

Conducting Dog Health Programs in Indigenous Communities: A Veterinary Guide



Samantha Phelan BVSc. (Hons)



Commissioned by Animal Management in Rural and Remote Indigenous Communities (AMRRIC) in partnership with the International Fund for Animal Welfare (IFAW).

ISBN: 0 9751968 6 3

Copyright

© Animal Management in Rural and Remote Indigenous Communities (AMRRIC) and International Fund for Animal Welfare (IFAW) 2007.

This work is copyright. Apart from any use permitted under the Copyright Act 1968, no part may be reproduced by any process without prior written permission from both AMRRIC and IFAW.

Disclaimer

This document has been prepared in good faith exercising due care and attention. However, no representation or warranty, expressed or implied, is made as to the relevance, accuracy, completeness or fitness for purpose of this document in respect of any particular user's circumstances. Users of this document should satisfy themselves concerning its application to, and where necessary, seek expert advice about, their situation. The author Samantha Phelan, Animal Management in Rural and Remote Indigenous Communities (AMRRIC) and the International Fund for Animal Welfare (IFAW) will not be liable to the user or any other person or entity with respect to liability, loss or damage caused or alleged to have been caused directly or indirectly by this publication.

The veterinary protocols, procedures and views outlined in this manual are intended to provide guidance only to veterinary practitioners working with rural and remote Indigenous communities in Australia and should not necessarily be considered standard practice.

The author can be contacted by email: samanthatphelan@hotmail.com

Edited by Marguerite Young and Karen Cambrell
Designed by Gianni Ferronato

Cover image courtesy of Dr Edward M. Donelan.

Dedicated with love to
the Donohoe family,
in memory of their
beloved husband and
father Phil.

CONTENTS

About AMRRIC	i
About IFAW	ii
Acknowledgements	iii
Message from IFAW Director	iv
1 Origins of the manual	1
2 History and importance of dog programs	3
3 History and features of communities	12
4 Key people and infrastructure	17
5 Community development theories and planning	30
6 What to take, what to expect	44
7 Zoonoses: myths and realities	54
8 Commonly encountered parasites, diseases and other conditions	68
9 Parasite control protocols	86
10 Population control	95
11 Basic business requirements	112
Appendices	114

ABOUT AMRRIC

AMRRIC is an independent group of veterinarians, academics, health workers and Aboriginal and Torres Strait Islander people that formed to facilitate sustainable dog programs in remote Indigenous communities to improve the health and wellbeing of the entire community.

AMRRIC is founded on a deep respect for the culture and traditional ways of the Aboriginal and Torres Strait Islander people in these remote communities. It promotes a model, developed over years of dialogue and interaction with remote Indigenous communities, in which the dogs are recognised as an intrinsic part of the fabric of the community; where the health and wellbeing of the dogs is inseparable from that of the humans.

Sustainable dog programs improve community health and wellbeing. They are affordable, manageable and effective, particularly over the long-term. AMRRIC has achieved great success in this field; facilitating the establishment and maintenance of many programs across Australia.

In addition to servicing immediate needs, AMRRIC also works on the 'bigger picture'. This involves creating effective partnerships with and between the many different stakeholders, promoting and supporting research in the area and creating forums for honest and constructive dialogue. The aim is to build awareness, understanding and a resource set that will make sustainable, affordable dog management available right across Australia.

For more information please visit www.amrric.org



ABOUT IFAW

IFAW (International Fund for Animal Welfare) was founded in 1969 and has now grown to be the world's leading animal welfare organisation, with offices in 15 countries and more than 200 scientists, campaigners and legal and political experts involved in IFAW's projects and day-to-day business.

The IFAW Asia Pacific office is based in Sydney and works on projects in Australia, New Zealand, South Pacific nations, the Philippines and Indonesia. IFAW Asia Pacific works to protect companion animals and marine mammals, provide help for wildlife in distress, and protect animals from commercial trade.

IFAW believes that human and animal welfare are strongly linked: a world in which animals can survive and thrive is vital to human wellbeing.

IFAW works to improve the welfare of wild and domestic animals throughout the world by reducing commercial exploitation of animals, protecting wildlife habitats and assisting animals in distress. IFAW seeks to motivate the public to prevent cruelty to animals and to promote animal welfare and conservation policies that advance the well-being of both animals and people.

For more information please visit www.ifaw.org



A Better World for Animals and People

ACKNOWLEDGEMENTS

I would like to give thanks to Stephen Cutter and Phil Donohoe for opening those first doors which enabled me to work in Indigenous communities.

To Marguerite Young for her enthusiasm and energy and to AMRRIC and IFAW for their support.

To those who contributed to the manual directly via peer review and photographic contribution: Jack Shields, Ted Donelan, Robert Dixon, Nick Sangster, Rick Speare, Rob Irving, Sophie Constable, Aaron Healy and Michelle Morters.

To Gay English and Ian Palmer for the loan of much valuable resource material and their honest quiet voice in the background.

To Karen Cambrell and Gianni Ferronato for making it all come together at the end.

To all the wonderful people who held my children, allowing me to complete this work.

And lastly and most importantly to all the Indigenous dog owners out there, my real teachers, thank you for your patience.

Sam Phelan
March 2007

MESSAGE FROM IFAW DIRECTOR, Michael McIntyre

In many remote Australian communities companion animal populations, in particular dogs, are very high and can be problematic. Vet services in Indigenous communities are either unavailable or unaffordable and as a result the health of the dogs, and ultimately the people who care for them, is suffering.

IFAW and AMRRIC share the understanding that the fate of animals is inextricably linked with our own and that improving the quality of life for the dogs will ultimately contribute to improving the health of the community. So when the idea for this manual was born between the two organisations, it was a natural partnership and one we look forward to cultivating in the future.

This manual has been inspired by the many vets dedicated to relieving the suffering of animals.

One such vet is Samantha Phelan, who worked as a solo veterinary practitioner for five years in Aboriginal communities of the Northern Territory. Following conversations with Marguerite Young from IFAW, they developed the idea of a resource to train vets to deliver effective, practical vet services while building trusting, lasting relationships with Indigenous communities.

This manual is not just about veterinary techniques; it aims to help vets overcome the geographic and cultural complexities associated with remote Australia by incorporating a culturally sensitive and community based development approach to animal welfare.

It has been a privilege for IFAW to work alongside AMRRIC on this project. Together we have created a practical resource that will contribute to improving the quality of life for animals in remote Australia and the people who care for them.

We look forward to seeing the manual become an important tool in the construction of sustainable dog programs, and hope to see more vets, with the same passion and dedication as Sam, forming long term partnerships with communities. Because of these compassionate and professional individuals we will see happier, healthier dogs and, ultimately, happier, healthier people.

Michael McIntyre
March 2007

ORIGINS OF THE MANUAL

Many veterinarians that have worked in Indigenous settings would testify to the very steep and often embarrassing learning curve that took place in their first few years of servicing communities. Technically any veterinarian can go into a community and work their way through a parasite control/sterilisation program. It is dirty, sweaty work but it's not rocket science. The more significant gaps in veterinary knowledge are related to the importance of effective community consultation processes when developing programs in Indigenous communities.

As veterinarians we are well versed in how to get a job done with animals in a quick and efficient manner. Owners in our own society trust us implicitly, understanding the university study we have completed to obtain our degree. Clients usually feel free to discuss their options with a veterinarian and generally do not feel coerced in any way. Most veterinarians behave in line with their belief that the customer is always right. Owners on the whole will seek out veterinary opinion if their animal is sick or in need of treatment. English is usually the common language of veterinarian and client alike. The structure of our society and culture is assumed knowledge, as is social standing within it. Our priorities for animal health and welfare are dictated by our society and legislation, therefore veterinarian and client share common concepts and legal requirements in relation to animal welfare. In our conventional work we are the experts. We can (and are expected to) devise a solution which our clients will follow. When working in an Indigenous community setting not one of the above statements can be assumed.

Many people with good intentions go into Indigenous communities to work. Most have no idea of how to go about things. We bumble blindly and often very rudely through our work learning as we go, often wondering why Indigenous people don't jump up and help us "and themselves" at every turn.

To get a feel for this and understand a little of our Indigenous client's feelings, we can try to put ourselves for a moment in their shoes: imagine if daily plane and car loads of foreign visitors came to work and research in our towns, yards and houses. If they had no idea and didn't ask how our system of government worked or who could make decisions in our community? If they didn't bother to learn our language or history? If they asked our children for permission to desex our dogs when we weren't home? If they medicated our dogs with unknown substances, without fully discussing this with us? If they killed our dogs without our permission claiming them to be strays? This is the reality in many Indigenous communities today, and we wonder why programs fail.

This publication is produced to reduce the risk of you making the mistakes already made, and regretted, by earlier veterinarians on the scene. It is a technical manual designed for veterinarians interested in getting involved in Indigenous community work. More importantly I hope it is an introduction to community consultation and development principles. Without effective models of community development there will always be a lack of community involvement. Without community support programs cannot be sustainable.

The manual has also been devised with working in remote localities in mind. It is frustrating to be asked a question regarding drug mechanisms of action or parasitic disease and not be able to easily access the information required. Given budgetary constraints the section on diseases with zoonotic potential is unfortunately a little simplistic but it is hoped that this chapter will be elaborated in time.

Please be aware when reading this manual that, although it was originally intended to cover all of northern Australia, this is not possible at this point in time and the manual is now largely centred on the history, legislation and veterinary work being conducted in the Northern Territory, with some reference to Queensland and Western Australia.

Whilst much of the information can be used across state and territory borders, it is anticipated that additional local knowledge gained will be of great significance to practitioners working in the field. Areas to investigate could include delivery of schedule drugs by agents, registration requirements,

local funding mechanisms, community histories and systems of governance. It will be the individual veterinarian's responsibility to determine the issues pertaining to their relevant state and community and alter their professional conduct accordingly.

Those contemplating starting a dog program would also be advised to talk with someone from AMRRIC currently running a dog program.

I would like to thank and acknowledge all veterinarians working in this area. Each has contributed useful information and techniques to the growing body of work in Indigenous communities. Special thanks go to all veterinarians on the AMRRIC Committee. Their dedication, commitment and vast knowledge base has continued to inspire me.

It is intended that this manual be a living document, which will hopefully be updated on a yearly basis. All comments are welcomed on the AMRRIC website.

HISTORY AND IMPORTANCE OF DOG PROGRAMS

DOGS AND DINGOES IN INDIGENOUS CULTURE

Dingoes have been on the Australian continent for the past 4000 or so years. It is thought that they were brought to the mainland by Asian seafarers, with whom the Aboriginal people had extensive trade links (Corbett 1995). During this time dingoes have been woven into the fabric of Aboriginal life, law and culture. Little distinction is usually made between dingoes and more recently introduced dogs when applying Indigenous beliefs and law.

Aboriginal people in contemporary society own dogs for a variety of reasons. They serve in the role of:

- » **Companion:** as for most societies, this is particularly the case for the elderly and children. It is also noted here that elderly people, possibly because of a stronger need to obey law and culture, tend to give their dogs greater attention than younger people in communities. It is common for older women to give large amounts of their own 'meals on wheels' food to their dogs. Older people also tend to accumulate dogs in far higher numbers than younger people.
- » **Physical protector:** the level of protection offered by dogs in a community setting is perhaps more important when one considers the high levels of dysfunction and violence that occur on some communities. "Cheeky dogs", whilst

considered a nuisance by many, will keep drunks and petrol sniffers at bay, thereby serving an important role for their family.

- » **Spiritual protector:** dogs continue to be seen as protectors from spiritual interference. Sorcery remains a very real threat in contemporary Indigenous life in northern Australia. Dogs howling, barking or indeed being silent through the night are often interpreted in relation to the spirit world.
- » **Hunter:** many dogs are known as the "good kangaroo dog" or the "good goanna dog". These dogs are prized for their hunting prowess and strategic breeding of their lines occurs.
- » **Source of warmth:** "two, three and four dog nights" are still very present in many Indigenous communities where relative poverty and overcrowding mean there is often not enough warm bedding to go around when the temperature drops.

Dingoes, and now to some extent dogs, are regarded as sacred animals. They are incorporated into Aboriginal society via:

- » **Formal inclusion into family units:** certain dogs are given "skin" names. This automatically positions the dingo into society, granting them status such as parent, grandparent, aunt, child, etc. In some cases dogs are considered important enough to attend rituals, acting as fully fledged lawmen (Kolig 1978).

In certain areas dogs are also believed to be direct reincarnations of ancestors (Prouse 1993).

» **Incorporation into creation and “dreaming” knowledge:** the Dreamtime or Dreaming is that part of Aboriginal culture which explains the origin and culture of the lands and its people. There are many dog dreaming sites located around the Australian continent. Each has its own and often interconnected story of creation and movement of the dingo through the country. Stories are told covering areas over thousands of kilometres and across different language groups. Ceremonies that are based around the dingo and dog continue to be practised across northern Australia with relevant songs, dances and stories being very much intact.

» **Individuals will carry with them “dog dreaming”,** that is, they are the custodians of the law and history of dingoes and dogs.

Much of the law as it pertains to dogs remains secret and is often held in the hands of only a few in a community. Stories may be told only by certain people to a select audience. Do not, as a veterinarian, expect to become an expert in dog dreaming overnight. In many cases you may remain unaware of the existence of dog dreaming throughout your entire work in a community. This does not mean it is unimportant or not part of the cultural fabric of the community you are in.

Whether spoken or not, the cultural significance of dogs has implications that extend into the realm of veterinary practice. To break the traditional law in relation to dogs can create great sadness, sickness and unrest in those entrusted with their dreaming. It is tantamount to desecration of religious shrines in European culture. When providing a veterinary service to a community it is usually enough to be respectful of the fact that there are spiritual ramifications of your actions.

To avoid breaking traditional law one must simply listen to the owners of individual dogs. Coming from a place where European culture is dominant it is all too easy to maintain your world view and cultural values. This will inevitably make you deaf to the sometimes quiet and indirect voice of individual dog owners as they state what they would prefer done or not done to their dogs. Never act without the expressed informed consent of the animal’s owner. Never coerce an owner into making a decision in regards to their animal.

At all times respect what individual community members want done. In some cases this may be difficult particularly when animal welfare issues raise alarm. In the case of welfare issues or strays that are causing trouble it is necessary to find the right people to develop an action plan with. Discussion with your assistant will usually lead you to the correct people. To act in a maverick fashion in these circumstances may jeopardise an entire dog program for years to come.

HISTORY OF DOG HEALTH PROBLEMS AND PROGRAMS IN INDIGENOUS COMMUNITIES

Over the years various visitors to communities have been shocked by the health and welfare of dogs. While sometimes this is absolutely justified it must also be remembered that there are cultural values inherent in the assessment of animal welfare.

Many Indigenous people see urban dogs locked in isolation in back yards, never free to experience a litter of pups or to roam and hunt as their instinct tells them as a serious welfare concern. It is worth remembering these cultural differences when working in the field. Even when all dogs are healthy and well fed, when 80% are desexed and there is no canine scabies evident in a community, there will be still be some who comment on the “appalling state of the dogs in town”.

Any isolated community without veterinary service provision will experience difficulties with animal health and welfare, however in Indigenous communities there are additional complicating factors influencing animal health. The reasons behind the relatively poorer health of dogs in Indigenous communities are multi factorial and vary from community to community. Some of the specific factors are as follows.

ADJUSTMENT TO LOSS OF NOMADIC LIFESTYLE

Prior to the British invasion of Australia, Aboriginal people lived a semi-nomadic existence with dingoes as their companions. Dingoes appear to have moved with Aboriginal people scavenging their food, but being largely self sufficient. Their domestication was only partial (Wilks 2000).

White occupancy in the majority of areas of the Northern Territory has only occurred within the last century. Many old people can still recount their childhood memories of massacres at the hands of white settlers. This is not ancient history.

People have been asked to accept change and adopt unfamiliar law and lifestyles in the space of one to two generations. The impact of this rapid change affects all areas of Indigenous community life. The transition from a nomadic lifestyle to residence in permanent settlements is therefore a very new cultural phenomenon for Indigenous people of northern Australia. In part, the issues of animal health and welfare now confronting Indigenous people in communities directly relate to the imposed European culture of permanent residence.

Culturally dingoes/dogs have previously been self sufficient within the context of Aboriginal life. Living in the confines of a town or community does not allow dogs the

hunting possibilities they once experienced. In some cases people still expect their dogs to go off hunting by themselves for food, rather than solely rely on humans for their sustenance. Even dog lovers may see little problem with the idea of leaving dogs to fend for themselves, and will on occasion leave them unattended at outstations for weeks.

Pups are no longer born and raised in the semi arid wild as they once were. Both external and internal canine parasites accumulate in yards that, in the absence of population control, can easily house six litters of pups a year. If yards are watered or have poorly maintained and leaking plumbing, the resulting dampness enhances parasite survivability.

DOGS NOT DINGOES

The majority of people living in communities now own domestic bred dogs as opposed to dingoes. Dingoes have successfully adapted to Australia's unforgiving climate in a way that domestic dogs have not.

The ecological differences between dogs and dingoes also contribute to the problems of over population witnessed in community settings today. Dingoes have a particularly tight pack structure. They only breed once a year, having litters of three to five pups. It is usually only the dominant male and female that will breed. If a subordinate female does become pregnant, the dominant female will usually kill the pups. The result is only three to five live pups per year from a pack of 10-15 dingoes. This is the breeding structure that Aboriginal cultural systems relating to dogs were created around.

In contrast to the pack structure of dingoes, domestic dogs breed twice yearly. All females tend to cycle together and all become pregnant. Litters usually contain seven to eight pups. Pups are rarely killed by the dominant bitch.

POVERTY AND GEOGRAPHICAL ISOLATION

Because of poverty and geographical isolation, access to veterinary services, medication, information and education is limited.

Many of the communities in northern Australia are very remote, sometimes a 1400 km round trip to the nearest veterinary clinic. If a car is taken to town there is usually no room left for a dog in the travelling party. Journeys to town often result in stays longer than anticipated. Cars break down, finances run low, relatives get sick, etc. Housing a community dog in an urban town centre can be incredibly problematic for owners.

Even if dogs could be brought to a veterinarian when sick or injured the majority of people living in communities have incomes that prohibit the payment of standard veterinary fees.

Many communities are completely inaccessible by road for three to four months of every year during the monsoon season. In this time the health of dogs tends to deteriorate as the 'wet season' brings with it huge tick burdens and the increased potential for bacterial, fungal and parasitic disease to impact on dog health. Veterinarians rarely attend these communities while the roads are closed due to the increased cost of travel and the increased risk of surgical infections. Ideally if capacity is built effectively, people in communities can manage the problems until a veterinarian returns.

Pastoralists living on cattle stations often face similar dilemmas but come from a culture that sanctions euthanasia using a rifle as an alternative to suffering.

The vast majority of welfare concerns are completely ameliorated by regular provision of a veterinary service to the community if effectively combined with training people 'on the ground' to deliver medications in a veterinarian's absence.

HEALTH AND WELFARE EXPECTATIONS OF A COMMUNITY

Dog health and welfare needs to be seen relative to the societal context in which it occurs. People's expectations of dog health are naturally seen in relation to the realities of their own health and wellbeing. When compared to non-Aboriginal people, Aboriginal people in Australia have the highest morbidity and mortality rates, are poorer, have lower literacy and education levels, have the highest levels of substance abuse and related violence and experience the highest rates of incarceration.

Infant mortality rates in the Northern Territory are four times higher than the Australian rate, low birth weights are twice as likely, maternal mortality is five times higher than other Australians. In the Northern Territory Aboriginal people born in 1990 have a life expectancy that is almost 20 years less than other Australians. 58% of Aboriginal people die before the age of 55 compared with 17% for the rest of the Territory population. 50% of Aboriginal adults suffer from preventable chronic diseases including diabetes, hypertension and proteinuria. The rates of renal failure requiring dialysis are the highest in the world (English 2004).

In any community the human impact of these statistics is raw, as Michael Dodson states:

The meaning of these figures is not heard or felt. The statistics of infant and perinatal mortality are our babies and children who die in our arms... the statistics of shortened life expectancy are our mothers and fathers, our uncles, aunties and elders who live diminished lives and die before their gifts of knowledge and experience are passed on. We die silently under these statistics (cited in Deane 1996).

As a veterinarian working in communities and closely associated with the health clinic, one cannot avoid witnessing these statistics

in their tragic human form. 'Sorry days' occur with saddening frequency. Dog health and welfare must be placed into the context in which it sits in Indigenous communities. It is unrealistic to expect dog health and welfare to be better than that of their human companions in any society.

3 **Providing education** related to animal health to both Environmental Health personnel and individual households.

4 **Providing feral animal control.** This is particularly significant in remote outstation settings where dogs, cats and pigs may be abandoned at various times.

WHAT IS A DOG PROGRAM?

The meaning of the term 'dog program' varies from community to community. Nowadays, dog programs are probably better termed 'veterinary visits'. The visits are not restricted to the service of dogs alone, although dog work continues to be the main focus of the service. Pet cats, pigs, horses, birds and kangaroos will all be encountered.

Essentially what constitutes a dog program depends on what the community wants. Extensive consultation should always be undertaken to ensure the veterinarian's agenda does not override that of the community. At this stage however the majority of dog programs have aims related to:

- 1 **Controlling dog numbers**, thereby reducing their environmental health impact by:
 - » reducing the accumulation of potentially zoonotic pathogens in people's immediate environment
 - » reducing nuisance behaviours such as car chasing, barking and uncontrolled pack aggression towards people
 - » reducing rubbish pollution due to dogs constantly tipping over bins.
- 2 **Improving animal health and welfare** through the provision of basic veterinary services. The majority of dog programs currently conducted continue to be comprised of sterilisation and ivermectin programs.

THE HISTORY OF DOG PROGRAMS

STATION AND MISSION DOG CONTROL

Missions were set up in the 19th century, usually by clergy, to house, protect and 'Christianise' local Aboriginal people. Many Indigenous people disliked the mission systems and started to demand their own land. The Colonial Government responded by setting up Aboriginal stations or reserves. Often, these had previously been mission settlements.

Prior to the late 1970s and early 1980s dog control in Indigenous settings was achieved with the barrel of a gun. Up until the early 1970s many Indigenous people in northern Australia continued to live and work on their traditional lands, which were occupied by pastoralists. The station managers enforced dog control, keeping numbers manageable. In Western Australia, Government policy dictated that Aboriginal people could possess only one dog and that dog had to be male. Dogs in excess of this were regularly shot.

For Indigenous people already living in missions and later communities, dog control was usually enforced by local police who would destroy dogs by shooting. It is still the case today that dog catchers, councils and police will unite and shoot dogs under the auspices of enforcing dog by-laws or in the name of animal welfare. These instances are

coming under greater scrutiny as in many cases the Northern Territory Animal Welfare Act is being contravened. These events often leave communities traumatised and are a hindrance to ongoing improvement in dog health and welfare.

In other cases police will be called upon by community members to euthanase vicious dogs or dogs in distress. In these cases police are able to use their discretion as animal welfare inspectors.

GOVERNMENT INITIATIVES

The first coordinated attempts to improve dog health occurred in 1983 when veterinarians from the Northern Territory Department of Primary Industry (DPI), now the Department of Primary Industry, Fisheries and Mines, began using oral ivermectin and prorgestone (Covinan) in trials in Arnhem Land. These practitioners were joined by clinic nurses, professionals from the Menzies School of Health Research and local private veterinarians. These Government funded programs continued into the early 1990s with variable success.

In Queensland, the Australian Quarantine and Inspection Service (AQIS) provided a veterinary service in the Torres Strait from the late 1970s. This was based largely on monitoring animal health and controlling populations, with exotic disease very much in mind. The Queensland Department of Primary Industries (DPI), now the Department of Primary Industries and Fisheries (DPI&F), initiated ivermectin and Covinan programs in Cape York in 1989 with sporadic programs elsewhere in the north.

The main aims of the Northern Territory DPI programs were to:

- » decrease dog parasite burdens using regular ivermectin
- » improve the health of Indigenous people by reducing their exposure to zoonotic pathogens

- » reduce hygiene and nuisance problems in communities by reducing dog populations through contraception (Shield 1993).

Probably the greatest impetus for Government funding at that point in time was the suspected association between human scabies and dogs. Human scabies is in epidemic proportions in many Indigenous communities, the sequelae to infection being Streptococcal induced glomerulonephritis and subsequent renal failure. Menzies School of Health Research in Darwin conducted studies to determine if indeed human and dog scabies were linked. The studies concluded that the animal variants of the scabies mite were generally restricted to their animal hosts, and that the vast majority of human scabies disease was induced by the presence of the human variant. With this information there was a steady decrease in Government commitment to dog programs.

In the Northern Territory there is currently minimal governmental support for Indigenous dog health initiatives. The effectiveness of Aboriginal Environmental Health Workers (AEHWs) employed by the Department of Health is usually dependant on the quality of support they receive from Environmental Health Officers (EHOs) located in the major urban centres. EHO support in relation to dog programs is usually dependant on the personal commitment of the individual manning the position as opposed to being policy driven. Support to veterinarians tends to be in the form of assistance with early program planning, transport, accommodation and introductions to the community. Committed EHOs will then continue to assist the AEHWs in carrying out the program in the veterinarian's absence.

There is a relatively new Government initiative being undertaken by the Queensland Department of Health, Environmental Health Unit, Public Health Services. The program relating to Indigenous and Torres Strait Islander domestic and feral animal management is currently in early developmental stages. Consultation is taking place with members from AMRRIC

and Queensland's departments of Health, Primary Industries and Fisheries, Local Government and Planning, and Natural Resources and Mines.

In Western Australia the Dog Health Program commenced in Kimberley Aboriginal communities in 1994 and has subsequently expanded to cover the state. The people undertaking the program were trained by the Murdoch University's School of Veterinary and Biomedical Sciences and the program allows for a nominated person to hold a Poisons Permit for three drugs used to treat dogs: pentobarbitone (Lethabarb), proligestone (Covinan) and moxidectin (Cydectin pour-on). The permit holder is currently a suitable employee of a Public Health region or shire and is responsible for the storage of these drugs and their use by people trained in the program. Therefore in Western Australia, a large amount of the maintenance of dog health in communities still relies on the persistence of EHOs and trained AEHWs. Given the massive geographical distances involved it is often only possible for EHOs to visit communities on an annual basis. Dog health in these situations is not a top priority, although EHOs will attempt to implement an ivermectin and Covinan program during their visits if possible.

HEALTH CLINICS

Having seen the success of early dog programs many human health clinics became involved in dog health promotion programs. Clinic nurses often became the dispensers of ivermectin and Covinan in the veterinarian's absence. With the gradual shift away from zoonotic disease control as a focus of dog programs, people working in primary human health care, while supportive of programs, are now not directly involved.

It is, however, worth remembering that there may be unidentified capacity for dog program assistance within the retired Aboriginal Health Worker (AHW) population. Many older AHWs have previous experience in conducting dog programs, know all those from the

community who have taken part in program implementation in the past, and have the added benefit of being medically trained.

Do not, however, expect AHWs currently employed in clinics to actively take part in dog programs. It is an inappropriate use of human health funding and an additional burden to people who already have incredibly stressful jobs.

ARMY

Indigenous people in northern Australia have a long association with the Defence Forces. Many people were involved in coastal and inland surveillance for the Army during war time and others are currently among the predominantly Indigenous personnel of the surveillance regiment, Norforce (North-West Mobile Force). There is generally a good feeling towards the Army in northern Australia's remote communities.

In 1997 the Chief of the Army signed a Memorandum of Understanding that committed the Army to the ATSIC Army Community Assistance Program. This program was to improve basic community infrastructure, including aspects related to environmental health.

The Army now conducts a large deployment to a select community on an annual basis. Along with animal health programs the Army carries out airstrip repairs, house building, yard fencing, sewerage and water supply improvements, etc.

Their dog programs are particularly effective due to:

- » the length of time the Army can stay in a community: deployment is usually for three to four weeks
- » the wealth of resources at the Army's disposal
- » the commitment of Army veterinarians to education and training.

These programs can provide a wonderful kick start for future veterinary programs, often bringing dog health to a point where twice yearly visits from a veterinarian are all that is required to maintain dog health. For cases where there is already veterinary service provision, the Army is developing resource materials to enable more extensive education for the community.

PRIVATE PRACTITIONERS

In the Northern Territory and Queensland dog programs are now almost entirely conducted by veterinarians in private practice. Due to the volume of the work, the remoteness and fiscal constraints, many communities remain unable to source veterinary services on a sustainable basis.

There are numerous veterinary practices engaged in community work in the Northern Territory. They tend to service communities closer to the townships where their practice is located. While it is ideal that all communities be serviced by their closest veterinary surgery problems encountered with this method of service delivery are as follows:

- » It is difficult for a veterinarian to be removed from their practice for days on end. Therefore the majority of service provision from local veterinarians takes place during one to three day visits. Time constraints like this make capacity building more difficult and programs tend to focus only on service delivery. Local veterinarians may also have limited flexibility in cases where 'sorry' or funeral days are called at late notice.
- » Given the seasonality of the work due to weather it is usually not viable for practices to employ an extra full time veterinarian on the basis of dog program work alone.
- » Private practice costing must also encompass maintaining the practice overheads, locum employment, etc. This often results in pricing that prohibits many communities from purchasing

sustainable programs, particularly those in more remote regions where day trips are impossible.

There are also a number of solo veterinarians whose primary work is in the field of dog programs. The veterinarians are often able to supply service at a reduced cost due to lack of overheads. They are usually able to stay in a community longer due to lack of other work commitments. The significant problems associated with this style of work are as follows:

- » Veterinarians who structure their work in this way can be on the road for five to six months each year. It is therefore of limited appeal to veterinarians who have family or other commitments. 'Burn out' can be significant as the work is repetitive and isolating in many ways.
- » The seasonality of the work means these veterinarians may face employment difficulties in the off season.
- » The local town veterinarians are usually still the people who have to contend with the majority of phone questions about individual cases in communities. Local practices can resent the intrusion of an out-of-town practitioner onto their turf and relationships may become strained. It is important that visiting veterinarians create an atmosphere of collegial communication with the local veterinarians in town. It is appropriate to inform town practices when you are visiting a community as this allows them to make better decisions for animal health and wellbeing when conducting phone consultations.

There is now also a small group of veterinarians who live and work interstate but have additional registration in the Northern Territory. These practitioners visit particular communities a few times every year to provide service. They usually have a commitment to assisting Indigenous people and thus find the work fulfilling, challenging and interesting.

Difficulties encountered in this context can be:

- » a lack of flexibility if trips are planned around confined fly-in fly-out dates
- » a lack of local knowledge and networks. This can be overcome with repeat visits but can create difficulty in the early stages.

There could also be veterinarians and nurses who, while unable to commit to running a program, are prepared to regularly participate in a program lead by someone else.

RESEARCH GROUPS

Special research into dog health in Indigenous communities has taken place across northern Australia. The majority of these research interests carry the philosophy of 'no survey without service' when veterinarians have been included in the research teams.

Research has or will be conducted by:

- » James Cook University, Public Health Unit (Rick Speare) in conjunction with Queensland Department of Primary Industries (Jack Shield)

REFERENCES

- Corbett, L. (1995). *The dingo in Australia and Asia*, Australian Natural History Series. Sydney: University of New South Wales Press.
- Deane, W. (1996). *Some signposts from Daguragu*, Inaugural Vincent Lingiari Memorial Lecture. Canberra: Council for Aboriginal Reconciliation/AGPS.
- English, G. (2004). *Healing in Parallel: The role of traditional healers in contemporary health care, Northern Territory, Australia*. A thesis submitted in partial fulfilment of the requirements of a Bachelor of Arts (Honours in Anthropology). Charles Darwin University.
- Prouse, I. (1993). An Aboriginal perspective on dog health programs. In J. Shield (ed), *Dog health in Indigenous communities*, proceedings of a conference held in Darwin in 1993 as part of the Western Pacific Conference, p. 26.
- Shield, J. (1993). The dog health programs in far north Queensland Aboriginal communities. In J. Shield (ed), *Dog health in Indigenous communities*, proceedings of a conference held in Darwin in 1993 as part of the Western Pacific Conference, p. 8.
- Wilks, K. (2000). Sustainable dog health programs are possible: West Australian experiences in remote management and service delivery. In *A better dogs life*, proceedings of a three day conference on dog health programs in Indigenous communities, Darwin, Australia, p. 15.

- » Northern Territory Department of Primary Industry (Ross Ainsworth, Arthur Palmer)
- » Murdoch University (Ian Robertson, Katherine Wilks)
- » Newcastle University (Graham Brown)
- » University of Sydney (Robert Dixon)
- » Menzies School of Health Research (Bart Currie).

Any veterinarians considering Indigenous community work are encouraged to contact AMRRIC and explore the possibilities of concurrent research in the field. The evidence base for much of the work in relation to zoonoses and population dynamics in dog programs is lacking. If research is not conducted early in a program valuable data in relation to the effect of dog programs is unavailable. Therefore record as much as possible. Even if you feel you don't want to get involved in research, this data can be valuable to others. Basic biometric and health data is also important for a before and after comparison to determine the success or otherwise of a dog program.

3

HISTORY AND FEATURES OF COMMUNITIES

....the past is never gone. It is absorbed into the present and the future. It stays to shape what we are and what we do (Deane 1996).

Essentially the history of every community's formation will be different. When working in communities it is worthwhile understanding the history of the particular community you are in. It often underpins the system of local governance, an understanding of which is essential to both an easy flow of work and inclusion of all members of the community.

It is also worthwhile having a broad understanding of Indigenous history since European invasion as it will place your work into its rightful context. The potted history below relates only to the Northern Territory, although much of the history is also true for Queensland and Western Australia. The information below is in no way a detailed history and further reading is recommended prior to beginning work.

CLAN GROUPS

Aboriginal society is comprised of extended family units of patrilineal descent known as clan groups. Each clan has its own complex history and culture that extends back thousands of years. Clan groups have their own estates of land, systems of governance, systems of trade, separate cultural traditions, differing areas of expertise and responsibility in relation to plant and animal husbandry and varying political allegiances to various other clan groups, etc. In effect they are small political and cultural institutions unto themselves. Various clans may share

language with neighbouring clans but their primary alliance is with their own clan members (Trudgen 2000).

Invasion has had an enormous impact on this system of clan governance. Some clans no longer exist, all members killed by frontier violence and subsequent sickness. Many others have been forced off their traditional lands and on to land of unrelated clan groups. Many communities are now home to up to 20 clan groups, each continuing to acknowledge their own clan history and allegiances. Not only may communities contain members from different clans they are also often home to members from entirely different language groups, originally forced together as people fled frontier violence or were 'rounded up' under various Government policies.

EARLY EXPLORATION, PASTORALISTS AND POLICE

Due to the harsh climate of both the desert and the tropics the impact of invasion on traditional Aboriginal lands was not felt until the mid 1880s in many areas of the Northern Territory. White people came in the form of gold seekers, pastoralists, missionaries and police. The prevailing white culture of the time viewed Aboriginal people as nothing more than animals on the landscape. This view combined with confusion over

land ownership resulted in the large scale shooting of family groups. The violence quickly evolved into protracted guerrilla wars between local Aboriginal groups and white stockmen and police.

Stories relating to this violence are far too numerous to list here but what resulted was in effect a policy of dispersement where Aboriginal people were violently forced from their homelands and clan groups were 'dispersed' in large numbers. Massacres of 50-100 people were commonplace, disputes often arising from white men's associations with Aboriginal women or the spearing of cattle on newly acquired station lands. In Hermannsburg, Central Australia, Missionary Kempe wrote in 1885:

In ten years time there will not be many blacks left in this area, and this is just what the white man wants. With all the shooting taking place it is hard to conceive that the native people have any kind of future (Dowling 1988).

A notable and relatively recent massacre occurred in 1928. The 'Coniston massacre' followed the kidnapping of a Warlpiri woman by a local white dingo scalper. The white man was killed by Warlpiri men. Police led a search party that resulted in the recorded deaths of 32 Aboriginal people, but local station owners who were present at the massacre calculate that at least 100 Aboriginal people were killed. This kind of brutal annihilation and dispersal of clan groups was practiced well into the 1900s and is still remembered sadly by elderly people.

RESERVES AND MISSIONS: POLICIES OF PROTECTIONISM AND SEGREGATION

The first mission in central Australia was established in 1877. Many more spread throughout the area as Aboriginal people sought protection from the increasing pressures of violence but also from drought on their respective countries.

Drought forced people on to mission stations as late as 1963. An account of a man hunt at Warburton Mission said:

We went to the mission because we had no food, and we didn't know what to think. This is our place, and we stayed here without food. So we went to buy food with dingo scalps. One by one we went and stayed a long time in that rubbish place (cited in Dowling 1988).

Whilst drought was certainly a natural feature of the Australian landscape its impact had become worse due to grazing of the land by cattle that contaminated water supplies and destroyed much of the plant biodiversity, thereby removing harvestable bush tucker. People's ability to move to protect themselves from drought was also compromised by station managers who would not permit access to traditional tracts of land.

1890 saw the establishment of the first Government Reserve for Aboriginal people in the Northern Territory. Direct Government control over people's lives grew and in 1910 the South Australian Government, at that time governing the Northern Territory, legislated for the "protection and control of Aboriginal people".

This protectionist policy largely became one of segregation. The majority of appointed 'protectors' were local police. They had powers under the Chief Protector of Aborigines that included segregating Aboriginal people into reserves within town limits, prohibiting entry into towns, forcibly transporting people back to remote communities, control over any finances an Aboriginal person may have, restricting travel by Aboriginal people, controlling sexual relations between Aboriginal people and whites and incarcerating Aboriginal people in medical facilities such as the venereal disease and leprosy compounds (English 2004).

POLICY OF ASSIMILATION

In 1939 the Government introduced its Policy of Assimilation of Indigenous People. It was largely assumed at this time that 'full blood' Aboriginal people would eventually die out. They were held in reserves to maintain segregation. The Director of Native Affairs assumed powers of control over where Indigenous people lived, when and where they moved, whom and under what conditions they could marry, as well as forcibly separating Aboriginal children of mixed descent from their families (English 2004). These children were moved to missions and reserves far from their homelands to prevent their families tracking them. This was already happening in a less organised fashion, but continued under official policy from 1939 until the early 1970s.

The development of settlements continued throughout the 1950s and 60s. Aboriginal people were forced onto these settlements, often being removed further from tribal countries in the process. The settlements were often established at pre-existing ration stations, on excisions from station pastoral leases, or were purpose built for forcible relocation of people from other overcrowded settlements in the region.

Throughout periods of restricted movement Aboriginal people continued wherever possible to retain their connection to their land and thereby their law, language, hunting, and ceremonies. Whilst there has been an enormous social cost, the resilience and determination of Indigenous Australians in continuing their cultural practices against an overwhelming assault has been remarkable. Michael Dodson captures the importance to Aboriginal people of connection to the land when he states:

To understand our law, our culture and our relationship to the physical and spiritual world, you must begin with the land. Everything about Aboriginal society is inextricably interwoven with and connected to, the land. Culture is the land, the land and spirituality of Aboriginal people, our cultural beliefs

or reason for existence is the land. We have grown the land up. We are dancing singing and painting for the land. We are celebrating the land. Removed from our lands, we are literally removed from ourselves (cited in Williams 1998).

STATION LIVING

Following the cessation of outward violence towards them many Aboriginal people in northern Australia remained, whenever possible, on pastoral leases near their traditional country. This allowed people some freedom from the restrictions of Government policy. Family groups remained relatively intact with those of working age taking employment on stations as ringers, nannies, cooks and cleaners. Payment was usually only in the form of rations. Whilst tightly controlled, Aboriginal people had continued access to their traditional lands for hunting and ceremony, and station managers benefited from the cheap labour.

These situations were commonplace until equal pay legislation was enacted in 1967. As Aboriginal people were no longer valuable to station owners as cheap labour, many were again forced from traditional lands towards welfare, settlements and mission stations. The station tradition continues however in many areas across the Territory with young men frequently leaving communities to work on neighbouring stations and the many Indigenous land holdings running as small scale cattle enterprises.

THE 1970S: ERA OF SELF DETERMINATION AND COMMUNITY CONTROL

In 1967 a referendum granted Australian citizenship to all Aboriginal people. This was closely followed by the development of a policy of self determination by the Whitlam Government in 1973. For the first time the

right of Indigenous people to determine their own future was officially acknowledged. The introduction of this legislation coincided with a land rights movement over much of the continent. In 1975, led by Vincent Lingiari, the Gurindji people successfully laid claim to an excision from Wave Hill Station at Wattie Creek following a nine year strike. This was the country they had traditionally owned and had continued working on since occupation.

Throughout the 1970s and 80s many Aboriginal people left the settlements and mission stations returning to their homelands, the Government making funds available to allow the purchase of what was often extremely marginal grazing country. Aboriginal people could now claim social security payments, and royalties from mining leases on Aboriginal land were becoming a reality.

This movement on to traditional lands has been further aided by the Native Title Act 1993.

MODERN COMMUNITIES

Communities today essentially reflect some or all of the above policies and forced movement of people. Some are old mission stations, some reserves and settlements, others lie on the sites of old station country or reflect the homeland movement with decentralised outstations covering a region. Others still are 'town camps' on the boundaries of white settlements and urban centres.

In theory the policy of self determination continues today and communities are run by democratically elected councils of local Indigenous people. The level of formal school education of many people on these councils is very limited and English is the second, third or fourth language of many older people. This combined with self determination having been squashed for the past 100 years means that much of the governance actually lies in the hands of

the predominantly white Local Government administrators, and Aboriginal councils are often only as strong and informed as these administrators wish them to be.

OUTSTATIONS

Since the 1970s there has been an organised attempt by community, family and clan groups to return to their own country which has resulted in the development of outstations or homeland centres.

These are usually small centres with between one and fifteen houses. The facilities at outstations are usually more limited than that of bigger communities. Most have no shop, school or clinic and run on generator driven power at night only. Outstations may be controlled by Local Government, outstation resource centres or may be independent. In some cases outstations are a three hour drive from the nearest shop, with people continuing to live a traditional life in many ways.

Dog health and population control on outstations is often a matter of concern. Servicing outstations is usually costly in terms of both time and money due to the travel required. The value of spending a full working day servicing an outstation on which there are only four dogs needs to be carefully considered. However one must also consider the feral animal implications of undesexed dogs on outstations given that:

- » female dogs left unchecked to breed with the local wild dog/dingo populations can potentially cause environmental disaster, hybridisation currently being the greatest threat to dingo conservation in Australia
- » outstation dogs are frequently left unattended for long periods of time. It is not uncommon for people to desert dogs at outstations if the country floods quickly.

REFERENCES

Deane, W. (1996). *Some signposts from Daguragu*, Inaugural Vincent Lingiari Memorial Lecture. Canberra: Council for Aboriginal Reconciliation/AGPS.

Dowling, J. *Ngurra walytia, country of my spirit*. Canberra: Australian National University, North Australia Research Unit.

English, G. (2004). *Healing in Parallel: The role of traditional healers in contemporary health care, Northern Territory Australia*. A thesis submitted in partial fulfilment of the requirements of Bachelor of Arts (Honours in Anthropology). Charles Darwin University.

Trudgen, R. (2000). *Why warriors lay down and die*. Darwin: Aboriginal Resource and Development Services Inc.

Williams, N. M. (1998). *Intellectual property and aboriginal environmental knowledge*. Darwin: Centre for Indigenous Natural and Cultural Resource Management, Northern Territory University, p. 40.

KEY PEOPLE AND INFRASTRUCTURE

THE VETERINARIAN

Veterinarians working in communities come from various areas of the profession. The majority of dog programs in northern Australia still run on a service delivery model. It is increasingly acknowledged that these programs are not particularly cost effective for communities nor do they promote community capacity development in any way. This issue is discussed in greater detail in the following chapter.

Veterinarians engaging in community work may be responsible for a range of tasks such as:

- » consulting with the community and other stakeholders
- » providing veterinary clinical services as deemed necessary by the community
- » providing expertise in relation to program planning, welfare considerations, the development of educational materials and estimating the time it will take for changes to occur
- » training personnel to undertake program maintenance in the veterinarian's absence
- » building capacity across all sectors of the community by delivering education
- » assisting with budgeting for a program's sustainability
- » surveillance of exotic diseases

» collecting data and/or samples for research.

It is advisable that veterinarians who want to work in Indigenous communities have the skills and qualities listed below.

- 1 *A willingness to undertake some form of appropriate cross cultural training.*

There are significant cultural differences between Indigenous society and our individualistic society that will impact on your ability to deliver a veterinary program. AMRRIC can recommend worthwhile cross cultural courses that are of interest and value to veterinarians moving into Indigenous dog program work. These can be short courses of two to three days or involve longer, more intense study.

- 2 *Willingness to learn a little of the language.*

If you are planning to provide a service to one language group area, it would be highly desirable to learn at least a little of the main language of the community you will be working in. Charles Darwin University offers these language courses.

- 3 *The ability to give a minimum three year commitment to a community.*

True developmental relationships are fostered upon "trust, empowerment, mutuality and participation. They are not entered into lightly and require commitment and responsibility on behalf of everyone involved" (Burkett and Kelly).

Remote communities tend to have a high staff turnover rate which is disruptive to new projects and community development programs. Good working relationships are crucial to getting anything done anywhere. When staff come and go every six months, getting any form of effective change is virtually impossible. High staff turnover also tends to make Indigenous people hesitant to engage in relationships with new staff members too quickly.

Indigenous people take the development of meaningful relationships and honesty in dealings very seriously. Once a long term relationship has been developed with a community it becomes a supportive environment in which it is very easy to get work done. People embrace the fact that you actually remember individual dogs, remember what house they live in, etc. These are small but incredibly important contributors to a successful community-driven dog program.

It is therefore recommended that any veterinarian wanting to engage in this form of work is able to give, as a minimum, a three year commitment to a community. If a veterinary practice secures a 'contract' in a particular community, it is highly preferable that the same individual veterinarian visit the community each time. Rotating operatives on a roster system may offer the advantage of increasing each individual's experience. This may, however, be at the expense of the community's trust and understanding if they see a different person arrive each time. A three year commitment will enable the planned program to be tested and modified over time and may empower a community to a point where they are able to direct the next veterinarian, rather than be directed by them.

While a minimum three year commitment is required from those running the program, there are opportunities for those prepared to assist on an occasional or ad hoc basis.

- 4 *To be available for a minimum of two visits per year to any given community.*

The time spent in a community will depend largely on what the community wants from the veterinary service and what their available budget is. In general the majority of communities require a minimum of two visits per year. If there is to be a community development focus to the work it is usual for each visit to be five working days. Ongoing phone support must also be available for the community people left in charge of the program.

Monthly or quarterly visits would usually be preferable, particularly at a program's inception, but the majority of communities do not have budgets that can sustain this intensity of service provision or the associated travel costs.

If proligestone (Covinan) is to be used, the scheduling of visits should take into account the frequency of treatment required and the ability of trained assistants to administer treatments in the veterinarian's absence (see Chapter 10: Population control: Proligestone injection (Covinan): Protocol).

- 5 *An ability to spey quickly and efficiently.*

The surgical facilities available in Indigenous communities are usually far from ideal. In these circumstances, it is highly desirable that a surgeon be able to adapt and improvise, and to perform routine surgery (mainly desexing) with ease.

- 6 *To possess personal attributes that lend themselves to intercultural work.*

The following list has been devised as a set of competencies for intercultural workers. The possession of these skills and attributes will make you more likely to succeed in any community development project.

- » Be non-judgmental: short circuit a tendency to negatively judge others perceived as different.
 - » Be flexible: readjust quickly and effectively in quickly changing situations.
 - » Be resourceful: skilfully and promptly obtain the things required to respond effectively to a given situation.
 - » Personalise observations: express appropriately your personal feelings, thoughts, ideas and beliefs in a warm personal way, whilst recognising that the other person may not share them.
 - » Pay attention to your feelings and take them seriously.
 - » Listen carefully and observe attentively: careful listening and attentive observation increase your sensitivity and ability to receive the whole message.
 - » Assume complexity: recognise in an ongoing way that in a culturally diverse environment, perspectives and possible outcomes are multiple.
 - » Tolerate the stress of uncertainty: avoid showing any irritation or annoyance you may be feeling with the ambiguity of the culturally diverse situation.
 - » Have patience: stay calm in challenging situations and persist through trying situations.
 - » Manage your personal biases and stereotypes: always move beyond your personal outlook and point of view so that you treat the person before you as an individual, in full acknowledgement that no one person ever typifies a group.
 - » Keep a sense of humour: avoid taking things so seriously that you lose your perspective and are unable to laugh at yourself or an absurd situation.
 - » Show respect: go out of your way to express, in a genuine and authentic way, respect for the people and culture you are submersed in.
 - » Show empathy: experience the other person's perspectives, feelings, beliefs and attitudes as if they were your own (Hogan-Garcia 1999, cited in CDU CDP400 Study guide 2003).
 - » Be level headed and have a degree of physical and emotional toughness.
 - » Be streetwise enough to anticipate violent situations and respond accordingly.
- In addition to these it is advisable to maintain self-awareness. To create sustainability in any program you must first sustain yourself. This may sound simple but when removed from the feedback systems in place in your normal culture it is easy to begin to run on auto pilot. It is important to maintain an awareness of things such as:
- » Your health: observing your diet, fluid intake and hygiene.
 - » Your mental outlook: if you feel you are not responding in an authentic fashion you probably need some time out. Resist becoming cynical as it will impact dramatically on your relationship with the community. Be aware if you feel you are beginning to burn out and address the situation before it worsens.
 - » The health of the community: at times the community may be in deep mourning or in crisis. It is essential that you acknowledge this and respond accordingly.

» The limitations of your work (CDU CDP400 Study guide 2003).

- 7 An ability to work in far less than ideal conditions.

There is no doubt that community work is both immensely rewarding and immensely challenging at the same time. One must be prepared to work outdoors in the heat with minimal creature comforts. It is probably fair to say that if you don't enjoy camping you probably won't enjoy the work, as more often than not you will be working in conditions similar to those experienced when camping.

WHAT DO VETERINARIANS CHARGE?

There are wide variations in fees currently being charged for services to Indigenous communities. Of course any veterinarian is free to charge what they feel is appropriate and necessary given their particular business requirements.

AMRRIC does not intend to set standard fees for veterinarians to charge. One must however realise that these communities are stretched when it comes to funding and a level of discretion and fair play in relation to charges is commendable and ensures sustainability of the program. At the same time AMRRIC does not wish to support a welfare system where services are provided at costs that are unrealistic, unsustainable and unreasonably low for the veterinarian.

Different veterinarians have different methods of charging. Some charge a flat daily rate, independent of the amount of work carried out. This encourages and benefits communities that are organised and have teams of willing assistants. They are able to get a lot of work done for their dollar. It is far easier to quote for the work to be done and thus makes budgeting and the tender process easier for the Community Government Council (CGC).

Other veterinarians charge a flat daily fee to attend the community and then additional fees for each treatment carried out.

Disruptions like 'sorry days', community meetings, no one to help or no vehicle can be very expensive for veterinarians who have come a long way and may be paying a locum back home. Charging a reasonable flat rate makes negotiating around sorry days or other forced stand down days easier. Another alternative is to charge a lower weekly rate irrespective of what happens on individual days.

Your charges should also reflect what the community has agreed to provide. Accommodation is mentioned in the next section and other provisions may include a vehicle, fuel for your vehicle or food for your team.

No matter how you choose to charge, accountability for work performed is essential. Always record the number of procedures such as ivermectin treatments, euthanasias, desexings, etc. against a house number or owner name. Include these numbers in your invoice to allow the council to quickly assess some aspects of the program's efficiency.

Additional charges

» Travel

If you are travelling by car, it is expected that you will charge for this at a specified rate per kilometre.

If you will be travelling from interstate, transportation between the main airport and the community, and the provision of a suitable work vehicle to use while in the community will need to be discussed.

In many situations the community is expected to pay air fares to get the veterinarian to the site. If this is the case, the community is normally expected to meet your full transport needs while in the community plus, if necessary, transport to and from your accommodation.

All of this needs to be worked out and any associated costs (including mileage rates and estimates) included in your initial quote.

» **Accommodation**

Accommodation is usually provided by the council free of charge. This needs to be clarified before arrival as accommodation for visiting contractors is at a premium in these remote settings. If a fee is to be charged for accommodation you may wish to recoup this in your account.

» **Goods and services tax (GST)**

If you are registered for GST you are required to add 10% GST to the total cost of your invoice. Community Government Councils are able to recoup all GST charged to them. Their stated budget for dog programs (for example \$10,000 per year) is usually exclusive of GST. Confirm this with the CEO when negotiating how much work is possible for the budget allocated.

Sorry days

In many Communities a day or more is required for grieving if someone has passed away. These are termed 'sorry days' and sadly occur all too frequently. Veterinarians need to remain mindful of family sadness and cultural sensitivities at times such as these. It is usual for the school, shop and council office to close for an entire day. On these days it is usually considered inappropriate to visit houses to carry out veterinary duties. Usually the day is spent inside quietly.

The Indigenous persons assisting you are the best people to determine the appropriateness of any work to be carried out on sorry or funeral days. In some cases it may be acceptable to service particular areas of the town. In other cases it is necessary to stop work completely.

It is important to discuss protocols around sorry days as they arise. Usually the CEO will continue to work on a sorry day in a closed

and locked council office. Report early in the morning to negotiate expectations. Rarely, a CEO may direct a veterinarian to continue working despite the community closing for the day. It is important in these circumstances to respond to the community wishes as highlighted by your Indigenous assistants.

Negotiate fair pricing for the day of forced stand down. Often, time permitting, a half day on Saturday may be worked to make up the ground at no extra charge. Alternatively a fee minus disposable expenses and sweat money may be negotiated. To be pushy and work against community wishes is poor cultural practice and will not engender a feeling of support for you or the services you provide in the future.

VETERINARY ASSISTANTS

The veterinary assistant is a key person in animal health programs. It is an enormous advantage for the visiting veterinarian to have a good assistant in the community and it is therefore worth selecting this person (or persons) well. A likely assistant should be encouraged, trained, rewarded and supported. In a well-working program this is the person through whom many of the community's questions will be channelled to you so it is important to sponsor a trusting relationship within which they feel comfortable to contact you back in your surgery between visits.

The availability and quality of veterinary assistants will vary enormously from community to community. The most common people involved in assisting you are:

- » your own nurse
- » an Environmental Health Worker (EHW) from the community
- » staff employed under the Community Development Education Project (CDEP)
- » other community members employed directly by you or by the council.

TRAINED VETERINARY NURSE

In cases where there is an enormous workload, with many people wanting surgery for their animals, it may be expedient to utilise your own nurse. The advantages of travelling with a fully trained nurse are obvious when it comes to the veterinarian's own workload and stress. To have someone experienced in all aspects of surgery is always welcome, particularly when working in less than ideal conditions.

In some communities it may be virtually impossible to have anyone local assist you in your work. In these cases travelling with your own nurse speeds up the process immensely.

There are however distinct disadvantages of travelling with your own nurse. If there are strong community concerns about a dog program (perhaps in light of a history of non-negotiated dog culls) the arrival of two white strangers may be seen as more threatening than the arrival of the veterinarian alone. Residents may initially be less threatened and more engaging when they only have to deal with a single white person. Large scale culling programs are usually conducted by more than one 'outsider'. Turning up alone may reassure old people that bullying owners into culling their animals is not your intention.

In some cases local workers may also feel disempowered by the presence of a nurse. They may effectively be left with nothing to do for long periods of operating time. When a veterinarian and a nurse have a pre-existing rapport, the local assistant may feel they are unnecessary to the process. Of course the opposite can be true, with experienced nurses being able to teach local assistants about premedication, anaesthesia, surgical preparation, aseptic technique and emergency wound repair while the veterinarian is busy operating.

The use of your own nurse will also increase the cost of the service being provided to the community. If the community is able to supply reliable workers to assist you, taking a nurse may be an unnecessary cost to the community. Discuss what capacity exists in the community prior to your arrival to determine the necessity of being accompanied by a veterinary nurse.

The use of a nurse should never replace the employment of local personnel.

Local people are crucial as interpreters and cultural guides. Without the involvement of local people, the program will always remain a 'service delivery' on the fringe of the community. Local people are also important in the continuation of the program in the veterinarian's absence.

Capacity building is a responsibility of all veterinarians visiting communities. If a veterinarian and a veterinary nurse enter a community together, ensure that your combined expertise does not exclude local people from a learning experience. Try to have the community veterinary assistant assist you in the surgery. The experience has the potential to train and empower them in a real and practical manner.

INDIGENOUS ENVIRONMENTAL HEALTH WORKER (EHW)

Some communities have access to service provision from a local Environmental Health Worker (EHW). Employment of EHWs in the Northern Territory is by:

- » Northern Territory Department of Health and Community Services: across the Northern Territory there are ten funded EHW positions
- » Local Area Health Boards
- » Community Government Councils, usually with Health Board co-contribution.

In Queensland EHWs are employed by:

- » Queensland Department of Local Government: funds 34 Queensland communities
- » Some Aboriginal and Torres Strait Islander shire councils.

In the Northern Territory, the positions may be full or part time. EHWs report directly to the Environmental Health Officer from either the Government health service or local area health board.

In the Northern Territory there is a standardised course for EHW training conducted at the Batchelor Institute of Indigenous Education. In Western Australia EHW training for dog programs is undertaken in association with Murdoch University's School of Veterinary and Biomedical Sciences.

The Batchelor course is divided into Certificates I-IV. Students attend the school for residential blocks. Given the training commitments of EHWs it is always worth confirming that they will be in the community to assist you during a planned visit.

EHW duties and training relate to:

- » facilitation of community consultation and education in relation to Environmental Health matters
- » assisting with the completion of housing maintenance surveys for Local Government and reporting repairs
- » conducting other Environmental Health surveys as required
- » conducting pest and vermin control as required
- » assisting the veterinarian with dog surveys and conducting and recording ongoing parasite treatments

- » monitoring mosquito species and prevalence, and conducting mosquito eradication and control programs as required

- » monitoring the community's sewerage treatment ponds

- » monitoring the community's rubbish tip

- » supporting and participating in community health information and education programs, and assisting with the development of educational materials.

COMMUNITY DEVELOPMENT EMPLOYMENT PROGRAM (CDEP) PARTICIPANTS

Involvement with the Community Development Employment Projects (CDEP) program is the most common source of employment available to people in communities. Given the lack of 'real' economy in most communities the vast majority of people are dependant on social security in some form or another. CDEP is in essence a 'work for the dole' type scheme. It is funded by the federal Department of Employment and Workforce Relations who also fund Centrelink.

The scheme was designed for Indigenous communities, however some non-Indigenous people are eligible if living in an Indigenous community. In large communities there is usually a non-Indigenous 'CDEP co-ordinator' position. This person directs and supports workers, assists with project development, handles time sheets and ensures people are paid correctly.

CDEP workers are employed in community based programs which vary enormously from community to community. Work includes Landcare and ranger work, plumbing and house maintenance, rubbish removal, community store employment, women's centre and 'meals on wheels' management, canteen cooking for 'smoko' provision, road grading and town beautification as well as

other area-specific employment, for example mud brick construction, fishing and crab licence operation, tourism, etc.

The standard requirement to receive CDEP is 16 hours of work per week. Most community workers work a four hour day having Friday as a day's leave (if you include the daily hourly break this is 20 hours). The pay is equivalent to the 'Newstart' allowance, totalling approximately \$12,000 per annum, and is tax free. In addition to the individual's pay, the community also receives additional project funding equivalent to \$3,250 per person. This funding supports the CDEP co-ordinator position and supplies vehicles and fuel, etc.

If workers are performing essential service delivery or are working in an area that generates income, there is room within the program to increase the number of hours worked to 40 hours a week. This is termed 'Top-up' and equates to a gross taxable annual wage of around \$27,000. There are however strict limits on the budget that can be directed towards top-up. Alternatively some CDEP programs issue the top-up as an hourly casual rate in line with awards.

In communities where there is no Environmental Health Worker it will frequently be one or two CDEP employees who will be your assistants. In initial discussions with the council or the CDEP co-ordinator it is important to ensure the assistants can be paid top-up or you will end up working unassisted every afternoon. It is also usually worth having two assistants where possible.

OTHER INDIGENOUS COMMUNITY MEMBERS

An alternative to working with people in the community roles mentioned, is to hire someone directly from the community and pay them either from your own pocket or

by previous arrangement with the council. Given the lack of meaningful employment in many communities workers employed in this capacity are usually very enthusiastic and dedicated to the work.

LOCAL GOVERNMENT AND COMMUNITY GOVERNMENT COUNCILS

In most cases veterinarians will initially deal with Community Government Councils. In Queensland these are called Indigenous Community Shire Councils. These councils are essentially like any other local elected municipal council across Australia. Each council has an elected membership and a President or Mayor from within the community appointed by a democratic voting system.

The majority of councils in Indigenous communities employ Chief Executive Officers (CEOs) to assist with all aspects of service provision and budgeting. CEOs are usually of non-Indigenous background and are appointed by the Department of Local Government. In their poorest form CEOs of communities have taken over the old role of mission station managers, engaging in limited consultation with community personnel and dictating as to people's needs. In their best form CEOs are people with a commitment to community development and sound business skills, and they assist in the smooth running of communities.

Like most other areas of employment in remote communities there can be a relatively rapid turnover of CEOs. It is therefore important that you do not rely on the CEO as your only means of assessing the community's priorities for animal health promotion, but instead consult more widely within environmental health networks and with members of the community.

Due to the remoteness of the Northern Territory the CGCs are responsible for a broader range of service provision than in many other states. The functions and services provided by the CGC include:

- » animal control and impounding
- » commercial development
- » communications
- » community amenities
- » education and training
- » electricity supply
- » garbage collection and disposal
- » health
- » housing
- » community employment
- » roads and associated works
- » sewerage
- » water supply
- » welfare.

In some areas in the Northern Territory no local government council will govern. This is often the case with outstations. In these situations government services are provided by Aboriginal outstation resource centres or incorporated council associations. In Queensland outstations are managed by the shire council of the area.

In relation to dog health promotion, the CGC or other recognised body may be involved in the following:

- » organising meetings and notifying the community of veterinary visits
- » the provision of accommodation and a suitable work space

- » administering CDEP and/ or EHW support
- » maintaining program timelines in the veterinarian's absence
- » contracting and paying the veterinarian
- » enforcing dog by-laws: some local councils have dog by-laws that stipulate regulations in relation to dog ownership and control. In the vast majority of cases those by-laws are not enforced at all. In some towns however, usually those not on Aboriginal land and with larger non-Indigenous populations, councils may make efforts to enforce dog by-laws. This situation is problematic as it almost inevitably leads to a direct clash of cultures. The two to three dog limit per household that usually applies is very difficult for Indigenous people to achieve, with euthanasia often being people's only option for compliance.

PURCHASE ORDERS AND PAYMENT

Usually the Community Government Council will be responsible for paying for veterinary services, although in some cases it could be another entity. CGCs operate on a system of purchase orders. The accountant or finance officer holds a book of purchase orders that allows them to track outgoing monies prior to the funds actually being paid.

A signed purchase order is your surety of payment. It is essentially a formalised contract between the veterinarian and the CGC. It ensures the veterinarian will be paid in the event of a CEO leaving or a council becoming defunct as occurs with relative frequency. It is wise to receive a purchase order number or have a copy faxed to you prior to visiting the community. If this is not possible it is wise to get one issued upon arrival.

On completion of work as compliant with the purchase order, the veterinarian invoices the CGC. This is simply achieved by carrying an invoice book with you, and can be completed prior to leaving the community (if return

travel kilometres are known). Alternatively the invoice can be computer generated on your return home.

In compliance with Australian Taxation Office (ATO) specifications the invoice must contain the following information:

- » a tax invoice number
- » your business name, Australian Business Number (ABN) and address
- » the community's name and address
- » an itemised invoice for services provided.

Additionally it is wise to include the purchase order number to make processing easier.

A 30 day turn around for payment is the minimum that ought to be expected. The majority of councils do not process funds in the community. Most invoices are sent on to finance officers or accountants in the major towns. This process is time consuming but to some extent protects communities from fraud. Most councils reconcile monthly. The money can usually be paid directly into your specified account or by cheque if you prefer.

HEALTH BOARDS

As part of a decentralisation of health service delivery in the Northern Territory, many regions now have health services provided regional Aboriginal Health Boards which are independent of state or territory health services. These health boards usually cater to the health needs of a number of communities over a wide geographical area. The communities are usually, but not always, linked by familial and language ties.

A central aim of these local area health boards is to facilitate the development of community control over the financing and provision of health services to the communities involved. Planning, administration and delivery of health services are directed by the elected Indigenous councils of the health boards.

Health boards are responsible for the provision of multidisciplinary health care including the following:

- » Acute care services in remote clinics, employing Aboriginal Health Workers (AHWs), nurses, midwives, doctors and other clinic personnel and generally maintaining the clinic's functions.
- » Developing preventative health strategies, particularly in the area of chronic disease management.
- » Facilitating other public health strategies through the employment of EHOs and EHWs.
- » Data collection to allow evidence based targeting of limited resources.

Whilst once the case, the majority of health boards no longer provide direct funding to dog programs. Given the continuing differences of opinion on the association between dogs and public health, EHOs are often under increasing bureaucratic pressure to minimise their support for dog programs. It is therefore important that veterinarians supply EHOs and local area health boards with ongoing data to provide an evidence base for any 'in kind' support given to dog programs.

When working as a veterinarian in a region that has a standing health board it is important to develop sound relationships. Veterinary service provision will impact on chronic disease management and the broader area of public health promotion. If the health board employs an EHO or EHW these people are likely to be the key to the program's sustainability.

Health boards can support a veterinarian in various ways:

- » Providing accommodation: expect to be last on the priority list below all other visiting health personnel.

- » Assisting with travel: in most cases EHOs are based in the town administrative centres of the health board, travelling to communities as required. For veterinarians travelling without a vehicle they may be able to assist with transport.
- » Assisting with community introductions, consultation and strategic planning.
- » Providing support for ongoing parasite and injectable treatments in your absence.

ENVIRONMENTAL HEALTH OFFICERS

In areas not under the jurisdiction of a local area health board, Government health services employ regional Environmental Health Officers (EHOs). The role of these officers is varied and multi faceted. It includes all activities relating to public health, from investigating town based food poisoning cases to testing water quality in remote outstations.

Included in the EHO portfolio is the support of EHWs in communities. This results in EHOs in the Northern Territory being involved in community dog programs to greater or lesser degrees. When working in any community it is always worth identifying the EHO who services that region and determining what level of support they can offer.

HEALTH CLINICS

The majority of communities have a health clinic staffed by nurses, Aboriginal Health Workers (AHWs) and occasionally doctors. The clinics in the Northern Territory are run by either local area health boards or Territory Health Services. The health team usually has its finger on the pulse of a community more so than any other group of people. Clinic staff are a wonderful source of information about where the mangy dogs

are, who is out of town and when they are expected home, and where to find anyone and everyone you need.

Some clinics may even lend you a key so you can let yourself in and out of the clinic without disturbing the person on call.

A good relationship with the clinic is well worth cultivating. If a good rapport exists, they may provide support for a dog program in forms such as:

- » Pharmaceutical storage: clinic buildings generally have an air-conditioned, locked pharmacy for safe storage. This can be important for legal as well as technical reasons.
- » Drug order pick-up point: with permission, drug orders can be directed to the local clinic for pick-up by the veterinarian.
- » Provision of an autoclave for daily sterilising.
- » Capacity identification: older health workers have a very broad knowledge of all members of the community and would know who may have had medical training in the past.
- » Provision of emergency supplies if unexpected stock problems arise. Clinics also sometimes have large amounts of out of date stock, particularly antibiotics. It is worth asking them to keep the stock for your perusal prior to sending it back to a major town centre.
- » Provision of complementary programs: occasionally clinics will conduct large, intensive assaults on particular diseases such as Healthy Skin Days to tackle scabies. It could be beneficial to both human and animal health for veterinary service provision to be integrated with these days to contribute to environmental disease control.

» General moral boosting: clinic staff are usually wonderfully good humoured and will understand better than most what difficulties you are up against in a medical and surgical context.

NON-INDIGENOUS COMMUNITY MEMBERS

There can be quite a few non-Indigenous people living in some large communities. You may need to consider whether you will treat their animals or not. If so, will you charge them or not?

All dogs should be included in the parasite and desexing program, irrespective of the skin colour of their owners. If you are only going to be in the community for a short time, you do need to be careful that non-Indigenous people do not dominate your surgical time.

However, non-Indigenous people also have no access to veterinary treatment for their animals and they are usually very happy to pay normal prices for vaccinations, flea and worm treatments, stitching up injured pig dogs, etc. Provided this does not take up time you should be spending on the community program, it is a great way to build goodwill with key practical people and also to generate some income to defray your costs and/or subsidise the community program.

Non-Indigenous people are often an invaluable resource when you need a power point or water supply in a hurry, food or ice when the shop is closed, a hole dug for burials, temporary transport, or a cage or

table knocked up in the metal shop. Doctors and nurses from the medical clinic who are also dog owners can be a great source of medical 'goodies'.

If you build relationships with everyone you can link in to all of the community's assets and resources.

LAND COUNCILS

Some Indigenous communities lie wholly or partially within Aboriginal freehold land. Regional Land Councils are responsible for the issuing of permits under the Northern Territory Aboriginal Land Act. Any non-Indigenous person entering Aboriginal Land must have a permit. Permits are available from the Northern, Central and other land councils in the Northern Territory, and relevant land councils in the other states.

"An official permit does not give permission in either a social or cultural sense" (Josif 1994) nor does it give you the right to wander around the countryside without permission.

Permits often stipulate areas outside the community that you may use for recreation. It remains essential that you ask the correct people about where and when you would like to visit around the community. Often sacred sites are located very close to communities and outstations. In just wandering off for an afternoon walk and 'explore' it is quite possible that you may inadvertently offend people. As veterinarians we do not see it as our right to wander off around a client's cattle property without invitation, nor should we on Aboriginal Land.

Whilst permits do not usually state restricted areas within a town, there are 'no go' areas for a veterinarian working in any given town. Often there is both a 'single men's camp' and 'single women's camp' or women's centre. These areas exclude members of the opposite sex. It is important to ask where these areas are to avoid offending people. Likewise there are often certain houses where important ceremonial belongings are held. It is not necessary to know where these are, however this gives further weight to the fact that you will always need to travel with a cultural guide from the community.

Some communities have useful websites which contain visitors' information and tell you quite a bit about the geography, culture, history and amenities. The Queensland communities, for example, can usually be found using the address format:

www.communityname.qld.gov.au

The rule of thumb in moving around a community is to always ask, then ask again if there is someone else you should ask!

REFERENCES

Burkett and Kelly, Oxfam Community Aid Abroad, Development Practice Program, Course Two, Development Method. Workbook and Resource Pack, p. 47.

Charles Darwin University (CDU). (2003). CDP400 'Orientation and foundation for development practice' Study guide, p. 80.

Hogan-Garcia, M. (1999). *The four skills of cultural diversity competence: a process for understanding and practice*. California: Brooks/Cole/Wadsworth. Cited in CDU CDP400 Study guide 2003.

Josif, P. (1994). *Straight talking: a guide to negotiating and consulting with remote area Local Government Councils*. Local Government Association of the Northern Territory.

5

COMMUNITY DEVELOPMENT THEORIES AND PLANNING

Community development is the focus of entire university courses and many of the principles are important in the development of a community-inclusive dog program. Unfortunately, most veterinarians are not educated in these principles, nor in program planning or cross cultural work theory.

This chapter is in no way meant to replace cross cultural training, nor is it a thorough discourse in community development. Rather, it is intended as an introduction with the aim of preventing the repetition of mistakes that every veterinarian who has worked in a community setting would probably admit to having made at some time or another. Included is some detail of community development theory to assist veterinarians who are beginning the process of program development with communities.

Please take the time to read this chapter. Approaching program development using this framework is best practice.

The need for a veterinary visit may be determined by any of the following:

- » Community Government Councils (CGC)
- » Indigenous Resource Associations
- » Environmental Health Workers and Officers attached to either the State or Territory Governments
- » Aboriginal Health Boards
- » housing program officers

- » welfare organisations e.g. RSPCA
- » police in response to particularly violent dog attacks or in the context of emergency relief e.g. flooding with subsequent evacuation of communities
- » State and Territory agricultural departments
- » AMRRIC
- » veterinarians themselves.

Whoever deems the visit necessary will have their own agenda as to what form the visit should take and what work should be carried out by the veterinarian. It is important not to be swayed by individual opinions prior to adequate consultation with community members.

SERVICE DELIVERY AND BUILDING CAPACITY

SERVICE DELIVERY PROGRAMS

There are essentially two ways to run an animal health program. The first comprises straight service delivery. In this case the council identifies the need for a dog program. The veterinarian tenders the CGC. The veterinarian arrives and carries out work largely prioritised by the veterinarian or the CEO. The veterinarian may or may not work with a local assistant, and returns at set intervals to repeat the process.

The majority of dog programs conducted in northern Australia largely fit into this service delivery model. Little or no community consultation takes place prior to the veterinarian and their assistant beginning large scale ivermectin, sterilisation and euthanasia programs.

Veterinarians tend to be outcome focused by nature and training and thus assess their work by measures such as percentage reduction of scabies, number of neutered dogs, number of euthanasias and the total number of dogs in a community. If viewing the program as purely a service delivery, then these are justifiable and important assessment parameters. They are usually how the CEO or other funding body will be assessing value for their dollar.

It is, however, worth considering that the above assessment criterion gives no consideration to:

- » whether the veterinarian has addressed what the community members see as the main priorities with regards to animal health
- » what information has been left behind in the community that will enable people to prevent illness in their animals
- » the time required to allow for the development of relationships so that effective interchange of ideas can happen and program changes can be made.

Purely technical service delivery programs are, in general, short term band-aid solutions and are not necessarily sustainable.

Indigenous Australia has a very long history of 'assistance programs' being delivered in this service delivery mode. There is now a large body of evidence that suggests this type of programming, whilst possibly successful in the short term, further disempowers people in the long term. It does not create an environment in which people can actively participate in the processes which affect their

daily lives. This in turn perpetuates what has been termed 'passive welfare' and 'learned helplessness'.

Learned helplessness has been defined as:

- » passivity which is inappropriate to the situation
- » passivity which follows uncontrollable events
- » passivity which is learned from previous events and is generalised inappropriately to situations in the future.

This helplessness "may be less a deficit than an alternative way of operating, a way of laying low and keeping one's eyes open when the world becomes unresponsive" (CDU CDP400 Study guide 2003). Veterinarians working in communities will be faced with this in various forms.

Certainly in a veterinary historical context the complete lack of community consultation, the ignoring of traditional law and custodianship of dog dreaming, and the mass euthanasias of animals without owners' consent would constitute uncontrollable events and are likely to make people less inclined to actively engage in dog programs in the future.

Improving animal health is not simply a question of better service delivery when facing the dilemma of passivity. Veterinary service provision needs to engage the community. This brings the responsibility of change back to the community and animal owners, rather than this responsibility being seen as belonging to the veterinarian, the council or the Government.

Working in a purely service delivery capacity is also problematic for the veterinarian. Often the veterinarian will be working alone or with one assistant. There may be a feeling that there is a lack of commitment to the program by the community. There may be less job satisfaction when you do not feel that progress is being made within the community in your absence and that the whole program

hinges only on the veterinarian, with or without the intermittent assistance of an Environmental Health Worker (EHW).

Pure service delivery programs are not cost effective for the community in the long term. To continue to pay a veterinarian to deliver worming medication for the foreseeable future is far less cost effective than educating householders to purchase and safely administer worming and ectoparasite treatments.

The shift away from a service delivery mentality is by no means an easy road and is essentially why most dog programs are still run in this way. There are many obstructive forces that may hamper efforts to extend a program beyond service delivery that need to be considered.

These include:

- » Funding bodies not wanting to fund the time spent on consultation, education, effective community program planning, etc.
- » Lack of willingness on the part of those in control of the councils to hand over power to community members to make and enact decisions.
- » Other commitments of community members which prevent interested parties being available for consultation and meetings in designated time frames.
- » Wide ranging social problems experienced by community members that impact on motivation and the ability to take responsibility for a program even when adequate and effective consultation has occurred.
- » Large differences of opinion within communities as to the best way forward on dog health and welfare matters.
- » Cross cultural differences that, without adequate language and cultural interpretation, may make consultation difficult.

It is also an undeniable fact that elements of a veterinary program can only be conducted by a veterinarian delivering a veterinary service. However, it is worth considering that we are working outside our dominant culture. What is considered to be prompt efficient service delivery in our society may in fact be viewed as barging in and further disempowering people in another context.

COMMUNITY DEVELOPMENT PROGRAMS

An alternative to the straight service delivery model is a dog program that has a community development focus.

Community development is defined in many ways but is essentially a model of work that aims to produce “self reliant, self sustaining communities that mobilise resources for the benefit of community members” (Homan 1999) as opposed to models that train people for dependency and helplessness.

If a veterinarian were to repeatedly attend a dairy farm for recurrent herd mastitis, yet never address the fundamental problems with the farmer in relation to herd health then we would consider this negligent. Certainly in a community context the multifactorial nature of dog health is complex, but if we don't engage community members in developing strategies for improving dog health themselves we will be forever creating a fire brigade mentality and forcing communities to depend solely on our services.

'Capacity building' is an approach to community development. It has become a bit of a catch cry around communities and represents work that will build the skills and resources required to achieve certain goals. It is work that will empower individuals and the community to address issues relating to animal health and welfare in a more knowledgeable way.

Empowerment that builds capacity is created by the interrelationship of four different activities:

1 *Building new developmental relationships, for example:*

- » training people in how to contact the veterinarian as required, instead of relying on the CEO to contact the veterinarian
- » brokering a relationship with the local stock and station agent so community workers are able to order their own veterinary supplies as required.

2 *Providing new information and skills, for example:*

- » training community members in the safe delivery of ivermectin or the use of injectable sterilisation drugs.

3 *Generating new resources, for example:*

- » facilitating the purchase of veterinary pharmaceuticals for supply at the local store and developing educational materials regarding their uses
- » facilitating the construction of kennels or a pound
- » facilitating the construction of a dedicated building in which to conduct veterinary work or the adaptation of a pre-existing building.

4 *Promoting people's ownership and experience by enabling them to make decisions and direct the flow of work (Burkett and Kelly), for example:*

- » conducting regular meetings to determine the progress of the program and allow for the prioritising of future work to be carried out.

Veterinarians visiting communities often do so with minimal planning. They speak to the CEO of a community. They obtain a permit from the appropriate Land Council, give a quote and arrive to start work a few weeks later. On arrival in the community they are introduced to the CEO and one other community member. They get in the car with the community member and begin to move house to house hopefully introducing themselves as they go, delivering ivermectin and sterilising and euthanasing dogs.

Residents are frequently offended by this sort of behaviour. Indigenous people have repeatedly seen the service delivery model enacted with varying degrees of barbarity and are relatively quick to condemn a veterinarian as "another one of those", meaning someone who will step in and take control of the animal health situation without adequate introduction or community consultation. It is worth noting here that Aboriginal people have described the following behaviours exhibited by contractors as particularly frustrating:

- » rushing in and out of communities
- » impatiently demanding an audience with community members, in ignorance of other obligations
- » driving into private living areas
- » shouting as if people were deaf
- » speaking about people in their presence
- » taking photographs and video recordings of people and places without proper permission
- » expressing paternalistic attitudes (Josif 1994).

PLANNING A PROGRAM WITH A COMMUNITY DEVELOPMENT APPROACH

The importance of a formal introduction, initial planning meetings and ongoing inclusive planning cannot be over emphasised. The quality of this initial relationship building will determine whether a program will follow a service delivery model or one that builds community capacity. If no adequate

consultation takes place before animal treatment begins, a precedent will have been set that will be hard to disengage from.

It is important to begin the planning process long before your anticipated arrival in a community. Initially your phone dealings are likely to be only with the CEO of the community. As previously mentioned the quality of CEOs varies enormously between communities, as does their commitment to community development. In some cases you may be confronted by a situation as outright as “Well, we just need heaps of dogs put down, that’s all. Can you do that for us or not?” In these cases it is important to determine who the ‘we’ is.

To avoid difficulties surrounding situations like this it is important in initial phone discussions to determine if a planning meeting can be held in the community prior to the veterinary work beginning. Funds spent on a day or two of introductions and discussions relating to program aims, objectives and options is well spent in the long term. CEOs and councils are well advised to include this in their budget. These meetings need to be conducted prior to the inception of a veterinary program. Advance notice of these meetings is crucial as is some flexibility in regards to their timing. Sorry days and other priorities can suddenly arise and force plans to change.

The meeting should aim to include:

- » the CEO of the council
- » traditional owners of the country you are to be working on
- » a quorum of councillors
- » those within the community who have authority to speak about matters relating to dog custodianship. These people are often not initially known to the CEO, however they are present in most communities. Request that the CEO find out who these people are if possible.
- » any environmental health staff from the community or local health boards

- » the people interested or nominated to work with the veterinarian as assistants
- » any other interested members of the community
- » representation from AMRRIC if negotiations will centre around the introduction of dog by-law enforcement.

Arrange to have a phone discussion with the President/Chair of the council prior to your arrival in the community. Discuss with them who else they believe ought to be present at the meeting. Discuss the possibility of all clan groups being represented at the meeting and acknowledge that you would like traditional ‘organisation’ to be represented at the meeting, that is, who would traditionally attend for this particular issue. Ask them whether the timing and venue for the meeting is appropriate or if a different time or place would be more conducive to a planning discussion.

If there has been a previous dog program conducted in the community and there are personnel on the ground, then it may be appropriate to send out a program survey form prior to your arrival. Householders can complete the form with the assistance of EHWs or other staff, thereby giving every household a voice prior to your meeting.

In some cases it may be impossible for a large meeting to be held. This does not and should not preclude effective consultation from taking place. On arrival in the community it is still important to dedicate time to introductions and collaborative planning. If you are working with an assistant ask them who you need to talk to. Move from house to house and office to office until you have discussed the program with all relevant people.

Communities operate with two distinct forms of governance. One is under Local Government jurisdiction and is comprised of the CEO and elected councillors. The other is the traditional form of governance, which in the majority of communities is still very powerful even if not outwardly obvious

to the visitor. People with traditional power may also be in the Local Government group, but not necessarily. If you follow the pattern of contacts recommended to you by people from within the community, you will find those that are responsible for the particular decision making applicable to dog programs under the traditional system of governance. Difficulties can arise when representatives of the two forms of governance want different things. Careful negotiation and consultation is required in these circumstances to determine who will have primary jurisdiction for any given aim of the program.

Unless the information is particularly sensitive it is useful to always have at least three people present for any discussion. This creates an air of transparency and prevents any individual agenda from predominating. At the end of every discussion with the designated person ask "Is there anyone else I should talk to about this?" Eventually you will be able to build a picture of what the community sees as important and what is feasible to proceed with.

Given the clan group structure of communities it is important that you consult with appropriate members of every clan group prior to initiating a program. Different clan groups may want quite different things from a program and it may be quite easy to incorporate every group's wishes into any given program. In some less traditional communities family groups, rather than clans, are the units of power. Try to ascertain whether you have been locked into one family or clan group only; that is, everyone you meet comes from the same group. To be truly independent you should work with people across all the key families or clans. Ideally there should be a veterinary assistant nominated from every clan group.

Where possible it is best if no veterinary work is conducted during this pre-program consultation visit. Plan to return to the community two to three weeks after initial talks. This will give people time to further consider the issues and clarify their needs.

Revisit the key players on your return to the community to clarify what work is to be done and how you are to go about it.

WHAT IS EFFECTIVE CONSULTATION?

Consultation is by definition a two way process. It is important to practice the art of really listening. The only way we can effectively do this is to 'take our agendas lightly' and be careful not to dominate proceedings. As a professionally trained person coming from the dominant culture it is all too easy to allow ourselves to assume centre stage in any consultative process. The minute this occurs we are not really listening and any action that emerges is at risk of being ineffective in the long term.

Community Aid Abroad/Oxfam recommends the following for developing relationships through consultation. It is worth applying these principles to any meetings that you have with communities.

- 1 *To join with people so that we can work with rather than for them, 'to see what the people see'.*

It is noted that this is always a difficult task but is made more difficult by:

- » Professional training: once defined as an expert we are likely to continue to act as one. This will inevitably create blind spots in appreciating other people's viewpoints.
- » Personal agendas, motivations and limitations: these will influence how effectively we can really join people in collaborative consultation. Does our desire to 'fix things' or 'make a difference' override our ability to really listen to others' priorities and wishes?
- » The imperatives of the work: the agendas of funding bodies, timeframes and budgetary constraints will often result in veterinarians listening to the

voice of the CEO or other funding body rather than the voice of the people in the community.

- » Who, where and when: who we speak to, when we visit a community and where we meet with people may have an enormous impact on how effectively we 'join with the people'.

2 *To build the relationship through dialogue.*

Effective dialogue is different to talking. Obstacles to effective listening and dialogue include:

- » Not paying attention.
- » Jumping ahead in conversation by finishing people's sentences. Indigenous people tend to be very thoughtful before speaking out loud. There is usually a considerable time gap between an important question being asked and answered. It is important that veterinarians recognise this for what it is and do not break people's flow of thoughts by jumping in prematurely.
- » 'Clayton's listening' where we assume we know the answers and that we are simply waiting for people to say them.
- » Manipulative listening where we attempt to lead community members towards conducting the type of program we see they need.
- » Personalising context, where we constantly come back to our own experience, "yes when I was at... I ..."
- » Closed time frames where you are conscious of working on a tight schedule that prevents full exploration of people's ideas.

Within the area of dialogue the nature and timing of questioning is also important. Questions ought always to be a two way stream. If questions are predetermined

then they tend not to be linked to the context of community members at the meeting and thus place individuals in awkward situations of responding to something from left field. This is not to say that direct questions cannot be asked, but it is worth considering when they are asked in the context of the meeting. Invite all members in the meeting to ask questions whenever they wish so the dialogue is a true discussion.

3 *To respond to people in a way that helps identify an action pathway.*

Through normal conversation, if we are not focused on our own agenda, we will be able to intuitively detect areas of conversation that can lead us towards development of an action plan that may engage the community.

4 *To join with other people.*

Working alongside people, working with their goals and agendas.

It is a worthwhile exercise as a veterinarian to make a list of your motivations and agenda prior to going into the field. This will clarify your position and make it easier for you to identify when you are allowing your agenda to predominate over other people's. Remember you do not live in the community year round. The decisions and priorities with regards to dog problems are best defined by the people living with the reality of the problem.

When holding discussions with people it is wise to be aware that there may be areas that initially appear incongruous. Your objective assessment may indicate another action may be more appropriate for the situation, but you are not living this person's reality. The actions you recommend will almost certainly have more consequences for the individual than for yourself. Do not assume by these incongruities that people are unable to plan and make decisions. Instead be aware that people may subtly avoid being coerced into

a decision they cannot or do not want to make by long periods of silence or by placing incongruities together.

If you do not want to perpetuate paternalistic attitudes when in a community, it is wise to consider such things as your intentional or unintentional ability to:

- » Manipulate, exploit power differentials or otherwise conduct unhelpful consultations.
- » Exercise process and information control, for example by informing some people but not others or by delivering information in a medium only available to some people, such as only providing information in English or in writing. Be aware that many Indigenous people in communities have poor English literacy skills and English is rarely people's first language.
- » Work with unchecked and unsupervised 'expertise' in a way that silences other quieter and less confident voices. This is more likely to occur if the veterinarian is feeling rushed. By 'just wanting to get the job done' veterinarians are immediately excluding community members from educational opportunities and at a household level, are preventing people giving informed consent (Burkett and Kelly).

WHY PLAN?

Planning a program thoroughly is important to enable a community to:

- » own their agenda
- » keep a long range view
- » focus on relevant priorities to enable a more efficient use of resources.

USEFUL INFORMATION THAT MAY BE OBTAINED FROM A PLANNING MEETING

Information that is useful to you as a veterinarian can be obtained from planning meetings and potentially includes answers to the following questions:

1. What is the history of dog programs in the particular community you are visiting? Were these programs deemed successful or not? What are the positive and negative things that people attribute to the delivery of veterinary services in the past?
2. What budget is available to deliver the program? Councils obtain money for dog programs from many and varied sources. Examples of funding sources are rent collection monies, municipal services funding, shop profits, social club profits, dog registration money, or one off grants from Environmental Health services or Aboriginal development organisations. As an individual veterinarian you will rarely be involved in procuring the funding, although you may be requested to assist with the development of grant applications. AMRRIC may also be able to offer assistance in these circumstances.

Many CEOs and councils do not immediately recognise that a one off visit from a veterinary surgeon will not solve the dog problem. There is a need in initial talks to forecast a budget that provides for twice yearly visits as a minimum imperative. To offer less than this in terms of visits is to simply waste valuable resources as dog health degenerates quickly in the absence of veterinary support.

3. Who are the main people that have authority in dog matters in the community?
4. What are the main problems people see with animals in the community? Have any attempts to solve these problems been made before? How successful were they? Do community members have any ideas as to how these problems could be solved? Where does the community want to end up in relation to animal health? What does the community want that is

different from how things are now? What does the community see as the role of the veterinarian?

5. How much involvement in the program does the community want? It may be that the community is happy with straight service provision and in fact does not want to be involved in the planning or decision making of the program. If the community does want to be involved, ensure there is an adequate budget to cover the time you will spend in meetings and discussions.
6. What capacity already exists in the community? Many people going into communities forget that there are a multitude of untapped skills possessed by individuals. Examples of people who have existing useful capacity are those who have been involved in dog program work before, who may have started and even completed EHW training, who have medical training but are not working at present, who have worked in some form of program planning and evaluation, who have an education background, who have authority regarding dogs in a traditional sense, etc. Who are the best

people to assist the veterinarian and why? Thus the focus becomes building on existing capacity within the community rather than starting from scratch.

7. What is the best way to divide the work up: by individual households, clan groups or other?
8. What form should education take? Education needs to be directed across all levels of the community. However we must bear in mind that traditionally education has been passed from older to younger people. There may be a sense of shame attached to a younger person gaining information that their elders do not have. Education must start with the right people. Many people in early discussions will direct you towards the education system they know fits your context rather than the community's. If this happens, it is always worth asking about other channels for the 'right way' to spread information in the community (Trudgen 2000).

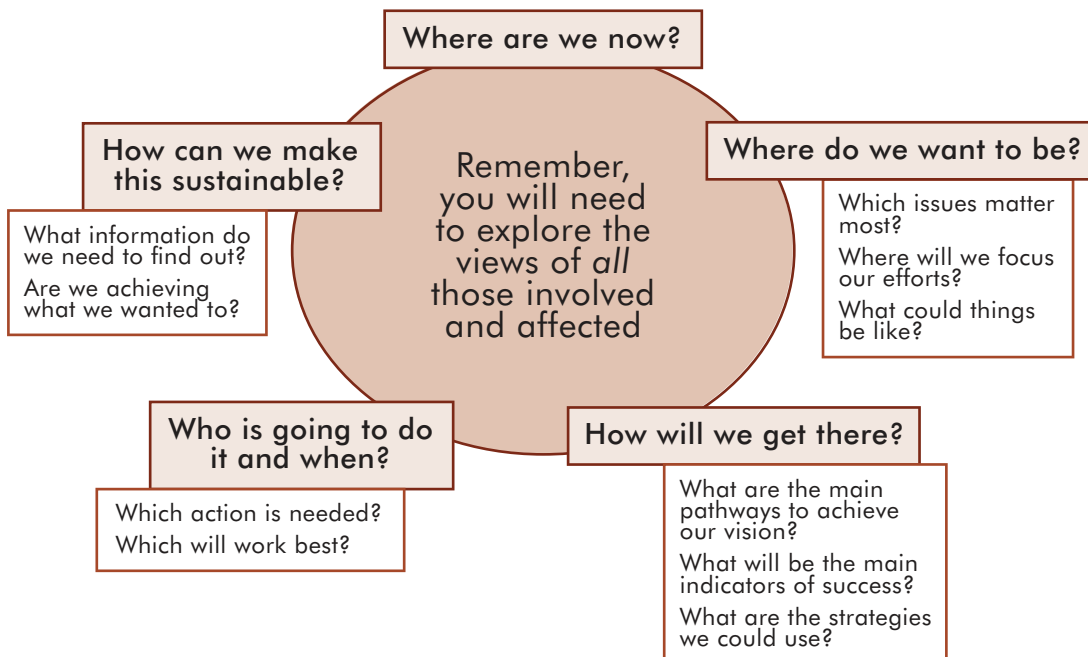


Figure 1. Based on diagram by Miranda Roe (cited in Apunipima 1998.)

9. What infrastructure exists in the community that could benefit a dog program? Does the shop stock any animal health products? What facilities exist for creating a temporary clinic?
10. How does the community want the program evaluated? What criteria will be used to determine the success of the program? When evaluating a program it is worth remembering to shift our focus away from the outcomes we are having in a community to the impact we are having. This is a subtle but very important shift. We can have wonderful outcomes in the short term but not have had any real impact on the community in the long term as no capacity has been developed. Whilst scabies reduction and population control are worthwhile aims, they may be no more important to the community than knowledge about how to apply specific flea prevention treatments, or the fact that you have gone about the process of education in a culturally appropriate manner.

In the process of this discussion it is worth keeping in mind the circular nature of planning and the ability to readjust the plan as required. Figure 1 shows a simple planning cycle that is a useful trigger for discussion and further planning.

Remember, you will need to explore the views of all those involved and affected.

At all times remember that plans are just that, they are not reality and will change over time. It is also very important to keep plans realistic to avoid failures within the program. If one focuses on the process of program development and continues to adjust the

program according to the community's needs, there is less likely to be a sense of failure when things don't go according to plan.

At the end of a planning meeting it should be possible to create a flow chart as shown in Figure 2 on the following page.

RECORD KEEPING

In all cases record keeping is essential. It is important for:

- » Medico-legal documentation, especially in cases where people are acting as your agent in the community.
- » Providing an evidence base of treatments administered to justify future budget allocations: Given the rapid turnover of staff it is advisable to also ask the community for permission to create a photographic evidence base. All too often a new CEO will arrive in a community and not appreciate that relatively good dog health is a direct result of previous programs. 'Before and after' photographic evidence speaks far louder than information on a table.
- » Continuity of care to be provided to a community: In a veterinary handover adequate records can save days of meetings, questions and re-planning. Any handover ought to be done in person with the incumbent veterinarian taking the time to conduct a formal introductory handover to the community. This is not always possible. An alternative is to create notes such as those shown in Figures 3 and 4.

STRATEGIC PLANNING MAP

Needs Identified	Aims	Objectives	Strategies	Activities Program	Evaluation
What are the dog health priorities in your community?	What are we attempting to achieve?	What are the specific steps needed to achieve our aims?	How might these steps be undertaken in this community?	Planned activities occur. Program is conducted.	Have our aims been achieved?
What evidence has been collected?	Is everyone clear that these are our current aims?	What changes are we expecting to see if our aims are met?	How do we intend to do it?	Is everything going to plan?	Process: review method, strategies, interactional processes.
Which of the significant problems are we going to address first?		Are the changes we expect from the program all easily measurable?	What methods, tasks and activities will be used? When are they to occur?	What modifications need to be made to enable us to achieve our original aims?	Outcomes and impacts of the program.

Time line: Who will do what? When?

Resources: What resources are available? Budget, time, people, information?

Target Groups: What groups are to be involved in activities?

Figure 2. Based on planning flow chart in Apunipima 1998.

ANIMAL HEALTH PROGRAM HANDOVER INFORMATION

Community Government Council Name:
Address:
Contact details:
CEO or alternative contact:
President of council:

Community Name:
Population of community:
Number, names and distances to associated outstations:

Populations within outstations:

Key people involved in consultation regarding dog situation/ program planning and their role:

Names of community members that have authority regarding dogs:

Environmental Health Team members
EHO covering the region:
EHW in community:

Assistants involved in dog program:
Capacity in which they are employed – CDEP, council, health board, other?

History of dog programs within last 5 years:
Funding source and budget allocated:
Veterinary Service Provider:
Total dog population:
Priorities of program:
Frequency of visits:

Does community accept euthanasia?
Does community accept post-mortems?

Date of last visit:
Medications administered:
Medications residing in community:
Persons in control of medications:
Method of population control:
% of dogs sterilised:
Common diseases encountered and % rates:

Infrastructure available

Accommodation:
Health clinic/ contact details:
Suitable work sites:
 For surgery:
 For recovering dogs:
 For post-mortems:
Location of fridges and freezers that can be used:
Transport available if any:
Cage available to go on back of utility or truck:
Location of pens, cages or kennels for holding dogs:
Leads or chains for securing dogs:
Can dead dogs be buried or easily disposed of?
Who is in control of disposal?

Figure 3.

CHAPTER 5 COMMUNITY DEVELOPMENT THEORIES AND PLANNING

Community Name:
 Date work conducted:
 Name of veterinarian:
 Name of Assistant:
 Next treatment required:

Total # dogs:

Owners name	House number	Dogs name	Sex	Scabies + + + +	Ticks + + + +	Fleas + + + +	Ivermectin Dose	Other medications	Sterilised Y/N

Figure 4.

REFERENCES

Apunipima Cape York Health Council. (1998). *Where to now? Build it on up. Capacity building handbook: A health worker's guide to promoting sexual health activities in communities.*

Burkett, I. and Kelly, T. Oxfam Community Aid Abroad, Development Practice Program, Course Two: Development Method, Workbook and Resource Pack.

Charles Darwin University (CDU). (2003). CDP400 'Orientation and foundation for development practice' Study guide.

Homan, M. (1999). *Promoting community change: making it happen in the real world.* California: Wadsworth & Brooks/Cole.

Josif, P. (1994). *Straight talking - a guide to negotiating and consulting with remote area Local Government Councils.* Darwin: Local Government Association of the Northern Territory.

6

WHAT TO TAKE, WHAT TO EXPECT

ACCOMMODATION

Accommodation varies hugely from community to community. The standard of accommodation will also vary from visit to visit depending on the number of visitors/subcontractors in the community at any given time.

Whilst work is constantly being done to improve housing, overall housing standards are very similar to those experienced when travelling in developing countries. It is wise therefore not to set your standards too high.

When considering accommodation it is important to remember the standard of housing that most Indigenous people living in communities experience as the norm. Frequently local people are sharing a house with up to 15 family members, many of them children. There is usually only one bathroom, often with no hot water. Plumbing and general maintenance are frequently substandard. There are limited cooking facilities and minimal furnishings.

The community does, however, need to supply you with a minimum standard of accommodation. This is often a lockable donga (small demountable home as used by road workers, etc).

A minimum expectation of the following would be considered fair:

- » Power, a stove top and refrigeration. Payment for power is in the form of a power ticket usually purchased at the shop and placed in the meter box to give a set amount of credit. Credit will usually be in place before your arrival, but check the power box to see how much credit you have.
- » Access to hot water, showering and toilet facilities. Bathroom facilities are frequently shared with other visitors/contractors and are often separate from the living quarters.
- » Lockable sleeping quarters. A bed is usually, but not always, supplied. Many contractors in the north of Australia travel with their own swags.

To make your stay more comfortable it is always wise to be as self-sufficient as possible.

It is essential to negotiate your accommodation before your arrive. If the council is unable to provide for you in any given week, it is also worth discussing options with the local health clinic. Health Departments often have a house available for visiting health professionals. They will extend this to a visiting veterinarian if there is spare room after all the primary health visitors have been accommodated.



Figure 1. Standard good quality accommodation: single roomed demountables or 'dongas' with outside ablutions. Image courtesy of Marguerite Young, IFAW.

WORK ENVIRONMENT

Presuming surgical sterilisation is part of the treatment protocol in any given community, the veterinarian will have to find a suitable area to operate. Different veterinarians have different preferences when it comes to a work environment. Some move the entire surgery on the back of a ute from house to house. Others choose a set location and bring dogs to this makeshift clinic for surgery then take them back home again. Others enjoy working outside in the shade. There are pros and cons to each method and sometimes you will have incredibly limited choices. Surgeries are performed on old washing machines and freezers in derelict buildings, the back of broken down trucks, the back of your own truck, in art centres, on clinic verandas... basically anywhere there is a flat surface long enough and high enough with a bit of shade and hopefully a tap nearby.

It is worth considering the following 'worst case' scenario to use as a yardstick. You have just driven two hours over very corrugated rough roads to get to an outstation. You

are already tired and dirty. Your gear is covered in a fine mist of red dirt. You arrive at the outstation prepared to deal with the six dogs you were told were there. Everyone is happy that you have arrived and suddenly the six dogs have become 16. There are ten female and six male dogs to desex. There is no running water available as the main is cracked somewhere. The generator is out of fuel and no power is available. The only shaded place to conduct surgery is on top of an old freezer on the veranda. So... you quietly wonder why on earth you have chosen to work like this... then, breathe deeply and get on with it.

If you do have a choice of work environment, consider the advantages and disadvantages of mobile and stationary surgeries as follows.

VETERINARY GEAR

The type of veterinary gear you will take will largely depend on the type of service you are to deliver and how you are getting to the community. If you will be travelling in a small chartered plane weight and dangerous

MOVING SURGERY HOUSE TO HOUSE/WORKING OUTDOORS

Advantages	Disadvantages
Do not require use of a building.	Shade, power and water are often limited and need to be negotiated at each stop. You may feel like you are intruding into people’s personal spaces to a greater extent than you are comfortable with.
Transparency of what is happening with people’s animals. Provides educational opportunities and allows everyone to know you’re in town.	Working with a large group of children and adults watching can be unnerving, particularly if you experience difficulties during a spey. Vocal recoveries from GA will also reduce the number of dogs brought to be speyed, particularly by elderly people.
Keeps momentum throughout the day. Each house can better anticipate when you will arrive and plan ahead what they want done.	Sterility is often more of a challenge particularly with the wind, dust and flies.
Reduces the problems of transporting patients to and from the surgery.	Temperature control can be harder to maintain. This is significant when considering compromise of animals under GA as well as the lack of temperature compensation in the Komisarroff machines.



Figure 2. A seldom used art centre, an excellent site to conduct surgery: it’s shady, ventilated, light, lockable and has running water. Image courtesy of Marguerite Young, IFAW.

STATIONARY SURGERY

Advantages	Disadvantages
Sterility is easier to maintain when you have the one field to work in. Wet kits do not slosh around, etc, as you move.	It may take a bit of initial cleaning and organising to get a room or shelter to a point where you are happy to conduct surgery.
Animals' recovery can be closely monitored, with animals only returned home once they are sufficiently recovered.	Occasionally an animal will wake and escape. This can be disastrous. Cats still under the effects of a GA can be mauled by dogs. Dogs running through territory that is not their own may also be attacked. Pet owners tend to regard this occurrence as extreme negligence on your part even if the animal makes it home safely.
People from the community know where to find you to address concerns they may have with their animals or to book animals in for surgery. People may feel less coercion to get their animals desexed. They have time to consider their options without you on their immediate doorstep.	There is not the immediacy of getting work booked in and lined up. The process can therefore be significantly slower if you are not working with a well oiled team.
If the environment is one that can be locked safely it is possible to leave some equipment overnight if working on consecutive days. Note: Do not leave any dangerous goods locked in this fashion. Keep them with you.	



Figure 3. A disused house as a temporary surgery. The table was borrowed from the health clinic. Image courtesy of Marguerite Young, IFAW.

goods (e.g. oxygen bottles) restrictions will certainly limit what you take. You will need to discuss this with the charter company when planning your trip. If you are using your own vehicle or a hired vehicle then the options become greater.

Base your decision about what to take on your discretion and your discussions with the community council. Some items may be able to be borrowed from the council if weight restrictions apply. In general, however, it is good to be as self-sufficient as possible.

Refrigeration is an issue when travelling in tropical climates. Portable fridges are available but they are costly and bulky. The roads can be particularly rough and it is worth considering whether you absolutely need one. It may get a bit of a bashing if the vehicle is not set up to secure such items. It is possible to run a very effective clinic without refrigeration whilst on the road, parking in the shade and leaving the esky (no ice bricks necessary) in a well ventilated area. To increase their longevity, excess supplies can be transferred to refrigerators in accommodation when you arrive.

Travelling without a fridge effectively only limits your ability to carry vaccinations. The majority of dog programs are not evolved to a point where vaccination is a routine consideration. Local Government councils essentially want population and parasite control. In most cases they cannot extend funding to cover other services.

The provisions listed in the veterinary checklist at the end of this chapter are necessary to provide basic veterinary care to community dogs. Of course when it comes to induction agents, euthanasia protocols, antibiotic choices, etc all veterinarians have their own preferences. Work with what you are professionally comfortable with.

If other specialist drugs, instruments, etc are required they can be brought in on the mail plane. Most communities are serviced once or twice a week by a mail plane and this service can be surprisingly efficient (when you're lucky). If you are to leave before the goods arrive it may be possible for the

trained assistant in the community, local health workers or nursing staff to administer the treatment in your absence.

If you are providing long-term services to a single community, you may well have the opportunity to leave some of your heavy equipment and supplies in secure storage.

CHECK LIST

Make a computerised list and check everything off. You will be really stuck if you forget something. If you end up needing something that is not on your list, add it for next time.

There is a check list for both veterinary and personal gear at the end of this chapter which you can use as a guide.

Give some thought to how you will pack, transport and protect your valuable gear. Metal or fibreglass tradesmen's toolboxes are useful and durable. Multiple small plastic boxes work well too.

VETERINARY STOCKISTS

Northern Territory Monsoon Veterinary Supplies

Julia Benfield has a long history of supplying remote veterinarians doing community work with equipment. She has a good knowledge of the environment and will go out of her way to assist you in any way possible.

COMMUNICATIONS

Telephone coverage (including CDMA) is limited in these remote areas, and community phones are often vandalised. Satellite phones, which will keep you in touch anywhere, can be rented from \$125 per week and take the anxiety out of facing an illness, vehicle breakdown or someone in distress on the road.

PERSONAL HEALTH

Be fastidious with personal hand washing and general hygiene.

ALCOHOL

Alcohol is a huge problem in Indigenous communities and you should be aware of any restrictions that apply to the communities you visit. You must accept that, as a visitor, you are subject to the restrictions that apply

to the community you are servicing. If that means you have to forgo the customary glass of wine or tot of rum after work, so be it.

In the Northern Territory most communities have a total alcohol ban enforced by the Licensing Commission which applies to all visitors. Almost all Queensland communities have an Alcohol Management Plan (AMP) that specifies what is legal in that community. This often prohibits 'full-strength' beer and usually prohibits wine and spirits. Alcohol Management Plans apply not just to consumption but to the carriage of alcohol. It also defines the quantity that can be legally carried. Details can usually be found on the community's website. This is important. It covers the bottle of wine you might have carried in your luggage 'to drink later' and to the bottle of rum that lives in the glove box 'for emergencies'. An AMP does not mean you should not enjoy a drink; it obliges you to drink what the community has decided is acceptable there. You might like to join the locals for a drink at their own canteen (which has the same drink restrictions as outside the canteen). This is usually a worthwhile public relations move anyway.

VETERINARY CHECKLIST

Ivermectin: 500ml multi-dose pack at 10gm/L cattle injectable
Bread: one loaf per 25 dogs. This is much cheaper to buy from town rather than community stores unless there is a bakery in the community.
Margarine
Dog all wormer
Cat all wormer
Paint: cheap acrylic in a 'non-dog' colour, i.e. bright pink or green
Toe nail clippers
Tooth extraction equipment
Basic bandage gear
Penrose drains
IV fluid bags + saline flush bag
Giving sets
IV catheters: 25, 22 and 20 gauge
Syringes: 3, 5 & 10ml boxes + a few larger versions for the occasional horse/LA euthanasia, etc.
Needles: 20, 22 and 25 + a few 18 gauge for LA work
Large tarpaulin that can be laid down as a recovery site if working outside – one which does not rustle much is best for undisturbed recovery if the wind is up
Fly repellent: it's often necessary to spray around the edges of the tarp to stop ants attacking recovering animals
Rubbish bags
Cleaning cloths and a few old towels
1-2 clean buckets
Portable surgical table: usually a table to suit your needs can be borrowed from around the community but travelling with your own, when possible, may well save an aching lower back. AMRRIC are currently considering having a few available for loan.
Instrument tray with lid
Pressure cooker or other sterile container for storage of swabs, gloves and blades throughout the day
Portable autoclave: an optional extra. Some veterinarians use these but it is entirely possible to go without one.
Chemical steriliser: this is fine if instruments are washed first
Basic eye and ear preparations
Euthanasia solution
Acepromazine tablets: 25 mg/tablet
Xylazine: 20 mg/ml
Acepromazine: 2 mg/ml
Methadone/ narcotic analgesic/ S8 book + locked box
Induction agent of your choice: thiopentone, valium/ ketamine, Alfaxan-CD, xylazine/ ketamine
Adrenalin

Anaesthetic machine: preferably one that is capable of being closed right down. In circle Komesaroff or Stephens are very handy as they require minimal oxygen. They are low-flow, closed-circle circuit machines with low resistance vaporisers. They are not temperature compensated but provided you keep them out of direct sunlight, know what to expect and are guided by the condition of the animal they work just fine. Discuss the availability of one for loan/ rent with other AMRRIC members.
Isoflurane if using gaseous anaesthesia
Soda lime
Small funnel to transfer excess isoflurane to bottle: it's impossible to use a syringe as it alters syringe rubber rapidly and prevents compressing of the syringe
O ₂ supply: c-size O ₂ cylinders fit Komesaroff machines although they are not designed to. If negotiating O ₂ on and off planes will be difficult, discuss this with the local clinic before arrival. It would be wise to check the air transport and hazardous goods legislations in your host state. The local clinic will usually have c-size cylinders that can be borrowed but require advance notice so they can prepare stocks. Alternatively a larger O ₂ bottle can be used if you have the appropriate hose attachment for the Komesaroff machine.
Long length of scavenge tube
Plumbers' tape, replacement o ring and adjustable spanner for running repairs on the GA machine
If you are taking gas you have to also take a pressure reducing valve, oxygen tubing and endotracheal tubes. You might also want to take a spare vapouriser bowl and rebreather bag in case of breakages.
Respiratory monitor: consider one of these, like an Apalert, for added safety if you are on your own. They are compact and inexpensive. Kids love the electronics and it's a great way to facilitate discussions about anaesthesia.
Stethoscope
Thermometer
Auriscope/ ophthalmoscope
Clippers and replacement blades
Long extension cord
20L water drum with tap if visiting outstations
Betadine scrub and surgical spirit/ methylated spirits or surgical skin preparation of your choice
Skin scrub of your choice: Hibitane scrub is less abrasive on your own skin. A week of using betadine scrub for your own skin can result in nasty trauma. Some veterinarians say the reverse is true.
Hand scrubbing brushes
Betadine solution or wet kit solution of choice
Swabs (pre sterilised)
Surgical drapes: Multigate plastic drapes 61 x 91 cm are the best. Re-order #22-201. Generic brands have recently become available at a cheaper price. Plastic can be a disaster in windy conditions. Simple fishing sinkers make great drape retaining devices.
Scalpel blades

CHAPTER 6 WHAT TO TAKE, WHAT TO EXPECT

0 and 2-0 gut or dissolvable suture of your choice on cassette. If using gut it is advisable to take extra packets of 2-0 and 0 absorbable monofilament for use in amputations, etc. where the field may not be as sterile as you would like.
Medium thickness non-absorbable suture on cassette or, depending on pattern of usage, pre-packaged materials can be as economical
Suture needles of your choice
2 spey kits: two kits is a minimal requirement. The more instruments you take the easier your days will be
Tattoo gun and ink: given chronic skin conditions the green ink holds up much better than black over time
Injectable antibiotic: Trimethoprim sulphur IV at induction is a suitable, cost effective choice
Antibiotic tablets: Trimethoprim sulphur + amoxicillin with clavulanic acid for the more serious cases
Antibiotic/ corticosteroid skin ointment
Corticosteroid injection and tablets: allergies and dermatitis are common in coastal communities
Ear drops
Eye ointment
Analgesia and post operative pain relief: some veterinarians use Rimadyl injection perioperatively. Tablets are invaluable for treating the inevitable car accident victims you will see
Microchips for identification (if needed)
All drugs are usually held in an esky. All other materials are placed into plastic containers that are as dust proof as possible.
If you have a good relationship with the local health clinic, it is worth discussing out of date stock with the community health clinic. Every six months or so, they return all out of date stock to a central point. They can have wonderful stores of just out of date IV fluid bags, antibiotics, dressings, suture materials, etc. that they are often willing to direct your way.

PERSONAL CHECKLIST

Swag of some description. Usually a water resistant canvas tarp that covers a mattress and assorted bedding. Through the winter months even tropical areas can experience very cold snaps. Be prepared with some warm bedding.
Mosquito net if the trip is to entail camping at outstations
Tucker box containing basic food supplies along with a good knife, billy, tin plate, cup and cutlery
Water bottles that can be frozen overnight to provide cool water through the day
Thermos flask if you are dependant on caffeine to keep your spirits up through the day
Work clothes: working in a uniform of some description makes life for you and the community easier. You are easily identifiable as the veterinarian on repeat visits by your uniform. There is also less hassle for you in terms of appropriate dress. It is important to dress modestly in many communities. Covered shoulders and knees for women are considered appropriate, skirts being better than pants. For men and women loose fitting overalls can work. For women a loose fitting knee length skirt with a loose scrub top is also easy. It is important to take casual clothes that also retain this level of modesty to change into after work.
Enclosed footwear: runners are good. You can pick up nasty diseases like meliodosis and hook worm through exposed feet, particularly in muddy conditions.
Sunhat, sunglasses, sun block
In many communities women should not wear bathing suits and should swim in normal clothes
Towel and toiletries: the water supply in most communities is very hard bore water. Scrubbing all day long and working in the dry conditions outdoors can lead to skin irritation. A soothing moisturiser and lip balm at the end of a day is often welcome.
Mosquito repellent
A good map: this is invaluable when visiting remote outstations although some veterinarians never go without a local guide. A GPS might be a good idea if you have one and know how to use it.

7

ZOONOSES: MYTHS AND REALITIES

Historically dog programs in northern Australia have been funded to reduce the levels of disease transmission between obviously sick dogs and their human companions. Initially these programs were run based on assumptions as opposed to clinical data relating to zoonotic disease transmission. To some extent this remains the case. AMRRIC is supporting continuing research into associations between dog and human health.

When critically examined the number of clinical presentations of dog borne zoonotic disease in humans is relatively low (Currie 1993). As a result it has become policy not to fund dog programs from primary health care budgets across most health systems. Environmental Health budgets continue to be directed towards dog programs to varying degrees.

The justification of dog health programs from a human health perspective is still debated amongst those working in the field. Many argue that whilst we are not seeing clinical disease presentations, subclinical infections are undoubtedly present in many people. They believe the links between zoonotic and chronic disease needs further investigation. Subclinical infections may contribute to conditions of chronic ill-thrift amongst Indigenous people, particularly anaemia of chronic disease.

Relatively little work has been done in determining the incidence of various intestinal parasites in dogs across Indigenous communities. Data tends to be confined to one off sampling in regions of north east Queensland, north east Arnhem Land and

the Kimberley. Certainly clinical presentations of heavy hookworm burdens in pups can lead one to suspect that intestinal parasitism of dogs is very common. Anecdotal reports of all dogs having serious diarrhoea during particular outstation visits also leads one to question possible causative agents with Salmonella and Giardia infections being suspected by visiting veterinarians.

When one considers the massive zoonotic dog parasite burdens that must contaminate some yards, particularly during the monsoon season, it seems hard to believe there is no association with human health, even if direct clinical cases are not appearing.

At this stage further investigation is planned into the interrelationship of dog and human disease particularly in relation to:

- » sub clinical dog parasite infections in people and their implications in chronic disease management
- » dogs as reservoirs for human diarrhoeal diseases, particularly Salmonella, Giardia and Cryptosporidium
- » dogs as reservoirs of Streptococcal skin infections.

SCABIES, *Sarcoptes scabiei*

Scabies is endemic in both the human and dog populations in many Indigenous communities in northern Australia. There is a wide spread belief in communities, even amongst health personnel, that people are getting scabies



Figure 1. A fairly common sight. What disease haven't I got?

from their dogs. Recent studies have shown canine and human varieties to be genetically distinct (Currie 1998).

Human to human transmission of the human variety of scabies is the predominant form encountered by human health professionals working in Indigenous communities. The main justification for scabies control in the dog population is, therefore, based on concerns for animal health and welfare.

In the broader community we recognise scabies as not being entirely host specific, with dog to human transmission occurring. In people presenting with scabies infected dogs in North American clinics, 25-33% of humans in direct contact with the dog have scabies lesions (Speare and McConnell 1993). In households where there are high numbers of scabies infected dogs, people in direct contact with the dogs often have dog scabies varieties on their skin. The lesions are most commonly a pruritic, papular rash without the telltale signs of burrowing. Unlike the human form, dog scabies mites do not breed on people and the disease is self-limiting (Speare and McConnell 1993).

Given the high levels of human scabies currently found in Indigenous communities, dog scabies ought essentially be seen as a poor cousin when considering the issue from a human health perspective. As the rate of human scabies falls, the significance of dog scabies in producing skin disease may be seen as more significant.

Dog ivermectin programs can have beneficial overlapping effects on levels of human scabies within any community. If environmental contamination is simultaneously addressed by means of airing and washing bedding, fumigating and/ or hot pressure cleaning houses, and cleaning yards to remove old foam mattresses, etc then the load of human scabies in the environment will also be reduced.

Further discussion on scabies can be found in Chapter 8: Commonly encountered parasites, diseases and other conditions. Also refer to the paper Rick Speare presented at the Dog People Conference, July 2006, when these conference proceedings become available.

STREPTOCOCCAL INFECTIONS

Streptococcal infections in Indigenous community residents are a significant cause of acute and chronic illness. Streptococcus can become a systemic infection borne from either an untreated throat infection or an open infected sore, as is common in secondarily infected scabies lesions.

The disseminated bacterial infection can result in a valvular endocarditis/ rheumatic heart disease, or acute glomerulonephritis.

Questions have arisen as to the potential role of the dog as a reservoir for streptococcal infections in a community setting. Further research needs to be conducted into prevalence and host specificity of streptococcus from dogs' skin and pharyngeal areas, to determine if in fact they are reservoirs of relevant streptococcal groups.

When there is a human death from glomerulonephritis, it is not uncommon for community residents to link the strep infection to scabies, to dogs, and to conclude that the dogs are the main problem. This sometimes results in emotional calls for the dogs to be culled. Veterinarians who are called to respond to such appeals would be well advised to confer with health authorities and perhaps with AMRRIC and to tread carefully.

Also refer to the paper Rick Speare presented at the Dog People Conference, July 2006, when these conference proceedings become available.

DOG INTERNAL PARASITES

DOG HOOKWORM, *Ancylostoma caninum*

Hookworm is the most prevalent intestinal parasite found in dogs in most Indigenous communities. Parasitism from hookworm

can result in the majority of unwormed puppies dying within the first three to four months of life from anaemia associated with overwhelming infection.

In tropical Australia *Ancylostoma caninum* is the common species. The southern species of dog hookworm, *Uncinaria stenocephala*, has not been found. *A. caninum* is not to be confused with human hookworm, *Ancylostoma duodenale*. Human hookworm is found in the Northern Territory, Western Australia and, very rarely, in tropical Queensland. It is commonly believed to occur only in rural and remote Indigenous communities, however it could be more widespread according to personal communication from Queensland Health to Jack Shield. Although the geographic distribution of *A. duodenale* is not accurately known, it is often considered responsible for childhood anaemia in Indigenous children in the Northern Territory and in Western Australia.

Many dog owners and health personnel alike confuse the two forms of hookworm. It is important to make the distinction between dog and human hookworm. Whilst *A. caninum* is implicated in the human diseases cutaneous larval migrans and eosinophilic enteritis, it is not the primary form of hookworm discussed in a human clinical context. Dogs are not a reservoir for *A. duodenale*. The other human hookworm, *Necator americanus*, appears to have been eliminated from Australia.

Many dog programs have been incorrectly instigated under the auspices of reducing worm burdens in children. Whilst useful for the dogs, and indirectly for their child companions, it is an allocation of resources on unscientific grounds.

Ivermectin is a highly effective treatment for adult *A. caninum* (Anderson and Roberston 1982; Wang et al. 1989; Daurio et al. 1993) at doses above 50 micrograms per kilogram. Ivermectin will also kill somatic larvae of *A. caninum* and reduce infection of pups via the milk (Egerton et al. 1985; Stoye et al. 1989).

Morphology

Dog hookworms are small pink worms about 15 mm in length. Males are about 75% the size of female worms in length and width. They are rarely seen in faeces even after treatment. Hookworms attach to the small intestinal mucosa by sucking it into their mouths. The mouth has 6 pointed teeth, presumably an aid to staying attached.

Life cycle

Thin shelled eggs are passed in the dogs' faeces and are susceptible to dehydration. Their rate of development depends on environmental temperature and moisture, and is a balance between speed of development and mortality of larvae. The ideal temperature is about 25°C; temperatures below 15°C prevent development; temperatures over 30°C will

accelerate development. However, at 37°C the mortality rate in developing larvae becomes quite high, and few larvae survive. Over 40°C larvae will be unlikely to develop. Typically, eggs hatch within 48 hours and infective hookworm larvae (Figure 2) are present after seven days at the optimum temperature.

Infective larvae enter the dog by 1) penetrating intact skin or 2) ingestion. Penetration of infective larvae through the foot pads is the optimal route. Infective larvae enter the capillaries, flow through the right side of the heart and into the pulmonary capillaries. They mechanically burst across into the alveolae, causing surprisingly little damage apart from microscopic haemorrhage. Larvae migrate up the trachea and return to become adults in the small intestine. Some infective larvae do not undergo



Figure 2. Hookworm infective larvae. The infective larvae are about 0.5 mm in length, attracted to heat, and can actively swim in a water film towards a host. Image courtesy of Rick Speare, James Cook University.

tracheal migration, but become somatic larvae in muscle and fat. They can subsequently activate to migrate to the small intestine, or in pregnant or lactating bitches can infect pups via the placenta or the milk.

Male and female *A. caninum* mature and then mate in the small intestine. The female worm lays eggs which appear in the faeces.

Incidence

Hookworm incidences of between 50-100% have been reported in Top End community dogs (Currie 1993).

Pathogenesis

1. **Dermatitis:** hookworm larvae can migrate through the dermis and cause a pruritic, erythematous and papular dermatitis in dogs, particularly pups. It is most commonly seen on the feet, limbs and abdomen. On gross appearance it can be confused with scabies.
2. **Migratory phase:** transitory organ damage may occur due to migration of the worms through the dogs' organs, e.g. a mild cough with lung migration. To detect this clinically would be extremely rare.
3. **Intestinal phase:** this is the most common clinically encountered syndrome. Hookworm attach to the small intestinal mucosa using teeth in their buccal cavity. Their saliva contains anticoagulant to assist in feeding on blood draining from the mucosal capillaries. Effectively an open wound is created at every site of attachment. Blood is lost in three ways: 1) bleeding into mucosal tissues adjacent to the bite site, 2) from the bite site into the intestinal lumen, and 3) blood passed through the gut of the worm. Hookworms do not seem to utilise the red cells effectively and defecate frequently. Blood loss from 50 female and 25 male worms can total about 4 ml per day (Georgi and Georgi 1991). Heavy worm burdens in young dogs have been recorded with

up to 250 adult female worms in a single puppy (Kelly 1977). Worm burdens of this magnitude can cause fatal blood loss in young dogs, particularly those suffering from concomitant malnutrition.

A peracute syndrome has been identified in pups infected perinatally via the placenta or maternal milk supply. It is commonly seen in unwormed puppies in remote settings due to the large numbers of pups frequently born in certain house yards. Following an uneventful birth and first week of life puppies die suddenly at around two weeks of age due to an overwhelming gastrointestinal bleed. These pups will often be negative on FEC, the infection not being patent until day 11 (Georgi and Georgi 1991).

Older pups carrying significant hookworm burdens have pale mucous membranes and dark faeces containing partially digested blood. The pups generally appear to be suffering from ill-thrift with a pot bellied and emaciated appearance.

End stage hookworm can appear remarkably similar to parvovirus. The pups are in a state of dehydration and collapse with profuse dark red diarrhoea.

In cases where the worm burden is extreme, a coagulopathy can develop due to the large quantities of circulating anticoagulant. This is of serious concern when surgically desexing immature female pups. The blood of these pups appears thinner and 'more watery' than usual and clotting is obviously impaired. They often have copious peritoneal fluid presumably due to hypoproteinemia. It is advisable to worm these young pups using an all wormer and then postpone their surgery until the last day possible to allow their blood dyscrasias to partially resolve.

Hookworm cases are more prominent in the wet seasons of the tropics, although high numbers have been found in desert communities where inadequate plumbing or drainage allows water to pool around houses (Wilks 1993).

Non-fatal hookworm infections create an acquired immunity to the anaemic form of the disease. Age related immunity invokes protection at around eight months of age, however previously dormant infections can reactivate in the case of immune and/or nutritional compromise, common in community dogs (Kelly 1977).

Zoonotic potential

In humans *A. caninum* can cause three diseases:

1. cutaneous larval migrans (see Figure 3)
2. eosinophilic enteritis in the small intestine
3. mucosal aphthous ulcers in the large intestine (Croese et al. 1994; Croese et al. 1996).

The prevalence of *A. caninum* is high in communities in the Top End of the Northern Territory, Cape York and the Kimberley. Consequently, one would expect that people are commonly exposed to the infective larvae of dog hookworms. None of the three diseases have been reported from Aboriginal and Torres Strait Islander communities, although nurses from Northern Territory communities verbally report cases of cutaneous larval migrans.

Cutaneous larval migrans results from infective larvae migrating through the skin. Lesions most commonly occur on the lower limbs and buttocks. The lesion is an intensely pruritic erythematous area with a track that extends up to 1 centimetre each day. The disease is self-limiting with the larva eventually dying under the skin of the human host. Secondary infection of any pruritic lesion is of concern in a community context due to the potential for secondary infection with streptococcus.

Eosinophilic enteritis occurs when the human host reacts to an *A. caninum* that migrates through the body to the small intestine (Prociv and Croese 1990). The occurrence of clinical eosinophilic enteritis appears to depend in part on an allergic response by the host to the

presence of an adult worm in the intestine. The factors that trigger attacks of eosinophilic enteritis are unknown. With the present state of knowledge about eosinophilic enteritis, it is impossible to speculate how significant it may be in Aboriginal and Torres Strait Islander communities. It appears in fact to be restricted to white urban communities.



Figure 3. Cutaneous larval migrans (CLM) on the ankle of a white resident of Townsville. The lesion starts as an itchy erythematous papule that moves, leaving a red line. This lesion had been present for six weeks. The initial lesion is just above the 4 cm mark on the ruler, and the migratory path wanders down parallel to the ruler and then turns at 90° to move towards the left of the picture. CLM is usually self-limiting and rarely lasts longer than two months. Which hookworm species is the cause of any individual case of CLM is almost impossible to determine. Image courtesy of Rick Speare, James Cook University.

DOG ROUNDWORM, *Toxocara canis*

Toxocara canis is the most common ascarid found in dogs in a community setting. If a community has not had veterinary service provision for some years it is common to find young puppies passing large boluses of ascarid worms following deworming with ivermectin. The worms are large enough for residents to see easily.

The greatest clinical importance of *T. canis* is when the zoonotic potential, visceral larval migrans, is considered.

Morphology

T. canis is a large cream coloured worm. Male and female worms can measure up to 10 and 18 cm in length respectively. The mouthparts of these worms consist of three large lips. They have no buccal capsule and are therefore unable to suck blood from their host, instead feeding on intestinal contents.

Life cycle

Adult worms live in the small intestine of their host. Eggs are passed in the faeces in an immature form. The eggs have a roughened thick shell. Under optimal conditions an egg can embryonate in the environment

to contain an infective larva within 9-15 days. Larvae within eggs will not develop at temperatures below 12°C and are killed prior to becoming infective at temperatures above 37°C (Dunmore and Shaw 1990). Eggs are reasonably susceptible to desiccation.

The dog ingests the embryonated egg. The larvae hatch in the small intestine and migrate through the intestinal wall, entering the portal circulation to finally lodge in the lung. From this point on the life cycle varies depending on the age and sex of the host.

» In puppies the larvae break through the alveoli walls and migrate up the trachea and are swallowed, finally residing in the small intestine where infection becomes patent 30-35 days post ingestion.

» Adult female dogs have acquired age related immunity and rarely develop a patent infection. Larvae are instead disseminated via the circulation. These larvae become encapsulated in various tissues around the body. In some cases a periparturient relaxation in resistance may result in a small window where a patent infection emerges from an adult female. In the last trimester of pregnancy encapsulated forms reactivate, infecting puppies transplacentally and to a lesser



Figure 4. *T. canis* adult worms in situ. Image courtesy of Nick Sangster, University of Sydney.



Figure 5. *T. canis* egg.

degree via the maternal milk supply. Pups infected in this way can develop a patent infection by three weeks of age.

- » In male dogs the acquired immunity appears to be less effective than in female dogs, with patent infection occurring in some adult dogs as for puppies (Dunmore and Shaw 1990).

Given the immune compromise experienced by many community dogs it would be interesting to assess patency of infections in adult community dogs.

Incidence

Studies have found the prevalence of roundworm in dogs in northern Australian Indigenous communities to be in the range of 3-6% (Currie 1993).

Pathogenesis

An age acquired immunity develops in adult dogs, with most clinically obvious cases occurring in puppies aged four to six weeks and pregnant or lactating bitches.

In puppies large worm burdens can cause gastrointestinal obstructions of varying severity. Pups appear to be suffering from ill-thrift with poor coats. They may present anorectic, vomiting with distended abdomens.

Pregnant bitches may abort litters of pups due to heavy worm burdens where large numbers of larvae are moving transplacentally (Dunmore and Shaw 1990).

Zoonotic potential

Toxocara canis has the potential to cause visceral larval migrans. Eggs mature in soil and are ingested. This disease occurs mainly in children, as they are more likely to ingest contaminated dirt. In the absence of a pronounced immune response larvae migrate throughout the body, occasionally localising in the central nervous system or retina (Dunmore and Shaw 1990).

In urban settings antibodies to *T. canis* are about 5%, with clinical expression VLM being rare. Residents of Indigenous communities undoubtedly have exposure to *T. canis* eggs but, as in urban areas, visceral larval migrans is rare (Speare and McConnell 1993).

Due to the pronounced susceptibility of *T. canis* to ivermectin, continued dog parasite control programs within communities can reduce any risk of human disease significantly.

DOG WHIPWORM, *Trichuris vulpis*

It would appear that, at 5-12%, the incidence of *T. vulpis* in dogs in Indigenous communities in northern Australia is relatively low (Speare and McConnell 1993). Higher prevalence has been detected in individual communities and further sampling is warranted to determine the true incidence of infection. Female worms produce eggs sporadically which may also result in an artificially low incidence being reported.

Human whipworm, *Trichuris trichiura*, occurs in human residents of many northern Australian rural and remote Indigenous communities. This is not transmitted from dogs.

Morphology

Whipworm obtains its name from its distinctive whip like shape. It is 45-75mm in length. The body of the worm is divided into two portions, one a long slender 'whip' like section that embeds into the host mucosa, the other a stouter 'handle' posterior portion free in the host's intestinal lumen.

Eggs have a distinctive bipolar plug. The eggs are passed in a non-infective state and become infective within three to four weeks in favourable conditions. The eggs are particularly resistant due to their thick wall. They can remain infective in the environment for up to five years in warm, humid conditions (Dunmore and Shaw 1990).

Life cycle

The host ingests infective eggs in the environment. Worms hatch in the small intestine and then migrate to the caecum and occasionally the colon where they



Figure 6. *Trichuris* egg. Image courtesy of Nick Sangster, University of Sydney.

mature. Worms embed in the caecal wall, small worms being completely embedded in the wall. As the worms grow their posterior ends gradually expand into the lumen. The worms feed off the host's blood.

Worms have a lifespan of over one year in the caecum. The prepatent period is 10-12 weeks.

Pathogenesis

Mild infections have little effect on the host. Heavy burdens create a typhlitis with excessive mucous production and haemorrhage. Diarrhoea with occasional blood flecks may be seen. Anaemia may result from blood loss related both to tissue injury and the worms feeding. Very severe infections penetrating the caecal wall may create adhesions.

Concurrent infections with *Giardia* have been described and it may be that *T. vulpis* infection predisposes the host to infection with *Giardia*.

Zoonotic potential

T. vulpis does have zoonotic potential and although infection is usually asymptomatic, it can produce clinical effects (Mirdha et al. 1996; Dunn et al. 2002). The only reported zoonotic transmission of *T. vulpis* in Australia is in Tasmania in mainstream communities (personal communication from Rick Speare).

THREADWORM, *Stongyloides stercoralis*

This is potentially a very serious zoonotic disease. The north of Australia has one of the highest incidences of this parasite in the world.

Refer to the most recent work done by Rick Speare.

HYDATID TAPEWORM, *Echinococcus granulosus*

Unlike in the southern states, hydatid tapeworm is not endemic in most areas of northern Australia and has not been reported in the Northern Territory. Given that community dogs frequently hunt wallaby, cattle and feral pigs and goats for their own food, the possibility of future infections within community dogs should not be excluded.

Massive hydatid burdens have been reported in dingoes in the southern states and in Queensland.

Ivermectin is not effective against *E. granulosus*.

Morphology

E. granulosus is a small tapeworm, 4-6 mm in length. The worm has a scolex and three to four additional segments. The scolex has a rostellum with two circles of hooks and four suckers. Only the gravid terminal segment is shed from the worm into the environment and is indistinguishable from the segments of other taeniid spp.

The egg is difficult to distinguish from that of other taeniid spp and contains a hexacanth embryo.

Life cycle

The adult hydatid tapeworm lives in the small intestine of the dog. The gravid terminal segment is shed into the environment via faeces. The eggs within the segment are infective at shedding.

An intermediate host, most commonly a grazing mammal but occasionally a human, then ingests the infective egg. The egg hatches in the stomach and small intestine of the intermediate host. The larva



Figure 7. Adult *E. granulosus*. Image courtesy of Nick Sangster, University of Sydney.

penetrates the intestinal wall entering the portal circulation or mesenteric lymph vessels. The larva then lodges in an organ, frequently the liver, and encysts, beginning a cycle of asexual reproduction.

Completion of the life cycle occurs when a dog ingests a cyst often containing thousands of protoscoleces. This can occur with owners feeding raw offal to dogs that has not passed meat inspection or from dogs hunting their own food supply.

Zoonotic potential

Whilst relatively non-pathogenic for the dog, humans can act as intermediate hosts to the hydatid tapeworm with serious consequences. The larvae encyst within soft tissues and create space-occupying lesions. The severity of clinical signs is dependent on location and size of the cyst. Surgical removal of the cyst is required.

DOG TAPEWORM, *Dipylidium caninum*

A variety of tapeworms are found in Australian dogs, *Dipylidium caninum* being the most common. *D. caninum* uses fleas as its intermediate hosts. The distribution of fleas in Indigenous communities varies greatly.

No fleas are found in many Indigenous communities, particularly in the arid central regions of Australia. In the moister sandy coastal areas where fleas are prevalent tapeworm can be a significant problem.

Tapeworm infections are particularly obvious to owners, as gravid segments can be seen migrating from the anus of infected dogs. This is often thought of as a failure of the worming program. It is important to inform owners that ivermectin is not effective against tapeworm.

The cost effectiveness of using an all wormer in a community setting needs to be considered. Without repeated use of an all wormer tapeworm reinfection will occur. If an owner is particularly concerned, or an infection prominent, an all wormer can be used for the household of dogs. Instructions can be given on the purchase of tablets from the community store or when next in a major town centre.

Morphology

Adult *D. caninum* worms grow to about 70 cm in length. The worm has a rostellum with several rows of hooks. The gravid proglottid segments are barrel shaped, being about 1 cm in length. The individual segments contain 20-30 eggs.

Life cycle

The adult worm lives in the small intestine of the dog, shedding its terminal segment, the proglottid. The proglottid is capable of independent movement and can often be seen moving over the dog's rear end or within the faeces.

Flea larvae feed on the egg filled segment. As flea larvae undergo metamorphosis into adult fleas, the tapeworm develops into an infective cysticercoid within the flea.

The life cycle is completed by the ingestion of an infected flea by the dog. The immature cestode attaches to the small intestinal lining, with patent infection developing within three to four weeks.

Zoonotic potential

People can become infected by ingesting cysterci from infected fleas and lice. Infection in humans occurs predominantly in children, although cases do occur in adults possibly due to the habit of capturing and crushing fleas between the fingernails. This releases cysterci from the body cavity of the shattered flea onto the fingers for later ingestion. *D. caninum* establishes in the small intestine in humans and proglottids are passed in the faeces. Case reports in Australia of humans infected with *D. caninum* are not common, with many instances of infection unreported. The clinical significance of infection with *D. caninum* is minor.

DOG HEARTWORM, *Dirofilaria immitis*

Heartworm is endemic in northern Australia. In 147 dogs from the Northern Territory and Cape York, Palmer and Presson (1990) found microfilaraemia in 48% and 68% respectively. *D. immitis* is a mosquito borne infection, and surprisingly is found even in the more remote arid regions of Australia.

Ivermectin is particularly effective against the larvae in the dog's circulation. Anaphylactic reactions have been reported in 0.2% of microfilaraemic dogs following ivermectin

administration. Recent evidence shows that repeated ivermectin dosing renders adult female worms sterile and slowly kills the worms over a period of 32 months.

Morphology

Adult worms range from 12-30 cm in length. They are found in the pulmonary arteries and right ventricle of the heart. Immature forms of heartworm, microfilariae, are found in the circulation and measure about 300 µm in length. Additional larval forms in the third to fifth stages (L3-L5) may be found in the connective tissues of the dog and range from 900 µm to 5 cm in length respectively.



Figure 8. Adult Heartworm in situ. Image courtesy of Nick Sangster, University of Sydney.

Life cycle

Microfilariae circulate in the peripheral blood of the dog and are ingested by Culicine and Anopheline mosquitoes. In 14-21 days the ingested microfilariae grow and moult to become infective third stage larvae (L3). When the mosquito feeds on a dog, L3 larvae are injected into the connective tissue where further growth and moulting take place through the L4 and L5

stages. The L5 stage larvae migrate into the host's venous circulation, lodging in the pulmonary arteries, where they develop into adult worms.

Pathogenesis

1. **Right sided heart failure** occurs due to physical obstruction of the pulmonary arteries and heart chambers by adult worms. In addition a pulmonary arteritis and fibrosis occur resulting in pulmonary hypertension. A cough, decreased exercise tolerance, ascites and hepatomegaly are all seen.
2. **Lung parenchymal damage** occurs due to emboli of worms breaking off, creating inflammatory lung foci.
3. **Caval syndrome** occurs in advanced heartworm disease where the worms amass and lodge in the right atrium. Hypovolaemic shock, dyspnoea, and massive intravascular hemolysis ensue, frequently resulting in sudden death.

Zoonotic potential

There appear to be no studies on the prevalence of antibodies to *D. immitis* in human populations in Australia. However, in endemic areas overseas, exposure of humans as measured by IgE antibodies against *D. immitis* is quite common with prevalence up to 12% (Espinoza et al. 1993).

In humans disease or pathology due to *D. immitis* appears to be quite rare. The worms usually die before developing into adults. Worms frequently lodge in a branch of the pulmonary artery and cause a small pulmonary infarct and subsequent granulomatous reaction, which appears as a solitary nodule in the lung (Ciferri 1982).

In Australia, human cases of dirofilariasis are usually detected opportunistically by chest X-ray as coin lesions in the lungs. Reliably distinguishing these lesions from early carcinomas has been difficult and surgical exploration with lobectomy, etc has occurred.

D. immitis can also cause subcutaneous nodules in humans (Santamaria et al. 1995). The major effect of *D. immitis*, therefore, is unnecessary thoracotomy with lobectomy, or minor surgery to remove subcutaneous lumps. The original lung granuloma due to the host's reaction to a degenerating worm is of little clinical significance per se.

There have been no reports of dog heartworm affecting members of Aboriginal and Torres Strait Islander communities. Since the prevalence of heartworms in dogs is high, we expect that residents of these communities would be commonly inoculated with *D. immitis*. Pathology of dirofilariasis may occur in Aboriginal and Torres Strait Islander communities, but it could be speculated that it is of minor significance (Speare 2001).

THE ROLE OF DOGS IN HUMAN GASTROINTESTINAL INFECTIONS

An underwhelming amount of scientific evidence exists as to the role of dogs in harbouring and transmitting common human protozoal, bacterial and viral intestinal infections.

Many Indigenous children living in community settings suffer from ill-thrift related to chronic diarrhoea and malnutrition. Many communities lack housing that meets World Health Organization (WHO) standards in terms of overcrowding, sanitation and water supply. This problem is directly responsible for the transmission of many gastrointestinal illnesses. Whilst human-to-human transmission of diarrhoeal diseases is recognised, the role of the dog as a reservoir of infection has not been thoroughly investigated.

Dogs, particularly pups, frequently feed on disposable nappies left lying around community yards. Dogs will also drink from toilets and the overflow of blocked septic systems. Yards and the insides of houses can become grossly contaminated with

puppy faeces. Given these circumstances the probability of dogs being implicated in diarrhoeal disease in humans is increased.

In one study in the Western Kimberley region 32% of children were found to be infected with *Giardia duodenalis*. Within the same communities 17% of dogs were also infected with the organism (Meloni et al. 1993).

The potential for dogs to carry and transmit *Campylobacter jejuni*, *Salmonella* spp, *Cryptosporidium* spp and *Giardia* has been flagged for some time. The role of dogs in perpetuating these diseases in communities requires further research.

In communities that have been without a dog health program for a period of time large, sickly puppy populations and adult dog ill-thrift are obvious. Given that host resistance determines the degree to which an animal sheds *Salmonella*, *Cryptosporidium* and *Giardia* it stands to reason that healthy, fat, wormed dogs will shed less infection than sickly dogs.

Refer to the paper Graeme Brown presented at the Dog People Conference, July 2006, when these conference proceedings become available.

REFERENCES

- Currie, B. (1993). "Dogs and human health in Aboriginal communities: How much zoonosis?" In J. Shield (ed), *Dog health in Indigenous communities*, proceedings of a conference held in Darwin in 1993 as part of the Western Pacific Conference.
- Dunmore, J.D. and Shaw, S.E. (1990). *Clinical Parasitology of Dogs*. Post Graduate Foundation in Veterinary Science, Department of Veterinary Pathology, University of Sydney.
- Georgi, J.R. and Georgi, M.E. (1991). *Canine Clinical Parasitology*. Lea and Febiger.
- Kelly, J.D. (1977). *Canine Parasitology*. Post Graduate Foundation in Veterinary Science, Department of Veterinary Pathology, University of Sydney.
- Meloni, B.P., Thompson, R.C., Hopkins, R.M., Reynoldson, J.A. and Gracey, M. (1993). The prevalence of *Giardia* and other intestinal parasites in children, dogs and cats from Aboriginal communities in the Kimberley. *Medical Journal of Australia*, February 1, 158(3), pp. 157-159.
- Speare, R. and McConnell, A. (1993). 'Worms and mites, dogs and people'. In J. Shield (ed), *Dog health in Indigenous communities*, proceedings of a conference held in Darwin in 1993 as part of the Western Pacific Conference.
- Wilks, K.M., Williamson, P. and Robertson, I.D. (1993). Assessing and improving the health status of dogs in Aboriginal communities in the Kimberley region, Western Australia. In J. Shield (ed), *Dog health in Indigenous communities*, proceedings of a conference held in Darwin as part of the Western Pacific Conference.

8

COMMONLY ENCOUNTERED PARASITES, DISEASES AND OTHER CONDITIONS

CANINE SKIN PARASITES AND DISEASES

There can be a tendency among veterinarians who have been working in Indigenous community settings to become somewhat limited in their diagnostic pursuits. In the absence of a microscope (most community health clinics don't have one) all pruritic alopecias become scabies. Beware the trap.

Whilst scabies does predominate in many communities, the immune suppression of many dogs results in the prevalence of other skin conditions such as ringworm and demodex. Flea allergy dermatitis also occurs with variable frequency. It is not uncommon for people to see these skin conditions as a failure of the scabies control program.



Figure 1. Scabies or not? Image courtesy of Steven Cutter.

SCABIES OR SARCOPTIC MANGE, *Sarcoptes scabiei*

Many dog populations in Indigenous communities in northern Australia have endemic infections of canine scabies.

Incidence

In communities where ivermectin has not been given for a few years it is not unusual to find over 50% of dogs displaying some form of mange (Wilks et al. 1993). In communities where an ivermectin program has been implemented every six months or more, it is rare to find more than one or two households with affected dogs.

Presentation

The severity of scabies lesions displayed in a community setting varies greatly. Some dogs will be in the early stage of infection with small pruritic crusting lesions over their ears and forearms. It is common to see only two circular lesions the size of a ten-cent piece at the base of the ears. Others dogs will have

a patchy alopecia over their entire body. The more advanced cases will be completely bald with hyperpigmented, lichenified, crusting skin with or without secondary infection. These dogs have become colloquially known as "leather dogs".

Differential diagnoses

- » Demodicosis
- » Ringworm
- » Atopy/ Flea allergy dermatitis
- » Areas of alopecia due to previous tick burdens (usual distribution is between the shoulder blades)
- » Healing hot water scalds with secondary infection.

Morphology

Adult female scabies mites measure 0.4 mm in length, males are 0.2 mm in length. The mites are round bodied.



Figures 2 & 3. Scabies infected dogs. Images courtesy of Nick Sangster, University of Sydney.



Figure 3.

They have well developed suckers on their front legs, enabling them to retain host contact but also to move vertically up standing structures when off the host. Egg, larva and nymph forms may all also be found on the host.

Life cycle

Estimates of time to complete the life cycle from egg through to larval, nymph and patent adult infection stage range from ten days to four weeks. Most transmission is by direct contact although scabies mites can survive in the environment for up to three days (Arlian et al. 1989). Survival times off-host may be extended if the mite leaves the host with the protection of a fomite such as a skin flake, or if the mite finds itself in a moist environment such as a wet foam mattress. Scabies eggs may survive up to two weeks in the environment in humid conditions (Dunmore and Shaw 1990).

The mite burrows in the stratum corneum of the host. The entire life cycle is usually completed on the host.

Pathogenesis

The scabies mite burrows through the most superficial layer of the skin, the stratum corneum. The mite feeds on exudative lymph and scurf in the skin. A hypersensitivity reaction is established by the presence of the mites' saliva on the host, and an intense pruritis follows. The resultant self-trauma becomes the primary clinical manifestation of infection. Due to the extreme hypersensitivity displayed by most dogs, very few mites are required to establish a severe infection.

Treatment

In addition to the following information, please refer to Chapter 9: Parasite control protocols: Oral ivermectin treatment.

For economy, 'traditional' dog programs use ivermectin preparations, namely sheep or cattle preparations, that are not registered for this use. Ivermectin is particularly successful in the treatment of scabies with some recoveries appearing nothing less than miraculous.

Dogs with small lesions will usually clear the infection following a single dose of ivermectin. Completely bald dogs may take two to three doses to resolve the scabies, with full hair cover usually returning within months.

For dogs that have chronic scabies the hair follicles are frequently damaged to such a degree that only patchy hair growth will return. Others still may have such deep lichenified fissures that scabies can persist in the face of ivermectin treatment. Given welfare concerns and the fact that these dogs may become a source of continuing infection for the whole community, it may be worth discussing euthanasia with the owners. Thankfully these cases are now almost unheard of in areas with good dog health programs.

Eradication or control?

Most practitioners note that a dog community apparently clear of scabies will have a resurgence of infections within six to twelve months if the ivermectin program ceases.

Reinfection probably stems from:

- » Dogs who missed treatment.
- » Visiting families bringing dogs from unserviced communities.
- » “Dump dogs”: most community dumps have a small feral dog population. These dogs frequently have little or no hair. Attempts to remove these dogs can be problematic. Methods to be considered are poison baits, shooting and trapping.
- » Wild dingo/ feral dog populations: many community dogs “go bush”. During the wet season dogs may be left unattended in communities and on outstations for lengthy periods of time. Dogs turn to hunting their own food supply. Alternatively dogs will be taken on hunting expeditions with families and may not return to camp as quickly as their owners. Cross infection with wild dog populations is likely in these circumstances.



Figure 4. Adult female scabies mite. Image courtesy of Nick Sangster, University of Sydney.



Figure 5. Adult Demodex mites. Image courtesy of Nick Sangster, University of Sydney.

DEMODICOSIS, *Demodex canis*

Demodicosis is caused by the ubiquitous mite *Demodex canis*. Demodex is a cigar shaped mite about 0.1 mm in length. The mite lives in the hair follicles of its host feeding on sebum. The majority of dogs harbour *D. canis* but do not display a clinical manifestation of skin disease. *D. canis* is host specific and is of no zoonotic consequence. Humans harbour their own species of demodex mite, *Demodex folliculorum*, which is unrelated to the canine mite.

Pathogenesis

Demodicosis in a clinical context can be categorised as follows:

1. Juvenile localised

Presenting frequently at around six months of age, this form often spontaneously resolves within ten weeks in otherwise healthy puppies. This condition seems to

relate to hormonal changes associated with puberty in pups. The lesions are typically around the face and forearms. Secondary infection is rare and pruritis minimal.

2. Juvenile generalised

The movement from a localised to a generalised form of the disease is dependent on genetic factors. An inherited T cell dysfunction that prevents the dog's immune system from keeping mite numbers within normal limits is identified as the main causative agent in the generalised form. The general immune status of the young dog will also affect mite numbers.

The generalised form is characterised by alopecia spreading across the entire body. Secondary infection is common with severe folliculitis and furunculosis often developing. The secondary bacterial infection generates a pruritis with self-trauma resulting.

3. Adult generalised

Adult onset Demodicosis usually represents some form of immune compromise.

Demodex in dogs in a community setting tends to be similar to but more severe than that found in an urban context. Generalised cases tend to be more common due to immunosuppression and stress that many dogs experience in communities. There is also an increasing trend for ownership of 'pig dogs' in many communities. These dogs often carry Staffordshire or Pitbull genes and are thus genetically predisposed to demodex.

Malnutrition and heavy intestinal parasite burdens allow localised forms of demodex in pups to rapidly become generalised. Female dogs are less likely to be desexed, with oestrus, whelping and lactation resulting in recurrent episodes of clinical demodex.

Inbreeding is also more common in a semi closed dog population. In some communities a high familial incidence of demodex

becomes obvious among the dog population once scabies is controlled. Presumably these dogs carry and pass on the inherited T cell dysfunction.

Diagnosis

It is impossible to adequately distinguish between *S. scabiei* and *D. canis* infections on the basis of clinical signs alone. Given the usual lack of diagnostic equipment available, histories and treatment trials become more common methods of diagnosis.

If owners are compliant and have a safe storage facility in their homes it is worthwhile conducting a scabies treatment trial using ivermectin, three doses at 300 ugm/kg given at fortnightly intervals. On the next visit discuss the effects of the treatment trial. If the owner reports that the dog's condition improved minimally and the dog is not extremely pruritic suspicions of *D. canis* alopecia ought to be strengthened.



Figure 6. Adult dog with Demodex, clinically indistinguishable from scabies. Image courtesy of Nick Sangster, University of Sydney.

Treatment

Depending on the severity of the problem and the degree of secondary infection, an owner may or may not be concerned about the dog's condition. Treatment is often unrewarding in a community setting.

It is important that people in charge of the ivermectin program in your absence are well informed about the cases of suspected demodex in the community. Due to the similar clinical appearance of demodex and scabies your assistants may need to justify why "some dogs still have scabies", when what is being observed is demodicosis.

Treatment of generalised demodex consists of internal and external treatments:

- » Correct any obvious areas of immune compromise by improving nutrition and instigating regular parasite control.
- » Whilst weekly oral ivermectin will have some effect on reducing the burden of demodex, daily oral ivermectin for six weeks may be appropriate in some cases. Individual veterinarians must assess the likelihood of owner compliance. It may also be appropriate for the owner to pay for the ivermectin in this circumstance.
- » Bathing the dog. There are anecdotal reports of owners bathing dogs using traditional antiseptic/ astringent preparations with good result. These washes or even the use of normal shampoo will reduce both the bacterial and mite load on the dog. Many community dogs will not tolerate baths so this treatment is reserved for the more concerned owners and affable dogs.
- » In cases of severe secondary infection the use of antibiotics may be required. Again, owner compliance must be established and a safe storage facility available. A 10-14 day course of amoxicillin/ clavulanic acid or cephalosporin is the most appropriate treatment choice.

» One veterinarian's preferred demodex treatment is dectomax cattle injection (10 mg/ml doramectin) at a dose of 1.2 ml/20 kg given by subcutaneous injection weekly for four to six weeks. However, given the complicated host/parasite relationship and the role of immunocompetence, it is debatable whether anything is curative in severe cases.

» It is also important to discuss the desexing of any dogs with chronic demodex. Apart from preventing likely transmission of the hereditary component of the disease, desexing also reduces the stress on the dog's immune system. Females are not contending with multiple pregnancies and males can step away from the intense dominance hierarchy that exists in community settings.

FUNGAL SKIN INFECTIONS, DERMATOPHYTOSIS

Cutaneous fungal infections appear to be relatively prevalent in Indigenous community dogs, particularly in debilitated pups. The majority of evidence is again anecdotal with diagnosis being made on visual characteristics as opposed to Woods lamp visualisation or fungal culture.

Ringworm is considered a zoonosis however when discussing 'ringworm' with medical personnel it is important to note that the most common form of tinea in people, particularly children, in northern Australian Indigenous communities is caused by *Trichophyton rubrum* (Currie 2000).

Causative agent

The most common cause of dog and cat ringworm is *Microsporum canis*. Other agents implicated in dog and cat ringworm are *Microsporum gypseum* and *Trichophyton mentagrophytes*.



Figure 7. Human skin lesion. Image courtesy of Nick Sangster, University of Sydney.

These organisms are ubiquitous in the environment and often survive on asymptomatic dogs and cats for long periods of time. The hot and humid conditions of the tropics, particularly during the wet season, enhance fungal growth considerably. Most dogs living in community settings are also predisposed to fungal colonisation due to large free roaming dog populations, multiple dog households, malnutrition and immune compromise due to internal parasite burdens.

Characteristic lesions

Clinical signs vary from asymptomatic carriage to a near complete alopecia in sick puppies. The classical sign of circular alopecia is not always evident and is more common in cats than dogs. In most dogs however close examination will reveal circular areas of hyperpigmentation. Whilst not diagnostic this is suggestive of ringworm. Discussions with owners may also reveal that the disease began with circular alopecia but then rapidly spread to generalised alopecia lesions.



Figure 8. Early single ringworm lesions. Image courtesy of Nick Sangster, University of Sydney.

Other signs are variable and include skin scaling, erythema, pruritus and granulomas particularly around the nose (Tilley 1997).

Differential diagnoses

- » Demodicosis
- » Early scabies lesions
- » Bacterial folliculitis.

Treatment

Many dogs and cats will undergo spontaneous remission, however treatment options that are easily adapted to a community setting include:

- » Washing all bedding in hot washes and leaving in the hot sun for days.
- » Mopping house floors with a 1:10 dilution of bleach.

- » Shampooing affected dogs with Selsun shampoo daily for one week then twice weekly until the condition resolves. Selsun shampoo is usually available from the clinic as a control for human tinea. Alternatively betadine scrub can be used but tends to be more drying on the skin.

FLEAS AND FLEA ALLERGY DERMATITIS (FAD)

Fleas can be prevalent in Indigenous community settings, particularly in areas close to the coast with sandier soils. Flea infestations are usually seasonal occurring during the warmer humid months, although in some communities, particularly those farther north, fleas are prevalent all year round.

Given the large numbers of free roaming dogs, fleas are particularly difficult to control on a household or individual dog basis. The majority of dog programs to date have



Figure 9. Multiple but still distinct lesions on a puppy. Image courtesy of Nick Sangster, University of Sydney.

placed fleas in the 'too hard basket'. In some areas Environmental Health Workers will conduct a veterinary dog program alongside insecticidal fogging of houses and yards. This is good in the short term but has little effect long term. Some shops stock flea powders or flea shampoos. These are usually of minimal benefit given the ready supply of larvae in the environment.

It is important that owners understand the flea life cycle and why control attempts may fail.

Fleas can be an enormous nuisance to some people, with papular lesions on the wrists and ankles developing as a result of flea bites.

It is worth including flea control in dog program planning if fleas are flagged as a problem in the communities you visit.

In areas where fleas are endemic cases of FAD will occur, although anecdotally it does not seem very common. Severe cases with alopecia and secondary skin infections can be confused with scabies particularly in the initial stages of an ivermectin program. Discussion with the dog's owner may reveal a seasonality of the problem, coinciding with flea plagues.

Typical lesions related to flea allergy dermatitis are pruritic alopecia around the tail base, hyperpigmentation, lichenification, scaling and generalised alopecia.

The main differential diagnoses are scabies and atopy.

Treatment of individual animals with prednisolone is problematic. The tablets are appealing to small children and safe storage in community houses may not be possible. There is also the added complication of

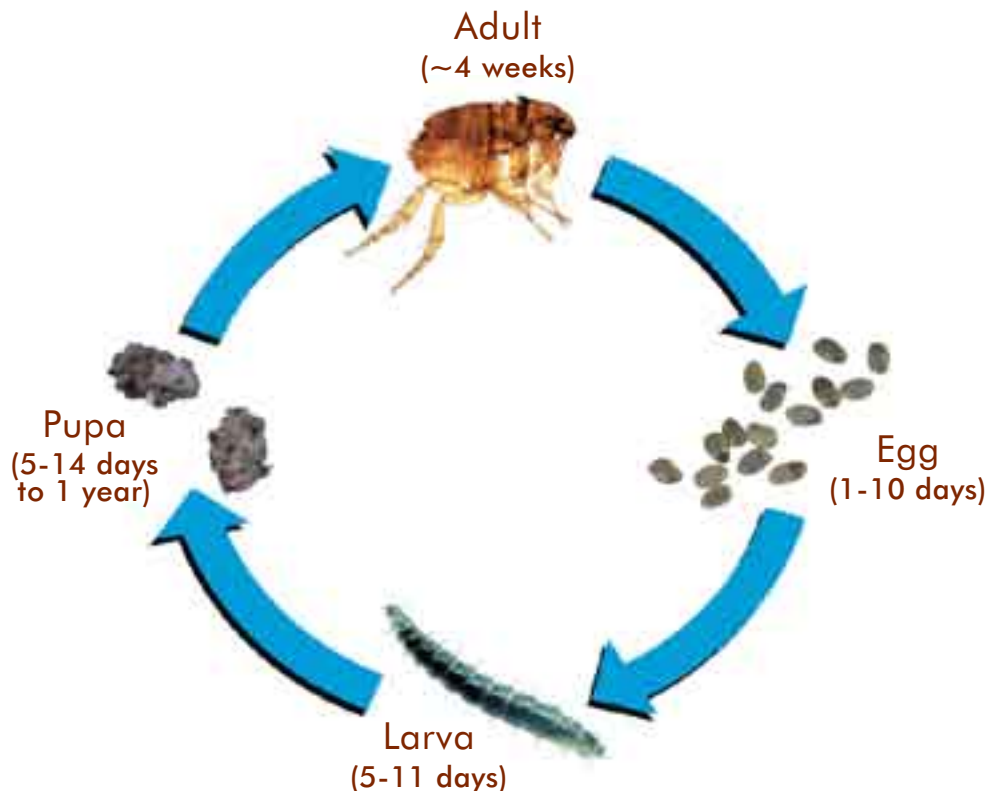


Figure 10. Flea life cycle. © 2007 Novartis Animal Health Australasia Pty Ltd. Reproduced with permission of the copyright holder.



Figure 11. Flea allergy dermatitis. Image courtesy of Nick Sangster, University of Sydney.

immune suppression of dogs already facing immune compromise. Severe pyoderma can be rapidly induced with prednisolone therapy. Of course there are always exceptions to these generalisations and responsible owners can be given the choice of prednisolone to control symptoms.

TICKS

The tick of major importance to dog health in northern Australia is the brown dog tick, *Rhipicephalus sanguineus*. The distribution of the paralysis tick, *Ixodes holocyclus*, does not extend into the Northern Territory or Western Australia. *Ixodes holocyclus* is found predominantly on the east coast (see Figure 12). The other major tick species in northern Australia is the cattle tick, *Boophilus microplus*, which can be distinguished by its pale legs, brown dog ticks having brown legs.

Life cycle

The dog is the main host for the brown dog tick. The tick has no native host. It is usually found in very high numbers where dogs are in large numbers; communities, kennels and suburban houses with multiple dogs. The tick attaches and feeds on a dog three times in its life cycle, dropping off to moult in between. Juvenile ticks appear like small

specks of dirt and are often seen when an animal is clipped and prepped for surgery. A mature female lays 1000-3000 eggs off-host and dies. The eggs hatch in 19-60 days depending on the season. The resulting larvae attach to a dog and feed for 2-7 days.

The larvae drop off the dog and moult into nymphs, which takes between 5 and 23 days. A few days after emerging from the larval stage, the nymphs attach to the host, feed for 4 to 9 days and drop off. They take 11 to 73 days to moult into adult males and females. The adults quickly attach to a dog. The females take between 6 and 30 days to become fully engorged. Then they drop off to recommence the life cycle.

These ticks are very resistant with larvae able to survive up to 8½ months, nymphs up to 6 months and young adults up to 19 months off-host (DPIFM Agnote #372 1996).

Disease implications

Given the massive numbers of ticks that can be produced by any one female, tick burdens seen on dogs in communities can be quite overwhelming. It is not uncommon to see up to 500 ticks on an adult dog during the wet season when climatic conditions favour their development.

People living in multi dog households can at certain times be overwhelmed by tick numbers. Ticks invade living spaces and bedding and will attach to humans indiscriminately. Removal often results in an itchy lesion that during the wet season can easily become an infected ulcer. Dogs with heavy tick infestations are usually marginalised from the house and can become neglected as a result.

Tick burdens result in:

- » Severe anaemia in pups. This can be fatal when combined with the anaemias of intestinal parasite burdens.
- » Irritation, depression and ill-thrift in adult dogs.

- » Hair loss, particularly between the shoulder blades. This can be confused with scabies or healed burns once the ticks have fallen off and the scarred bare skin remains.
- » The spread of canine babesiosis. *Babesia canis* is endemic across the Northern Territory. It is a blood borne intracellular protozoon that uses ticks as the main vector for transmission. In the majority of cases infection is subclinical however an acute syndrome characterised by fever, lethargy and haemolytic anaemia can result from infection of non-immune adult dogs or pups. The disease can be fatal. Infected dogs can become life long carriers of the organism.

Control/ treatment

Given the tick's potential for reproduction, control poses a challenge to fully resourced dog owners in the suburbs of mainstream tropical cities. In a community setting the challenges are even greater and as yet no one solution can be recommended as the panacea. The following are a list of choices available.

1. Bayticol: see Appendix A

Bayticol (Bayer) is an acaricide developed for cattle that comes in the forms of a 'dip and spray solution' registered for dogs and a 'pour-on' treatment not registered for use on dogs.

Both products are very effective at removing all ticks from dogs and continuing to kill ticks for up to one month after treatment.

The dip and spray formulation does not strip out in water and can therefore be repeatedly used in a dip setting. Thought has been given to the establishment of dip baths in communities. Many older people remember throwing their dogs into cattle dips in the station era. Some talk of dogs becoming sick afterwards, presumably from organophosphate poisoning.

The major problem with the dip treatment is initially the establishment of dip facilities and then the handling of the dogs.

The question of who is prepared to risk being bitten by the dogs becomes a stumbling block. Alternatively the dip and spray can be placed in a spray bottle or sponge bath and the dog soaked in that fashion. This is successful for the well mannered dogs but the unruly do not appreciate the soak or the handling.

In the past extra label use of the pour-on solution has been the treatment used and advocated by most veterinarians in the field. However in 2001 the company experienced difficulties with registration of the pour-on formulation. The product proved particularly stable in fat and residues were detected in cattle fat deposits at slaughter. Fears were generated in relation to the export of beef to countries where no chemical residue was acceptable, notably the United States of America. An expensive product recall followed.

The product is once again on the market but is now only registered for **live cattle export** purposes. The export of these cattle is to countries where the product is registered and the individual countries' withholding limits can therefore apply. The product is not registered for use in beef for Australian tables.

In the Northern Territory the question now lies in the hands of veterinarians and the individual communities. Some veterinarians continue to use the pour-on in an extra label fashion, feeling its success as an acaricide and the ease of its application far outweighs any human health risk. In Queensland there are greater restrictions placed on extra label use of drugs under the Veterinary Surgeons Act. It is worth considering this. The dose used varies, but few problems are seen with a dose of 1 ml per 15 kg applied as a top-spot between the shoulder blades. A small drop in each ear for badly infested dogs is beneficial. Itching, redness and a small area of alopecia are anecdotally the infrequently experienced adverse effects. Higher doses have the potential to be toxic. If holding Bayticol

for this purpose veterinarians must keep in mind the restrictions that apply to the cattle industry and act responsibly with the product.

Some veterinarians have raised the concern that since the chemical accumulates in cattle fat it has the potential to do so in people who have contact with the chemical. The fact that small children and dogs live in such close proximity to one another raises concerns of indirect accumulation in children. Whilst the company believes the risk to human health from eating mildly contaminated meat is negligible, there have been no studies. Bayer categorically does not support the use of the pour-on formulation in dogs at all.

2. Ivermectin

The administration of ivermectin orally at a dose of 300 ug/kg will kill ticks already present on the dog and will continue to kill new ticks moving onto the dog for a period of two to three days. In suburban centres some clinics recommend ivermectin injections weekly for four weeks when ticks are abundant due to favourable climatic conditions. Whilst reducing the immediate burden on a household, the long term merit of ivermectin as the primary method of tick control in communities is debatable. The frequency of use required to control ticks would dramatically increase the chances of resistance developing to the family of ivermectin products. Given their value in the control of scabies, heartworm and intestinal parasites this must be avoided.

3. Commercial top-spots

Top-spots marketed for use in urban environments have had little use in community settings to date. Their cost is largely prohibitive given the budgets most programs operate on. The notion of individual responsibility for the purchase of these type of chemicals is growing in favour.

In suburban Darwin veterinarians often face the story that “the product’s not working” with top-spot preparations. The company reports this is due to the rapid re-infestation with ticks from the environment and the time lag for the product to kill them. Certainly one would envisage this would also be problem in a community setting.

There are however a few veterinarians now considering these products in sample trials, eventually looking towards shops stocking the products for individual sale.



Adapted from Roberts, F.H.S. (1978) Australian Zool. CSIRO Yearbook, Q.L.D., and Conroy, W. www.com.au for TAGS Inc.

Figure 12. Map of paralysis tick distribution.

PARVOVIRUS

In all but the most remote communities parvovirus is endemic. Vaccinated dogs are scarce with immunity being conferred to most adult dogs in communities from non-fatal infection usually as pups.

Parvovirus can initially be difficult to differentiate from overwhelming hookworm burden. The disease is generally more characterised by vomiting preceding diarrhoea than hookworm infestation is. Fatal diarrhoea and vomiting in otherwise healthy, chubby litters of pups is a good indication of parvovirus in the community. Parvovirus also tends to affect whole litters quickly. It usually moves through a community in waves. Puppies brought in from urban centres seem most vulnerable, presumably because they do not possess strong maternal antibodies.

Apart from the obvious health and welfare implications, an outbreak of parvovirus can significantly damage the reputation of a dog program. If an outbreak of parvovirus occurs in a town within weeks of your visit people may blame your actions and the medications for killing their puppies. This can be largely overcome by informing your assistants and the health clinic staff, particularly interested Aboriginal Health Workers, about parvovirus. Health Workers are a wonderful vehicle for the dissemination of medical information to the community and have regular contact with most community members.

If you are in town during an epidemic, informing owners about parvovirus is time well spent. The majority of dog owners in Indigenous communities have seen these cycles of puppy death repeated many times over and are relieved to finally have an explanation.

As callous as it may sound parvovirus in the early stages of a dog program is a natural population control mechanism. Without the deaths of these pups far greater numbers of pups would survive to adulthood and reproduce. At this stage of development, given the limited funding available for the programs, the focus remains on parasite

and population control. Once these areas of a program are stabilised consideration ought to be given to the introduction of vaccinations.

TRANSMISSIBLE VENEREAL GRANULOMA

Whilst almost unheard of in urban practice in Australia, transmissible venereal granuloma is endemic in some Indigenous communities across northern Australia. TVG is a round cell tumour that is spread via direct sexual contact between dogs. In communities the dogs are often termed "cancer dogs".

In communities where TVG is endemic but owners have a poor understanding of the disease, the veterinarian may be blamed for "doing something wrong in the operation". It is relatively common for a subclinical infection in a male dog to become clinical following castration. This is presumably because the dog is no longer debulking the tumour by mating bitches in the community. The owner sees a dog dripping blood from his genitalia in the weeks following surgery and queries the veterinarian's competence. A similar scenario can occur in bitches, but is anecdotally less common.

Some veterinarians do not agree with the 'sexual activity' debulking theory. It is thought that the dog picks up the tumour with sexual activity before a veterinarian gets the opportunity to desex it, and it is months or years before the mass becomes large enough to be noticed by the owner. Owners' perception that "the operation caused the cancer" is certainly an issue. Be vigilant in examining the penis/ prepuce and vagina of any anaesthetised animals. You will be amazed at how many TVGs you will find.

Presentation

TVG appears primarily as a granulomatous vascular mass on the genitalia of dogs. It is similar to proud flesh on a horse but more friable and less deep red in colour. In many cases the mass will not be evident externally,

but the owner will complain of the dog dripping blood around the house. On closer inspection of the male dog the prepuce often appears swollen due to tumours on the preputial mucosa and penis. In the female, digital examination will reveal granulomatous feeling lesions on the internal vaginal walls. Small portions of these tumours may be broken off painlessly for closer examination.

In advanced cases a large mass will be prominent protruding from the external genitalia of the bitch. Untrained observers often describe "the bitch with the prolapse" due to the size and vascularity of the lesions. In advanced cases male dogs have difficulty urinating and appear extremely uncomfortable. Occasionally these dogs have a chronic phimosis. There may be advanced penile trauma due to lengthy exposure of the penis to the elements.

Treatment

Many cases of TVG spontaneously regress over time. In immune suppressed dogs this is unlikely to occur.

Indigenous people have observed the phenomenon of spontaneous regression repeatedly and are sometimes happy to wait for self-resolution. In other cases owners are concerned about the dog continually dripping blood around the house. In houses with small children, parents may be anxious about the potential spread of the infection to their children. TVG is not a zoonotic disease.



Figure 13. TVG in an undesexed female. Additional diarrhea became obvious on induction. Image courtesy of Marguerite Young, IFAW.

Treatment options include:

1. Wide surgical excision

This is often very difficult in advanced cases. Surgical exposure of the bases of many of these tumours is impossible given the constraints of surgical facilities and after-care. The lesions are often multifocal with five to ten individual tumours often present.

2. Vincristine chemotherapy

Weekly doses of vincristine, 0.5 mg/kg/m² IV for three to six weeks resolves the majority of tumours. Veterinarians working in the field report the complete resolution of tumours following only one to two doses at weekly intervals.

The use of vincristine in a community setting however is problematic. Safe handling of chemotherapeutic agents in communities is virtual impossible. Contaminated urine, faeces and discarded vials cannot be adequately controlled.

If owners want complete medical resolution and choose this option then referral to a town-based clinic is recommended.

3. Debulking

Due to the ability of this tumour to spontaneously resolve, a surgical debulking is often all that is required to manage the situation (although one veterinarian has suggested that, from his experience of watching animals over a four year period, the condition is often horribly progressive, which suggests more research needs to be conducted). Debulking improves the appearance of the dog. It resolves the issues of dripping

of blood, phimosis and discomfort. Many tumours, once debulked complete the process of regression unassisted.

There is anecdotal evidence that surgical debulking plus one dose of vincristine can lead to regression (refer to AMRRIC veterinarians). This is probably the most realistic treatment option in a community setting. Owners must be warned of the possibility of recurrence.

The tumours are very friable and can be stripped from the underlying tissue by grasping the bulk of the tumour across the base with a pair of hemostats and removing it. A raw flat ulcerated looking surface is left.

4. Surgical desexing

Surgical desexing will not resolve the TVG but it will prevent further sexual behaviour thereby preventing transmission. In all cases it is important to discuss the problem fully with the owner. Many owners do not realise the 'cancer' is a sexually transmitted disease. Once this is understood, owners are usually happy to desex their pet to prevent further transmission.

Treatment of TVG at a community level

Individual veterinarians have achieved great success in near eradication of TVG from some communities. This has occurred via a process of consultation with the 'right' people. If TVG is endemic in a community, it is worth entering formal discussions with those in the community who have authority in regard to dog matters. Allow these people to decide on best practice for the whole community once they have a thorough understanding of the epidemiology of the disease.



Figure 14. Removal of a milk can from a dog's head. Image courtesy of Philip Donohoe, AMRRIC.

MISCELLANEOUS 'FIRE BRIGADE' MEDICINE

Veterinarians travelling to Indigenous communities may also have to contend with all and any of the diseases and misadventures that occur in an urban practice. Whilst it is impossible to prepare and pack for all possible contingencies it is wise to be prepared for such incidents as:

- » limb and digit amputations, often open, chronic and infected
- » tooth extractions
- » fight wound stitch-ups
- » lump removals.

If you require additional resources the human health clinics/ community hospitals are sometimes happy to provide assistance in the way of extra medications, etc so long as this privilege is not abused. In Queensland, at least, this is not to be taken for granted.

People greatly appreciate a veterinarian taking time out of their population/ parasite work to tend to sick or injured animals. Indigenous communities are subject to many broad scale 'public health initiatives'. When people see you treating animals as individuals it will often increase people's respect for the veterinary program, your assistants and you.

REFERENCES

- Northern Territory Department of Primary Industry, Fisheries and Mines (DPIFM). (1996). *The Brown Dog Tick*. Agnote #372.
- Arlian, L.G., Vyszenski-Moher, D.L. and Pole, M.J. (1989). Survival of adults and development stages of *Sarcoptes scabiei* var. *canis* when off the host. *Experimental and Applied Acarology*, 6, pp. 181-188.
- Currie, B. (2000). Dog health and zoonotic diseases – a review from a northern Australian perspective. In *A better dogs life*, proceedings of a three-day conference on dog health programs in Indigenous communities, Darwin, Australia.
- Dunmore, J.D. and Shaw, S.E. (1990). *Clinical parasitology of dogs*. Post Graduate Foundation in Veterinary Science, Department of Veterinary Pathology, University of Sydney, pp 101-104.
- Speare, R. and McConnell, A. (1993). Worms and mites, dogs and people. In J. Shield (ed), *Dog health in Indigenous communities*, proceedings of a conference held in Darwin as part of the Western Pacific Conference.
- Tilley, L.P. and Smith, F.W. (1997). *The 5 minute veterinary consult: canine and feline*. Williams and Wilkins. pp 506-507.
- Wilks, K.M., Williamson, P. and Robertson, I.D. (1993). Assessing and improving the health status of dogs in Aboriginal communities in the Kimberley region, Western Australia. In J. Shield (ed), *Dog health in Indigenous communities*, proceedings of a conference held in Darwin as part of the Western Pacific Conference.

9

PARASITE CONTROL PROTOCOLS

The main class of drug used to treat parasite burdens in community dogs is the macrocyclic lactones. In the Northern Territory ivermectin, given orally or injected, is still the most common drug used. In Western Australia moxidectin (Cydectin) is more commonly used.

The macrocyclic lactones are used in communities largely for the control of canine scabies. At the dosage for scabies control they have the added benefit of treating dog hookworm (*Ancylostoma caninum*, *braziliense* and *Uncinaria spp*), whipworm (*Trichuris vulpis*), roundworm (*Toxocara canis* and *Toxascaris leonina*), threadworms (*Strongyloides stercoralis*), throatworm (*Oslerus osleri*) and tissue worm (*Dipetalonema reconditum*) (Cutter 2000).

The use of these drugs can also be of assistance in controlling heartworm (*Dirofilaria immitis*), demodectic mange (*Demodex canis*) and brown dog ticks (*Rhipicephalus sanguineus*).

Whilst the macrocyclic lactones have no direct effect on protozoal or bacterial infections such as *Giardia* and *Salmonella*, it is thought that healthier parasite-free dogs have less potential to shed these diseases into the environment due to improved immune status.

These drugs are not effective against tapeworms or fleas.

Never begin a parasite control program in the absence of population control measures.

To recommend a parasite control program in the absence of population control measures is tantamount to negligence. Heavy parasite burdens decrease fertility and cause young pups to die within the first six to nine weeks of life. Once wormed and cleared of scabies, fertility and puppy survival both increase dramatically. The outcome of a stand-alone ivermectin program is a population explosion within six to nine months.

It is often tempting to kick-start an ivermectin program because of the very visible successes. Dogs once skinny, bald and covered in weeping scabies sores are, in the space of three months, fit and healthy animals covered in glossy hair. This is terrific as long as they don't have a belly full of ten pups to accompany their glow. For this reason it is important to have a large sterilisation program at the inception of any dog parasite control program. For large communities (human population >800) it is wise to budget for a start up visit of one to two weeks at the inception of the program if surgical desexing is a method suitable for the community. This timeframe will permit a large number of dogs to be desexed.

ORAL vs INJECTABLE IVERMECTIN DELIVERY

There is ongoing contention within the veterinary community about the method of administering ivermectin. Some veterinarians continue to doubt the efficacy of ivermectin administered orally and insist on injecting the drug. Others have had remarkable success in near eradication of scabies from communities with the use of oral ivermectin. AMRRIC supports the use of oral ivermectin.

ADVANTAGES OF THE ORAL ADMINISTRATION OF IVERMECTIN

- » It is a blanket treatment

It is far easier to achieve near blanket coverage using ivermectin orally. Ivermectin that contacts subdermal tissue often results in stinging and the animal crying out. If a pack of dogs witnesses this during the treatment of the first dog, you will be lucky to catch the second in line for treatment.

- » It requires minimal dog handling

There is no requirement to catch the dog to be treated. Owners often do not like catching their dogs for fear of being bitten or because they feel sorry for the animal if it is being man handled.

- » It allows for a more accurate animal census

It is easier to get a good perspective of true dog health in the community. When owners are asked to present dogs for an injection they will often not produce the sickest, most scabies-ridden dogs for fear of the vet wanting to euthanase the animals or because they are embarrassed. When feeding dogs it is more common for those animals to present themselves. It therefore becomes easier to identify where the real problem areas are.

- » Dogs become more compliant

With repeat visits dogs grow to remember the call you use and turn up eager for medicine. Dog owners appreciate that their dogs are enjoying rather than resenting the treatment.

- » It provides a vehicle for community capacity building

Ivermectin is not a schedule drug and can therefore be legally ordered and administered by appropriate personnel within the community in the Northern Territory. (Note: this is not the case in Queensland where there are controls under the Veterinary Surgeons Act regarding such extra label use of ivermectin. You are advised to make enquiries about these controls when working in Queensland.)

Oral ivermectin dosing provides an excellent vehicle for getting local people involved in a meaningful way early in the animal health program. It is far easier to train an assistant in the use of ivermectin when it is to be given orally as opposed to by injection. As with all programs it is important that the assistant is supported and feels confident in their role prior to being left with the job.

DISADVANTAGES OF ORAL IVERMECTIN TREATMENT

- » Dogs may refuse medication

Some dogs refuse the treatment. They smell or taste the ivermectin and will not eat it. This occurs most often when the dogs are fat and healthy. It also occurs more commonly in male dogs, particularly if females in the community are on heat. If there is no scabies obvious, it may be possible to worm these dogs using an all-wormer tablet. If scabies is present in the household of dogs, even if it is not evident on the dog in question, then it is advisable to catch the dog and inject it.

» Multiple dosing is possible

Double or even triple dosing may occur in some cases. It is most commonly the quick, skinny six month old pup that can duck and weave its way through the pack, gulping bread and butter quicker than you can blink. Rarely does a double dose produce signs of intoxication, however once a third dose is consumed you can begin to see complications.

A toxic dose for ivermectin administered orally is 10 mg/kg, or 5 ml per 5 kg of dog (Robertson 2005).

The signs of overdose are pronounced, but rarely fatal. Expect and warn the owner of the signs of overdose, namely apparent blindness, large, green coloured eyes due to pupil dilation, and a staggering, hypermetric gait. The problems usually resolve within 48 hours. Toxic doses will result in death usually within 24 hours. Severe tremors and coma will precede death.

The 'Lethal Dose 50%' (LD50) for dogs is 80 mg/kg, or 40 ml per 5 kg, so the safety margins are very high (Robertson 2005).

If signs of intoxication are present, take the animal into your own care if you or the owner deems it necessary. When considering this it is worth remembering that community dogs are subject to a strict and brutal form of pack pressure. A young pup who blindly stumbles into another dog's bone could quite possibly be killed.

Of course, it is far better to avoid double dosing in the first place. Unfortunately this is not always possible.

» It is an extra label use of the drug

Administering injectable cattle preparation orally to dogs is an extra label use of ivermectin. Appropriate consideration

and discussion needs to be directed towards this if it is the first time the community has used ivermectin.

The extra label use of ivermectin is also significant when considering the Veterinary Surgeons Act in individual states and territories. It has been standard for veterinarians to train staff in communities in the safe use of ivermectin for dogs. The community assistants then act as agents for the veterinarian. Special remote area prescribing allowances have been a traditional part of the veterinary landscape in northern Australia for sometime, however recent legislative changes in Queensland have made this practice difficult. For extra label use of a drug to be ordered by a veterinarian the veterinarian and the agent must now be under the same roof when instructions regarding the use of the drug are issued.

You will need to check the previous statement against the most recent legislation for accuracy.

OTHER COMPLICATIONS OF IVERMECTIN TREATMENT

» Complications in heartworm positive animals

The luxury of heartworm testing prior to the administration of ivermectin to community dogs is not possible due to fiscal, time and laboratory constraints. Given that the prevalence of heartworm in the Northern Territory and Cape York was recorded as 48% and 68% respectively, very few dogs succumb to anaphylactic reactions following treatment with ivermectin. It is however wise to treat the aged dog judiciously. If there is no evidence of scabies on a geriatric dog that has never been previously treated with ivermectin, it would be more prudent to use an all-wormer for parasite control.

» Individual susceptibility

As in all dog populations, there will be individuals who are particularly sensitive to ivermectin. It is worth discussing with owners how the dog reacted to the treatment last time. If an owner notes that the dog became ill for a few days after the last ivermectin treatment, be cautious about delivering a second dose. It may represent a direct adverse reaction or a heartworm positive anaphylaxis.

Avoid dosing dogs that appear to carry Collie genes.

As in any practice, if adverse reactions do occur always discuss the matter in depth with the owner. On occasions such as these always have your local assistant come with you. They are able to ensure the owner has a comprehensive understanding of the problem in their first language. When owners have a deep understanding of what has occurred they are usually very accepting of the problem. If you are seen to run away without adequately apologising or explaining, distrust will be created in the program.

» Resistance

With the ever-increasing use of ivermectin as the sole anti-parasitic drug administered to dogs in communities the problem of potential resistance grows. Erratic absorption of ivermectin has been reported in humans. The absorption of ivermectin in dogs has not been adequately assessed but may be the subject of future research should problems of apparent resistance begin to surface.

Resistance to ivermectin has occurred in the field in parasites in sheep.

Chronic under dosing of dogs may also occur in some communities. Consistent under dosing may arise from poorly trained operators delivering ivermectin. The metal injection guns also frequently

contain air bubbles that go unnoticed, resulting in a reduced amount of ivermectin being delivered to each dog.

Veterinarians and Environmental Health Workers (EHWs) operating in the field are asked to remain mindful of the possibility of resistance development. If you have a program that was working well and suddenly isn't, despite regular dosing, then consider resistance in your planning, monitoring and feedback notes/ logs.

DOSAGE AND ADMINISTRATION

Note: dosage rates are accurate at the time of writing. It would be wise to check current dosage rates before use.

Ivermectin dose rates (of 10 g/L cattle injectable preparation)
 Oral administration: 1 ml/ 25 kg
 Administration by injection: 1 ml /33 kg

Do not treat unweaned pups. The milk level of the drug is three to four times that found in the blood (Robertson 2005). Suckling pups will therefore receive an adequate dose via the maternal milk supply. Additional dosing of suckling pups is likely to create a significant overdose and has resulted in fatalities. Partially weaned pups should be wormed using an all-wormer tablet.

The ivermectin steel gun is used by some practitioners to deliver a set 1 ml dose. As mentioned above, when using the gun one must take care to carefully instruct the operator about the potential for air bubbles to form in the chamber with dogs subsequently being under dosed. A plastic gun syringe that delivers a measured dose is also available. Alternatively, a syringe and a 20 gauge needle can do the job effectively.

When first training staff it can be easier to teach about appropriate doses using an individual 3 ml syringe where the demarcations are easy to follow. This is a slower way to dose but is often more clear to the operator.

The dose is given on a sandwich of bread containing thick margarine. The portion of the sandwich given to each dog depends on the dose, for example $\frac{1}{2}$ a sandwich for a 1.5 ml dose, $\frac{1}{4}$ of a sandwich for smaller doses. The ivermectin should lie mostly within the butter. The more the ivermectin has soaked into the bread, the greater the likelihood of the dog rejecting the dose. Some veterinarians have found that anchovy paste instead of butter is less likely to be rejected.

It is advisable to get a bit of competition happening within the group to ensure dogs don't reject the dose. First, throw a round of sandwich pieces to the pack that contain no ivermectin. This will result in the majority of dogs wanting to catch the next piece on the full, gulping it down before they register the

strange smell or taste. It will also give you an idea of the quick or dominant dogs, which are likely to get a double dose.

Many owners will want to catch their dogs for you, particularly if the community has a history of injecting dogs with ivermectin. Once an adult dog is caught it will rarely accept the medicine. Community dogs are rarely caught by adults. When they are, they really know something is awry and will not accept the dose. For these dogs a quick squirt down the mouth or an injection is the easiest way to ensure blanket coverage occurs.

If conducting blanket ivermectin dosing it is worthwhile painting the dogs that have received treatment. A bright pink or green acrylic paint swipec along the dog's head or back prevents the same dogs being dosed at home, at the shop and again at the health clinic as they move about town with various family members. It will also allow owners to notify you if they find a dog that has missed treatment.



Figure 1. Making ivermectin sandwiches. Image courtesy of Marguerite Young, IFAW.



Figure 2. Delivering ivermectin to an eager audience. Encouraging dogs to catch doses on the full is the best way to deliver blanket treatment. Image courtesy of Marguerite Young, IFAW.

FREQUENCY OF DOSING

SCABIES ERADICATION

Scabies mites are capable of living up to ten days in a warm, moist environment off the host. There is usually an ample supply of old foam mattresses lying around damp yards in communities. These mattresses provide a perfect environment for scabies to perpetuate in the environment. Scabies eggs remain viable for three days. Thus, a single treatment is unlikely to remove scabies from the environment.

It is also unlikely that a 100% blanket treatment will be possible. There will always be one or two dogs that skip treatment and continue as hosts in the community. This is even more likely in communities that have a history of large scale culling. In these cases old people will remove their dogs from the community as the veterinarian arrives. You may never view or treat the dogs that are potential hosts.

For these reasons the protocol involves multiple dosing at the beginning of a program if scabies is particularly prominent in a community.

It is recommended to give three treatments at fortnightly intervals.

This can be problematic given time frames. However if you are visiting a large township (human population >1000-1500) for the first time, it is likely that you have set aside ten days to two weeks for your initial program. If so, it is advisable to plan to administer ivermectin on the first and last day in the community. This gives good training to assistants in a short space of time. It also allows you to highlight the houses that have severe scabies problems and will require a third dose.

If your assistant is becoming competent in ivermectin administration then you can leave them with the task of giving the third dose. Assist them in compiling a list of animals that require this dose with the dose rate recorded. Inform your assistant's

supervisor of the need to give the third dose and mark it on a calendar or white board planner if available.

It may be impossible to give multiple doses to dogs. Relatively good success over time is still possible with single three to six monthly dosing in most communities.

MAINTENANCE PROGRAM

The timing of an ivermectin maintenance program is dependant on both the development of capacity within the community and the degree to which support for personnel is structured. Probably the most common protocol involves the administration of ivermectin:

- » monthly during the wet season (if there is a wet season in the area you are servicing) when parasite levels can reach massive proportions due to the favourable conditions
- » three monthly during the dry seasons
- » as required for any suspected outbreaks of scabies.

Identification of dogs for appropriate dosing can be difficult. Understandably personnel can be quite nervous administering ivermectin in the veterinarian's absence for the first few times. To encourage confidence the identification and dose rates must be fool proof. In small outstations a list of dogs and owners' names will usually suffice. In larger communities digital photos are probably the best method of dog identification. Most council offices have a digital camera. A folder of dog photos can be made up with the owner's name and the dose rate written adjacent to the photo.

ORDERING AND STORAGE

Ivermectin and moxidectin can be purchased from most stock and station agents in the nearest major centre. Community councils generally have a purchase order arrangement with these suppliers. Needles and syringes can be obtained from the health clinic once the operator is fully trained in their safe handling and disposal. Alternatively, a gun syringe can also be purchased by the Community Government Council to remove the need for needles in the program.

Ivermectin can be purchased in a 200 or 500 ml bottle. If a community is handing over the ivermectin program to community staff for the first time it may be worth them initially investing in the 200 ml bottle. This results in limited losses if the program stalls in its initial phase. Once the veterinarian and council are assured that the ivermectin program will continue in the veterinarian's absence, it is safe to order larger quantities.

Ivermectin is now off patent and cheaper generic brands are becoming available, for example 'Nordectin'. It is worth making price comparisons, as the differences can be substantial.

If the gun and ivermectin are left in the community it is important to warn the operator of the potential for leakage from the bottle. The prong on the tubing leaves a large hole in the top of the ivermectin bottle. It is not uncommon for an assistant to find \$300 worth of ivermectin evenly distributed through the filing cabinet next time the dogs are due for a dose. In these cases councils are often reluctant to purchase a second bottle and the program stalls.

Equally important is the safe storage of the drug. It is important to emphasise that ivermectin is denatured with exposure to UV light and excessive heat and it must be stored at <30°C. It cannot therefore be left in the glove boxes or front seats of work cars. Discuss and view adequate storage methods

with the people assisting you. Locked fling cabinets in an office or the clinic pharmacy are suitable storage places.

It is usually worth binding the outside of the bottle with 'co-flex' or some other form of bandage material to protect it from light as the box usually disintegrates following the first one or two rounds of dosing in a community, thus exposing the contents to UV light.

MOXIDECTIN (CYDECTIN) POUR-ON

Moxidectin in the form of Cydectin pour-on for cattle and red deer is used as a topical backline treatment as an alternative to ivermectin. Its ease of application has led to broad scale usage in Western Australian communities. The use of this product on dogs is extra label.

**Moxidectin dose rates
(of 'Cydectin' pour-on)
500 ug/kg or 1ml per 10kg of dog**

At this dose rate the spectrum of activity is as for ivermectin. The drug is absorbed through the skin.

Moxidectin pour-on should not be used in unweaned pups, Collie breeds or on wet dogs (from rain or swimming).

Contact with human skin should be avoided and spills washed with soap and water. Children and pregnant or nursing women should avoid contact with the product.

As for ivermectin, moxidectin must be stored at <30°C and away from direct sunlight. The compound is in an alcohol base and is therefore flammable. Keep away from naked flames and do not burn empty containers (Robertson 2005).

CONSIDERATIONS IF SCABIES DOES NOT APPEAR TO RESOLVE

In some cases it seems that no matter how vigilant the scabies eradication program is, bald itchy dogs continue to wander around town. If this is the case consider:

- » Other skin conditions, for example demodicosis, flea allergy dermatitis, ringworm, etc.
- » Possible interaction of town dogs at the rubbish tip with feral or semi-wild strays with scabies.
- » Infected dogs of significance. Elderly people can sometimes be distrustful of dog programs and may leave and go to either single men's or single women's camps to avoid the veterinarian, returning with untreated dogs once you have left. Alternatively, people with sacred dogs may also not want that particular dog treated, and avoid rather than discuss the issue.
- » Possible familial relationships between personnel. In cases where the ivermectin is mostly delivered by a community member, kinship relations or other complications may prevent that person interacting with a particular household. Ask the EHW or other assistant if there are any houses that he or she is uncomfortable about treating and discuss alternatives.
- » Proper storage of ivermectin or moxidectin. Ensure drugs are being stored in a dark, cool environment and have not been denatured.
- » Proper dosage. Ensure that animals are receiving the correct doses. Assistants may become less confident once removed from a training environment. In some cases people will deliberately under dose dogs to avoid any risk of complications.

REFERENCES

Cutter, S. and Wells, J. (2000). 'Northern Territory experiences of dog programs'. In A review from a northern Australian perspective. In *A better dogs life*, proceedings of a three day conference on dog health programs in Indigenous communities, Darwin, Australia.

Robertson, I. (2005). *Dog health programs in Indigenous communities*. School of Veterinary and Biomedical Sciences, Murdoch University.

10

POPULATION CONTROL

Dog population control is one of the biggest problems most communities face. In many communities dogs come close to outnumbering people. When one considers that many Indigenous people share a house with up to 15 family members, it doesn't take many dog owners in a family before you have ten dogs per household.

Anecdotally, female dogs in a community tend to cycle within a six week period. If no dog sterilisation program is running it is not uncommon to have up to seven adult dogs as well as up to 30 puppies in any given yard at certain times of the year. The majority of these puppies will perish young due to overwhelming hookworm and tick burden or later from parvovirus. The contamination of yards with corpses and faeces can on occasion be overwhelming.

The problems related to overpopulation of dogs are numerous and include such things as:

- » Inadequate food supply, resulting in dogs stealing human food, often off the plates of babes.
- » Overburden of parasites in houses. Many houses cannot effectively keep dogs outside due to overcrowding and maintenance issues. Parasites such as ticks, fleas and canine scabies, as well as ringworm, can become real problems in people's bedding.
- » Overburden of dog faeces around communities and inside houses, with subsequent increased parasitic burdens of potentially zoonotic diseases.

- » Dog to dog and dog to human aggression. In large communities it is not uncommon to see dog fights involving 10-15 dogs in a large tumbling pack. People, including children and the elderly, occasionally attempt to break up these fights by entering the pack armed with huge sticks. The dangers of such actions are obvious.

- » Tipping over of rubbish bins nightly.

- » Disruptions to normal sleep patterns as dogs bark, howl and fight throughout the night.

METHODS AVAILABLE FOR POPULATION CONTROL

The most permanent population control in any community is surgical desexing. However given cultural, geographical, fiscal, time and labour constraints it is not always the most appropriate form of population control. In any community a logistical and cost benefit assessment needs to be combined with community discussion to determine the best form of population control.

The availability of adequate after-care should also be a factor in determining whether surgery is appropriate. If the individual owner or the community in general is unlikely to offer a recovering patient at least the basic needs in after-care, it may not be appropriate to perform laparotomies. Nothing would do more to weaken a community's support for a program than the sight of a recently spayed bitch trailing its intestines through the dirt.

The type of sterilisation chosen may be a decision that needs to be made on a community level, however more often than not, individual households will make decisions as to what they want done with their own pet.

Available forms of population control are:

1. euthanasia
2. injectable sterilisation drugs, both short and longer term
3. surgical sterilisation.

It is worth noting that a very high level of female sterilisation is needed in dog populations to achieve a decrease in numbers. Modelling suggests that between 80-90% of females need to be sterilised to obtain zero population growth (Lawrie and Brown 2006). Given the increased risks facing many dogs in a community setting the required number of sterilised females to result in zero population growth may be less than modelled, but the figure is worth keeping in mind

It is also essential to note that sterilisation should not just be directed towards female animals.

Attempt where possible to sterilise equal numbers of male and female dogs.

This controls male fighting and other nuisance behaviours and prevents chaos developing when the few fertile bitches left in a community cycle.

We should also be aware too, of our capacity to inadvertently alter the social structure of the dog population. If, for example, we castrate every dog that is offered, we are usually removing the more friendly dogs from the breeding population and selecting for wariness. The 'cheeky' dogs and the dingoes will often escape the 'knife' and increase their contribution to the gene pool as a result. This may not meet the community's expectation of the dog program.

EUTHANASIA

Euthanasia is a critical issue in traumatised communities where you are trying to build trust. Some veterinarians advise to only do it on request, and then never on that day. Come back later to ensure the owner really wants it done.

Euthanasia is argued to be the most cost effective method of reducing a given dog population in the short term (although some would not agree). In some Indigenous communities, 'dog programs' are purely annual culling campaigns. Veterinary services are sometimes used, other times dogs are simply rounded up and shot. Whilst undoubtedly effective in reducing dog numbers these programs have inherent problems.

- » They do not provide a sustainable and long term solution to dog control for the community.
- » The programs may not comply with Indigenous people's cultural belief system. They can directly contravene Aboriginal law as it relates to dog dreaming.
- » Often a majority of female dogs are selected for euthanasia. This is particularly so if females have recently been on heat, the chaos caused being fresh in people's memories. The result is a community dominated by male dogs prone to fighting. The few females remaining are harassed beyond measure next time they cycle.
- » Repeated mass culling may foster a culture wherein dogs are a disposable commodity. It becomes difficult to form caring attachments to animals if one knows that they will simply be killed the following year.
- » Arguably mass culling contributes to a culture of violence within communities. This is particularly the case when dogs are killed in public view. In any 'round up' for euthanasia there are dogs that must be cornered and trapped and will obviously

resent the treatment being given. It is worth carefully considering the impact on people, in particular children's sensitivities, of such 'round ups'. Anecdotally, violence towards animals is greater in communities where mass culling is the major form of dog population control.

- » Consent for euthanasia can be a minefield. Without adequate interpretative services, ownership and consent issues are frequently misinterpreted by veterinarians. The fact that an owner does not directly complain about a dog being wrongly euthanased does not mean they do not resent the dog program. A long term distrust of dog programs and you as a veterinarian may result. It is essential you find the owner of the dog and speak to them in the presence of your guide and assistant. Any language barriers should be overcome by the use of a translator. Check and recheck that euthanasia is what the owner wants.

In communities that have been without veterinary services for some time it may be requested that you begin a dog program with euthanasia as a dominant feature. Of course this can only ever be upon the council's request and with full owner consent. If this is requested, try to ensure it is the last time the community will need to witness such actions. Develop a program of intensive sterilisation to immediately follow the cull. As dog health improves due to veterinary and community service provision the number of dogs being presented for euthanasia usually falls to almost zero within three visits.

In some areas, particularly where dog dreaming culture is strong, no euthanasia will be permitted at all. Billy Gumana (2000) points out:

One thing that comes to mind here is killing dogs: you can't do it. It's all right to treating dogs that have no ceremony name, you can go right ahead: but dogs with ceremony name, you got to be real careful. Because

dogs on ceremony ground are our people, they gave dog's name. It's my dog dreaming. I like to sing a lot for my dog dreaming and I like to dance our dogs and they run around.

When euthanasing any community dog for any reason these comments of Richard Trudgen's (2000) are worth keeping in mind:

People sometimes will give a dog a special name that belongs to the angel from the Creator. So if a dog is seen as a special dog and has been given a special name, that dog is almost seen like one of the angels revisiting, a reminder of the angel itself. And if that dog is killed, it has the same repercussions traditionally as killing a person.

It's all a matter of control. When people are in control and they make decisions about something, then the consequences are far less than if somebody from the outside, seen as a powerful agent, makes the decision over, say, euthanasing a dog. If people have all the information, then they have control to make the decision, and they see that it's for the best that this happens. Then the consequences are far less, even with a ceremonial dog.

We need to understand that community violence is one of the worst forms of violence psychologically, even worse than natural catastrophic violence like cyclones, earthquakes, whatever. When violence is committed by one cultural group against another cultural group, it creates repercussions that are far more severe. So when people say "this is a ceremony dog", we should back off and say, "Okay, this is one dog in particular that we must absolutely make sure the owner has control over and that they deal with it". In my view, we should treat all animals, especially pets, with respect.

If you euthanase a dog and you don't know whether it's a ceremony dog or not, and it is, the owner gets into deep trouble because he hasn't protected that dog.

It is also worth adding here that people may not feel comfortable explaining the situation in its entirety to you. A deep and trusted relationship is often required before people will divulge any information in regards to dreaming, law and culture. It is also unfair to expect your assistant and interpreter to translate these facts in full. In many cases silence will speak louder than any words. It is important to listen to people's silences and body language as clearly as you listen to the words.

Registration and euthanasia

The last year has seen an increasing desire for legislative changes in relation to dogs in Indigenous communities. Registration is being introduced into some communities combined with an introduction of dog by-law legislation and enforcement. These by-laws usually proscribe a maximum number of dogs per household. To comply with the legislation, sometimes the only alternative householders face is the euthanasia of large numbers of dogs. This area of work is particularly problematic. As a veterinarian asked to cull dog numbers in this way, due consideration needs to be given to the following factors.

- » Whose decision was it to enforce the law? In some cases where councils may not be strong, a CEO can effectively dictate and enforce council policy single-handedly.
- » To what extent has community consultation taken place prior to the proposed euthanasia?
- » What time frame exists between notification of the introduction of by-laws (or the intention to enforce existing by-laws) and enforcement?
- » What will the repercussions of the culling program be on the overall sustainability of a dog program? Is the cull to be a one-off event? Will other population control measures then be supported by the council to prevent repeat culling?
- » Is it possible to phase in the by-laws over time to avoid the need for a mass cull?
- » Does the method of enforcement of the by-laws contravene the Animal Welfare Act of the state or territory you are working in? It is worth referring to the relevant Animal Welfare Act if feeling at all unsure of the council's selection and notification processes in regards to euthanasia.

AMRRIC is currently writing recommendations for councils wanting to bring about legislative change. If, as a veterinarian, you are faced with this issue we recommend contacting AMMRIC for assistance in negotiations with those enforcing the by-laws.

The Animal Welfare Act and euthanasia

Veterinarians have powers as Animal Welfare Officers. As in all work environments you are bound at times to come across issues of animal welfare. These may be due to a lack of veterinary service provision, cruelty or neglect.

In many communities euthanasia of sick or injured dogs is not considered a viable alternative with people frequently choosing to "let him go naturally". These cases are difficult and require careful negotiation. Again, it is important to inform people of the animal's prognosis and then only do what you are given permission to do. Coercion is recognised for what it is and is not appreciated. To act without true and informed consent will create distrust and may jeopardise the entire program for years to come.

Of course, it is possible for veterinarians faced with welfare dilemmas to enact animal welfare legislation as they see fit, and

largely this comes down to the individual veterinarian's personal code of ethics. It is wise to remember that when practising in communities you are on Aboriginal land where two systems of law, Traditional and European, exist. Your permit is essentially your passport to a different country. As when travelling internationally, it is wise to respect different laws, so it is in the case of legislation relating to animal welfare. This will ultimately be a decision made by individual veterinarians and the community as they see fit, but it is wise to act cautiously and with full consultation.

Euthanasia: capture and chemistry

Physical capture

In the majority of cases a dog can be caught by an owner and euthanased in the usual manner using sodium pentothal with or without prior sedation. There will however be problem cases. The expedient capture and euthanasia of semi-wild dogs and cats in a community setting can be extremely difficult and as yet no adequate solution has really been found within the veterinary community working in the field.

It is not known whether the large net capture of dogs such as that demonstrated in field operations in Bali has been trialled in Australia. It is certainly worth considering. One potential problem envisaged is that the majority of semi-wild dogs in communities will not allow people within four to five metres of them due to regular harassment.

Chemical restraint

There is currently no ideal method of chemical restraint of the animals that cannot be caught. Veterinarians, including members of AMRRIC, are researching the problem and any likely solutions will be promoted as soon as they are available.

Methods currently used are listed below.

1 Oral acepromazine/ pentothal

This method involves sedation using acepromazine tablets. A dose of 6 mg/kg is hidden in sausage and thrown to the dog. Throwing food from a vehicle sometimes works better than people approaching on foot. You should return in around three hours to catch and euthanase the dog using a catching pole and pentothal administered intravenously.



Figure 1. Catching dogs with large nets in Bali. Image courtesy of Yudisthira (Bali Street Dog Foundation).

This method has the following problems:

- » Tablets can be accidentally left in the environment and may be attractive to children.
 - » Non-targeted dogs may ingest the acepromazine bait.
 - » Sedated dogs can wander off under a house and not be found until the next day. If a dog is missed it is worth going back to its house very early the next morning. Dogs are frequently sedated for up to 24 hours with this dose rate. It is common for them to be found in a deep sleep at their chosen house the next morning.
 - » The effects of sedation can be overridden by extreme fear in the truly wild dogs.
- 2 Drugs such as xylazine can be administered effectively using a blow pipe to dogs that can be approached to within about four metres.
 - 3 If the dog is not 'cheeky' some vets use Zoletil intra-dog to painlessly induce anaesthesia, then take the dog away for intravenous pentobarbitone (Lethabarb) and burial.

Capturing cats for euthanasia

In most cases cats can be trapped in a bathroom of the house overnight. Given the minimal handling that cats elected for euthanasia will have had it is recommended that they are heavily sedated with a low irritant subcutaneous injection prior to restraint for euthanasia. Xylazine dose rates of around 4 mg/kg make the process far easier.

Non-veterinary methods of euthanasia

Because of the contentious nature of other methods of euthanasia (e.g. shooting) and because veterinarians are usually not required to use these, they will not be discussed in this manual.

Carcass disposal

In most communities carcasses are disposed of in the local town dump. Most larger communities have deep pits dug for rubbish disposal. The pits are usually left as open rubbish sites until full. Scavenging by birds of prey, crows, dingoes, wild pigs and feral dogs is common at these dumps. When animals have been euthanased using sodium pentothal the risk of secondary poisoning must be considered.

Machinery is usually available to cover over carcasses in the larger communities. Ensure by checking with the council that this will be possible prior to euthanasing any animals. Notify the council any time a carcass is placed in the pit so that it can be covered as quickly as possible.

In smaller communities and outstations rubbish is often disposed of by burning in 44 gallon drums. In these situations specific body burial pits may need to be organised if euthanasias are planned.

STERILISATION BY INJECTION

Whilst not the 'gold standard' of surgical desexing the use of both long and short term injectable sterilisation drugs has a place in a community setting.

- » Injectable sterilisation can build capacity within a community. EHWs and other assistants can be trained, and if necessary licensed, in the use of injectables in accordance with the relevant state or territory legislation.
- » Remote outstations and homeland centres often have only small numbers of dogs. They can be a full day's drive away from the main community you are servicing. In these cases it is often not financially viable for the community to pay for a veterinarian's travelling time. Trained assistants can travel to the outstations at appropriate times, often

in conjunction with other reasons for visiting, and temporarily sterilise dogs in the veterinarian's absence.

- » In communities where dogs' life spans are short it may be more cost effective to use injectables than to surgically sterilise. This is frequently the case in outstations where snake bites, crocodile attacks and desertion by owners due to flooding or other business may occur frequently.
- » If there is an overwhelming demand for sterilisation then it may be physically impossible to surgically desex all animals in the time frame of the visit. In this case temporary injectable sterilisation can minimise the risk of a population explosion prior to your next visit.
- » Some owners find it culturally unacceptable to "cut" their dog. Others fear or have had the experience of their dog dying from the surgery. In these cases owners will usually be happy to accept an injection to prevent breeding.
- » In some cases dogs may be in very poor condition due to malnutrition and overwhelming parasite burdens. The animal may still be fertile but be too great an anaesthetic risk. In these cases injectable contraception can decrease the risk of breeding before the next veterinary visit.

The two most common injectable sterilisation drugs used in a community setting are proligestone (Covinan) and the more recent development, deslorelin (Suprelorin).

Proligestone injection (Covinan)

Covinan or "depo" injections have been the mainstay of population control programs in many Indigenous communities. The most notable use of Covinan was a four year pilot program conducted by Murdoch University beginning in 1992 to assess the efficacy of canine breeding and parasite control in Indigenous communities. This study has formed the basic protocol for Covinan based population control programs.

Covinan has the advantage of being registered for use in cats. It can be particularly useful in situations where time does not permit all booked surgeries to be completed.

The disadvantage of Covinan is the frequency with which it needs to be administered to prevent breakthrough heats. This timetabling can be difficult to achieve in a community setting and requires a supportive environment for the assistants carrying out the task. If given to pregnant females, Covinan may prolong the pregnancy, with associated adverse consequences.

Protocol

The protocol successfully used by Murdoch University for dog population control is a subcutaneous injection of 10-33 mg/kg as per the manufacturer's instructions. The dose is given to female dogs only. The dose is repeated three months after the first injection, then in four months and then repeated at five monthly intervals for permanent postponement of oestrus.

When this regime was followed no breakthrough pregnancies occurred. In the Murdoch study pregnancies did occur in the study group, however these were attributed to dogs missing an injection. Pregnancies within the community outside the study group were also attributed to the importation of dogs from other communities (Wilks 2000).

The dosage regime for cats is similar to that for dogs. The majority of queens will cycle 6.5 months after injection with Covinan (Covinan package insert).

Deslorelin implant (Suprelorin)

In December 2004, Peptech Animal Health released Suprelorin, a deslorelin implant that results in reversible contraception. It is registered in Australia and New Zealand for the purposes of contraception, treatment for benign prostatic hyperplasia and to aid in the control of unwanted sexual behaviours in male dogs. Despite its registration only for males, deslorelin has now been used widely



Figure 2. Implant and applicator. Image courtesy of Peptech.

as a female contraceptive in both scientific trials by Peptech themselves and also by AMRRIC veterinarians working in the field.

Deslorelin has the advantage of reliable contraception lasting six months. At the time of publication it is expected that a product that confers 12 months of reliable contraception for both male and female dogs will become available. Studies have shown a dose related suppression of oestrus for up to 27 months in some cases (Trigg et al. 2001). Peptech is currently working towards registration of deslorelin as a female contraceptive.

Drugs such as these are likely to become the mainstay of future animal population control programs within communities. Whilst this method of contraception has a wonderful potential for easy delivery, there are some disadvantages experienced by practitioners in a community setting at this stage.

1. The first administration of the implant will result in an initial stimulation of FSH and LH with a heat resulting one to two weeks following implantation. In most cases if pregnancy occurs in this heat there is subsequent abortion or resorption prior to day 40 (Wright 2001). This oestrus will not occur in females with a progesterone level < 5 ng/ml. Therefore the heat will

not occur in prepubescent females (pups less than five months old), in females with a functioning implant or those in early di-oestrus, i.e. up to three weeks following a natural heat. In a community setting these facts can be hard to determine with any great clarity.

The alternative suggested by the company is the administration of a dose of proligestone one week prior to implantation. This will prevent any potential heat, but is a costly addition to the program.

2. The drug must be kept refrigerated at 4°C. This may prove difficult for veterinarians on the road for long periods of time, or those travelling without refrigeration.
3. Reliable identification of animals that have an implant is proving somewhat difficult for veterinarians in the field. In trial situations conducted by some AMRRIC veterinarians microchipping has been used as a method of identification, however this is a costly exercise if conducted at the community's expense.

Mechanism of action

Suprelorin is a slow release GnRH agonist. It acts on the pituitary to prevent the release of FSH and LH, thereby inhibiting oestrus and ovulation in the female dogs and testosterone production in males.

Studies have shown that deslorelin is safe to use in pregnant females >30 days although this is not recommended. For non-pregnant females the efficacy of the drug did not alter regardless of the stage of the oestrus cycle in which it was administered.

Administration

Suprelorin is a subcutaneous implant similar to a microchip or the rod implants some women now use for contraception. It is marketed in boxes of two or five implants each with an applicator (see Figure 2). The area ought to be clipped and scrubbed prior to application. No local anaesthetic is required for insertion.

Costing

The cost at this stage is approximately \$30 per dose. When available, it is anticipated that the cost of the 12 month version will be slightly less than double this amount. If it is to be used in a community setting the manufacturer has suggested that they will consider reducing the price of bulk purchases for animal welfare work.

SURGICAL DESEXING

The effectiveness of surgical desexing in Indigenous communities is often overlooked or underestimated. There is some evidence to suggest that dogs do not live long enough to warrant the time, cost and risks involved in surgical desexing. In a population study conducted by Murdoch University, within one year of the study's commencement 47% of the original dogs in the study had either died or gone missing (Wilks 2000). If these population dynamics existed for every

Indigenous community one would seriously have to consider the merits of surgical desexing.

Whilst no clear evidence exists as to the longevity of desexed dogs in a community, anecdotal evidence supports the fact that the mean life span of desexed dogs in many communities in the Northern Territory is around six to seven years. Desexed dogs are less likely to roam, require less nutrition and are less likely to perish as a result of breeding behaviours such as male aggression, female whelping difficulties or complications resulting from infections such as TVG, prostatitis and pyometra.

AMRRIC is planning population dynamic studies to provide a larger evidence base regarding dog longevity. Until more evidence is produced we must work on anecdotal assessments, the majority of which in the Northern Territory support surgical desexing as the best possible population control measure affordable to larger communities at the present time. This comment must be considered alongside the contraindications for surgical desexing as highlighted in the section discussing the benefits of injectable sterilisation.

The cost effectiveness of the surgery depends on the longevity of animals in the community, but is also largely dependant on what the individual practitioner is charging. As an indication, if a veterinarian charges \$800-1000 per day (excluding GST) and 12 dogs are desexed in a day, the unit price is around \$65-85.

There is a large variation in desexing methods of individual veterinarians in remote settings. Circumstances and individuals' comfort zones will largely determine the extent to which a clinic based spey is replicated in a remote setting. Numerous practitioners in northern Australia are able to provide what many consider to be the basic minimum requirements for surgically desexing a mature female dog. As in any practice, veterinarians will operate to their own professional standards. The protocols developed and outlined below are a working indication of how some veterinarians overcome the problems associated with bush work.



Figure 3. An assistant premedicating a dog for surgery. Image courtesy of Marguerite Young, IFAW.

It goes without saying that it is essential to establish informed consent prior to performing any surgery. Explain thoroughly to people what will be occurring. People tend to talk of desexing in terms of an operation to “stop him or her breeding up” or in females to “take out the baby bag” or in males to “make him bullocky” or “cut his dilly bag”. This is by no means universal and your guide and interpreter is invaluable in these situations. Answer any questions in a detailed way. Do not promise what you may not be able to deliver. All owners know there is a risk involved in operations so do not deny this truth. However, when asked offer people your success rates so they can make informed judgements about your skill as a surgeon.

Anaesthetic protocol

The basic anaesthetic protocol used by many practitioners is given as an example below. In all cases dose rates must be adjusted according to the health and age of the animal. It is wise to be cautious when estimating an animal’s age prior to anaesthesia. Due to chronic skin conditions animals can appear



Figure 4. Administering IV anaesthetic agent. For those wanting registration for the use of injectable euthanasia solutions, a week anaesthetising animals is invaluable venipuncture training. Image courtesy of Marguerite Young, IFAW.



Figures 5 & 6. Preparing an animal for surgery. Images courtesy of Marguerite Young, IFAW.

far older than they really are, teeth will be worn down, as will their general demeanour by chronic itching. Giving all intravenous anaesthetics 'slowly to effect' is the best way of overcoming potential dose related problems.

- » Everyone has their preferences. Some suggestions are: Premedication with acepromazine 0.1 mg/kg + methadone mixed in the same syringe as a s/c injection. Methadone more than any other narcotic seems to quieten the fearful dogs. Some vets use a premed evolved from 'BAG' which is still called this

although its components are butorphanol : acepromazine : atropine in equal parts. This completely flattens dogs for an hour or so and is safe and easy to administer.

- » IV induction using valium/ ketamine or thiopentone. Valium/ ketamine provides for a more relaxed recovery with minimal if any vocalisation.
- » Maintenance of anaesthesia using isoflurane delivered via an in circle anaesthetic machine, e.g. Stephens/ Komisaroff to minimise oxygen requirements. Oxygen can be carried on

the road. If difficulties are experienced bringing in oxygen when flying contact the local clinic. They will often be supportive of dog health initiatives and do not mind loaning a c-size oxygen cylinder for the week. Book this in advance as sometimes the only c-size available is for use in the clinic ambulance and cannot be removed.

It is also worth noting that most animals will not have been fasted prior to anaesthesia. The use of a cuffed tube is essential. If you know the animal has had a large feed prior to surgery premedicating with morphine will usually induce vomiting. Surprisingly few episodes of vomiting whilst under anaesthetic occur. If and when they do recheck that the cuff is inflated, hang the dog's head over the table, swab the back of the throat, finish the surgery as quickly as possible and institute broad spectrum antibiotic therapy once the animal can swallow. Explain the gravity of the situation to the owner to ensure the dog receives its medication.

Cat anaesthetic protocols

In general, subcutaneous anaesthetics are preferred to gaseous anaesthetics given the difficulties in handling many community

cats. Combinations of xylazine/ ketamine, Domitor/ ketamine or ACP/ Alfaxan-CD are favoured.

Antibiotic protocols

Intravenous antibiotics are usually given at induction. The most common form used in the Northern Territory is trimethoprim sulphur IV. Other practitioners use LA penicillin formulations IM.

Sterilisation of equipment

The majority of community clinics have a working autoclave. Check with the local clinic before arriving as there is a trend to centralise services including sterilisation, which is resulting in fewer autoclaves in communities. If there is no human certified autoclave, check to see if the old autoclave is still hidden in a cupboard somewhere. Whilst not certifiable for human health uses these old autoclaves often suit veterinary purposes.

A minimum of two full spey kits is recommended. The more kits you have the easier your day will be. For working outdoors additional towel clamps need to be added to your usual spey kit to overcome the problem of wind gusts. Additional large spey clamps or haemostats are also recommended.



Figure 7. Don't forget the tattoo!!! Image courtesy of Marguerite Young, IFAW.



Figure 8. Cooking the empty pressure cooker over breakfast. Boil until it is dry then open the lid over heat, allow the remaining water to evaporate and reseal. You now have a sterile container for the day. Image courtesy of Marguerite Young, IFAW.

Females have often had multiple litters prior to being speyed and the cervix and ovarian pedicles can be quite large and tough.

If no autoclave is present in the community it is advisable to create multiple packs of sterile swabs containing suture needles prior to leaving home.

Some practitioners have old portable autoclaves which are worth their weight in gold if you can get one. Alternatively, instruments can be sterilised very effectively in a pressure cooker on a stovetop each morning. Place the instruments inside the pot, place about 2 cm of water in the bottom of the pot, seal and place over heat. The steam will periodically discharge until the water is nearly all gone. Release the steam, open the pot and keep over heat until the bottom of the pot is dry. Do not touch the contents. Reseal and pack to take to surgery.

If travelling on dirt roads prior to reopening the pressure cooker, seal the steam vent with tape to prevent fine dust entering the pot.

The pressure cooker method has the added advantage of giving you a sterile sealable pot in which to place swabs, needles, gloves and drapes once the instruments are transferred to the wet kit. If purchasing a pressure cooker for this purpose try to get one with no plastic attachments. Op-shops or the back of grandma's cupboard provide the best old fashioned ones. This will enable you to sterilise instruments on top of an open fire if required. Frequently outstations, for one reason or another, will have no power. If moving from one outstation to another you may need to sterilise in this way.

Throughout the day instruments are kept in a wet kit. A stainless steel tray with a lid is best. The solution can be either betadine

solution/ water to a strong tea solution or chlorhexidine/ water/ alcohol as per the manufacturer's instructions. Betadine/ water tends to be less tissue irritant and does not cause blood to congeal on the instruments. Debris is rinsed out as required and the solution replaced.

When considering the surgery list, plan according to the degree of contamination expected. Castrations and immature females first, followed by older females. Bitches who have puppies on the ground make a mess of the kit. Their uterus is still involuting and contains caseous lochia. If possible do these and obvious pyometra/ TVG/ stich-ups, etc last. Replace the entire kit with a new one as required.

Sterile working field

Managing a sterile working environment, particularly if working outdoors, is difficult but not impossible.

Always carry your own basic cleaning materials, e.g. trigen, bleach, etc, so the surface that becomes your surgery table can be cleaned.

Usually running water is available, however some outstations have periodic difficulty with clean running water supplies for various



Figure 9. Contents of the pressure cooker used throughout the day: gloves, drape, scalpel, swabs and needles. Image courtesy of Marguerite Young, IFAW.

reasons. No running water for hand washing or changing your wet kit is probably the most compromising to sterility. This, to some extent, can be overcome by carting a 20 litre drum of water with a tap attached when working on outstations.

The use of surgical gloves affords the animal additional protection when adequate scrubbing is not possible. Even when an appropriate hand scrub is possible surgical gloves are recommended.

Following anaesthesia the area for surgery is clipped, preferably away from the surgical table. If there is no power available a scalpel blade can be used to provide a very close shave. Alternatively, rechargeable clippers can be used. The skin is aseptically prepared as per usual routines.

The wet kit is then prepared. The sterile pressure cooker is filled with swabs, needles, scalpel blades, drape and surgical gloves. Many practitioners use disposable plastic drapes. These retail for under 50c each and are a worthwhile investment. Alternatively pre-packed sterile drapes can be taken with you.

Surgical techniques

Again the surgical technique used by the practitioner must be the one he or she is most comfortable with. Castrations are usually uncomplicated and can be performed as in a clinic setting. For speys in remote communities many practitioners prefer using the right flank as opposed to a ventral midline approach.

The advantages of a flank spey in this setting are as follows.

- » **Prevention of air-borne contamination:** Once perfected, the incision through muscle layers is via blunt dissection and needs only to be as big as your index finger or the ovary to be removed, i.e. a hole of around 1 cm diameter through the muscle layer with an overlying skin incision of 2-3 cm.

- » **Prevention of complicated wound dehiscence:** If wound breakdown does occur, the flank approach usually remains sealed due to the overlapping of muscle layers. There is very minimal chance of intestinal eventration when compared to a midline approach. Given the remoteness of many communities, intestinal eventration once you have left the community will result in the death of the dog.
- » **Length of surgery time:** Once perfected, a flank spey is in most cases faster than a midline, largely due to the lack of time spent closing the wound. Often a single suture through all muscle layers, another through the subcuticular layer and another single skin suture are all that are required on closing. This decreased surgery time is beneficial both for anaesthetic risks and wound contamination.

The major disadvantages associated with the flank approach are as follows.

- » **Less potential for visualisation:** If an artery is dropped it is very difficult to regain the stump. This, of course, is of greater importance when one considers

that many of the surgeries being conducted can be on bitches which are pregnant or on heat. Always pop ligaments to permit better exteriorisation.

- » **Greater difficulty exteriorising the ovaries:** In some cases the left horn of the uterus of a small puppy or kitten can be difficult to exteriorise. Given the small size of these horns they can break off unless extreme care is taken. This usually results in the practitioner having to make another incision on the left hand side of the animal. In wide bodied overweight females it can also be difficult to exteriorise the left ovary. In most cases however, bitches for desexing have already had a litter and the uterine and ovarian ligaments are somewhat stretched.

Suture materials

The cost of suture materials can impact on the profitability of a spey significantly. Many practitioners continue to use cat gut on cassette in the field, particularly if performing flank speys. They report few, if any, problems, although greater care needs to be given to asepsis if gut is being used. If you are using gut it is advisable to carry



Figure 10. Looks rough, but she's ready to drape for a relatively sterile field. Image courtesy of Marguerite Young, IFAW.



Figure 11. Area clipped and prepped for flank approach. Image courtesy of M. Young, IFAW.

individual packets of synthetic monofilament material such as PDS for use in cases where a lot of suture material will be required, e.g. limb amputation and tumour removals. Alternatives to gut for routine speys are the cassette monofilament absorbable such as Monodox. These are more costly but are a superior suture material.

Skin can be closed using cassette non-absorbable monofilament, e.g. Vetafil or Supramid, or use intradermal absorbable. Always give owners instructions regarding suture removal. The trained assistant can take out sutures or, if not available, clinic staff will often oblige at the owner's request. Alternatively, dogs tend to remove their own sutures as necessary.

Post operative care

Post operative pain relief should be a non-steroid anti-inflammatory drug (NSAIDS), for example Rimadyl. A second dose of a narcotic drug is not appropriate in most circumstances as dogs need to be alert and mobile as they can easily be attacked by others. Also, dog programs are conducted

during the dry season when nights are cold and dogs need to be able to find a camp fire.

Always deliver an animal directly back to its house unless otherwise indicated. Animals left to cross town on their own following an anaesthetic can be attacked and killed by other dogs. Check that the owner is home and let them know where you are staying. Instruct the owner to contact you if they are concerned about the animal through the night. Nights may get deceptively cold through winter. Animals that have had an anaesthetic late in the day may need to be kept warm with blankets overnight.

If you are at all concerned about the recovery of an animal, hold the animal with you overnight. Explain to the owner exactly the reason for your concern. Some Indigenous people may have sufficient knowledge of anatomy due to hunting to appreciate the post operative risk. They appreciate honesty in these situations.

Only discharge animals that are swallowing and near ambulatory.

REFERENCES

- Covinan, Progestagen for subcutaneous injection, manufacturer's package insert.
- Gumana, B. (2000). Dogs in Aboriginal communities: An Environmental Health Worker's perspective. In *A better dogs life*, proceedings of a three day conference on dog health programs in Indigenous communities, Darwin, Australia.
- Lawrie, M. and Brown, G. (2006). Advances in reproductive control technology. Presentation at *Dog People 2006*, a five day conference on dog health programs in Indigenous communities, Darwin, Australia.
- Trigg, T.E., Wright, P.J., Armour, A.F., Williamson, P.E., Junaidi, A., Martin, G.B., Doyle, A.G., and Walsh, J. (2001) Use of a GnRH analogue implant to produce reversible long-term suppression of reproductive function in male and female domestic dogs. *Journal of Reproduction and Fertility*, Supplement 57, pp. 255-261.
- Wilks, K. (2000). Sustainable dog health programs are possible: West Australian experiences in remote management and service delivery. In *A better dogs life*, proceedings of a three day conference on dog health programs in Indigenous communities, Darwin, Australia.
- Wright, P.J., Verstegen, J.P., Onclin, K., Jochle, W., Armour, A.F., Martin, G.B. and Trigg, T.E. (2001). Suppression of the oestrus responses of bitches to the GnRH analogue deslorelin by progesterin. *Journal of Reproduction and Fertility*, Supplement 57, pp. 263-267.

11

BASIC BUSINESS REQUIREMENTS

VETERINARY SURGEONS BOARD

You will need to register with the Veterinary Surgeons Board in the state or territory you intend to work in. Their contact details are below.

Northern Territory

The Registrar
Veterinary Surgeons Board
GPO Box 3000
Darwin NT 0810

Ph: 08 8999 2133
Email: vetboard.dpif@nt.gov.au

Western Australia

The Registrar
Veterinary Surgeons Board
PO Box 1124
South Perth WA 6951

Ph: 08 9367 4674
Email: vsbperth@wt.com.au

Queensland

The Registrar
Veterinary Surgeons Board
GPO Box 46
Brisbane Qld 4001

Ph: 07 3239 3600
Email: vsbqld@dpi.qld.gov.au

BUSINESS NAME

If you are working under your own name, e.g. Joe Bloggs, you are not required to register your name as a business. If, however, you are working under a business name, e.g. Joe Bloggs Veterinary Services, you are required to register your business name with the relevant authority. In the Northern Territory the Department of Justice carries out this registration through their Business Affairs section. Their toll free phone number is 1800 193 111.

AUSTRALIAN BUSINESS NUMBER (ABN)

Whether or not you plan to register for Goods and Services Tax (GST), the community you are working for will require you to have an ABN.

When it comes to taxation administration and what business expense deductions are allowed you will need to discuss your individual circumstances with the Australian Taxation Office (ATO).

BANKING DETAILS

If operating as a business when conducting community work, you will need to open an account under your business name. It is illegal for banks to process cheques, etc. through your personal account. Check with your bank in regards to your personal situation.

WORKERS COMPENSATION

Work cover for yourself and anyone travelling with you is important. People assisting you from the community will be covered by work cover arrangements by the Community Government Council (CGC) or under the Community Development Employment Projects (CDEP) scheme. That will not be your responsibility, unless you act in a negligent fashion in regards to their safety.

PROFESSIONAL LIABILITY INSURANCE

It is worth considering whether you believe it to be economically viable to hold professional indemnity insurance, if you do not already hold it. It is not compulsory to practice with insurance.

OTHER LEGAL CONSIDERATIONS

If you propose to work interstate, the state may have different laws to what you are used to. For example, Queensland's acts covering veterinary chemicals and 'acts of veterinary surgery' differ from those of other states. It would be wise to familiarise yourself with the situation in your host state.

APPENDICES

Bayticol D&S Technical Update	A
Covinan Material Safety Data Sheet	B

Technical **UPDATE**

Baytical Dip and Spray – Tick Control for Dogs.

Introduction.

Baytical Dip and Spray has a long history of success in the livestock industry and is highly effective in controlling the cattle tick *Boophilus microplus*.

Tick Protection for Dogs.

A recent change to the registered claims for Baytical Dip and Spray means that the product can now be used for the control of tick infestation in dogs.

Which Ticks does Baytical Control in Dogs?

Use Baytical Dip and Spray for the control of the Brown Dog Tick (*Rhipicephalus sanguineus*) and the New Zealand Cattle Tick (*Haemaphysalis longicornis*).

This product does not control the Paralysis Tick (*Ixodes holocyclus*).

Mixing Directions for Use on Dogs.

Baytical Dip and Spray is added to water at the rate of 3mls per 5L water. This is lower than the rate used for tick control on cattle.

Using the Baytical Dip and Spray Rinse on Dogs.

A sponge should be used to wet the dog all over with the rinse. Rub the rinse into all parts of the coat.

DO NOT WASH OUT. Allow the rinse to dry on the coat.

Sites More Prone to Tick Infestation.

Ticks commonly attach to the skin around the head and neck and also between the toes. Pay particular attention that these areas of the dog are thoroughly treated.

How Often Should the Dog be Rinsed?

Continuous tick control will be achieved when the treatment is repeated fortnightly.



Technical **UPDATE**

Bayticol Dip and Spray – Tick Control for Dogs.

Disposal of Unwanted Rinse.

Disposal should be into a pit of adequate size, away from streams and watercourses. The active ingredient is rapidly degenerated by soil organisms.

When applying to animals, standard safety procedures such as the use of protective clothing and gloves should be employed.

Bayticol Dip and Spray – Label Directions for Use on Dogs.

PEST	METHOD	RATE		CRITICAL COMMENTS
Brown Dog Tick and New Zealand Cattle Tick This product does not control Paralysis Tick on dogs	Rinse	Dilution Rate: 3ml Bayticol per 5 Litres of water	Replenishment Not applicable	The dog must be thoroughly wet all over with the rinse. Do this by using a sponge to rub the wash into all parts of the coat. Do not wash out. Allow to dry in the coat. Repeat fortnightly for continuous control. Ticks commonly attach to the skin around the head and neck and between the toes. Pay particular attention to ensure that these areas are thoroughly treated. When tick pressure is particularly heavy owners are advised to visually inspect the animal for ticks at frequent intervals to ensure application has been thorough. This product does not control Paralysis Ticks. It is recommended that in paralysis tick areas dogs are thoroughly searched each day for attached ticks and that any ticks found are removed.

MATERIAL SAFETY DATA SHEET

COVINAN®

Issue Date: July 21st, 2004
Review Date: July 21st, 2007

Company Address: Intervet Australia Pty Limited
Box 2800
Bendigo Delivery Centre
VIC 3554
Phone: 03 5440 9888
Fax: 03 5442 3162

Emergency Tel. No.: Veterinary Services Manager
Intervet Australia Pty Limited
03 5440 9888

Poisons Information Centre: 13 11 26

1. IDENTIFICATION

- 1.10 Product Name: Covinan progestagen for subcutaneous injection.
- 1.11 Correct Shipping Name: Not Available
- 1.12 Other Names: Proligestone
- 1.13 UNNO: None Allocated
- 1.14 Hazchem Code: None Allocated (not listed as a hazardous substance)
- 1.15 Dangerous Goods Class: None
Sub-risk: None Allocated (not listed as a hazardous substance)
- 1.16 Poison Schedule: S4
- 1.17 Manufacturers Product Code: 21130
- 1.18 Use: Prescription Only drug for animal treatment only – For oestrus control injection for use in horses, dogs and cats.

1.2 Ingredients

1.20 Chemical Entity	CAS No.	Proportion per mL
* Proligestone	23873-85-0	100.00 mg
Methyl parahydroxybenzoate	99-76-3	+
Propyl parahydroxybenzoate	94-13-3	+
Sorbitan monopalmitate	26266-57-9	+
Monobasic Potassium phosphate	7558-80-7	+
Polysorbate 40	9005-66-7	+
Sodium citrate anhydrous	68-04-2	+
Marcogol 4000	25322-68-3	+
Lecithin	8002-43-5	+
Water for Injection	7732-18-5	To 1mL
* Active Constituent		
+ Confidential Manufacturing Information		

1.21 Chemical Characterisation: Sterile suspension of proligestone 100 mg/mL injection.

1.3 Physical Description / Properties

1.30 Form:	Sterile liquid contained in 20 mL multidose vials		
1.31 Colour:	Colourless clear aqueous solution		
1.32 Odour:	No odour		
1.33 Change in Physical State:	Settles out – particle size:	60 – 70%	720 µm
		22 - 25%	740 µm
		2 – 2.5%	765 µm
1.34 SG:	1.035 at 25°C		
1.35 Vapour Pressure:	Not available		
1.36 Viscosity:	Very viscous		
1.37 Solubility in Water:	Insoluble – settles out on standing		
1.38 pH Value:	5.8 – 7.7		
1.39 Flash Point:	Non flammable – aqueous preparation		
1.40 Ignition Temperature:	Not relevant		
1.41 Explosive Limits:	Not relevant		

1.5 Other Properties

1.51 Further Information: See Martindale Extra Pharmacopoeia 29th ed., pages 1386 - 1387

2. HEALTH HAZARD INFORMATION

2.1 Health Effects: The therapeutic dose in animals is 10 – 33 mg/kg. Proligestone has weakly progestogenic action. It is anti-oestrogenic but has no oestrogenic, androgenic, anti-gonadotrophic, anti-oestrogenic or anabolic action. It is

slightly corticosteroid.

- 2.10 Information on Toxicity: Proligestone - in LD₅₀ studies in mice the highest doses tested 2000mg/kg I.P and 1000mg/kg S.C were not lethal. Daily S.C administration to rates at 50mg/kg and to dogs at 25mg/kg over a period of three (3) months revealed no toxic effects. Teratological studies in rabbits and rates revealed no teratological effect or rabbit and rat embryogenesis. The following is recorded as general properties of Progestagens and may or may not apply to Proligestone in humans:

Side Effects: of progestagens include gastrointestinal disturbances, acne, fluid retention, weight gain, allergic skin rashes or urticaria, mental depression, breast changes, libido changes, altered liver function and rarely, jaundice.

Precautions: mentioned are caution in humans with cardiovascular, renal or hepatic impairment, diabetes mellitus, asthma, epilepsy, migraine or other conditions which may be aggravated by fluid retention. There is a warning about use in humans suffering a history of mental depression.

2.2 First Aid

- 2.20 First Aid:
- Eye contact - Flush eyes with copious amounts of water for at least 15 minutes.
 - Accidental ingestion – seek medical advice.
 - Skin contact - Flush skin for 15 minutes with copious amounts of cold water . Remove and wash contaminated clothing before reuse.
 - Self Injection - Seek medical advice. Show bottle and this Material Safety Data Sheet to your doctor.

- 2.21 Advice to Doctor: Accidental self-injection may lead to fluid retention. This drug has an action of 3-5 months duration in animals. It may have the same duration in humans so health monitoring is indicated for six (6) months. Treat symptomatically any allergic reaction or any local irritancy. Accidental ingestion – treat the same as accidental self-injection.

PRECAUTIONS FOR USE

3.1 Exposure Standards / Engineering Control

- 3.10 Regulations: This product is not subject to the Australian Code for the Transport of Dangerous Goods by Road and Rail. This product is a Poison Schedule 4 prescription drug and may only be possessed and used by those people with appropriate authorisation.

- 3.11 Technical Protective Measures: No special measures are required. Exercise normal care to prevent accidental ingestion. Store away from food, drink or animal feeding stuffs. Store below 25°C. Do not

freeze.

3.2 Personal Protective Measures

- 3.21 Personal Protective Equipment: None required
- 3.22 Industrial Hygiene: Avoid contact with the skin and eyes

3.3 Flammability

- 3.31 Protection Against Fire: The product is water based and not flammable.

4. MEASURES IN CASE OF ACCIDENTS AND FIRES

4.1 Storage and Transport

- 4.11 Classification under the Transportation of Dangerous Goods Code:
 Shipping Name: Not Available
 Packing Group: None
 UNNO: None Allocated
 DG Class: None
 Sub-risk: None
 Hazchem: None
- 4.12 DG storage/transport in accordance with State and Territory regulations. This product is not subject to the requirements of the Australian Code for the Transport of Dangerous Goods by Road and Rail. Product should be stored and handled in accordance with regulations governing Schedule 4 (prescription) drugs.
- 4.13 International Transport Codes: Not relevant

4.2 Spills and Disposals

- 4.21 Dispose of unused or expired material in an authorised landfill.
- 4.22 After Spillage/Leakage: Spillage quantities will be minor due to the small volumes of product normally transported and stored. Prevent the spill spreading to contaminate other areas. Do not allow the product to contact skin or eyes. Wear rubber gloves for clean-up operations. Do not smoke or eat during clean-up operations. If contact occurs immediately wash off with soap and water.
- 4.23 Disposal of Spillage: Absorb into paper towel, hydrated lime, soil or sand, depending on quantity involved. Dispose of contaminated absorbent material in an appropriate manner. Rinse area of spill with detergent and water.
- On completion of clean-up wash all exposed skin areas and any contaminated protective clothing. Inform the local water authority if large amounts enter the drainage system.

4.3 Fire / Exposure Hazards

- 4.35 Thermal Decomposition: In fire incidents toxic fumes of nitrogen oxides, sulphur oxides, carbon monoxide may be formed.
- 4.36 Hazardous Decomposition Products: Do not use expired, pre-used or past date material in animals.
- 4.37 Hazardous Reactions: None
- 4.38 Extinguishing Media: Not relevant

5. OTHER INFORMATION

- 5.10 Information on Ecological Effects: There is no data on ecological effects. It is not anticipated that this product will enter the environment as a consequence of normal use.

6. CONTACT POINT (For Non-Emergency Calls)

- 6.10 Product Safety Coordinator: Veterinary Services Manager
Intervet Australia Pty Limited
03 5440 9888

DISCLAIMER

The Material Safety Data Sheet has been developed according to WORKSAFE Australia / NOHSC guidelines.

The data, information and recommendations herein ("information") are represented in good faith and believed to be correct as of the date hereof.

The purpose of this Material Safety Data Sheet is to describe product in terms of their safety requirements.

Intervet Australia Pty Limited makes no representation of merchantability, fitness for a particular purpose or application, or of any other nature with respect to the information or the product to which the information refers ("the product").

The information is supplied upon the condition that the persons receiving same will make their own determination as to its suitability for their purposes prior to use of the product.

The physical data shown herein are typical values based on material tested. These values should not be construed as a guaranteed analysis of any specific lot or as guaranteed specification for the product or specific lots thereof.

Due care should be taken to make sure that the use or disposal of this product is in compliance with relevant Federal, State and Local Government regulations.



Commissioned by Animal Management in Rural and Remote Indigenous Communities (AMRRIC) in partnership with the International Fund for Animal Welfare (IFAW).