



Our medical cannabis research

I can hardly believe that it was over three years ago (Dec 2016) that I sat down with Dr Shaun Holt to discuss New Zealand medical cannabis.

Normally Dr Holt is the one with creative ideas and I am the one who addresses the production issues. It was quite surprising this time to find he was the one saying it would be very difficult and the bureaucracy would drive us crazy.

We needed four things to make it happen, medical standard grow rooms, a doctor with a knowledge of natural products, a research organisation to do a clinical trial and a factory that could manufacture products to pharmaceutical standards.

Dr Holt introduced me to Professor Richard Beasley, the Director of the Medical Research Institute of New Zealand, NZ's leading independent clinical trials organisation.

Our team at Zealand Health Manufacturing (ZHM) had already been working on implementing Good Manufacturing Practices (GMP) and Scott our warehouse manager (now grow manager) had 20+ years experience growing export quality flowers. I was confident we had the skills to cultivate and produce pharmaceutical grade medical cannabis.

I asked David Coory (Dad) to research it (refer to his article on page 3) and then he said go-ahead.

We meet with Government Officials

In January 2017, Dr Holt, Professor Beasley and myself went to Wellington to meet with representatives from the Ministry of Health (MOH).

To our pleasant surprise, the MOH was positive and helpful. They gave us information on licences and we began the first steps in the challenging process to start growing medical cannabis in New Zealand.

In April 2017 we meet with Peter Dunne (yes he was still in Government and the Medical Cannabis regulations had not even been considered). This taught me the first of many valuable lessons. Who would have thought that discussing your medical cannabis plans with the Associate Minister of Health, meant you were in fact disclosing your plans to someone who is now on the advisory board of a competing medical cannabis company.

Then there was a change of government. It is pleasing (and quite fortuitous) that the Labour government then introduced specific medical cannabis legislation and regulations. During this long legislative and regulatory process we continued with our cannabis research project.

I have to admit Dr Holt was right, it has turned out to be a lot more difficult and time consuming than I ever thought.

Our trial at Lincoln University

To grow high quality medical cannabis requires temperature and humidity controlled grow rooms, no germs, no bugs, no pests, no dirt and no pesticides. We began designing suitable rooms and identifying the best equipment and processes.

While doing this research we were introduced to the appropriate staff members at Lincoln University. The



Stu Larsen from Lincoln University taking a sample to check the plant's pH levels.

University has controlled environment plant growth rooms. We went down to meet the team, to discuss whether they could help us with our research process. They were keen to help and the knowledge and experience in horticulture that they had was impressive (just not in the specific plants we were asking them to grow).

In October 2017 we received the necessary MOH licences so Lincoln University could grow cannabis plants on our behalf. This would provide us with raw material to do testing on, select the strain(s) and develop our manufacturing processes.

We then obtained MOH and Ministry of Primary Industries (MPI) licences to import suitable medical seeds from the Netherlands and organised the inspections that would be required as the plants grew. This was also a new challenging process because as far as we know, no-one had legally imported medical cannabis seeds before.

We sent down our cultivation equipment to Lincoln University and the first lot of seeds arrived at the University in April 2018. Craig, a plant inspector from MPI came in every few weeks to inspect the plants.



Daliya Cyriac from Lincoln University prepares to trim and manicure our first ever cannabis crop.

Stu Larsen and Daliya Cyriac at the University did a great job managing two full crops of cannabis plants for us. Team members from ZHM went down to help with and learn about seed treatment, cultivation, sampling and harvest. Our first plants were harvested in August 2018 and the second batch in October 2018.

Testing and inspections

Helen at the ESR performed all the cannabinoid level testing on the many samples from the plants as they grew at the University and later at our site. The ESR (the Institute of Environmental Science and Research) is New Zealand's Crown Research Institute and their extensive drug analytical services means we could test and then select the most suitable strains of plants.

The testing of the plants is a very important part of the process and we need to ensure that each plant has exactly the level of CBD and THC needed (for more information on why these levels are important refer to page 6).



A stereo microscope photo of a close up of the flower showing the trichomes (which contain the cannabinoids).

Our Research cultivation facility

While the cultivation was happening at the University we constructed our own research grow rooms to the same high standard as our existing clean rooms.

We followed industry and international best practice. It is important that the air is filtered and at the correct temperature/humidity. The water is pure and we don't use pesticides or anything else unnatural on the plants. The plants are fed with minerals and the nutrient formula is a lot like our CAA-Multi formula (but designed for plants) e.g. potassium, phosphorus, iron, zinc, magnesium, calcium, etc.



Control equipment that supplies liquid minerals to the plants.

We do not use soil but use blocks made from 100% natural chalk and rock, free from bugs and any contaminants.

For lighting we wanted to use the latest technology so we choose LED lights. These special lights allow us to programme in a cycle so we can replicate the sun as closely as possible.

With the temperature, humidity, lighting and nutrients all controlled to a preferred level, they are probably the most pampered plants in the country.

Abu, a MPI Technical supervisor comes and inspects our plants every few weeks. We cannot harvest the plants until a final check and sign off is given.



Our research and development grow rooms. Mother plants are on the left and drying cabinets on the right.

We planted our first crop in our grow rooms in February 2019 and our first harvest was three months later. We are now about to harvest crop number seven and are preparing to apply for a commercial cultivation licence.

As you can see we have taken our responsibility to provide top quality and safe medical cannabis very seriously.

Next catalogue we will cover our harvesting, drying, manufacturing and testing and also the construction of our commercial facility.



Our flowering room, plants stripped of leaves ready for harvest.



What is medical cannabis?

Firstly we want to make it clear that Health House does not support the commercialisation of recreational cannabis. We believe that cannabis should only be used as a medicine and that medicines should be prescribed by doctors. Patients need the support of health professionals when taking any medicine, especially when there are side effects to manage.

Using cannabis for recreational intoxication is technically overdosing on a medicine and this should not be encouraged. Medicines should be taken only as directed by a doctor/health professional.

Health House believes cannabis is a natural herbal product that will be beneficial for certain patients and certain conditions. There is a lot of good quality research that in our opinion prove this to an acceptable standard (refer Shaun Holt's book Medical Cannabis Book - A brief guide for New Zealanders, for more details).

The purpose of our medical cannabis research and development project has been to determine the best plant(s) for medical use only.

CBD good, THC bad? Not necessarily.

There is a lot of confusion about the types of cannabis and a lot of misinformation in the public area.

One of the biggest confusions is about two main active ingredients in cannabis, CBD (cannabidiol) and THC (tetrahydrocannabinol). You will hear that CBD is the "good medical ingredient" and THC is the "bad ingredient that gets you high". Many people are stating that we should just use CBD and avoid THC, then proceed to put CBD into every imaginable product for almost every condition.

Unfortunately this is both simplistic and incorrect. THC is a very important ingredient and CBD alone is generally not very effective and for many medical cannabis conditions CBD is not effective at all. Many studies have shown that patients would need many times the dose of CBD compared to a product that has both CBD and a small amount of THC. Many patients confirm that pure CBD does not give them the relief they seek.

Hemp and CBD

You may wonder why CBD is so prevalent overseas and promoted so heavily. This is mainly due to the law regarding the definition of hemp. Now hemp is just a form/type of cannabis, but it must legally have very low levels

of THC and has been more readily available (though still requiring a licence). CBD extracted from hemp is big business, but in our opinion this is not the best product. Although CBD can be extracted from hemp, it makes more sense to grow a high CBD cannabis plant that has a small amount of THC as well and extract the oil from that.

Figure one is a chart showing the differences between the various types of cannabis.

Cannabis and soil

Cannabis is very efficient at extracting minerals and metals from the soil as it grows. This can be beneficial when it extracts the good minerals and this is why hemp seeds are very nutritious. It is not so beneficial when the soil has a lot of heavy metals or pesticide residue. When CBD is extracted from hemp plants, the extraction process can increase the concentration of these negative elements, resulting in high levels of heavy metals and pesticides in the oil. In New Zealand it appears that it is not going to be legal to make a medicine from hemp, so this is a pleasing decision by the regulators.

Figure one - Varying types of cannabis

Type	Purpose	THC	CBD	Seeds*
Industrial hemp	Fibre	Below 0.5%	Below 2%	Some
Food grade hemp	Grain/Oil	Below 0.5%	Below 2%	Many
CBD cannabis	Medical	Below 2%	Med/High 5%-30%	None
Balanced cannabis	Medical	Med 5%-15%	Med 5%-15%	None
THC cannabis	Intoxication	High 15%-30%	Below 2%	None

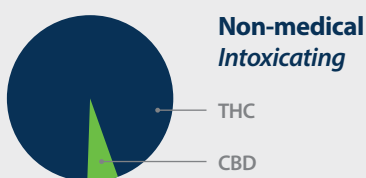
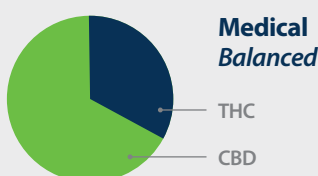
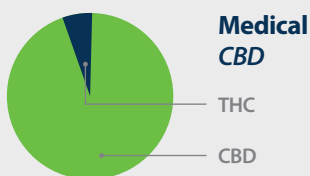
*Hemp is fertilised and produces seeds, while medical and recreational cannabis don't produce seeds.

Medical versus recreational cannabis

Many people claim that there is no difference between recreational/ intoxicating cannabis and medical cannabis. Respectfully I believe this is incorrect and that medical cannabis plants should have more CBD than THC. Illegal breeders have been growing plants that have a high level of THC with very low CBD. Naturally and historically it seems that cannabis plants would have balanced levels with slightly more CBD than THC.

The pie charts below show the differences between the main medical types of cannabis and the intoxicating type. These levels are based on our test results of actual plants we grew.

Note: we did not actually intend to grow the very high intoxicating THC plant. A strain that we were told would be balanced, turned out to not be balanced. This is why our research was important, it allowed us to identify strains that are appropriate for medical use and eliminate those that were not.



My research indicates that the cannabis plant naturally had a ratio of approx. 2 parts CBD to 1 part THC. The high CBD and high THC strains are the result of man's interference and cross breeding.



PLEASE NOTE :

Medical cannabis is a **PRESCRIPTION ONLY MEDICINE** and should be discussed with your doctor.

Please **DO NOT** ask us to supply you with cannabis as we cannot.

All media enquiries should be directed to **Dr Shaun Holt.**

Will medical cannabis get me intoxicated?

The most common concern with patients in respect of cannabis is "will it get me intoxicated?" The people we speak to who are interested in medical cannabis do not want this side effect. They want to be able to function normally while still getting relief from the various symptoms that they are considering taking cannabis for.

While the dosage of cannabis is variable depending on each person, with proper management avoiding intoxicating side effects should not be difficult.

The dosage of THC at which the medical benefits arise is low and the level at which negative side effects arise is quite high. We are going to conduct a small clinical trial with our cannabis to confirm

these exact levels, but overseas research indicates doses of 5-20 milligrams.

You can see from *figure two* that providing the dose is managed (by way of prescription), it is not difficult to avoid the negative side effects of intoxication.

The other beneficial part of medical cannabis is that the higher the CBD level, the less chance of the negative side effects. Of course everyone is different and the method a patient uses to take medical cannabis will influence this. Having a good quality clinical trial to determine the dose is very important.

In our next catalogue we will talk about the different methods of taking medical cannabis and how they affect the body differently. We will also talk about the non-intoxicating cannabis acids (THCa and CBDa) and the clinical trial.

Figure two - Dosing levels (milligrams of THC)

