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About the authors

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Credits

Clare Holt and Mike Coory for fact-checking and proof-reading

Chapter 1

The world's most controversial medicine

We are currently living in the golden age of advances in medical treatments. Many cancers can be cured, imaging techniques can see inside the body in extraordinary detail, and a disease such as smallpox, which had existed for 3000 years, has been eradicated. People are living longer and are healthier than ever before and we may soon have medicines that are tailored to a person's genetic makeup. Yet one of the important issues in medicine at the moment is whether doctors should be able to prescribe a plant – a plant which has already been used medically for at least 5000 years.

Not only is cannabis currently the most widely discussed and debated topic in medicine, it is also a hot topic in the business world. As more countries legalise the medical and social use of cannabis, thousands of companies have been formed in order to capitalise on this trend.

When Sir Richard Branson visited New Zealand in 2017, he urged New Zealand to become leaders in cannabis production. He said: 'You should legalise it, grow it, tax it, and regulate it ... Because of the number of dairy farms in New Zealand, they are damaging the rivers. If you could put some of that land over to growing cannabis it would be just as profitable, if not more profitable for [farmers].'

The New Zealand climate ensures cannabis can be grown almost anywhere. It can be sold for up to \$5000 a kilogram, as opposed to fruit which might sell for around five dollars a kilogram. Investors are looking at all things cannabis-related and it has been described as the biggest investment opportunity since the early days of the internet.

For many reasons, there has never been a medicinal product like cannabis. Potent natural products such as opiate drugs and even botox injections have previously been introduced into medicine and, as we will discuss in more detail, opiates can cause health problems when used recreationally for non-medical purposes, just as cannabis can. But for safety reasons, potent opiate medicines and botox injections are only available with a prescription from a doctor.

One of the main differences with cannabis is that the potential health risks are often nowhere near as severe as doctor-prescribed products.

How cannabis is unique as a potential mainstream medicinal product

Its use, both medically and socially, is a political issue

Few, if any other, medicines have their legality decided to a large extent by politicians rather than health authorities. In some countries it is a democratic voting issue. There will soon be a referendum on cannabis in New Zealand; at the time of writing this, the government has committed to a referendum with the next general election in 2020.

It is a new medicine prescribed by doctors, but it is already widely being used

Usually, a new medicine a doctor can prescribe has undergone extensive testing that can take 10 years or more and can cost over a billion dollars. In fact, most potential new medicines fail at some stage of their testing and never make it to a doctor's prescription pad. Cannabis is already widely used as a medicine by patients in many countries, including New Zealand.

It is a new medicine but has not been widely studied

Although doctors in many countries and in many states in the USA can prescribe cannabis products to patients, there has not been a lot of research conducted on cannabis. Some of the reasons for this will be discussed in chapters 5 and 7, and much of this book is devoted to describing the research that has so far taken place. But compared to the number of people using it, and the level of research that normally occurs before a new medicine is approved by regulatory bodies and prescribed by doctors, little quality research has been undertaken. However, there *is* evidence of its beneficial effects, from the millions of people around the world who are or have used it.

Governments are worried about legalisation

Usually, a new medicine is only approved for use when it has been shown to be safe and effective. Most new medicines are not able to be 'abused', for example, cause a 'high' if used by someone who is not the patient. Cannabis is different in both these respects: there have not been enough clinical studies showing safety and effectiveness, and it can be used, or abused, for its psychoactive effects. It is often compared to alcohol, which also has mild intoxicating effects. If alcohol were invented tomorrow, would it be illegal, given the harm it can cause in terms of health, deaths from drunk driving and so on? Despite much debate over whether alcohol or cannabis is more harmful, it is *not* disputed that cannabis can potentially cause harm when used for medical and/or social purposes.

Governments want the tax revenue

In places where cannabis has been legalised and can be bought over the counter, it is taxed like any other consumer product. This can be a boost to government coffers. Some people argue that this is why it should be legalised, so it can be regulated and taxed. In California, which has recently legalised cannabis, the state made \$60.9 million in

tax revenue from cannabis cultivation, excise and sales taxes, and still more from local tax revenue, in the first quarter of 2018. Within the states of America with legalised cannabis, approximately \$655 million in taxes on retail sales was collected in 2017 (more than from alcohol taxes); and it is forecast that tax revenues will reach \$1.8 billion per year.

It is a medicine that could boost the economy

Medicines are generally a drain on the economy. In New Zealand, new medicines are expensive and take up a large percentage of the health budget. However, in addition to potentially providing tax revenue, the cannabis industry could create a lot of jobs, particularly as New Zealand has such a great climate to grow cannabis. Jobs could be created directly with cannabis start-up companies and indirectly from the growth of support services such as laboratory testing. There are companies in New Zealand that have already formed and are getting ready to grow cannabis, based on the assumption it will soon be legalised, at least for medical purposes.

Legalisation would reduce law-enforcement costs, estimated to be over \$200 million in New Zealand in 2017 for cannabis-related offences. The global cannabis market is projected to be worth US\$87.8 billion by 2024, and some economists predict the New Zealand market itself could be over \$1 billion.

It is a medicine that doesn't need a pharmaceutical company

Cannabis can be grown at home with just some basic equipment. Pharmaceutical companies are already producing cannabis-based products and will develop more but, depending on if/how the law changes in New Zealand, patients may be able to obtain products made by non-traditional pharmaceutical companies and be able to grow cannabis themselves. This will appeal to many people. In the USA, recent surveys found that only one third of citizens have a positive opinion of big pharma and that no industry was held in lower esteem. This is not

helped by the fact that, again in the USA, pharmaceutical companies have been financing anti-cannabis efforts, for example, Purdue Pharma and Abbott Laboratories, both makers of opiate painkiller medicines, and among the largest contributors to the Anti-Drug Coalition of America, a body which opposes cannabis legalisation.

It is a medicine patients risk breaking the law in order to use

People who know cannabis is illegal, even for medical use, and yet use it, are breaking the law and risk being prosecuted, fined or jailed. The fact they are willing to potentially suffer these consequences shows they believe it is effective enough to take the risks. A similar situation was documented in the film *Dallas Buyers Club*, which tells the story of Ron Woodroof, an AIDS patient who smuggled unapproved pharmaceutical drugs into Texas for treating his symptoms and distributed them to fellow AIDS-sufferers, while facing opposition from the Food and Drug Administration (FDA).

It is a medicine that comes in many different forms

Sometimes a pharmaceutical medicine can be available in more than one format. Diclofenac sodium, a nonsteroidal anti-inflammatory drug, often under the brand name 'Voltaren', can be taken as a tablet, or applied as a cream on the skin. Cannabis takes this flexibility to a whole new level. The different formats will be discussed in chapter 4, but it can be taken as a pill, a spray into the mouth, eaten in cookies, drunk as a tea, and several other ways. The various delivery systems can be an advantage for people who are seriously unwell or may struggle to swallow tablets.

It is a medicine that is different every time you get it

With a pharmaceutical medicine, you can be sure that every dose is always the same. As would be hoped and expected, medicine manufacturers adhere to the highest manufacturing standards and

have incredibly robust quality-control systems in order to guarantee this. Even if a medicine is off-patent and you get a generic version, the amount of the active ingredient will be exactly what it says on the label.

Medicinal products from cannabis (unless they are extracts with just one or two chemicals in them) are highly variable. There are hundreds of different chemicals in cannabis and as it is a natural product, no batch is ever identical. Strains of cannabis plants have been described as being like denim brands ...we know what a pair of jeans looks like, but each is different to some degree. The exact levels of the components in cannabis products vary due to the environment in which they are grown and the genetic make-up of the plants.

It is a medicine that has passionate support and equally passionate opposition

Not many patients get so excited about their particular type of blood-pressure pill they form an advocacy group to promote it. No medicine has the intensity of opinion and debate as does the use of cannabis. Anti-cannabis groups include private sector organisations such as the American Anti-Drug Council and The Heritage Foundation, political parties including the Republican Party in USA, and a multitude of government organisations involved in drug policy and healthcare. There are probably even more organisations which promote cannabis, including the National Organization for the Reform of Marijuana Laws (NORML), the Society of Cannabis Clinicians and the American Civil Liberties Union.

The debates over cannabis use are both unique and fascinating. With a referendum on the issue occurring in New Zealand in 2020, it is important that voters know at least the basics about the use of cannabis, including a definition of the terms used, and what science is saying about the potential benefits and negative effects.

A lot of stories are already appearing in the media indicating the views

of advocates and opponents. Unfortunately, as often occurs when science and health topics are discussed in the media, some of the information is not quite accurate, is unbalanced, or simply incorrect. There are legal, ethical and societal implications associated with its use, but sensible discussions are not possible without a good understanding of what the product actually is and what is the current scientific knowledge of the risks and benefits.

This book has therefore been written as an unbiased, easy-to-read summary of the topic – Cannabis 101 – for both the general public and for health professionals, so we can all be better informed. It is not intended to be a book on policy or law, nor be a massive, encyclopedic tome. We seek to give this brief guide as an approachable overview.

To make it more accessible we haven't referenced the book (knowing you can google any topics or statements made in order to read and know more). And, more importantly, this book does not discuss the morality of using a substance that can potentially lead to intoxication. Nor does it offer an opinion on what government policy should be.

The aim is that having read this, you will be well placed to make your own informed opinion.