

# 2011 Health Survey Results

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The 2011 health survey covered the period from September 1<sup>st</sup> 2010 through to August 31<sup>st</sup> 2011. This time period is used for health surveys as it covers a complete “season” for alpacas in New Zealand. The survey period allows for the analysis to primarily encompass one cycle of birth and matings (so, for example, the effects of an especially harsh or easy winter can be seen in all the spring/summer births).

For the second time, the online service Survey Monkey was used to collect the results, with links to the survey being distributed via email to alpaca owners in New Zealand. This list includes the members of the AANZ, and participants in other camelid-interest mailing lists to which I have access. Versions of this survey were also sent out to alpaca owners in South Africa and Germany, the analysis of that data will be covered in another document.

Most of the survey responses came from people with relatively small operations; very few large breeders have historically participated in these surveys. This does create a potential bias in the data, as we might be missing information relevant to alpacas living in larger groups. In addition, people who take the time to answer a health survey are likely to be more interested in animal health and welfare, so these responses probably represent better than average knowledge and practices.

One complaint regarding the 2010 survey was that the setup of the survey form only allowed people to log into the survey once (Survey Monkey uses the IP address as a unique identifier). This meant if people only filled out the form half way then lost their internet connection, they couldn't return to finish the form.

This restriction was removed for the 2011 survey, and that caused a different problem. In some cases it appears people logged on, partly answered the form, then logged in again and partly answered it again. This resulted in doubling-up of portions of some responses. I have endeavored to rectify these extra-entries, but even so it is likely that an occasional data-point was either double-entered or dropped.

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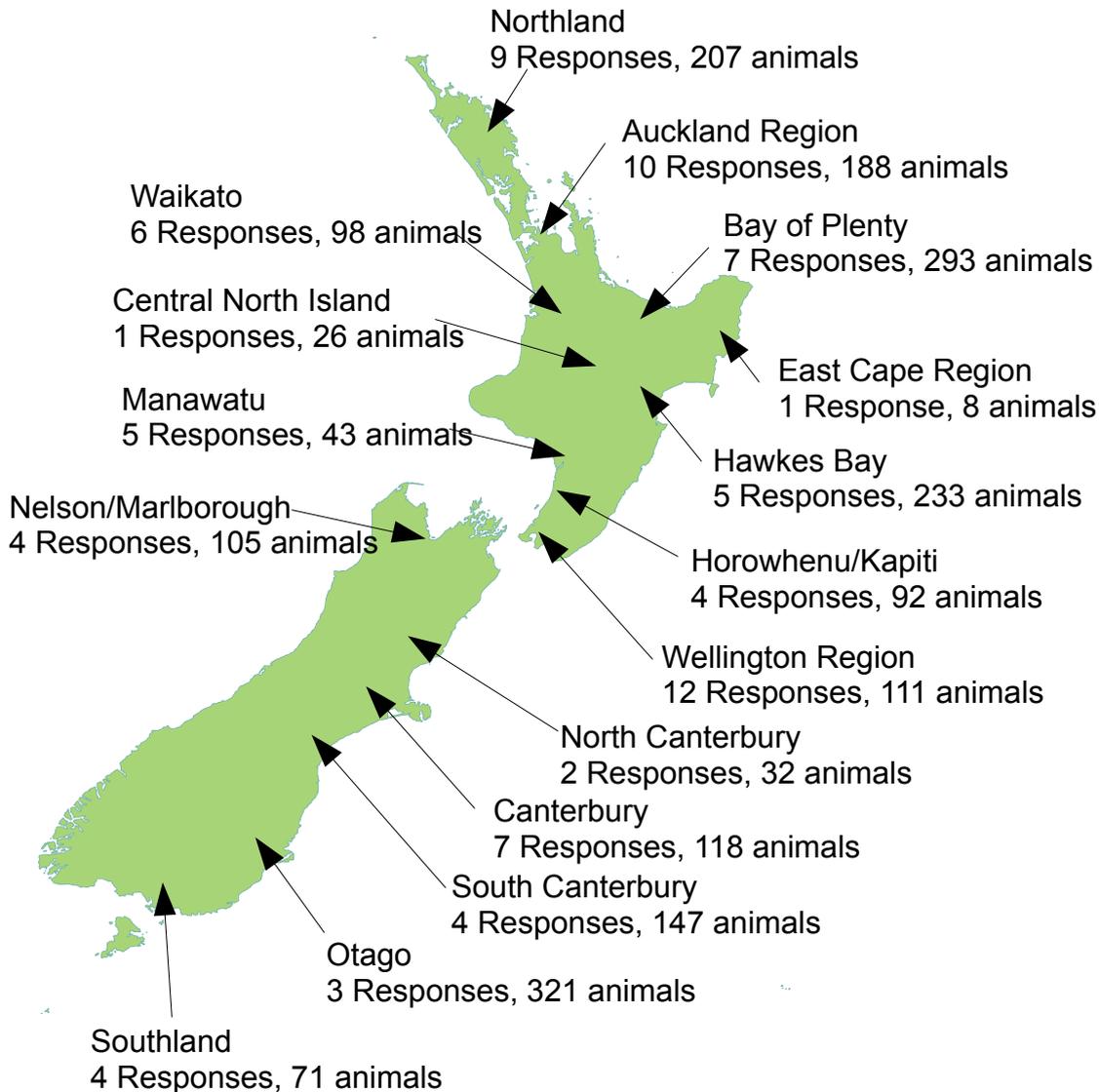
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## General Information

### Census

A total of 88 people participated in the 2011 New Zealand Alpaca survey, and this covered a total of 2093 alpaca. The split between the two islands was close to even, with 1175 animals on the North Island and 918 animals on the South Island.

The regional breakdown is as follows:



On August 31<sup>st</sup> 2011 the population breakdown of reported animals was:

	Female	Male	Wether
Huacaya Adult	992	238	167
Huacaya Cria/Tui	225	163	13
Suri Adult	149	52	32
Suri Cria/Tui	33	24	3

A total of 402 cria were born alive. Of these 216 were male (78% were registered with the AANZ)

and 186 were female (100% were registered). This is a male:female ratio of 1.16:1, which is notably higher than the 1.08:1 ratio reported in the previous survey.

### Farm Data

The average farm had just under 10 acres of grazable area, with the largest being 40 to 45 acres. The smallest blocks, holding only a few pet animals, were less than an acre.

37 Properties were on flat ground only  
46 had rolling to medium hills (with some steep hills)  
4 had steep hills only

72 of the 88 responses came from AANZ members.

## General Health and Maintenance

### Eye injuries and ailments

A total of 12 eye-problems were reported (0.6% incidence in population). Two cases were caused by trauma (fence), one due to a grass seed, and the remaining nine had unknown causes. Every case but one cleared quickly with treatment. Most eyes were treated with various ointments or drops sourced from the local veterinarian, though one successfully used tea-bag and saline wipes. In the one case that did not resolve, the treating veterinarian resorted to sewing the 3<sup>rd</sup> eyelid shut in conjunction with regular application of antibiotic cream, but even that was insufficient to resolve the infection.

### Foot and Toe Infections

A total of 9 cases were reported (0.4% incidence in population). All resolved after treatment with either antibiotic cream, iodine spray, or Gentian Violet spray.

Comment: The number of toe infections is probably significantly under-reported. I now check every animal we shear, both on our farm and in farms around the Wellington district, and find an incidence rate of about 2 to 4%. Probably most cases go undetected, and resolve without treatment.

### Rickets (Hypophosphataemia)

Seven cases of Rickets were reported; two in Northland, one in the Bay of Plenty, one in the Manawatu, one in Canterbury, and two in Otago.

Most of the cases were in cria or tui, and were resolved by application of Vitamin D (and sometimes supplemental phosphate). In two cases the treated animal was reported to still have a small stature after recovery. One of the cases involved a two year old female that had been given VitD its first winter, but not during the second winter.

Comment: It is likely that many more sub-clinical cases of Rickets go unreported. VitD is very important for growing animals, and should be provided over winter during at least the first two years of life. The cases in Northland and Bay of Plenty highlight that Rickets is not just a problem of the deep south, and all alpaca in New Zealand require supplementation.

### Rye Grass Staggers

A total of 41 cases were reported (1.9% incidence in population). Cases were reported widely, from Northland to Southland. Most reports were of a single animal on the farm being affected, and most of the affected animals were probably adults, though it is hard to be certain of animal age in some reports. The affected cria were three to four months old.

The severity of the staggers varied, with most people recognizing the problem and intervening early.

Standard treatments included removing the animal from affected pasture, feeding hay or other non-ryegrass supplements, feeding Equiguard, and vitamin B injections. One farm reported using seaweed drench on their 3 affected animals successfully.

Some of the affected animals suffer from recurring staggers every year, in other cases the owners reported that an animal that staggered when young outgrew the vulnerability in later life.

### Stomach Ulcers

There were three reports covering four animals, from Bay of Plenty in the north to Otago in the south. Two cases resulted in death, but in neither case was an ulcer confirmed by post-mortem examination. This question seems to have generated responses about general digestive/wasting issues. In one case the owner believed the problem to be from coccidia, in another to be a consequence arising from a Haemonchus afflicted animal which had had a blood transfusion.

### Colic

Only two animals were reported to have suffered from colic. One was an animal that had gone onto new feed, and was veterinarian-treated with magnesium drench and injectable anti-inflammatories. In the other case the colic was minor and self-resolved in a few hours.

Comment: I believe that spasmodic colic (essentially a stomach ache) often goes unnoticed or undiagnosed. I see a couple cases a year in our own herd, and I field a few phone calls from owners seeing similar symptoms. An animal suffering spasmodic colic is uncomfortable, and may be recumbent and depressed. If they are showing signs of significant pain (groaning, teeth-grinding, kicking at their abdomen), or if the condition does not improve in a couple of hours, then it may be a more significant problem and veterinary help should be sought.

### Facial Eczema (FE)

There were reports of 16 animals suffering from FE, from Auckland and Bay of Plenty in the north to Nelson in the south. 1% of the North Island alpaca population had a visible, clinical case of FE. Five of the affected animals died (though some of the deaths occurred after the August 31<sup>th</sup> report period, but because the survey was released in March of 2012, the long-term outcomes of the affected animals could be reported). In one case the FE was exacerbated by the animal also suffering from a heavy worm burden and being bullied.

As the first sign of FE exposure can be the death of the affected animal, it is possible that cases were missed. Likewise sub-clinical cases where the affected animal suffered liver damage may also be missed. Animals suffering from FE-caused liver damage can die later from other stresses that are seemingly unrelated to FE.

Participants were also asked about their FE management plans. Most of the plans described were likely to lower the FE risk- fungicidal spray on paddock before peak risk periods and feeding zinc-containing supplements before and during peak-risk periods to increase FE resistance. Not all farms had FE management programs.

Declared FE plans by region:

- Northland 5 of 9 farms
- Auckland 6 of 9 farms
- Bay of Plenty 7 of 8 farms
- Waikato 5 of 9 farms
- Hawkes Bay 2 of 5 farms
- Manawatu 1 of 5 farms
- Kapiti/Horowhenua 2 of 4 farms

## Wellington 3 of 11 farms

Only one farm on the South Island, in the Canterbury region, reported having an FE management plan. Their reported strategy, putting Zinc blocks in the water troughs, was unlikely to provide peak zinc concentrations sufficient for FE protection, but the continuous slight excess of zinc in their diets might put those animals at risk of copper deficiency. (Fowler; Medicine and Surgery of South American Camelids)

Comment: FE risks generally rises as you travel north. While microclimate, farm topography, and pasture composition can play a role in FE risk, all farms in the Northland/Auckland/Waikato/Bay of Plenty regions should be aware of FE risks, and have at minimum a monitoring plan to stay abreast of local conditions throughout the year. Unusual weather patterns, such as the 2012-2013 North Island drought can cause large changes in risk. It is also worth noting that while FE risk management was not seen as a priority on the South Island, there were losses due to FE in the Nelson/Marlborough region. Alpaca owners further south should not be too complacent, with a changing climate and increasing extreme weather events conditions that favor FE may occur in places where it has historically not been a problem.

### Internal Parasites

Most of the answers to this question focused on animals that had a significant illness due to internal parasites, though others simply reported how many of their animals had required drenching during the year for parasites, even when the worm burden had not been causing significant illness. As such, it is not possible to generate any valid numbers for the rate of parasitism in the national alpaca herd.

Specific worm species that were identified and treated included *Haemonchus contortus* (Barbers Pole), Tapeworm, and Whipworm.

### Poisonings

There was a single case of poisoning involving Rhododendron. The vet was called, the animal was treated (with magnesium and other treatments the responder could not remember). The affected animal had a complete recovery.

### Other Issues

As expected from such an open-ended question, there was a wide variety of answers ranging in severity from sunburnt noses to sudden unexplained deaths. Some of the conditions here are discussed in more depth in later sections.

Cases included:

- a dislocated shoulder
- a twin pregnancy that resulted in premature birth, one born dead and the other euthanized
- an infected upper pallet caused by a stuck grass seed
- a case of non-cancerous leg tumors that bled profusely, but slowly healed over
- multiple reports of jaw abscesses
- multiple reports of skin problems; mites, fungus, dermatophilus (the validity of the diagnosis is uncertain due to the variability in the descriptions of the conditions)
- a case of mastitis
- a copper-deficient cria that had been excessively-supplemented with zinc
- an animal that died of a perforated gut (confirmed by PM), cause unknown
- a case of hiccups
- a pair of sudden unexplained deaths in older animals on one farm
- death by head trauma, animal found under a hay rack and is presumed to have been startled and hit its head on the metal rack.

- a sudden death by bowel torsion
- a group of three animals that suffered from a metabolic disorder (not described in detail, unfortunately). The first animal died, but the other two were saved
- unexplained deaths of animals of unknown age
- a recurrent ulcer on the mandible (jaw bone). Recurs when animal is under stress (winter, pregnancy)
- a bone infection in the maxilla (upper jaw) in a 5 year old female, it came right after an intensive treatment regime, though she slipped her pregnancy during treatment.
- a case of regenerative anaemia, cause unknown. Seemed to recover after treatment of symptoms
- a couple cases lameness with no obvious cause that all self-resolved.

### Adverse Reactions to Medication

Two cases were reported.

- an animal that fittted after being given Dectomax
- an animal that had an anaphylactic reaction and died within 15 minutes (name of medicine used not provided, unfortunately)

### Wethering age

Because not all respondents to the Health Survey actively breed alpaca, wethering is not an issue for everyone.

Age of Wethering (37 responses)	Number of males wethered (31 responses)
5 (13.5%) wethered at 6 months	4 (13%) didn't wether any of their males
4 (11%) wethered at 9 to 11 months	1 (3%) wethered only 1%
5 (13.5%) wethered at one year	4 (13%) wethered 33-60%
17 (46%) wethered at 15 to 18 months	4 (13%) wethered 70-90%
6 (16%) wethred at 2 years or later	18 (58%) wethered 95+%

### Quarantine Procedures

Few of the surveyed alpaca owners have a program to quarantine animals moving onto their farm. Quarantine can be very helpful to prevent or slow the spread of infectious diseases and the exchange of parasite populations between farms. As the question did not ask how many people moved animals between farms during the period of the survey, I cannot tell what fraction of people with active movements actively quarantine.

Quarantine for animals:	Length of Quarantine
1 After shows	3 for 2 days
4 During breeding visits	4 for 5-7 days
6 At the start of agistment	2 for 2 weeks
7 For visiting males/females/boarders	1 for 8 weeks
	1 for duration of stay

### Regular Maintenance

I consider the regular maintenance questions to be very important for three reasons. First, these are activities every camelid owner should be undertaking whether they have 2 pet boys or a large breeding operation. Second, drenching practices are important not just for maintaining animal health, but also for slowing the development of drench-resistant parasites. And finally when respondents are confused as to what drench/vaccine/vitamins are it demonstrates the continuing need and areas of focus for educational articles and materials.

## Drench

Once again Dectomax remained the most popular drench by a wide margin, and 93% of respondents were using a drench in the macrocyclic lactone family. (These are the drenches whose active chemical ends in “-ectin”. e.g. abamectin, doramectin, etc. Drench resistance, if it develops, tends to effect all the chemicals of the same family to a greater or lesser extent.)

Drench Used:
31 x Dectomax alone
5 x Dectomx plus other drench products
4 x Genesis/Genesis Ultra
4 x Genesis plus other drench products
2 x Ivomectin
1 x Noromectin
2 x Vetdectin
1 x FIRST drench
1 x Arrest
1 x Wasn't sure of the brand used, as it was administered by their vet
1 x Agrisea Seaweed animal tonic
1 x farm reported as organic and chemical drench was only held in emergency reserve,
1 x farm said they didn't drench

Drench Dose Administered for Dectomax	Drench Frequency (All Drenches)
2 x 1 to 1.5 ml (or 1 per 50 kg)	1 x Monthly for the Agrisea Seaweed Drench
9 x 2ml	1 x Every 6 weeks over summer (Location: Auckland region)
3 x 2.5ml	3 x 4 times a year
4 x 3-4ml	2 x 3 times a year
5 x by weight (at 1 per 25 to 33 kg)	17 x 2 times a year
	10 x 1 time per year
	12 x “as required”

## Drench Dose.

Under-drenching remains a significant problem. Under-drenching (giving insufficient chemicals to ensure the killing of all the worms present) is bad in two ways. First, it means that worms are left behind, so if the animal was sick due to worm-burden, then the drenching has not completely cured the problem. Second, when worms are exposed to low doses of the drenching chemical, it allows for natural selection of worms with partial resistance to those chemicals. Over many cycles of under-drenching this can eventuate in worms that are completely immune to the drench. In previous health surveys I have had reports from a total of four different alpaca farms that now have confirmed Dectomax-resistant worms on their properties.

A number of respondents answered the dosing question with answers such as “as per manufacturers recommendation” or simply “the correct amount”. Both of these answers are problematic. No animal remedies are officially sanctioned for use on camelids (llamas and alpacas). This is because of the small camelid population relative to major farmed/companion species, and the high cost of confirmatory safety testing. Because the drugs are used “off label”, there are no manufacturers' recommendation for a proper alpaca dose. Safe and effective doses have been determined by trial and error, and are usually expressed in terms of their relation to the sheep, cattle or pig dose. So when people answer “the correct dose” it is not clear if they know what that dose should be.

For “-ectin” drenches (the macrocyclic lactone family) the recommended dose is 1.5 times the sheep dose (from Alpacas a basic veterinary reference by Peter Aitken BVSc). As adult alpaca are about 70kg, for Dectomax this would equate to a dose of about 3 ml. A 4ml dose might be needed for an especially large animal, and a 2.5 ml dose might be sufficient for small adult.

This means that 11 of 23 (48%) of Dectomax-using respondents were giving marginal (2 ml) to ineffective (1 to 1.5 ml) doses.

#### Drench Frequency.

Part of combating the rise of drench-resistance is ensuring that the parasites only ever experience drench when it is at concentrations sufficient to kill all of them. The philosophy should be much like the administration of antibiotics (with which rising resistance has been deemed a potential catastrophe by health authorities in the US and the UK), in that you should “give it only when needed, and then make sure you give enough”.

All alpacas have worms. Adult alpacas that are well-fed and not overly stressed can develop a strong natural resistance to parasites that allows them to easily and naturally fight off low-to-moderate worm levels. The goal is not to eradicate all the worms in your alpaca; that is impossible and unproductive. Rather, the goal is to keep the worms from rising to levels that threaten the health of your alpaca. What constitutes a dangerous levels of worms depends on the species of worm, talk to your vet to find out how to optimize your drenching strategy for the worms in your area.

The old practice for drench was to apply “by calendar”, that is, you drench your animals on fixed dates during the year. The problem is that this is not likely to be very effective at treating animals that are sick from worms, and by putting the drench chemicals through the animal again and again it gives more chances for drench-resistant worms to be selected.

The current best-practice is to give drench “as required”. Generally this means giving it only to animals for which there is evidence (high Fecal Egg Count) or suspicion (ill-thrift) of parasite load. This means that only a few animals in a given mob may require drenching, and it may be that those vulnerable animals might require being drenched multiple times throughout the year while their paddock-mates don't get any drench at all.

Talk to your vet about the risks and worm populations in your area to work out the drench program that is best for your animal's health while simultaneously combating the rise of drench resistance.

#### Vaccinations

Type	Dose- Adults	Dose- Cria	Frequency
33 used 5 in 1 (even spit of Ultravac and Multene brands)	17 x 1ml 4 x 1.5ml 19 x 2ml	4 x 0.5ml 20 x 1ml 3 x 1.5ml	17 x once per year 26 x twice per year
7 used 7 in 1	1 x 3ml	8 x 2ml	
4 used 10 in 1	1 x “by weight”	(two initial doses, then yearly maintenance)	

The vaccination strategies listed were all generally quite reasonable.

All camelids require regular vaccination. The 5 in 1 drench protects against 5 common and very deadly form of bacteria that can be found widely in the environment. The 7 in 1 and 10 in 1 provide

protection against more diseases, and may be advised depending on the local conditions. Talk to your vet about what is suitable in your area.

The recommended dose is equal to the sheep dose, which for many vaccine products is either 1 or 2ml. The same dose should be used for both adults and cria.

Because vaccination products are used off-label (like all other veterinary therapeutics) it is not known what the optimal vaccination frequency should be. Death from clostridial disease in vaccinated adults is very rare. Vaccination does carry a small risk of causing a pregnancy to abort (estimated to be about 1%, based on a talk given by Dr Dave Anderson at the 2007 Dunedin conference).

### Vitamin D

37 people reported giving regular doses of Vitamin D to their alpaca.

Type/Brand	Dose
30 x Hideject	3 x 0.3 to 0.75 ml 9 x 1ml 2 x 1.5ml 9 x 2ml
3 x VetADE	3 x 2ml
3 x Adject	2 x 2ml 1 x 3ml
Duobject B	

Doses for cria/tui were generally half the adult dose.

All growing alpaca need sufficient Vitamin D, otherwise their calcium/phosphate levels goes out of balance, and this can result in the painful condition hypophosphataemia (commonly known as Rickets). Alpaca are growing for their first two years, and some males keep growing until age 3.

Vitamin D is normally produced naturally in the skin by the UV in sunlight reacting with a compound in the cell membrane. Growing alpacas require supplemental VitD over winter, when a combination of clouds, fewer daylight hours and thick fleece prevent sufficient ultraviolet light from reaching the skin. Injectable Vitamin D lasts about 8 weeks in the blood stream (a half-life of about 2 weeks based on data presented by Dr Dave Anderson at the 2007 Dunedin conference).

Cases of Rickets occur throughout the country, from Northland to Southland, and for every case described probably many more cria have their growth stunted as they develop sub-clinical cases.

In New Zealand injectable VitD comes in mixtures with Vitamins A and/or E. These vitamins are fat soluble, and it is possible to over-dose and poison an animal (unlike the B Vitamins, which are water soluble and excess can be urinated away).

The most popular brand of VitD is Hideject, though the dosages reported in the survey data that many Hideject users are applying is probably too high. Repeated injections of high concentrations of VitD can cause health problems. A 1ml dose of Hideject would be plenty for an adult alpaca. The dose should always be scaled down to take the weight of animal into account, so a 25 kg cria would only need 0.3 ml of Hideject in each dose. There is still uncertainty as to what dose of VitD would be toxic. There have been no reports of toxicity after giving Hideject at 2 ml doses, but based on the

high level of VitD in that product a 1ml dose delivers what is widely accepted to be an effective dose.

Doses delivered in May/July/September cover the peak time of darkness. The September dose provides cover until the animals are shorn in Spring, after which time their exposed skin will produce plenty of VitD naturally.

While Rickets tends to show up in young growing animals it may be advisable to provide supplementary VitD to your adult animals to help prevent the development of Calcium/Phosphate imbalances which may go unrecognized due to the stoic nature of alpaca. This could be studied, but there is currently little to no funding for camelid health in NZ.

One respondent reported giving Vitamin B. I am not sure if they misread the question, or if it was a more fundamental misunderstanding of the roles of the different vitamins in animal health.

### Shearing

Almost all shearing was done in the November/December timeframe. A few farms started as early as October in the North, and for a few, shearing was delayed until January due to limited shearer availability.

89% (49 of 55) of respondents hired professional shearers, the remaining 6 did their own shearing.

The primary criticisms in the comments section was the limited availability of shearers in many areas, limiting choice. There were also complaints about the high cost. Two respondents expressed their frustration at getting the shearer to take the time to remove the fleece in a condition suitable for sale/shows.

### Body Condition Scoring

Most people body scored their animals at least periodically. Body-scoring is important. A thick fleece can disguise the signs of emaciation; fat and thin animals look about the same when they have 10 cm of fleece. The stoic nature of alpaca means they often don't show signs of sickness until they are near death. Detecting an animal losing weight by a declining body score allows for earlier intervention and increases the chance of a positive outcome.

#### Body Scoring Frequency (61 responses)

- 10 x Never Body Score
- 6 x Body Score weekly
- 21 x Body Score monthly
- 21 x Body Score quarterly
- 3 x Body Score Yearly

#### Average Body Scores

Breeding Female	Working Males	Non Breeding/Working animals
1 x BCS 2.5	1 x BCS 2.5	
8 x BCS 3.0	6 x BCS 3.0	3 x BCS 3.0
8 x BCS 3.5	7 x BCS 3.5	6 x BCS 3.5
6 x BCS 4	8 x BCS 4.0	13 x BCS 4.0
2 x BCS 4.5		5 x BCS 4.5
		1 x BCS 5

As the results above show, most alpaca in New Zealand are overweight. Given the lush grass that is

usually available and the generally mild climate this is not a surprise. Camelids evolved to survive under harsh conditions at 4000 meters altitude, making the average NZ pasture something of a luxury resort by comparison.

In our experience healthy young adult animals can maintain a BCS of 4 or more while running on hill country without any supplementary feed, all while being pregnant with a cria at foot.

This difference in average body condition (which is no doubt related to nutrition) makes direct comparison with animals living in Australian conditions difficult.

### Weighing Animals

Few people weigh their adult animals, no doubt due to lack of the specialist scale required. Most of the people breeding alpaca weigh at least some of their cria.

Weighing Adults	Weighing Cria
54 x never weigh	2 x weigh daily
1 x weighs weekly	6 x weigh twice a week
4 x weigh monthly	8 x weigh weekly
1 x weighs quarterly	2 x weigh monthly
1 x weighs yearly	13 x weigh only at birth
	20 x weigh only cria they are concerned about

Arguably weighing cria is more important than weighing adults. It is the best way to gauge the milk production of the dam. It is also a good way to catch a cria that may not be getting sufficient feed, or a cria that may be having other health issues.

Historically many cases of mastitis have been first detected with the death of the cria based on previous health surveys.

It is also possible that early cria deaths (first 7 days) are sometimes due to the cria getting inadequate colostrum and/or nutrition, which then makes it vulnerable to infection.

### Tuberculosis Testing

23 people tested regularly for TB (38% of the 60 responses).

The reasons for TB testing varied:

- 12 tested so they could attend shows
- 4 tested their alpaca as part of the normal farm testing regime (for cattle and/or deer)
- 2 tested to protect the alpaca export industry
- 1 tested to support the Voluntary TB scheme
- 3 tested for peace of mind or farm/business specific reasons

The skin test used to test camelids is not very reliable. Experience from the TB epidemic in alpacas in the UK has shown the TB test can produce many false negatives (animals test clear, but have TB). Experience from NZ has shown that the test can also produce large numbers of false positives (where the animals show up as having TB, but are actually clear of the disease). The skin test was never intended to be hugely reliable as a test for single animals, rather it is screening test for whole herds. The evidence is building that in camelids the skin test may not even be sufficiently effective on a whole-herd basis.

The risk of TB in NZ is very low thanks to the efforts of the AHB and various local authorities in

controlling the possum population, which is the primary vector for spreading TB. If you live in an area of high TB risk, the best way to ensure your herd is clear is to have any adult animal that dies examined by a veterinarian. If the animal has TB, it will show up very clearly in the liver and lungs.

### Fecal Egg Counting (FEC)

Fecal egg counting is a simple procedure. A measured amount of feces from an alpaca is mashed-up and suspending in a concentrated salt or sugar solution. A few drops of that solution is then examined in a special slide under a microscope to look for the eggs of intestinal parasites. Large numbers of eggs can indicate a heavy parasite burden. Fecal egg counting allows for drenching based on a known problem, and by checking the egg numbers before and after drenching the effectiveness of the drench can be checked.

FEC is not a panacea, as different species of parasites produce more or less eggs, or only produce eggs during parts of their life-cycle. Information is available that show how to do your own FEC, and you can talk to your vet or local Veterinary Laboratory about the worm species present in your area.

7 people surveyed do their own FE counts, 3 of whom use a centrifuge in preparation of the samples.

4 people send off samples for lab analysis.

9 of 10 people doing regular FECs are in the North Island. For those further north, this is often in response to the danger of *Haemonchus contortus* infestation in their herds.

### Johne's Disease

Johne's disease is caused by an infectious bacteria that invades the intestinal lining. Afflicted animals cannot effectively absorb nutrients, and waste away. Johne's is a significant problem in the deer herd in NZ, and causes problems in dairy cattle in Europe and the US.

There were two confirmed cases of Johne's Disease, one in Kapiti, the other in Hawkes Bay,

### Chronic Wasting

This question was included for two reasons. First, it opened the opportunity of catching cases of possible Johne's Disease that were not diagnosed by a vet. Second, chronic wasting can be a symptom of very many diseases, and needs to be monitored. A new or emerging camelid disease may first appear as a set of seemingly unrelated cases of unexplained chronic wasting. As such, this question remains an important part of the long-term monitoring of the health of the national herd.

8 cases of chronic wasting were reported:

- In the Bay of Plenty there was an animal that suffered persistent weight loss and did not respond to any treatment, it died.
- An animal in Nelson that has always been thinner. He is now 8 and the vet believes it may be a congenital heart defect
- A case in Kapiti involving an 18 year old wether. Did not respond to treatment.
- A case in Otago involving a 15 year old female that was found at PM to have a neoplasm (tumor)
- A case in South Canterbury involving a 4 year old animal suffering weight loss. Treated with Drench, Baycox, and bloods taken for analysis. Animal alive, but only weighs 53 kg.
- A case in Bay of Plenty involving a 8 year old female. The attending vet believes it was a tumor which led to cardiac problems which eventually killed the animal.
- A case in Canterbury involving a number of old animals (age not specified). Stiff with

limited mobility they were treated with vitamins and antibiotics. All died or were euthanized.

- A case in Bay of Plenty involving a 2 year old female. No symptoms aside from not putting on weight after the birth of her cria. (This could be Johnes, as stress can cause the disease to flare up in an otherwise infected but healthy animal. In deer Johnes often occurs in young deer at weaning.)

### Plasma

Plasma was used to treat one at-risk cria in the Hawkes Bay. The cria survived.

### Dog attacks

2 attacks were reported.

- In Otago there was an attack on a farm near a city. One animal was killed, two were injured but survived. The dog was never found.

- In Wellington there was an attack by a wandering neighbor's dog. A 4-month old cria locked in a pen to treat RGS was killed (broken neck). The dog was returned to its owner by animal control.

### Antibiotic Administration

14 owners administered antibiotics without veterinary consultation(16% of respondents).

## Reproduction and Birthing

### Matings

Pen matings were the most common tool for alpaca breeding, with more than 90% of respondents using this system exclusively. One person did about 50-50 pen-paddock matings, and two breeders used paddock matings exclusively.

### Mating Issues- Refused to Sit

About 20 animals refused to sit or were not receptive (about 5% of bred females).

In the case of young females (15 to 24 months of age) waiting a few months before trying again was mostly effective. In three cases there was a medical condition (infection, retained CL, ovarian cyst) that once treated resulted in a successful mating and pregnancy. In another case putting the male and female in a paddock mating situation solved the problem.

A few animals never got pregnant, despite repeated attempts, in some cases over years of trying.

### Matings- Not Pregnant After 3 Tries

About fifteen cases were reported (about 3.5% of bred females). Mostly they involved young (12-24 month) or old (10+ years) animals. In some cases moving to a paddock mating situation solved the issue, in other cases the female needed to be treated for an infection.

### Slipped Pregnancies

About 29 pregnancies were known to have slipped (which would equate to a slip-rate of 6.7% when compared to the total number of live births). On one farm four of the animals that slipped their pregnancy had medication (Dectomax and/or Genesis) ~4 weeks weeks before they slipped. There is not enough evidence to say if this drenching had any influence on the lost pregnancy

Because it is not clear how many pregnancies were confirmed, or how they were confirmed, calculating the exact slip-rate is difficult. There are also no-doubt environmental stressors that can affect the rate, for example an especially harsh winter could cause enough metabolic stress to cause a higher slip rate. A overall slip-rate of 5 to 10% would not be surprising.

### Discharge at the Vulva

Only a single case was reported in a 6 year old which had suffered a uterine prolapse at birth. The discharge resolved without vet intervention, and the female went on to get pregnant.

### Birth Dystocias- Wrong Position

A total of 10 cases were reported (2.5% dystocia rate):

- “head first” resolved by owner
- “head first” resolved with veterinarian assistance
- umbilical cord around shoulder, resolved by owner
- one leg back, resolved by owner
- one leg back, resolved by owner
- both legs back, resolved by owner
- breech birth, stillborn, removed by veterinarian
- both legs back, stillborn, removed by veterinarian
- “feet wrong way”, resolved by owner
- one leg back, resolved by owner

In the cases described as “head first” and “feet wrong way” I am not sure exactly what type of positional dystocia they are trying to describe. I would guess that “head first” means both front legs retained.

### Birth Dystocia- Cria too Large

There were a total of eight cases reported (2% dystocia rate):

- an assisted birth in a 14 year old dam
- an assisted birth in a 14 year old dam, 9.5 kg cria. Healthy outcome for mother and cria
- 26 month old maiden, 8.5 kg cria successfully removed with help from veterinarian
- Cria was not excessively large, but dam had a very narrow birth canal and needed an episiotomy, 4 year old dam. Good outcome for both mother and cria
- a severely deformed cria that needed to be dismembered and extracted by a veterinarian. Suspicion that the deformity may have been due to injections received during import quarantine.
- 2 year old dam with very large cria, removed with assistance
- a 4 year old female with a 8.4 kg cria, assisted delivery
- assisted delivery of a large cria
- a 4 year old dam that became exhausted, progress stopped with head&legs presented. Cria pulled out, both mother and cria healthy

This is an overall dystocia rate of 4.5%. All the cria bar one survived with helpful intervention by either the owner or a veterinarian.

### Cria Stillborn Full Term

Six cases were reported:

- full term, no apparent cause of death
- full term, looked like a torn umbilicus
- full term, looked like a torn umbilicus
- cria may have been born alive, but its neck was broken during the birthing process. Large cria and a large dam
- full term, from a maiden during heavy rain
- full term, 6.3 kg, no external signs of deformities

### Cria Stillborn Premature

Eight cases were reported:

- two months before due date, no obvious reason
- a set of twins born 6 weeks early. One dead at birth, the other born alive but later euthanized
- premature, born with no fleece growth
- born premature (no description)
- three premature births that had been reported earlier under the “slipped pregnancy” section
- two months before due date, probably due to a twisted umbilicus

This results in a combined (premature + full-term) stillbirth rate of 3.3%.

### No or Inadequate Milk from the Dam

Ten cases were reported:

- a 3 year old maiden with especially small nipples
- cria of a 3 year old mother that needed supplementation
- a maiden whose cria needed milk/colostrum supplements, cria began rejecting supplements as the mother's milk improved
- a 3 year old mother, cria always trying to drink. Dam treated with oxytocin, milk production improved after about a month
- two females of unknown age with milk issues who are no longer used for breeding
- a 4 year old mother whose cria had minimal growth after 2 weeks. Was given supplemental milk for 8 weeks and started growing as either mothers milk improved or his ability to digest grass developed
- a mother whose second cria needed a month of supplemental feeding. Her first cria had been entirely bottle fed
- a three year old maiden whose cria needed about a month of supplemental feed
- a dam with severe rye grass staggers that eventually at day three produced milk and began raising her cria

### Mothers Rejecting Cria

Four cases were reported:

- a cria that was found out and nearly dead of exposure first thing in the morning. The cria was warmed and revived, but rejected by the mother. Eight year old experience mother.
- a large cria that was pulled out, cria hand raised
- a dam who has rejected all of her six cria
- a dam that was a poor mother, and getting worse over each of her four cria, mother culled and cria hand-raised

### Twins

There was only one set of twins reported. They were born 6 weeks premature. One was stillborn, the other was only 4 kg and was euthanized.

### Cria Born with Deformities

Seven cases were reported (a 1.7% incidence). It is possible that some of the stillborn cria had internal deformities that was the cause of their death. A congenital defect rate of 1-3% is expected, and is quite normal for mammalian species. Monitoring the rate and type of deformities is important

to check for any genetic diseases that may creep into the alpaca population.

- a cria born with no anus, a heart murmur, and a hernia. Euthanized
- a cria born with small ears
- a deaf cria (no mention if it had blue eyes)
- a cria born with no anus, euthanized
- a cria born with fused front legs, euthanized
- a cria with choanal atresia, diagnosed and euthanized on day two
- a cria born with a severe heart defect, would faint when it stood to feed. Euthanized at 2

weeks.

- a cria that died on day two. Malformed stomach

### Premature/Dysmature Cria

Because of the variable gestation length, it is important to try and distinguish between prematurity and dysmaturity when assessing if a birth is “normal”. Premature is based on the date of birth, if the cria was born before 335 days gestation. Dysmaturity is developmental status. Is it possible for a cria to be born early but fully formed, or late but severely dysmature.

Seven cases reported (a 1.7% incidence rate):

- the twins mentioned above
- a 5.2 kg cria born at 334 days
- born 320 days at end of November with teeth not emerged, soft feet and floppy ears.

Colostrum by syringe for two days, millophyline (1ml) at birth and next day. After that cria was fine. That was second cria for the mother, her first cria was more premature.

- four year old dam, second cria, end of March. Cria very sluggish, teeth not emerged.

Millophyline first two days plus colostrum and VitB. Cria quiet for first week, then fine

• a premature that seemed healthy, but then died on day 10. Diagnosis was underdeveloped kidneys

• day 328 birth from maiden female. Cria was small, had a sparse coat and floppy ears. Cria reared successfully after eight weeks of supplementary feeding

• a dysmature cria that had to be held up so it could feed for the first three days. Given antibiotics for possible fluid in lungs. On day 4 cria stood and fed on its own and was fine after that

### Cria Ailments

The only two ailments reported were a cria with umbilical bleeding that needed tying off, and another born with an umbilical hernia that self-resolved.

### Breeding Goals

48 people reported their breeding goals. There were an average of four “primary breeding goals” reported, and this is probably an under-estimate as some breeders simply ticked nearly every option as “important” without differentiating the primary goals.

Knowing the breeding goals and practices of the alpaca-owning population is important for two reasons. First, it gives us an idea where the herd is moving genetically, and what traits we can expect to see improve in the years to come. Second, it gives an idea of how well people understand selective breeding and trait selection so that educational articles can be generated that will help people reach their goals more quickly.

As a general rule the fewer traits you are selecting for the more rapid your advancement will be. Trying to rapidly advance one or two traits while holding the other traits at least stable is a very viable tactic. Trying to advance every trait simultaneously is not impossible, but it would either require either a legendary-quality male (but that only advances you for one generation), or it would

take dozens of generations to make appreciable progress.

Not every respondent answered for each trait, so the totals for each line are different.

TRAIT	Primary	Important	Considered	Unimportant	Not considered
Fineness	21	15	6	1	3
Staple	5	22	8	1	6
Low SD/CV	19	14	6	2	4
Crimp	9	23	3	3	8
Lustre	14	21	6	2	4
Bundling	4	17	6	3	11
Fleece Weight	5	15	9	3	6
Normalized fleece weight	1	15	4	4	13
Follicle density	7	9	7	5	13
Consistency over body	13	19	6	3	3
Consistency over time	11	19	4	2	5
Colour	15	13	11	3	3
Solid Colour	13	11	10	5	3
Fancy Colour	2	1	4	8	21
Animal Size	5	19	11	3	5
Temperament	15	13	12	4	2
Milk Production	7	16	8	4	7
Fertility	12	18	4	4	5
Mothering Ability	12	19	6	2	5

#### Fraction of Females Mated

There were 51 responses. 14 people were breeding all their females, 5 bred none, the remained bred some fraction. The average breeding rate (averaged by owner, not weighted to herd size) was 56%, with a prediction of a 44% breeding rate for the next season.

The primary reasons listed for limiting breeding rate were heavy stocking rates on their farms and difficulty in selling animals, particularly older and lower quality animals.

## Deaths and Significant Illnesses

### Deaths

A total of 36 deaths were recorded.

Age	Sex	Description	Vet called/Post Mortem
2 days	F	Choanal Atresia, Euthanized	Yes / No

2 days	?	Lethargic at day 2, feeding but weak. Taken to vet and tube fed. Regurgitated feed. Died	Yes / Yes- stomach not properly formed
3 days	M	Found dead in the paddock	No / No
4 days	?	Failed to thrive	No / No
4 months	M	Killed by dog, broken neck	No / Yes
4 months	?	Got tangled in fence and died	No / No
9 months	M	Slipped down bank, caught head-down, suffocated on rumen	No / No
10 months	F	Broken neck- accident during halter training	Yes / No
10 months	?	Had suffered FE previous year. Never fully recovered, liver damaged. Went downhill quickly in bad weather	Yes / No
18 months	?	Found dead in field. No apparent injury or illness	No / No
18 months	?	Losing weight. "tried everything"	Yes / No
3 years	M	Found dead in the paddock	No / No
36 months	F	Had aborted a month previous.	Yes / Yes but inconclusive
42 months	F	Perforated gut, cause unknown. First symptoms included sitting lots and shade-seeking, lack of appetite. Blood samples taken and animal treated with Richtafort, Duoject, Losec, later with Zantac, ketol and penicillin. She improved a bit at first, then went downhill.	Yes / Yes
4 years	F	Suri female, walking in circles, vet called, VitB1 injection and magnesium drench.	Yes / Yes- Thiamine deficiency
4 years	M	Stud male. Subclinical FE resulted in slow wasting. Treatment came too late to be effective.	Yes / ?
4 years	?	Found recumbent. Barbers Pole. Vet did not have equipment for transfusion, euthanized	Yes / ?
4 years	?	Found down and acting strangely. Treated for meningitis	Yes / No
6 years	F	FE	Yes / Yes
8 years	F	Euthanized due to ongoing health problems. Vet believe a tumor was putting pressure on her heart.	Yes / No
9 years	M	Had swollen testicles and lost condition suddenly. Cancer not confirmed by vet.	Yes / Yes
10 years	F	Lethargic and unresponsive. Vet diagnosed metabolic disease	Yes / ?
10 years	M	Euthanized due to problems with front knees which made it too painful for him to walk	Yes / Yes
15 years	F	Emaciated and wasting. Neoplasia discovered at PM	Yes / Yes
?	?	Sudden loss of weight- had an undershot jaw. Found unconscious in extremely bad weather, euthanized	Yes / ?
?	?	Ulcers and worms/coccidia. Taken to vet.	Yes / Yes
?	F	Suri that dropped in paddock, vet called but was dead by morning. Strangulated bowel. No signs of pain at any period up to the point.	Yes / Yes

?	M	Entire male suri. Found down with head starting to twist back. Vet called, given VitB12 and antibiotics. Head continued to twist back, hard to hold. Died about 2 hours later.	Yes / ?
?	F	Suri, age unknown. Found dead in paddock.	No / No
?	M	Stud male. Found dead. Probable thiamine deficiency	No / ?
?	?	Dog attack. Euthanized by vet	Yes / No
?	?	Barbers Pole	? / ?
?	?	Barbers Pole	? / ?
?	?	“Old age”	? / ?
?	?	“Old age”	? / ?
?	?	“Old age”	? / ?

### Significant Illnesses

14 cases of various severity were noted:

- 2 cases of jaw abscesses, both had slow recovery over many months
- top pallet infected. Rotten flesh surgically removed, antibiotics. Recovered
- mastitis (discussed above)
- a six year old male that developed sudden gastric distress with a very high temperature.

Peritonitis possible diagnosis. Treated with 2 courses of penicillin (different types). Seemed to improve, but then relapsed. Further investigation failed to find a definitive cause. Eventually cleared by a 2-week course of oral penicillin, as well as anti-inflammatories and zantac. Vet believes it was a severe infection in the intestinal tract.

- a four year old with scabs on the face. Samples collected and analyzed. Treated with 2 courses of 2 different antibiotics (5 days and 7 weeks duration). Malaseb wash to remove scabs, now on Preddy granules for the long term. Still battling the problem.

- a lump developed on the leg of a pregnant female which the vet could not diagnose. Treatment was delayed until she gave birth. Lump is still present, but it quite small and does not appear to cause discomfort.

- a female that failed to thrive after giving birth. Cria was weaned early. Dam skinny, but no obvious problems. She died in the 2011-2012 recording year.

- a male got tangled in a fence and injured himself. Treated by chiropractor and physio, still recovering.

- a one year old female with a large bubble of fleshy material bulging from her anus which seemed to come and go. Vet put in stitches around the anus to tighten it up, but the female then could not defecate. After 36 hours of providing enemas and parafin oil the stitches were removed. The problem has not recurred.

- a case of colic
- two cases of spasmodic colic that self-resolved within 3 hours
- a case of rhododendron poisoning as mentioned earlier.

### Strange or Vexing Cases

In this section, people took the opportunity to re-iterate some of the cases they had described previously when dealing with sick/injured/dead or not-thriving animals. There were a couple of quite odd cases:

- tumors that developed on the legs of a female alpaca. They were full of “blood and ooze”, but they would then heal over and stay as a growth.
- comments about the high rate of dermatophilus seen at shearing time

- difficulties in hand-raising autumn cria. They didn't like the taste of the milk replacer, and the grass was insufficient, resulting in small, undernourished adult alpacas. Spring crias that are hand-raised seem to have better outcomes.
- a female which had a leg amputated and is doing well.
- an adult male that will not gain weight, vet is baffled after 4 years of struggle

## Afterword

The results presented above are a top-level look at the raw data, without any deeper analysis searching for correlations. In many categories the number of responses is sufficiently small that producing a statistically-significant correlation from a single year's data set is not practical. But each year, with each successive survey, we accumulate more data. The hope is that eventually we'll have enough data to be able to make further discoveries. For example, I'm curious to know if animals on hilly ground (and thus presumably fitter) have lower rates of birth dystocias (strong mothers to push out the babies). Do farms with very overweight females have more problems getting and holding pregnancies (endocrine problems)? Right now we can't answer these questions, but hopefully one day we will to the betterment of the health and welfare of the alpaca and our businesses.

Thank you to those of you who participated in the 2010-2011 health survey. I hope you continue to support the health survey process in the years to come.

Regards,  
Stephen Mulholland, Ph.D.