately. The following day he presented at the base hospital, where IV antibiotics were administered. The red area was now the size of "the bottom of a stubby holder". The hospital staff did not appear concerned that the reaction, by now the size of a saucer, could be related to the vaccine.

While lying in casualty, Tim updated his Facebook status, and was contacted by a vaccine distributer who emphasised the seriousness of the injury and advised Tim to seek the advice of a plastic surgeon.

Tim spent two days in hospital and underwent two procedures under general anaesthetic. A piece of skin the size of a 50 cent piece was removed, the area washed and cleaned, and left to drain, with further debridement at the second procedure before suturing. The lesion contained traces of the vaccine and the oil-based carrier. Tim was left with only a scar (see figure 9).

The distributer was supportive of Tim during this time and provided a new shrouded safety vaccine gun. Tim no longer uses the old-style guns when vaccinating.

Case study three

Zack brushed past a colleague who was vaccinating sheep for the prevention of Johne's disease. The protection guard (shroud) had been removed from the injection unit and Zack's left hand was pricked by the needle, but not fully inoculated. He had no symptoms at this time and did not seek medical care. Twelve months after the injury, he knocked the hand and this was followed by marked swelling. At surgery, a central area of necrosis and granulation surrounded by fibrous reaction was excised (see figure 10).

Case study four

Barnaby, a 40-year-old farmer, presents with a painful left eye. He states that he was sweeping in the cow shed earlier in the day PAGE 22 ▶

Figure 8. Limited function six weeks after surgery.

◂PAGE 20 and felt increasing pain in his left eye a few hours afterwards. He tried to wash his eyes with water, but this did not help.

He is wearing dark sunglasses as he is photophobic.

His past medical and ocular history is unremarkable. He does not wear glasses or contact lenses.

Visual acuity is 6/6 in the right eye and 6/7.5 in the left. Pupil reactions are normal and eye movements full and smooth, with no diplopia.

Slit lamp examination of the left eye reveals significant conjunctival hyperaemia, no visible foreign body embedded in the cornea or bulbar/palpebral conjunctiva, a small round peripheral corneal ulcer at 11 o'clock about 1mm diameter, staining with fluorescein, no significant anterior chamber reaction, and normal eyelids and eyelashes.

Given the significant pain, photophobia and corneal ulcer, Barnaby is diagnosed with bacterial keratitis. The treatment options are to either refer to an ophthalmologist (who was quite some distance away), or to start treatment with empirical antibiotic therapy for bacterial keratitis, after a phone consultation with an ophthalmologist.

According to the Therapeutic Guidelines, the following are treatment options:

- Ciprofloxacin 0.3% eye drops, one drop every hour (including overnight).
- Ofloxacin 0.3% eye drops, one drop every hour (including overnight).
- Cefazolin 5% + gentamicin 0.9% eye drops, one drop every hour (including overnight) [extemporaneous preparation only].[30]

Figure 9. Scar after surgery.

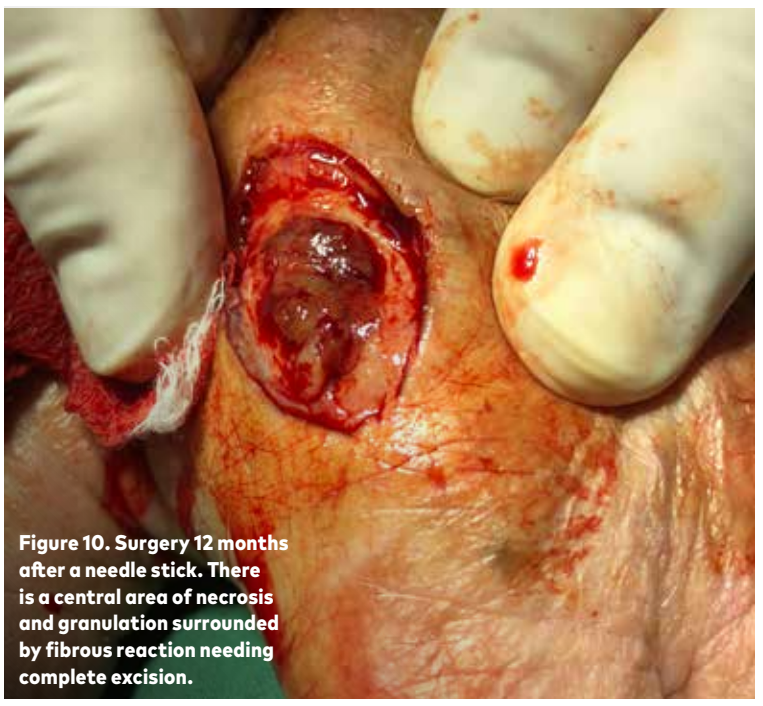

Figure 10. Surgery 12 months after a needle stick. There is a central area of necrosis and granulation surrounded by fibrous reaction needing complete excision.

Key points

- Ensure you read the material safety data sheets for veterinary vaccines particularly those with use mineral oils as adjuvants.
- Report an adverse event due to veterinary medicines (human requiring medical treatment) to the APVMA and record in the patient notes.

Given the ready availability of fluoroquinolone eye drops, Barnaby is started on ciprofloxacin 0.3% eye drops, initially one drop every hour in his left eye for 24 hours (including overnight).

When reviewed 24 hours later, the eye pain has significantly improved and the corneal ulcer diminished in size.

Therapy is continued for another 24 hours with frequency of treatment reduced to every two hours. Subsequent review shows further regression of the ulcer and resolution of the pain.

Visual acuity returns to 6/6 in the affected eye. Treatment is continued on a tapering basis over the next 72 hours with ongoing improvement. On review two weeks after his initial presentation, the corneal ulcer has resolved and there is no corneal epithelial defect.

Barnaby is discharged from follow-up with the advice to return promptly should he experience further symptoms.

CONCLUSION

FARMS are dangerous places, particularly where the overflow of work encroaches on family life. Stress, fatigue, difficult climatic conditions, and working with animals and various pieces of equipment all take a toll.

Agriculture also regularly has the highest number of deaths for workplaces and the highest rate in Australia. For many of the deaths, there are numerous near misses and minor injuries. Adopting a culture of safety, understanding the context of farming and its risks, and understanding some of the hazards for farming families, agricultural workers and also farm visitors is important. A dialogue about future prevention is also important.

ONLINE RESOURCES

- **National Centre for Farmer Health**
  - Farmer Needlestick Injuries — Risk & Recommended Treatment bit.ly/2Lma5ax
  - Support resources bit.ly/31stzz1
  - Health topics bit.ly/2KbNPjl
  - Safety topics bit.ly/2KJPlbM
- **The Australian Pesticides and Veterinary Authority** https://apvma.gov.au
  - Adverse Experience Reporting Program bit.ly/31qRA9H
- **Where to report injuries** bit.ly/2KIGQxb
- **Victorian State Government Better Health channel Farm safety-crush injuries** bit.ly/2X48sUG
- **Farm emergency contacts sticker** bit.ly/2IKKwMU

References on request from howtotreat@adg.com.au

How to Treat Quiz.

MINOR FARM INJURIES

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1. **Which ONE is the most common cause of on-farm injuries?**
   - **a** Fall from a farm vehicle.
   - **b** Needle stick.
   - **c** Animals.
   - **d** Foreign materials, such as nails and timber.

2. **Which THREE statements regarding farm injuries are correct?**
   - **a** Those injured on-farm are more likely to be male.
   - **b** Agricultural injuries involving the hand and upper extremity are rare.
   - **c** Wearing a recommended Australian Standard welder's mask will prevent flash burns.
   - **d** A farm safety emergency plan is advised to minimise risk.

3. **Which THREE factors contribute to needlestick injury and its complications?**
   - **a** Poor vaccination technique.
   - **b** The age of farmers and farm workers.
   - **c** Inappropriate medical treatment.
   - **d** The use of vaccines with mineral oil adjuvants.

4. **Which THREE are appropriate in the management of category 2 mineral oil needlestick injuries?**
   - **a** Clean the wound thoroughly with soap and water and ensure appropriate tetanus cover.
   - **b** Advise patient to seek further treatment if there is pain and inflammation at the site and refer to surgeon.
   - **c** Squeeze the wound site to remove as much of the foreign material as possible.
   - **d** Consider topical corticosteroids and antibiotics to prevent opportunistic infection.

5. **Which THREE may prevent needlestick injury occurring during livestock operations?**
   - **a** Tenting the skin.
   - **b** A tight race/enclosure with minimal stock movement.
   - **c** Not removing safety shrouds.
   - **d** Keeping the non-vaccinating hand well away from needle.

6. **Which TWO statements regarding eye injuries are correct?**
   - **a** Fungal keratitis is unlikely when the injury is from organic material.
   - **b** Flash burn occurs when the cornea is exposed to UV light from welding.
   - **c** The cornea forms an effective barrier, slowing systemic absorption of materials splashed into the eye.
   - **d** Self-removal of corneal foreign bodies is not recommended.

7. **Which TWO are appropriate in the treatment of flash burns?**
   - **a** Lubricant eye drops.
   - **b** Topical anaesthetic drops to allow adequate examination of the eye.
   - **c** Topical anaesthetic drops prevent corneal irritation and scarring.
   - **d** Prophylactic topical antibiotics.

8. **Which THREE may be symptoms of a corneal foreign body?**
   - **a** Pain.
   - **b** Sensitivity to bright light.
   - **c** Purulent discharge.
   - **d** Blurred vision

9. **Which THREE are part of the management of agricultural injuries?**
   - **a** Expedited administration of antibiotic and tetanus prophylaxis.
   - **b** Aggressive irrigation.
   - **c** Serial debridement.
   - **d** Leaving all wounds open.

10. **Which TWO statements regarding machinery-related injuries are correct?**
    - **a** Most machinery-related injuries are crush injuries or amputation of the fingers or toes.
    - **b** Each piece of machinery will produce a specific injury type, and a range of soft tissue and bony injuries may be seen.
    - **c** Injuries include the loss of a limb or digit, infection, long-term loss of function and disability.
    - **d** Agricultural injuries rarely involve the hand and upper extremity.

CPD POINTS

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- Each article has been allocated 2 RACGP QI&CPD points and 1 ACRRM point.
- RACGP points are uploaded every six weeks and ACCRM points quarterly.