



The North American Cannabis Report™

SEPTEMBER 2019

About Prohibition Partners



Advancing the global cannabis industry.

Data, analytics and business intelligence on the international cannabis industry.

ABOUT US

Prohibition Partners was founded in 2017 with a mission to open up the international cannabis industry through reliable data and intelligence. Within two years, we have become the world's leading provider of market insights and strategic consultancy for this emerging frontier. We firmly believe that data, insights and education will unlock the societal and commercial potential of cannabis. Our research and content teams routinely share the latest legislative developments and key trends in the industry - information that is regularly cited by political leaders, investment banks and Fortune 500 companies. Our consultancy team works with investors, operators and regulators to identify and execute opportunities across multiple jurisdictions. We advise our private clients on licensing, regulatory and business opportunities.

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Bespoke Research, Polling, Consumer Insight, Pricing, Market Forecasting.

Intelligence

Policy & Compliance, Market Analysis, Supply / Demand.

Strategy

Market Entry / Expansion, Regulatory Guidance, Licensing, Partnerships, Business Development.

PROHIBITION PARTNERS TEAM:

Our consultancy team works with investors, operators and regulators to identify and execute opportunities across multiple jurisdictions. We advise our private clients on licensing, regulatory and business opportunities.



Daragh Anglim
Managing Director



Alexandra Curley
Head of Insights



David Attwood
Head of Consulting



Eoin Keenan
Head of Content

CONTACT DETAILS:

London

A: 33 Foley St, Fitzrovia, W1W 7TL,
London, United Kingdom
T:+44 203 928 2812

Barcelona

A: Carrer d'Estruc 9, 08002,
Barcelona, Spain
T:+34 936 818 019

Dublin

A: 22 Temple Lane South, Temple Bar,
Dublin, Ireland
T:+353 87 1200539

E: info@prohibitionpartners.com
TW: @prohibition_p

PARTNERSHIP OPPORTUNITIES



Prohibition Partners is the number one source for data and information on established and burgeoning cannabis markets. Read by over 150,000 global cannabis investors and entrepreneurs, and creating more than 6 million social impressions annually, Prohibition Partners produces thought-leading industry reports. If you would like to partner with us and support independent data and research please contact our sponsorship team on info@prohibitionpartners.com

This is a unique opportunity to promote your business to key players in the cannabis industry, particularly those who have a keen interest in the cannabis market. As companies and investors scramble to get a foothold in the market, this is an invaluable opportunity to put your brand front and centre in one of the industry's most influential reports.



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” The North American market is growing at an explosive rate, fuelled by progressive legislative changes, innovation and a burgeoning commercial market. We expect the total cannabis market to be worth US\$47.3 billion by 2024.

Daragh Anglim,
Managing Director
Prohibition Partners



INTRODUCTION

The North American Cannabis Report is a comprehensive analysis of the world's most mature cannabis market. Our research provides the data, insights and intelligence needed to navigate the regulatory landscape and understand the commercial opportunities in the region.

The North American market is growing at an explosive rate, fuelled by progressive legislative changes, innovation and a burgeoning commercial market. We expect the total cannabis market to be worth US\$47.3 billion by 2024. By then, we believe medicinal cannabis, as well as recreational cannabis, will be legal across the region, integrated across a number of industry verticals from pharma to food.

As the first G7 country to legalise both recreational and medical cannabis, the Canadian market is monitored worldwide by governments considering cannabis reform. Governmental delegates from Croatia, Ireland, the UK and Luxembourg have all visited the world's most mature cannabis market to understand the commercial, societal and political benefits of a legal cannabis market.

However, US market growth will greatly exceed their North American neighbours. Currently the most profitable cannabis industry in the world, the US is expected to enjoy triple-digit growth by 2024, despite not having legalised cannabis on a federal scale.

The North American cannabis market is also closely monitored by other consumer industries, as product innovation, such as edibles, beverages, tinctures or topicals, threatens to disrupt well-established sectors. This explains the high activity in acquisitions coming from the beauty, alcohol and tobacco industry.

The North American Cannabis Report is a unique deep dive into both the challenges and opportunities in this booming market – providing key data and qualitative analysis. Our reports are free to download, as we continue to drive forward the global cannabis industry. I hope you enjoy the report.



Daragh Anglim
Managing Director
Prohibition Partners

LEAD FOREWORD

The global cannabis landscape is rapidly changing. As countries around the world look to Canada to pave the way for legal medical- and recreational-use cannabis at the federal level, licensed producers across the country have a responsibility to set an example for the international stage. At Zenabis, we take this role seriously.

Zenabis is a *Health Canada* approved licensed producer of cannabis, headquartered in Vancouver, British Columbia. Zenabis has four licensed cultivation and extraction facilities coast to coast across Canada. We began as a medical cannabis company offering safe, third-party tested, high-quality cannabis products to Canadian patients across the country. Since the Government of Canada legalised recreational cannabis on 17 October 2018, Zenabis has launched two additional recreational use brands, Namaste and Blazery. Additional brands are being launched shortly. In the coming year we intend to add a number of brands and products to our portfolio in order to cater to the unique needs of each and every Canadian cannabis consumer.

To meet these supply demands, we are currently operating four licensed facilities located in Langley, British Columbia; Atholville, New Brunswick; Delta, British Columbia; and Stellarton, Nova Scotia. In addition, Zenabis has facilities in Pitt Meadows and Aldergrove, both located in British Columbia, as part of its propagation, floral and hemp cultiva-

tion business. With cannabis products listed across eight provinces and one territory in Canada, we are confident in our ability to deliver product as a result of our experienced and passionate team. Under the guidance of an exceptional leadership team with a combined 100+ years in agriculture, propagation, retail distribution, and infrastructure construction, Zenabis continues to grow at an exceptional pace.

Zenabis is achieving operational excellence, reaching milestones month after month, and exceeding our production and cultivation objectives. We have generated this result, in part, through our team's commitment to behaving in a manner consistent with the company's corporate values. These values include excellence, compliance, responsibility, and delivery of stakeholder value. Our team is committed to these values in everything that we do, and that is reflected in the industry-leading standards we put forth for not only our products and services, but for the cannabis industry as a whole. Key elements of our corporate social responsibility as a licensed producer include economic expansion and giving back to the communities in which we operate. In communities where our facilities are located, the company works hard to actively engage with local government, First Nations bands, healthcare practitioners, education providers, and scientific researchers to inform policymakers and educate the public on cannabis, medical or otherwise. Additionally, Zenabis is doing its part for the environment, having signifi-

cantly reduced packaging of its products and establishing a recycling programme for retail locations across Canada.

While our impact domestically has been and continues to be significant, including strategic partnerships with national Canadian pharmacies such as Shoppers Drug Mart and Pharmasave, Zenabis has always had its eye on expanding globally. Our company entered the European market in April of this year, signing an agreement with Farmako GmbH, a leading German pharmaceutical research company, with the explicit goal of being the gateway to Europe for medical cannabis. With an overall population of over 740 million, Europe is the largest medical cannabis market worldwide. With two of its biggest economies, Germany and the UK, recently passing legislation allowing for the prescription of medical cannabis, we are confident in the long-term strength of the market. As a result of the above, Zenabis has partnered with organisations in the UK such as the Conservative Drug Policy Reform Group (CDPRG) and the Centre for Medicinal Cannabis to work with policymakers and members of the industry in Europe. Our goal remains simple: to educate the general public on how the cannabis industry can have a significant impact in local communities not only in Canada, but beyond its borders.

Our aim, particularly in European countries where medical cannabis is legal, is to advocate for a fair, responsible, and evidence-based framework. Zenabis is also

a member of the Global Cannabis Partnership, an organisation made up of members of government, industry, and stakeholders who are dedicated to developing a global standard of social responsibility for the cannabis industry. Despite being a relatively new entrant in the cannabis market, Zenabis has quickly positioned itself to guide the Canadian and global cannabis industry. This can be attributed to our team's adherence to our corporate values, the company's strategic partnerships, and the leadership team's many years of experience in cultivation, finance, research, and business.

These pillars are essential to building a cannabis company that succeeds not only on the domestic front but also internationally. With all eyes on us, we hope to lead the way for the global cannabis industry by setting a formidable example marked by, above all, high-quality cannabis products and procedures that we stand behind.

**Andrew Grieve,
CEO,
Zenabis Global Inc.**

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GROWING BY LEAPS AND BOUNDS.

With an anticipated 3.5 million square feet of available production space, upon full build-out and optimization of its multiple facilities throughout Canada, Zenabis is quickly becoming one of the largest licensed producers of medicinal and recreational cannabis in the world.

To find out more, visit us at
zenabis.com

 @Zenabismmj  @Zenabis  @Zenabis  /Zenabis

TSX: ZENA

The global cannabis landscape is rapidly changing. As countries around the world look to Canada to pave the way for legal medical- and recreational-use cannabis at the federal level, licensed producers across the country have a responsibility to set an example for the international stage.

Andrew Grieve,
CEO,
Zenabis

EXECUTIVE SUMMARY

The first G7 country to legalise the recreational use of cannabis was Canada, on 17 October 2018. By mid-2019, 11 US states and Washington DC had legalised recreational as well as medicinal cannabis, with another 33 states allowing the use of cannabis for medical reasons.

This regulatory shift has come on the back of pressure to quell the illicit drug trade, improve public safety and develop a profitable legal cannabis sector. The need to reduce Americans' huge healthcare spending is also a factor. Over 40% (133 million) of Americans suffer from at least one chronic disease, and this statistic is increasing. Cannabis offers cheaper alternatives to prescription medication and a less addictive alternative to opioids, which is being utilised across the healthcare system in both Canada and the US.

The passing of the US Farm Bill in December 2018 was pivotal to industry change and a catalyst to huge industrial growth. The bill amended the term 'marihuana' (a term found in the 1972 Controlled Substances Act) to exempt hemp, which is defined as a cannabis sativa plant that contains less than 0.3% tetrahydrocannabinol (THC).

Reform across the hemp and cannabis sectors has offered numerous opportunities to companies in multiple consumer sectors. As western countries experience a long-term decline in smoking and stagnation in alcohol consumption, big tobacco and drinks businesses

are looking to boost growth by investing in the sector as exemplified by deals from Constellation Brands and Altria

Across the Northern border, Canada is looking to cement its position as the global industry leader. In December 2018, draft regulations for edible cannabis, cannabis extracts and cannabis topicals were tabled in Canada. Regulations covering the production and sale of cannabis topicals and their legal sale are anticipated by 17 October 2019, thereby opening up entirely new segments for product and brand development.

Over time, the US will likely challenge Canada's leadership. Industry observers are vociferous about the huge potential that legalisation of recreational use in New York would have on the market. In 2018, Andrew Cuomo, the Governor of New York State, proposed the Marihuana Regulation and Taxation Act (MRTA), which would have legalised cannabis for adults (over 21) in New York. A vote on the bill took place in June 2019, but was not passed.

The North American market plays a significant role in the wider industry. From an international perspective, the regulatory frameworks across Europe mirror the patchwork of legislation across the US. Meanwhile, countries considering reform will look to understand the learnings from Canada's blueprint. As the industry continues to develop, Europe, and indeed the international market, will continue to monitor developments in North America closely.

INSIGHTS

- 1** Developments in the political and regulatory fields, which are bringing wider and more permissive legislation to states as politically diverse as New York and Utah, and as geographically separate as New Mexico and New Jersey, offer the cannabis industry more potential for growth in the CBD sub-sector.
- 2** The arrival of big-name brands and celebrity endorsements is helping drive the US cannabis industry and is lifting it out of the back rooms to centre stage.
- 3** Against the backdrop of a long-term decline in smoking and stagnation in alcohol consumption, alliance activity and deals by global alcohol and tobacco giants seeking to exploit the North American cannabis sector are likely to persist.
- 4** The beauty market is seeing strong activity with a growing number of high-end retailers adding cannabis products to their stock.
- 5** Cannabis edibles are currently not legal across all of North America but this is expected to shift in October 2019 for all of Canada, thus signifying a further expansion of this industry.

METHODOLOGY

(Further notes on methodology on page 116)

The market sizing contained within this report assumes that by 2023 all countries profiled will have legalised medical cannabis and will have regulated recreational use. It is our view that Moore's law is at play within the global cannabis industry; momentum is building pace and is hitting a critical mass. We anticipate that medical cannabis consumption (as a percentage of the population) will increase faster than seen in early-adopter nations and states.

Market size and segmentation have been calculated following extensive analysis of the dynamics and performance of fully regulated cannabis markets, including those of Uruguay, Canada and the legalised states within the US.

Quantitative analysis of socio-economic data, consumption trends, cannabis requirements and pricing have been informed by a wide range of reputable datasets including, but not limited to, the *United Nations Office for Drug Control (UNODC)*, the *World Bank*, the *Organisation for Economic Co-operation and Development (OECD)* and the *International Narcotics Control Board (INCB)*.

Qualitative intelligence has been gathered through published reports and papers from the world of academia, business and medicine, and draws on a range of research techniques including digital tracking, discourse analysis and in-depth interviews and verification with our international network of industry experts.

The 'Commercial Opportunities' section of each country profiled represents our best estimate of market size, segmentation and future performance. However, market size, segmentation and performance, as well as cannabis prevalence and consumption volume, may change as more data becomes available.

MEDICINAL

The medicinal market-size estimates and forecasts contained within this report include both medical and pharmaceutical products. They represent a calculation of average price per gram of cannabis multiplied by the expected usage, multiplied by the estimated potential patient population. Price per gram of medicinal cannabis differs to street value prices, and the price per gram has been modelled based on post-legalisation pricing trends from a number of markets. This has been factored into the market-size calculations with price modelling incorporated into the year-on-year forecasts.

Patient numbers have been modelled on existing markets where medicinal cannabis has already been legalised and regulated. It is not calculated as the sum of patients who suffer from qualifying conditions, primarily because patients may suffer from multiple qualifying conditions for which cannabis can be prescribed. Value forecasts can include pharmaceutical and CBD medical products.

RECREATIONAL

Our recreational cannabis market sizes include the black market. Taking the *UNODC* prevalence figures as a starting point, this has been multiplied by average annual consumption and average prices for cannabis (herb). The growth rate has been modelled on trends seen around the world, and pricing trends have been informed by research published in more mature markets on the impact of legalisation and regulation on the average cost per gram on the black market. We have assumed that the price per gram of cannabis will either be the same or lower than the most recently available pricing data.

MARKET VALUE

For the purposes of this report, medicinal market sizes include pharmaceutical cannabis and medical cannabis that are sold as flowers, oils, topicals, etc.

LEGALITY

Industry tracking has proven to us that a simple legal vs illegal classification of cannabis is inadequate, and at times misleading. For this reason, we have introduced a scale of legality for each country profiled, which is defined as follows:

ILLEGAL

ILLEGAL

ILLEGAL, BUT DECRIMINALISED

ILLEGAL TO CONSUME, BUT LEGAL TO CULTIVATE (WITH LICENCE)

LEGAL

TECHNICALLY LEGAL, BUT NOT LEGALLY AVAILABLE

LEGAL, BUT NO FORMAL ACCESS PROGRAMME

LEGAL, WITH AN ESTABLISHED FORMAL ACCESS PROGRAMME

DEFINITIONS

MEDICINAL CANNABIS

Medicinal cannabis refers to both medical and pharmaceutical cannabis products. Please see definitions below for more detail.

MEDICAL CANNABIS

Medical cannabis refers to plant-based or plant-derived cannabis products prescribed by a medical practitioner for the treatment of a specific condition or disease (e.g. epilepsy, pain, multiple sclerosis (MS)). Medical cannabis uses the whole unprocessed plant, the processed plant or the chemicals contained within it. It can include high-CBD and low-THC products, though CBD products may also appear as consumer goods. Medical cannabis products are currently prepared as plant materials, oils, tinctures, edibles or capsules.

PHARMACEUTICAL CANNABIS

For the purposes of this report, pharmaceutical cannabis refers to products formulated using pure cannabinoids (either plant-extracted or synthetic) that have been through full clinical trials and licensed as a medicine. Examples of products include Sativex, Epidiolex, Cesamet, Marinol and Syndros.

RECREATIONAL CANNABIS

Recreational cannabis refers to any cannabis used for non-medical purposes, and this category includes black market products. It ordinarily has a higher concentration of THC, the psychoactive and intoxicating compound of the cannabis plant, and is illegal in many countries and states. People tend to smoke (or consume via edibles) recreational cannabis, or use oils and vaporised products. For the purposes of this report, usage is assumed to be by people aged 15+.

CBD

Throughout this report, reference is made to CBD. Whilst there is an emergent market for CBD-infused consumer goods, capsules and oils, these have been excluded from the market-size calculations due to a lack of sales data. Although these products may be used for wellness purposes such as aiding sleep, or for pain or anxiety management, they do not require a prescription and have therefore been excluded from the medical market sizing.



Positioned to become a leading global cannabis retailer

Fire & Flower is a purpose-built, independent cannabis retailer launched in Canada with its sights set on global expansion as legal cannabis markets emerge. The Company guides consumers through the complex world of cannabis with a best-in-class retail experience using the proprietary Hifyre™ digital platform.



Key Facts & Accomplishments

- Strategic investment with Alimentation Couche-Tard (TSX: ATD.A ATD.B) of \$380MM of growth capital for global expansion, if fully exercised
- Owns or has interest in branded stores across Alberta, Saskatchewan, Manitoba, Ontario & Yukon Territory
- Hifyre™ digital retail platform launched and generating independent revenue stream
- Strong corporate governance through an experienced Board of Directors
- Experienced leadership team with proven retail and cannabis industry experience

Listed on the
TSX: FAF

fireandflower.com

As Featured In



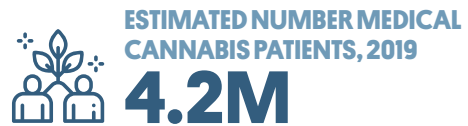
MARKET OVERVIEW

WHAT YOU NEED TO KNOW

- 1 Canada fully legalised recreational cannabis in October 2018;**
- 2 The US legalised hemp cultivation in December 2018;**
- 3 Consumer product industries, including beauty, food and drink, are increasingly disrupted by cannabis-based products.**



KEY STATISTICS FOR THE NORTH AMERICAN CANNABIS INDUSTRY



*Estimate based on most recent expenditure as % of GDP

**Includes illegal users

***Estimates assume that by 2024 all states in the US will have legalised medicinal cannabis and regulated recreational use.

Source: World Bank/ UNODC/ Prohibition Partners

REGULATION, COMPLIANCE AND LEGISLATION

Canada

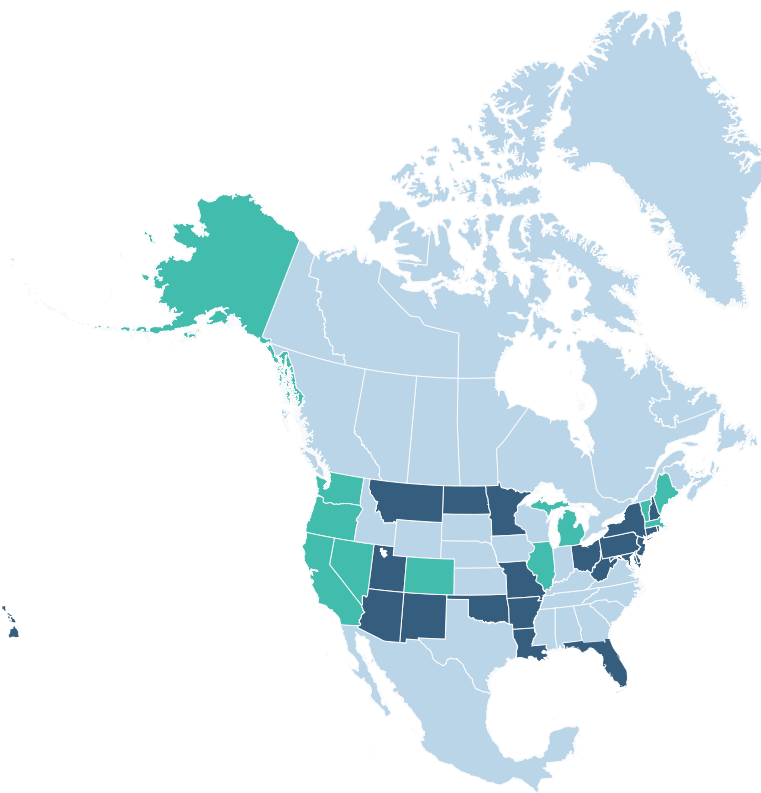
Health Canada first established regulations on access to cannabis for medical purposes in 2001. This regulatory framework underwent further change in 2014 and 2016. In April 2017, the Government of Canada tabled legislation in the House of Commons to

legalise and regulate access to cannabis for non-medical purposes.

On 17 October 2018, Canada became the world's first major/G7 country to fully legalise the recreational use of cannabis.

USA

Legal status by US states:



◆ MEDICAL AND RECREATIONAL CANNABIS LEGALISED

Alaska, California, Colorado, Illinois, Maine, Massachusetts, Michigan, Nevada, Oregon, Vermont, Washington, Washington DC

◆ MEDICAL CANNABIS LEGALISED

Arizona, Arkansas, Connecticut, Delaware, Florida, Hawaii, Louisiana, Maryland, Minnesota, Missouri, Montana, New Hampshire, New Jersey, New Mexico, New York, North Dakota, Ohio, Oklahoma, Pennsylvania, Rhode Island, Utah, West Virginia.

The regulatory shift has come on the back of pressure to offer consumers alternatives to prescription medication.

CBD

Cannabis is federally classified as a Schedule I narcotic, and hemp (cannabis' low-THC, high-CBD cousin) is still relatively new in its legal status. CBD has existed for quite some time in a legally grey area, and, as such, it has retained its underground status, based on word-of-mouth 'marketing'. However, this is changing and a new industry is growing, virtually out of nowhere. Pivotal to industry change was the passing of the *2018 Farm Bill* in December 2018.

Taxation

The passing of the bill has opened up a huge new industry to producers across the country. The huge attraction of millions of dollars to be gained in annual tax from cannabis sales is also a factor to be taken into consideration. Industry observers anticipate that by simply allowing adults aged over 21 to purchase cannabis, New York alone could see multi-billion-dollar sales by 2024, bringing with it a considerable tax income.

Forthcoming legislation

In December 2018, *Health Canada* published draft regulations for edible cannabis, cannabis extracts and cannabis topicals, which cover the production and sale of cannabis topicals and their legal sale in Canada. It is anticipated that the regulations will become law by 17 October 2019, with products hitting shelves in December, which will lead to the opening up of added areas for product and brand development. In a move that sees the state stick closely to FDA guidelines, in August 2019, Washington State Department of Agriculture clarified that food and beverages containing CBD (including hemp-derived CBD) are not permitted under federal or state law.

Across the US, the legalisation goalposts are shifting with the decriminalisation of cannabis at one end of the scale (Maryland, Indiana), through to increasing tolerance of medicinal cannabis (Tennessee), legalising medicinal cannabis (Kentucky, the US Virgin Islands) right through to the proposed legalisation of recreational cannabis (Minnesota, New Jersey).

CORPORATE ACTIVITY

Key developments

Inter-state expansion in the US is in evidence. In December 2018, LA-based MedMen acquired Chicago-based PharmaCann, resulting in combined company New MedMen, which comprises a portfolio of cannabis licences in 12 states, permitting the new venture to operate 79 cannabis facilities.

Growing numbers of companies display a seed-to-sale focus. Vertical integration has been a key focus for companies looking to grow both in North America and into overseas markets as more countries liberalise their cannabis laws. Cronos Group is an example of a company seeking to access an entire supply chain, in order to operate on a global scale through its international production and distribution across five continents.

Canadian cannabis producers, including Tilray, Inc. and Canopy Growth Corp., are a growing presence listed on US stock exchanges in a bid to raise capital to fund expansion.

Number of publicly listed cannabis companies by exchange and top five companies per exchange by market cap

CANADIAN SECURITIES EXCHANGE (CSE)	NEW YORK STOCK EXCHANGE (NYSE)	TORONTO STOCK EXCHANGE (TSX)	NASDAQ
156 LISTED COMPANIES	9 LISTED COMPANIES	22 LISTED COMPANIES	15 LISTED COMPANIES
Curaleaf	Canopy Growth	Canopy Growth	GW Pharmaceuticals
Green Thumb Industries	Aurora Cannabis	Aurora Cannabis	Cronos Group
Cresco Labs	The Scotts Miracle-Gro Company	Cronos Group	Tilray
Acreage Holdings	Aphria	Aphria	Arena Pharmaceuticals
Harvest Health & Recreation	Hexo Corp	Hexo Corp	Cara Therapeutics

Source: Prohibition Partners/Nasdaq/CSE/TSX/NYSE



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INDUSTRY EXPERT INTERVIEW



Trevor Fencott

*Chief Executive Officer,
Fire & Flower*

Who are Fire & Flower?

Fire & Flower is a pure-play, independent and purpose-built cannabis retailer in Canada. We currently have 27 stores open across the Canadian provinces of Alberta, Saskatchewan, and Ontario and are pursuing licensing opportunities in other Canadian provinces where private retail is allowed including British Columbia, Manitoba, and the Yukon territory.

What makes us unique is that we are not focused on a legacy business and we are not channel-conflicted like many other players in the space. Because we started this business from scratch we looked at best-of-breed retailers out there to find the gold standard. These next generation retailers aren't simply buying and selling products – they make extensive use of technology to deliver better service to their customers and to help their vendors make products for their customers. Early on, we acquired a digital product and analytics company called Hifyre™ which has built a leading cannabis data platform that connects consumers with cannabis products and helps us better understand consumer purchasing behaviors.

What separates us is our use of data to understand customers insights in bricks-and-mortar and online retail. Our sights are also set on global expansion as cannabis is federally legalised in countries around the world.

Digital and analytics products are becoming an integral part of the industry. You mentioned your digital retail platform, what is this and how does it contribute to your operations?

We describe ourselves as a retail 2.0 company and treat our stores as a product lab to help producers test and refine cannabis products with consumers. The Hifyre™ platform powers all of our company's operations from our e-commerce online sales to our Fastline pickup service and our customer engagement and loyalty program.

Within the platform, we also have a service called Active Data™ that streams in real-time point of sale data and triangulates that data with other demographic and psychographic data points to get an accurate picture of our cannabis consumers. We deliver this product in real time to subscribers across a variety of industries and use this data to help us better understand the preferences of our customers and refine our product selection.

In the future, we will be able to use the Active Data™ program to demand forecast and use predictive artificial intelligence to equip us to make the best business decisions that align with the demands of our customers.

We view the Hifyre™ platform as a significant opportunity in entering international markets to help understand the unique consumer preferences in those markets as they emerge.

Cannabis companies has seen a wave of investment from more traditional operators including the CPG, tobacco & beverage industries. Alimentation Couche-Tard announced a strategic investment in Fire & Flower earlier this summer, what does this mean for the company?

Alimentation Couche-Tard is one of the largest retailers in the world that operates more than 16,000 convenience stores under the Circle K, Couche-Tard and Ingo brands. This is an absolutely transformative transaction and a huge vote of confidence in Fire & Flower. Under this strategic investment Couche-Tard would invest a minimum of CAD\$380 million of growth capital for global expansion and would take a controlling interest in the Company, if fully exercised.

We will work alongside our partners at Couche-Tard to focus on international expansion as global markets emerge. Couche-Tard will rely on our expertise as pure-play cannabis retailers and our Company will benefit from the extensive experience of Couche-Tard in growing a global retail brand.

On some time horizon, we believe that cannabis will become a regulated, convenience product and our partnership with Couche-Tard will enable us to deliver on these consumer needs in a way that no other existing cannabis retailer can.

We have had many offers for strategic partners. We felt that Couche-Tard was the right partner and a path to controlling interest was important because we wanted a partner who was fully invested in our shared success.

What does the next 12-24 months look like for the cannabis industry and how will Fire & Flower be part of this?

We believe the next 12-24 months will be an enormous growth opportunity in the retail channel, both in Canada and internationally as countries look to federal legalisation. We are already seeing an oversupply of product in Canada, which should allow us to enjoy increasing margin.

We are also very excited for the next wave of products including concentrate vaporisers, beverages and edibles. We believe these new and innovative products will bring new consumers to the category and built upon the already diverse demographics that are represented by Fire & Flower customers.

We will continue to build stores throughout Canada with our target of 45 open by the end of 2019 and will continue on our path to becoming the leading Canadian cannabis retailer with our sights set on global expansion.

MARKET SIZE

- 1 **The North American cannabis market will be dominated by the US, accounting for some 85% of total sales in 2019.**
- 2 **Medicinal cannabis will dominate value sales in 2019, accounting for around 60% of the total estimated value.**
- 3 **If cannabis is legalised in all states of the US by 2024, the total value for cannabis could be approaching the US\$50 billion mark.**

Estimated value of North American legal cannabis market, by segment, 2019–24

	CANADA	AMERICA	TOTAL
MEDICINAL 2019 (EST.)	US\$0.9b	US\$9.7b	US\$10.6b
RECREATIONAL 2019 (EST.)	US\$1.6b	US\$4.8b	US\$6.5b*
TOTAL 2019 (EST.)	US\$2.6b*	US\$14.5b	US\$17.1b
MEDICINAL 2024 (EST.)	US\$1.1b	US\$24.1b	US\$25.2b
RECREATIONAL 2024 (EST.)	US\$2.3b	US\$19.8b	US\$22.1b
TOTAL 2024 (EST.)	US\$3.4b	US\$43.9b	US\$47.3b
% CHANGE 2019–24	+33	+202	+177

*May not sum due to rounding

Source: Prohibition Partners

MEDICINAL

Prohibition Partners estimates that the North American medicinal cannabis market will be worth some US\$25.2 billion by 2024, assuming that legalisation happens in all US states within this time frame.

The US is the world's largest cannabis market despite not having legalised cannabis at the federal level. Industry observers highlight a dramatic transformation of the legal cannabis industry since 2013 when the US market was 'medical-only'. In 2019, legal cannabis in the US generated approximately US\$9.7 billion in sales.

Ongoing legalisation efforts on a state-by-state basis are driving the market forward: at the time of writing this report, 33 states and Washington DC had approved the medical use of cannabis. Several crucial factors are driving the growth of the medical cannabis market, including growing recognition of the medical benefits of cannabis and increasing consumer demand for cannabis in disease management and treatment.

In 2001, *Health Canada* granted access to cannabis for medical purposes to Canadians under the *Marihuana Medical Access Regulations (MMAR)*. Consumption of cannabis for prescribed medical purposes has grown substantially in recent years and continues to rise: the number of patients prescribed cannabis between April and September 2018 rose by over 11% to reach over 342,000.

RECREATIONAL

The key market driver is the explosive growth and breadth of the recreational market.

The number of states in which recreational cannabis has been legalised has reached double digits, and it is estimated (2017 survey by *Yahoo News* and Marist College) that more than 50% of American adults have tried cannabis (at least once in their lives) and 22% (around 55 million) currently use it ('current use' defined as having used cannabis at least once or twice in the past year). Following the Canadian government's tabling of legislation in April 2017 to legalise, regulate and restrict access to cannabis for non-medical purposes, the *Cannabis Act* came into force in Canada on 17 October 2018, which put in place a new, strict framework for controlling the production, distribution, sale and possession of cannabis.

Nearly half of Canadians who reported using cannabis (to *Statistics Canada*; 2018) said they did so for non-medical reasons, while one-quarter said they used it for medicinal purposes. Spending on recreational products exceeds per capita spend on medical usage by a considerable margin.

PRICING TRENDS

In 2018, the price of cannabis remained very stable in the US (and Canada), continuing the trend of recent years. However, dispensaries' sales data suggests that in 2018 cannabis cost around US\$11.4 compared with US\$8 per gram in Canada.

The main reason cited for cannabis being so much cheaper in Canada is the much longer history of legalisation in Canada and, therefore, the presence of a greater number of legal cannabis growers and sellers. As a result of the supply being high, prices decrease. It costs much more to buy cannabis in San Francisco, mirroring the generally high cost of living in the area. In San Francisco, cannabis is 12% more expensive than in Seattle and 20% more expensive than in Los Angeles. Further restrictions on inter-state trade in cannabis create micro-economic conditions and a lack of market uniformity in the US in comparison to Canada, where federal legislation and larger distributors maintain prices.

As supply increases on the back of a surge in activity pursuant to the *Farm Bill*, and as corporate activity proliferates in every way (growers, suppliers, retailers), the price could begin to drop in the US, although it is predicted that prices could rise in the short term as demand exceeds supply. With legalisation comes increased regulation and this often results in higher costs in the form of higher taxes and regulatory costs. As such, the

legalisation of cannabis is proving to be a double-edged sword for cannabis start-ups as higher taxes and other regulatory costs offset soaring sales. Figures released by *Statistics Canada*, the national statistics office that gathers data on the Canadian economy, society and the environment, reveal that the differential between producer and consumer cannabis price favours the consumer.

As usual in a consumer economy, the more supply there is, the less cost to the consumer. Suppliers continue to face an uphill struggle and producer prices have been falling steadily since 2015 as more companies come to the market, with producer price in 2018 down over 10% from 2015. The downturn has been even steeper in certain segments: the licensed cannabis producer Aurora Cannabis Inc. cited a 21% drop in the average net selling price of dried cannabis.

Statistics Canada reported that the average price of a legal gram of medical cannabis in Q4 of 2018 was CA\$9.70, compared with the black-market price of CA\$6.51. This highlights the continuing attraction of a black market.



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Prohibition Partners estimates that the North American medicinal cannabis market will be worth some **US\$25.2 billion by 2024, assuming that legalisation happens in all US states within this time frame.**





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LEGISLATION AND REGULATION

North America is still very much a developing market, as legacy operators from the decades-old black market and the younger medical grey market transition into the newly regulated system.

Both the US and Canada are a patchwork of regulations and rules. Local jurisdictions can often choose to implement their own regulatory schemes on top of state rules.

STATE LEVEL REGULATIONS

Whilst California has legalised recreational usage at state level, not all jurisdictions allow cannabis sales. Only 161 of California's 482 municipalities and 24 of the 58 counties have opted to allow commercial cannabis activity of any sort.

Washington DC does not resemble any other legalised cannabis market in that legalisation does not extend to users purchasing cannabis in a standard buyer-seller manner. Instead, it allows users to buy another item or service and then receive a 'free' cannabis product, which is nominally 'gifted' by the vendor. This very grey area has created a unique cannabis 'ecosystem' of 'ganjapreneurs' in the city. From confused tourists to risk-taking vendors, arrests are still a possibility for those caught on the wrong side of laws that are difficult to navigate.

As witnessed with alcohol, conflicting adult-use laws have led to businesses moving to neighbouring states. The same is true of cannabis and this is fuelling momentum in legalisation as state regulators see the disadvantages of their residents heading off to neighbouring states, e.g. for a reduction in tax revenues.

CROSS-BORDER TRADE

Achieving approval for regulations that govern forthcoming medical and recreational adult-use cannabis is time consuming, and lawmakers' decisions often take up to 18 months to enact, thus availability is often severely delayed.

Out-of-state companies in the US and Canada are locked in a frenzied tussle for cross-border access and are rushing to joint venture deals as a means of staking stronger cross-border claims.

TIERS OF REFORM

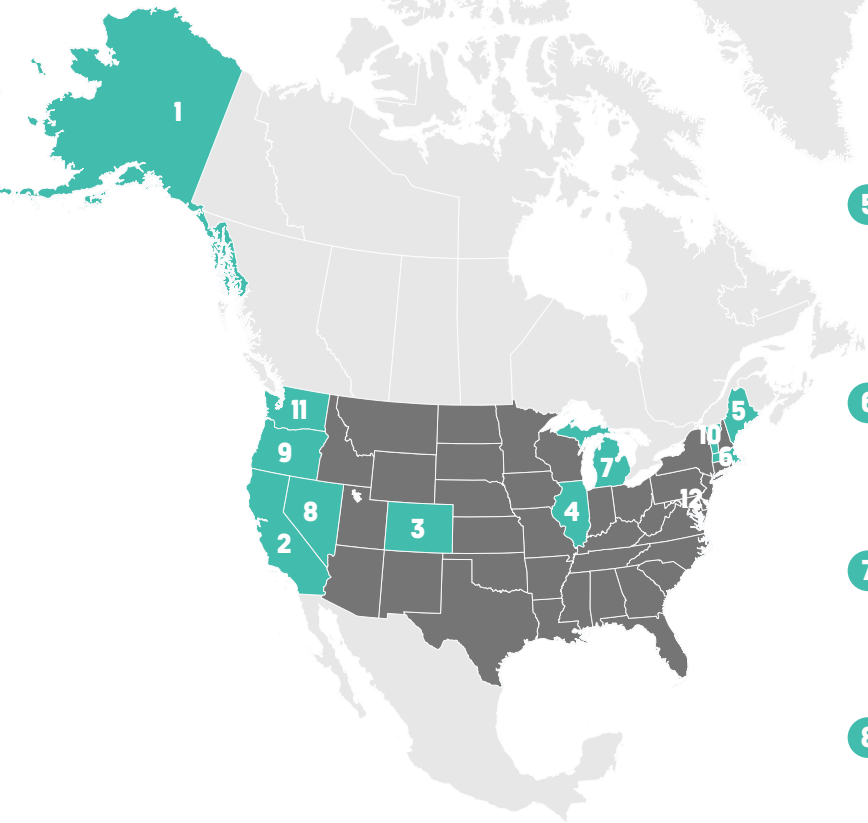
For the purposes of this report, we have categorised the three tiers of reform as follows:

Tier 1 – Leading the way

Countries, states and territories that fall into Tier 1 are spearheading growth in the cannabis industry. They have moved forward with significant changes to the laws and policies on medical and/or recreational cannabis.

Source: Prohibition Partners

11 US States and Washington DC have legalised recreational cannabis



1 ALASKA

- Legal for adults 21 and over to possess up to 1 ounce of cannabis
- Legal to grow up to 6 cannabis plants per household

2 CALIFORNIA

- Legal for adults 21 and over to possess up to 1 ounce
- legal to grow up to 6 plants per household

3 COLORADO

- Legal for adults 21 and over to possess up to 1 ounce
- Legal to grow up to 6 plants per household

4 ILLINOIS

- Legal for adults 21 and over to possess up to 1 ounce of cannabis flower and 0.2 ounces of cannabis concentrate. For cannabis-infused products, the limit is 500 milligrams of THC.
- Medical patients are allowed to grow 5 plants at a time. Non-patients are not allowed to grow at home.

5 MAINE

- Legal for adults 21 and over to possess up to 2.5 ounces
- Legal to grow up to 3 flowering plants per household

6 MASSACHUSETTS

- Legal for adults 21 and over to possess up to 1 ounce
- Legal to grow up to 6 plants per household

7 MICHIGAN

- Legal for adults 21 and over to possess up to 2.5 ounces
- Legal to grow up to 12 plants per household

8 NEVADA

- Legal for adults 21 and over to possess up to 1 ounce
- Legal to grow up to 6 plants per household

9 OREGON

- Legal for adults 21 and over to possess up to 1 ounce on their person and up to 8 ounces at home
- Legal to grow up to 4 plants per person

10 VERMONT

- Legal for adults 21 and over to possess up to 1 ounce
- Legal to grow up to 6 plants per household

11 WASHINGTON

- Legal for adults 21 and over to possess up to 1 ounce
- Illegal to grow plants

12 WASHINGTON DC/ DISTRICT OF COLUMBIA

- Legalised cannabis for recreational use for adults (21+) in 2014
- Legal for adults 21 and over to possess up to 2 ounces

33 US States have legalised medical cannabis

LEGAL SINCE	STATE
1996	» California
1998	» Alaska, Oregon, Washington
1999	» Maine
2000	» Colorado, Hawaii, Nevada
2004	» Montana, Vermont
2006	» Rhode Island
2007	» New Mexico
2008	» Michigan
2010	» Arizona, New Jersey
2011	» Delaware
2012	» Connecticut, Massachusetts
2013	» Illinois, New Hampshire
2014	» Maryland, Minnesota, New York
2016	» Arkansas, Florida, Louisiana, North Dakota, Ohio, Pennsylvania
2017	» West Virginia
2018	» Missouri, Oklahoma, Utah

In 2001, *Health Canada* first established regulations on access to cannabis for medical purposes. Influenced by public opinion, which favoured legalisation for recreational use, the Government of Canada announced in 2015 that it was working on regulatory change. In April 2016 it confirmed its intention to proceed with legalisation, and a year later discussions started in the House of Commons regarding

the legalisation of and regulations concerning access to cannabis for non-medical purposes.

Canada fully legalised the recreational use of cannabis on 17 October 2018.

Tier 2 – Poised to move

Tier 2 countries, states and territories have active ongoing reviews of medical and/or recreational cannabis laws and regulations. They are likely to embark on liberalisation within the short term.

There are moves afoot across the US to move the legalisation goalposts, but how far they have moved and how far they are likely to move varies from state to state. Political persuasion is less a factor than it was, as both Democrats and Republicans are voicing calls for regulatory developments and wider legalisation.

Conflicting adult-use laws are increasingly becoming more of an issue. Vermont has legalised possession but not sales. Despite the Senate repeatedly passing legislation to establish state-regulated retail cannabis, it has been blocked by the Vermont House. However, the 2018 elections resulted in more members known for their positive view of legalisation and regulation: licences for growers are likely to be in place by December 2020 and the market open for retail business by April 2021.

In November 2018, New Mexico elected governor Michelle Lujan Grisham, who is in favour of legalising cannabis as a way of boosting New Mexico's economy.

It is widely regarded as inevitable that Arizona is going to legalise recreational cannabis. To a great extent this is deemed to be the result of its westerly neighbour, California, having legalised recreational cannabis.

Newly inaugurated Connecticut governor Ned Lamont has said that legalising cannabis in his state will be among his 'priorities'. Previous recreational cannabis bills have failed, but, with a bigger Democratic majority and legal sales in neighbouring Massachusetts, this may change. In January 2019, more than 40 House Democrats agreed to a bill for state-wide cannabis legalisation, allowing medical dispensaries in Connecticut to commence cannabis sales to customers aged over 21. These medical cannabis dispensaries would be the first to be given licences to sell recreational cannabis.

Bowing to pressure from nearby states (Maine, Massachusetts and Vermont) that have already legalised cannabis, Rhode Island governor Gina Raimondo has shifted her long-standing position of reluctance to a proposition that the state ends cannabis prohibition.

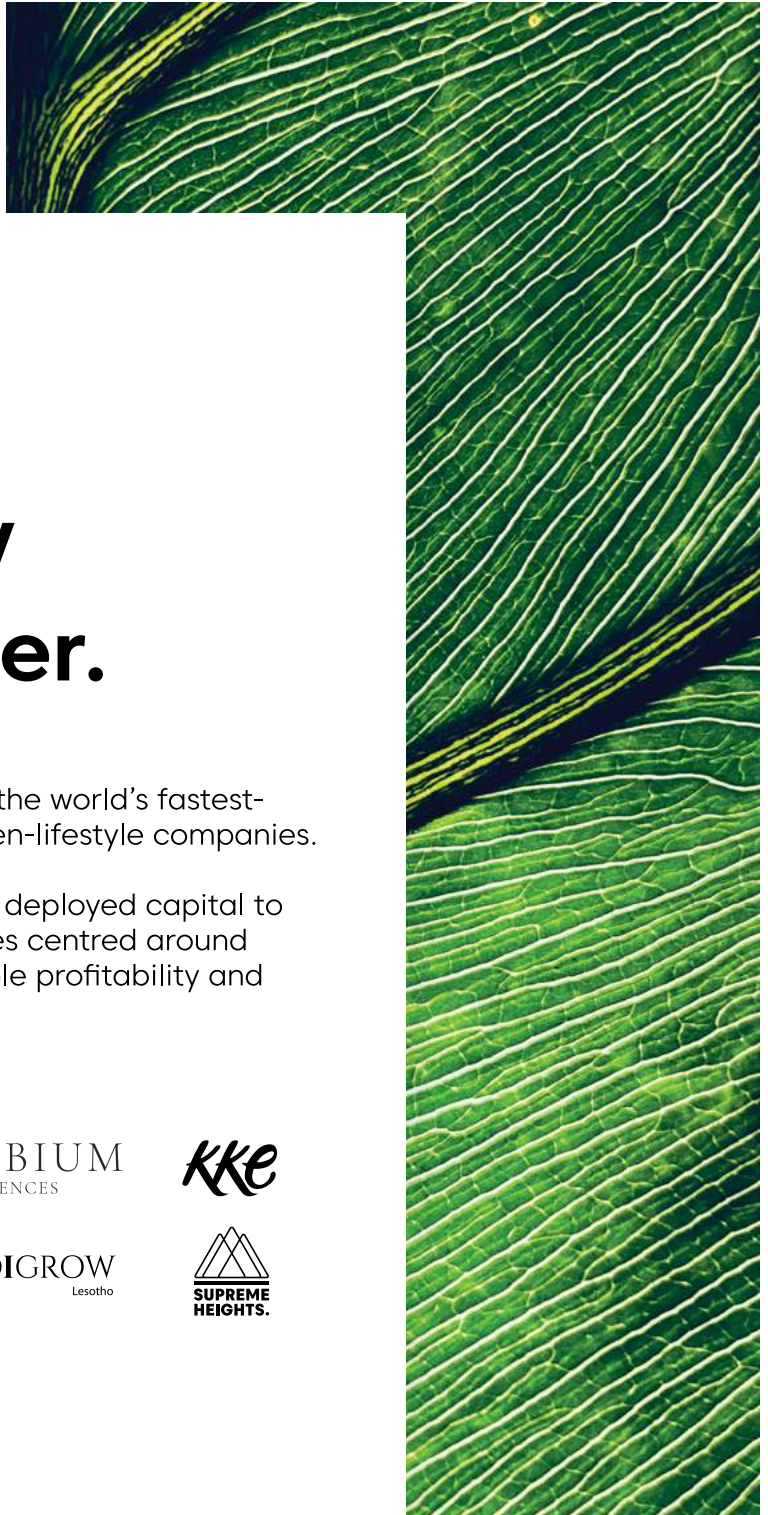
In Minnesota, there are moves afoot to approve legislation that would permit Minnesotans aged 21 and over to possess and use cannabis recreationally. Dispensaries would be licensed to sell dried cannabis flower and other products (such as edibles, concentrates and topicals), and adults would be permitted to grow their own plants at home. It is anticipated that these measures could be introduced as early as 2020 with retail shops opening in 2022.

In Maryland, since January of this year, residents will no longer be prosecuted for possessing cannabis.

Two Democratic legislators in Tennessee, Representative Gloria Johnson (D-Knoxville) and Senator Sara Kyle (D-Memphis), are behind the proposed cannabis policy reform that aims to be 'more understanding and friendly' and that allows visiting medical cannabis patients to 'bring their medication with them to Tennessee'.

Calls for legislation to decriminalise the possession (of up to two ounces) of cannabis are finally being given a hearing in Indiana, which is known to have some of the country's most stringent cannabis penalties (e.g. possession of a single joint is punishable with up to 180 days in prison and a US\$1,000 fine). State Senator Karen Tallian (D-Ogden Dunes) has been fighting for cannabis policy reform since 2012 and her case is deemed to have gathered momentum. In March 2018, Governor Eric Holcomb signed a bill to legalise CBD oil in Indiana.

Illinois has a successful medical cannabis programme in place already, and in early 2019 a Democratic state lawmaker filed a bill to legalise recreational cannabis in the state.



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Whilst legislation to legalise medical cannabis in Kentucky was not approved in 2018, the House Bill 136 (an amendment to legalise medical cannabis) was introduced in the Kentucky Legislature in January 2019. Rep. Diane St. Onge was quoted in the media saying: 'The intention of this legislation is not to generate tax revenue, but rather to provide relief to the thousands of Kentuckians who suffer from conditions that have not responded to traditional medicine.'

Voters in Arkansas approved *Issue 6* in November 2016, which legalised cannabis for medicinal purposes. In January 2019, cannabis seeds were legally planted for the first time since prohibition in the state in 1923. The state awarded a total of only five licences for medical cannabis producers, who all paid a US\$100,000 licence fee and a US\$500,000 performance bond:

- Natural State Medicinals Cultivation
- Bold Team
- Natural State Wellness Enterprises
- Osage Creek Cultivation
- Delta Medical Cannabis Co.

Arkansas Department of Finance and Administration have approved a total of 32 licensed dispensaries in the state, which the *Arkansas Alcoholic Beverage Control Division* is currently working to issue. Medical cannabis cards for the 7,000 expected patients are not set to be issued until 30 days before product hits dispensary shelves.

The *Virgin Islands Medical Cannabis Patient Care Act* became law in January 2019. Governor Albert Bryan Jr. was quoted as stating: '**I have approved the Virgin Islands Medicinal Cannabis Care Act because it is a step in the right direction toward assisting Virgin Islanders suffering from autoimmune and other debilitating medical conditions.**'

Tier 3 – Not yet ready for change

Tier 3 countries, states and territories have historical or unique cultural characteristics that make it unlikely that there will be much, if any, liberalisation of medical and/or recreational cannabis in the short term.

In 14 of the remaining 18 US states where medical cannabis laws have not been passed at state level, it is legally allowable for CBD to be used in special instances or for medical benefits in certain ailments. Although the laws vary from state to state, 14 states allow for the prescription and/or sale of CBD oils or products.

In Tennessee, for example, medical and recreational cannabis is wholly illegal. It does, however, allow for the sale of CBD oil that is derived from the hemp plant, and properly licensed products made with CBD are legal without a prescription.

In Idaho, Kansas, Nebraska and South Dakota, all forms of cannabis and CBD are illegal. Whilst Idaho, Nebraska and South Dakota have all attempted to push through cannabis medicalisation initiatives at some point, there has never been any real push to legalise cannabis or CBD in Kansas.

FORTHCOMING CHANGES/ VOTES REGARDING LEGALITY OF CANNABIS

In Canada, draft regulations for edible cannabis, cannabis extracts and cannabis topicals have been tabled, and the expectation is that the production and sale of these cannabis products will be legal in Canada by 17 October 2019.

In the US, activists have called on the federal government to remove cannabis from Schedule I of the *Controlled Substances Act*. US surgeon General Jerome Adams is one of the key figures to push for this change, and he is calling for reform of both health and criminal justice policies related to medical cannabis. Ad-

ams has stated that medical cannabis should be declassified as a Schedule I substance and studied like any other pain-relief drug.

Following in the footsteps of Uruguay and Canada, Mexico may soon legalise recreational cannabis. In late 2018, the Interior Minister of Mexico, Olga Sanchez Cordero, submitted a bill to end the prohibition of cannabis and create a regulated market for the drug. In October 2018, the country's Supreme Court handed down two decisions deeming the country's recreational cannabis prohibition laws to be unconstitutional.

TRENDS IN MEDICAL CONDITIONS

The FDA has approved three man-made cannabinoid medicines for the US market.

In 2018, the agency approved Epidiolex oral solution for the treatment of seizures associated with two rare, severe forms of epilepsy, Lennox-Gastaut syndrome and Dravet syndrome.

The FDA has also approved the synthetic cannabinoids dronabinol and nabilone to treat nausea and vomiting associated with chemotherapy treatment for cancer in people who have already taken other medicines to treat these symptoms without effective results. Dronabinol is also approved to treat loss of appetite and weight loss in people with HIV/AIDS. Dronabinol contains synthetic THC, and nabilone contains a synthetic substance with a similar chemical structure. In 2016, the FDA approved Syndros, a liquid form of dronabinol.

The US National Institute of Drug Abuse cites ongoing preclinical and clinical trials of cannabis and its extracts to treat symptoms of illness and other conditions, such as diseases that affect the immune system, including: HIV/AIDS; multiple sclerosis, which causes gradual loss of muscle control; inflammation; pain; seizures; substance use disorders and mental disorders.

Based on the most-prescribed drugs in the US and according to analysis by Medscape (medical resource for US physicians) of data provided by *IMS Health* (which provides information, services and technology for the healthcare industry), the seven top health problems in the US are:

- 1 **Hypothyroidism**
(around 2% to 3% of the US population);
- 2 **High cholesterol and high triglycerides**
(nearly 99 m of the over-20s);
- 3 **Heartburn and gastroesophageal reflux disease**
(c.20% of Americans);
- 4 **Breathing disorders**
(over 25 million Americans);
- 5 **High blood pressure**
(one third of American adults/one in five Canadian adults);
- 6 **Diabetes**
(over 29 million Americans/3 million Canadians);
- 7 **Depression and anxiety**
(c.14.8 million Americans aged 18+ suffer from a major depressive disorder annually and one in five Canadians will experience a mental health problem or illness in any given year)

INDUSTRY EXPERT INTERVIEW



Andrew Grieve
CEO,
Zenabis

How do you view North America's role in the legalisation of cannabis within the international market?

North America has a real opportunity to show the world the right approach to the legalisation of cannabis, for both medicinal and recreational use. Canada provides a great example of how to do it right from a regulatory standpoint. Some people would disagree, as a result of the relatively strict approach to the rollout. But that's actually a great way to approach the legalisation of a previously prohibited product. The fact that we haven't had any issues of organised crime involvement, and the fact that we have a strong compliance regime, is an excellent example for the rest of the world because it demonstrates that the legalisation of cannabis can be done in a manner that minimises risk to citizens and the government.

Zenabis has positioned itself as a regional leader in cultivation. What is the approach you have taken to growing the business?

The approach that we have taken to growing our business is to find the right people. The right people from the cultivation standpoint doesn't necessarily mean just having people who previously worked in the black market. Instead, our approach has been to bring in industrial-scale cultivation expertise. Through a reverse takeover, Sun Pharm Investments and Bevo Agro merged to create Zenabis. Bevo was a plant propagation and

floral business that had been participating in industrial-scale cultivation for years, and if you look at our cultivation results relative to our original design capacity for our Atholville facility, for example, we have been outperforming expected results by a meaningful amount. In June of 2019, for example, we outperformed by 40% relative to the original designed capacity envisaged for that facility, and we also have a facility in which we outperformed by more than 90%. This goes to my earlier point – bringing in the right people and industrial-scale cultivation experience to cannabis has really been the key.

The other thing we have done is that we moved incredibly quick. When we first listed the business on the stock market, people indicated that we lagged behind the competition, and it was kind of a strange time to list the business. At the time, we had just over five tonnes of capacity. Now, based on how we are currently operating, we have more than 50 tonnes of capacity. In the next few months, we anticipate that we should have close to 150 tonnes. If we are on target, we will go from being a company in the middle, or even at the back of the pack, in terms of capacity, to becoming a market leader, in terms of capacity, in the first quarter of 2020.

With an increasingly consolidated market emerging in North America, what is Zenabis' strategy for success in the future?

It's not yet a consolidated market. But that's coming. People should expect there to be a limited number of cannabis companies that are able to achieve and maintain a meaningful scale. The way to do that is to have great product at the right price, and to have the right interactions with your customers. Canada is a country that has a limited number of counterparties or customers for the cannabis products because, in general, most provinces have a regulatory regime where you sell directly to a crown corporation, owned by the province. As a result, you have to focus on maintaining great relationships with those counterparties. That's essential and part of the reason why Canada is more likely than the United States to have meaningful consolidation in terms of the number of companies participating in the market, because there isn't really a reason, long term, for those provincial counterparties to purchase from a significant number of companies. The expectation over time is that the provinces will delist suppliers who don't have the right products and stop doing business with companies who they don't have a great relationship with.

Partnerships and distribution are a key theme for cultivators and producers. How have you approached these partnerships and what makes a successful arrangement?

We approach them as genuine partners, rather than as a company seeking to simply derive the most we can from any relationship. We want to ensure the relationships that we build work for both parties. Currently, in the cannabis industry, in many cases, there are enough profits in the near term to satisfy everyone, so long as you move quickly. In many instances, the most important thing is speed, and to simply be reasonable and acknowledge that everything might not be perfect when you start working together. But if you start working together sooner than everyone else, and you are willing to move at

the right pace, then that will deliver success in the end.

Talk us through the developments (legislative, commercial and scientific) which are exciting you and your team.

In the coming months, the most important legislative development is the legalisation of edibles, beverages and other products, scheduled for October of 2019, with products launching in December of 2019. Commercially, this will bring significantly greater opportunities to the Canadian market, beyond just flowers and oils. This will also allow for both greater diversity in terms of product type, as well as a stronger opportunity to brand products, and bring relatively unique products on the market. It's somewhat challenging at this time to demonstrate how a product can be unique if there's only an opportunity for everyone to sell flower or oil, but the opportunity for branding will be significantly greater. We will be able to have brands that mean something and products that are differentiated will be significantly greater, upon legalisation of this second round of products, this October.

What can we expect from you and the Zenabis team over the coming years?

What you can expect from the Zenabis team really is continued execution. As I mentioned previously, Zenabis has gone from 5 tonnes of capacity to more than 50 tonnes, over a very short period of time. This was achieved in a span of seven to eight months. We anticipate we will have the capacity for nearly 150 tonnes in another few months. At that point in time, we will be one of the leading cultivators in Canada; and we will have gotten there incredibly fast. You should expect the same pace and approach when it comes to entering international markets, and when it comes to developing different products, and bringing those products to market. That pace is something that will definitely differentiate Zenabis from other companies.

The other key differentiator is transparency. As a business, we report every month what we achieve from a cultivation standpoint through our operational update news releases. We are incredibly transparent with our partners, as well as with the public market. We also provide consistent updates to our provincial counterparties, as to how we are doing from a construction and licensing standpoint. We are very open in terms of product availability. There's a high level of transparency that we bring to the table. This transparency, along with our desire to grow and expand our business, is what makes Zenabis unique in the Canadian market.

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OPPORTUNITIES FOR MEDICAL CANNABIS

Key medical opportunities for cannabis use

ALLEVIATING CHRONIC PAIN

Data from the *Centers for Disease Control and Prevention (CDC)* estimates that 50 million Americans suffer from chronic pain, and 20 million of them suffer from pain so severe that it limits life or work activities. Research conducted by *Yahoo News/Marist College* in a 2017 survey found that almost one in five (19%) cannabis users use it to relieve pain, and this highlights the ways in which cannabis is currently being used for medicinal purposes.

As of March 2019, two US states, New York and Illinois, have legalised the use of cannabis as an alternative to addictive opioids to help treat chronic pain.

TREATING ADDICTION WITH CBD

Medical cannabis is being explored as a go-to strategy to deal with other health disorders on the increase, notably addiction to prescription painkillers.

In 2017, *The National Institute on Drug Abuse* estimated that around 1.7 million Americans were addicted to opioids, another 50,000 died from overdosing on opioids, and the number of opioid prescriptions had risen from around 112 million in 1992 to 236 million in 2016.

A study published in the *Journal of the American Medical Association (JAMA)* in 2014 determined that US states with medical cannabis programmes saw 25% fewer opioid deaths than states without such programmes.

The CDC estimates that the total 'economic burden' of prescription opioid misuse alone in the US amounts to US\$78.5 billion a year.

TREATING SLEEP DISORDERS

CBD may have been in the spotlight in 2017/8 but CBN (cannabinol) could take the limelight in 2019/20.

CBN is a non-psychoactive compound of cannabis, which develops as THC oxidises.

Benefits include pain relief and anti-inflammation, but its primary use is for sleep issues.

According to a study conducted by the University of Pennsylvania School of Medicine in 2018, data shows that 25% of the population experience acute insomnia each year. This represents a huge market potential for CBN.

CBN is not on the list of scheduled controlled substances in the US. However, it is possible that CBN could legally be considered an analogue of THC or CBD, both of which are Schedule I substances; therefore, sales or possession could potentially be prosecuted under the *Federal Analogue Act*.

Source: CDC/ Yahoo News/ Marist College/ National Institute on Drug Abuse/ JAMA/ University of Pennsylvania/ Prohibition Partners

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One in four adults in the US have two or more chronic conditions, and the likelihood of co-morbidity increases with age: over 50% of adults aged over 65 have three or more chronic illnesses. The *US Census Bureau* predicts that 20% of the population will be over 65 by 2030.

Figures published by *Statistics Canada* have indicated that population ageing in Canada would accelerate between 2010 and 2031, when the baby boomer generation will reach the age of 65. This is set to result in a rise in the overall number of patients with comorbidities. Chronic diseases (defined as lasting over a year) are among the most prevalent and costly health conditions in North America. For example, in 2005 (according to the latest published figures by the *National Center for Chronic Disease Prevention and Health Promotion (NCCDPHP)*), over 75% of the public and private healthcare budget was spent on chronic diseases in the US.

With incidences of cancer on the rise across North America (352.2 (US) and 334 (Canada) per 100,000 people in 2018, according to the *World Cancer Research Fund*), research into the use of cannabinoids to boost the body's natural endocannabinoid system is exploring new therapeutic options to improve clinical outcomes for certain cancers as well as other serious diseases for which patients have few other effective therapeutic options.



THE RECREATIONAL CANNABIS CONSUMER



- 1 In both the US and Canada, 22% of people used recreational cannabis over the past 12 months;**
- 2 In the US, almost one in five (19%) cannabis users use it to relieve pain;**
- 3 The average age of first-time cannabis users in Canada is almost 19 years old.**

Profile of typical recreational cannabis user

US

Most people who use cannabis are parents.

A total of 25% of millennial cannabis users say they feel 'guilty' about their cannabis habit, compared with 17% of non-millennials.

The majority of cannabis users are male, educated below degree level and earn under US\$50,000 a year.

Approximately 14% of current users are Republicans, and over two thirds supported Hillary Clinton in the latest presidential election.

Nearly 55 million (22%) currently use cannabis (the survey defines 'current use' as having used cannabis at least once or twice in the past year); 52% are millennials.

Around 35 million are 'regular users' (at least once or twice a month).

Some 28% would use cannabis if the federal government legalised it nationally. The rest said the legal change 'wouldn't make much of a difference in their behaviour'.

CANADA

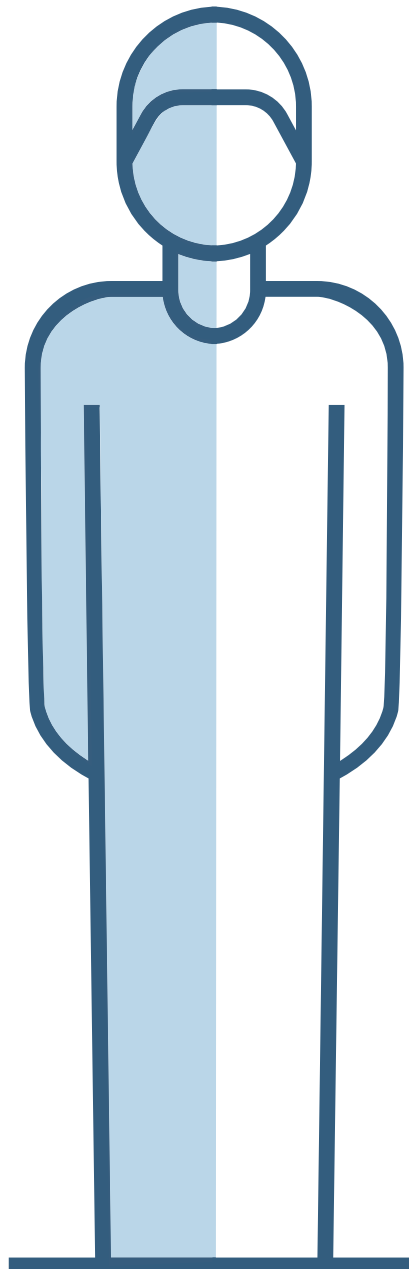
The 2018 Canadian Cannabis Survey found that the average age of initiating cannabis use was 18.9 years.

The 16–24-year-old age group reported cannabis use in the past year at a percentage that was double that of people aged over 25.

Within the past 12 months, 22% of people reported having used cannabis for non-medical purposes.

Around 26% bought the drug from licensed retailers or online producers.

More than four in ten (42%) obtained cannabis illegally.



Source: Prohibition Partners/ Marist College/ Statistics Canada

GROWING SUPPORT FOR LEGALISATION

The prospect of the legalisation of the use of cannabis was highly unpopular when *Gallup* first asked Americans about it in 1969 – just 12% said at that time it should be made legal. Support grew in the 1970s but stagnated with a figure of approximately 20%, until the new millennium, when momentum for legalisation picked up again. Since 2000, support for legalising cannabis has trended steeply upward, reaching majority support for the first time in 2013 and peaking at 66% in 2018.

A poll carried out by the *Pew Research Center* (Washington DC) in 2018 revealed that six out of ten (62%) of Americans supported legalising cannabis. Interestingly, the share of US adults who support cannabis legalisation changed very little from 2017 (61%), but doubled the percentage recorded in 2000 (31%).

There are, unsurprisingly, differences in generational viewpoint. In the US, Millennials (74%), Gen Xers (63%) and Baby Boomers (54%) are most keen on legalisation. Partisan differences are more marked: nearly seven out of ten Democrats (69%) say cannabis use should be legal, as do 75% of independents (who lean toward the Democratic Party). Republicans are more divided, with 51% opposed to legalising cannabis.

In October 2018, the *Cannabis Council of Canada* conducted a national survey of 3,000 Canadian adults to find out attitudes towards the forthcoming change in legislation. The longer history of legalisation in the country is likely to explain the higher level of support in Canada compared with the level of support in the US:

For:

Against:

70%
SUPPORT OR
CAN ACCEPT
LEGALISATION

12%
OPPOSE

46%
STRONGLY
SUPPORT

18%
STRONGLY
OPPOSE

24%
ACCEPT

21%
CAN ACCEPT

Source, *The Cannabis Council of Canada*



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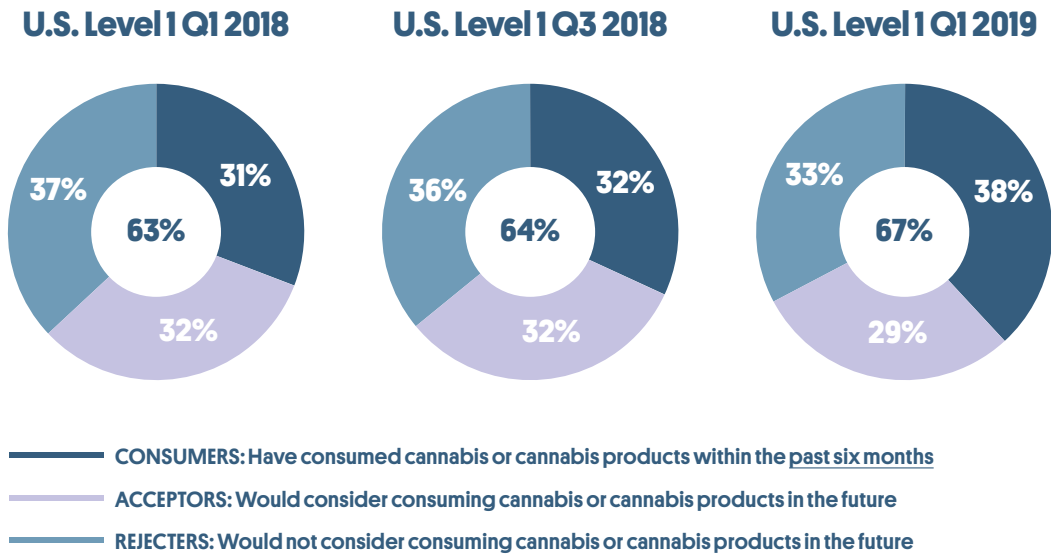
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Past 6 months: Consumers, Acceptors and Rejecters

Majority of adults in fully legal U.S. states are Consumers or Acceptors, and the proportion of Consumers noticeably increased from 2018 to 2019



Source: BDS Analytics' Public Attitudes and Actions Toward Cannabis, Level 1 Fully Legal US States Q1 2019

LEGALISATION DRIVES ACCEPTANCE AND CONSUMPTION

Studies conducted by BDS Analytics Consumer Insights show that Canadians and Americans as a whole are similarly inclined to be Consumers of cannabis product or Acceptors of the idea of doing so, though variations at the state and provincial level are substantial. But market potential even reaches into the Rejecter group, those who say they 'would not consider consuming' cannabis: 44% of US Rejecters agree with the statement 'If a loved one was ill and cannabis might ease their suffering, I would want them to use cannabis.'

The highest percentage of Consumers is found in states that have legalised cannabis, Oregon for example. But, according to annual tracking by the Substance Abuse and Mental Health Services Administration of the US Department of Health and Human Services, that was also the case before legalisation, and may be the cause rather than the result of legalisation.

There is evidence to show that consumption increases over time post-legalisation. In what BDS Analytics classified as 'Level 1' states (i.e. those with adult-use legalisation), the percentage of adults reporting consumption in the past six months increased by seven percentage points from Q1 2018 to Q1 2019. In contrast, the percentage of Rejecters dropped from 37% to 33%.

HIGH-PROFILE CAMPAIGNERS

Whilst the cannabis market in Canada was fully legalised in October 2018, the US market remains a patchwork of regulation, even though the 2018 *Farm Bill* went some way to a more permissive environment at federal, rather than state level. However, as more and more politicians from both parties voice their view that it is counterproductive not to legalise cannabis, or at least are trying to back states to have the right to decide for themselves, and as consumer opinion is shown to be in the majority in favour of legalisation, the pro-cannabis movement gathers momentum.

In June 2018, members of Congress introduced the bipartisan *Strengthening the Tenth Amendment Through Entrusting States (STATES) Act*, intended to protect states' rights to determine their own cannabis laws without federal interference

Governors pushing for change

Representative Gloria Johnson (D-Knoxville) and Senator Sara Kyle (D-Memphis) are pushing for reform of cannabis policy in Tennessee.

In Indiana, State Senator Karen Tallian (D-Ogden Dunes) has been fighting for cannabis policy reform since 2012.

In 2014, Governor Andrew Cuomo signed off the *Compassionate Care Act* to legalise cannabis for medical use in New York, and in 2018 Cuomo proposed the MRTA, which would have legalised cannabis for adults (over 21), but it did not have enough support to pass.

In New Jersey, since 2018, Governor Phil Murphy has supported reform, and Senator Cory Booker is succeeding in drumming up congressional support for his proposed *Marijuana Justice Act*.



INDUSTRY EXPERT INTERVIEW



Alvaro Torres

CEO,
Khiron Life Sciences

ALVARO TORRES, CEO, KHIRON LIFE SCIENCES

Where do you see opportunities for growth in the next 12 to 24 months – particularly in the North American market?

In the North American market, we see strong interest for well-done and identifiable brands in the cannabis space. Over the past few months, we have been attending both consumer and industry events in the US, such as Foundermade and Cosmoprof Las Vegas, to further our understanding of market needs and to test market Kuida, our landmark CBD-based cosmeceutical product, with key audiences. Our experiences and learnings from these events have reinforced our belief in the power of strong brands: we've seen first-hand how consumers connect to an innovative and credible product, and have been greatly inspired by the positive response to our cosmeceutical line. Now, after recently obtaining approval from the TSXV, Canada's leading stock exchange for emerging companies, we are setting our sights towards commercialising Kuida in the US, to plant a flag that will allow us to explore possibilities to bring more products and high-end CBD brands to the market. We are very optimistic about the opportunities for growth in the US – and the launch of Kuida is only the beginning.

What steps has Khiron taken to enter the US market? How important is the Hispanic market to this strategy?

The United States is a dynamic and complex market where strong brands and strategic partnerships are crucial for success. By joining forces with Dixie Brands to bring Kuida to the United States, we are able to leverage the relationships and resources of both organisations. Dixie Brands is a well-known cannabis CPG company, and we could not be prouder of our partnership, which will introduce Kuida into the US and Dixie's product portfolio into Latin America through a 50/50 joint venture. We believe that our brand will resonate well in the US, as consumers across the board are looking for high-quality CBD-based cosmeceutical products. While our products are expected to have particular appeal to the growing US Hispanic population, estimated at around 60 million people, we are also striving to broaden our audience across the US.

Do you see a difference when it comes to developing and marketing cannabis-related products for the North American market, vs other markets where the company is operating? What is your advice on reaching consumers across markets?

The biggest differences we see are 1) the broad competition in the North American market, which has a multitude of product offerings available, and 2) the strong awareness that already exists around CBD. For instance,

in Colombia, Kuida was the first CBD-based cosmeceutical with FDA-equivalent certification to be sold on the shelves. As the first mover in the market, we had to invest in consumer engagement and education to increase awareness on the benefits of CBD, but this also enabled us to build a very strong brand that understands and connects with consumers – particularly with women at this stage. Our success in brand building, in addition to the high quality of our products, provides us with a solid foundation when entering the US market. Even among the competitive market offerings in North America, Kuida stands apart as a scientifically proven, GMP-lab-made product, supported by a powerful branding and marketing campaign that resonates with consumers. As a result, we find ourselves in a strong leadership position to reach consumers in the US.

As the cannabis sector continues to globalise, how can cannabis companies such as Khiron set themselves apart? What is Khiron's strategy to position itself as a leader in the global market?

In an increasingly crowded cannabis space, every company has to be unique to survive and thrive in this new industry. A couple of years ago, it was a novel idea to start a cannabis company out of Colombia on the premise of becoming the lowest-cost producer in the world. Now, if you are trying to build a cannabis company based on that model, you will find limited capital and enthusiasm

because other companies have already done that and are much more advanced. Khiron, on the other hand, has never sought to be the lowest-cost exporter to the rest of the world. We take the agricultural advantages we have in Latin America as a platform to build a brand connection with our patients and consumers. Powered by an efficient supply chain, we aim to be the leading B2C cannabis company in each market we enter. Our goal is not to sell coffee at 80 cents a pound – but rather a latte at four dollars a cup. To achieve this, we've focused on advancing our research, on strengthening our relationships with patients, doctors and consumers, and on developing high-quality products in an innovative manner. Our priority is to become as close as possible to patients and doctors, and we've worked intensively to develop the capacities – in patient care, education and shelf space – that will enable us to do so. We believe that building brand loyalty and awareness is the path that will ultimately provide for a sustainable and successful business in the long run.

COMMERCIAL OPPORTUNITIES



- 1** **Developments in the political and regulatory environment are making way for more permissive legislation in favour of legalisation of cannabis for medicinal uses as well as opening up the recreational market.**
- 2** **Despite being illegal at federal level, the US government does permit patenting of cannabis-related products. The number of patents in the sector has witnessed explosive growth in the last decade.**
- 3** **Rising incidence of chronic illnesses, including cancer, is driving demand for further research into the medicinal benefits of cannabis, and consequently innovation in cannabis products.**

Market segmentation of the cannabis industry

CORE SEGMENT	PRODUCTION	PROCESSING	DISTRIBUTION & RETAIL	DIGITAL	ANCILLARY
SUB-SEGMENT	Commercial seed growers & suppliers	Industrial processing	Distribution	Information	Real estate
	Production equipment manufacturers & suppliers	Industrial manufacturing	Transport (standard and secure)	Communities	Legal
	Cultivation of medical-grade cannabis	Medicinal processing	Online (ecommerce)	Data	Finance
	Cultivation of recreational-grade cannabis	Medicinal manufacturing	Off line (bricks & mortar)	Marketing	Consulting
	Cultivation of industrial-grade hemp	Recreational processing		Software	Technology
	Testing & quality control	Recreational manufacturing			

Source: Prohibition Partners

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Key trends that are driving the North American market and providing the conditions for an abundance of commercial opportunities:

Political and regulatory developments not only in politically diverse jurisdictions such as New York and Utah but also in states that are separated by vast distances such as New Mexico and New Jersey are leading to an increase in legalisation.

Leading Canadian cannabis producers, notably Tilray, Inc. and Canopy Growth Corp, are listed on US exchanges and are raising capital to fund ambitious expansion. The long-standing fight for pole position between Tilray and Canopy has underpinned considerable acquisition, joint venture and expansion activity in 2018/19 and is likely to continue to do so.

Increasing numbers of US multi-state operators are going public on the Canadian Securities Exchange, with five operators reaching valuations above US\$100 million and a combined market cap of US\$5.5 billion.

Countries liberalising their medical cannabis regulatory regimes, including potentially enormous markets in the United Kingdom and Mexico, are framing expansion opportunities for Canadian and US companies alike.

The cannabis industry is disrupting established consumer product industries as it attracts huge investment from major players looking to exploit the potential for the development of cannabis-based products, notably in the food and drink categories.

The large players in the alcohol and tobacco industries, suffering from the decline in consumption of alcohol and smoking, are hoping to benefit from the North American cannabis market by entering into joint ventures.

'Mark Grindeland, co-founder and CEO of Coda Signature, is positive about the future for the US cannabis industry and has been quoted as

stating: 'After operating on the fringes for several years, in 2018, big business began to recognise that cannabis had potential to disrupt established industries from pharma to spirits to consumer-packaged goods. In 2019, the disruption will go from potential to reality and the industry will explode. As the momentum grows, I am optimistic that by 2020, we will see new laws that enable our industry to operate on a level playing field with the Canadian marketplace and provide us with the ability to partner with public companies.'

The over-the-counter (OTC) pharmaceuticals market in the US is anticipating a relatively low compound annual growth rate (CAGR) of 1.6% between 2019 and 2023. At 1% CAGR forecast, growth in the Canadian market for the same period is even more modest. As alternatives to prescription and OTC medicines are being sought, and new technologies for health improvement are being explored, consumer trends are firing research and development in the CBD market. Corporate activity has expanded as businesses seek to capitalise on trends.

Increased incidence of cancer across North America has driven research into the use of cannabinoids to boost the body's natural endocannabinoid system, and scientists are looking to discover new therapeutic options for certain cancers (including glioblastoma multiforme and triple-negative breast cancer) as well as other serious diseases. However, in March 2019, the *US National Cancer Institute* pointed out that physicians who recommend medicinal cannabis whilst caring for cancer patients do so predominantly for symptom management. The benefits of medicinal cannabis for people living with cancer are reported to include antiemetic effects, appetite stimulation, pain relief and improved sleep.

In Canada, further product development is likely. Draft regulations for edible cannabis, cannabis extracts and cannabis topicals have been tabled and the expectation is that the production and sale of cannabis topicals will be legal by 17 October 2019. This is positive news for companies such as Ovation: following legalisation of topical CBD and THC products, Ovation can expand its business into Canada.

PATENTS

Despite being illegal under federal law, the *US Patent and Trademark Office (USPTO)* has been issuing patents for cannabis-related inventions since 1942. Recent examples of issued cannabis-utility patents include US patent 10,028,987, issued on 24 July 2018, titled 'Cannabis-infused milk', and USPN 10,206,888, issued 19 February 2019, titled 'A cannabis-based therapeutic product for treatment of chronic pain produced by separating hash resin from plant material of the cannabis plant'.

Cannabis-related patents have been permitted by the US Patent Office even though the legality of cannabis varies between the state and federal level. It is also reported that the US government holds a 2003-issued patent for certain uses of cannabinoids as antioxidants and neuroprotectants.

According to legal firm Quinn Emanuel, since 1995 the number of cannabis-related US patents to be filed and issued has shown a significant increase. The law firm estimates that more than half of all cannabis patent applications have been filed in the past 25 years. Innovation has been largely spurred by legislative change and increasing research and development expenditure by major cannabis producers. In the US, disparities in the legal status of cannabis between states have had little impact on patentability or the ability to enforce cannabis-related patents in federal court.

THE Q2 EARNINGS REPORT FOR THE 2019 FISCAL YEAR INDICATED THAT CANADIAN CANNABIS FIRM CANOPY GROWTH SPENT CA\$1.94 MILLION ON RESEARCH AND DEVELOPMENT, REPRESENTING ALMOST

A 300% RISE
IN SPEND COMPARED WITH THE FIRM'S CA\$494,000 SPENT IN Q2 2018.

AURORA CANNABIS SPENT CA\$3.43 MILLION ON R&D DURING THE FIRST QUARTER OF 2019,

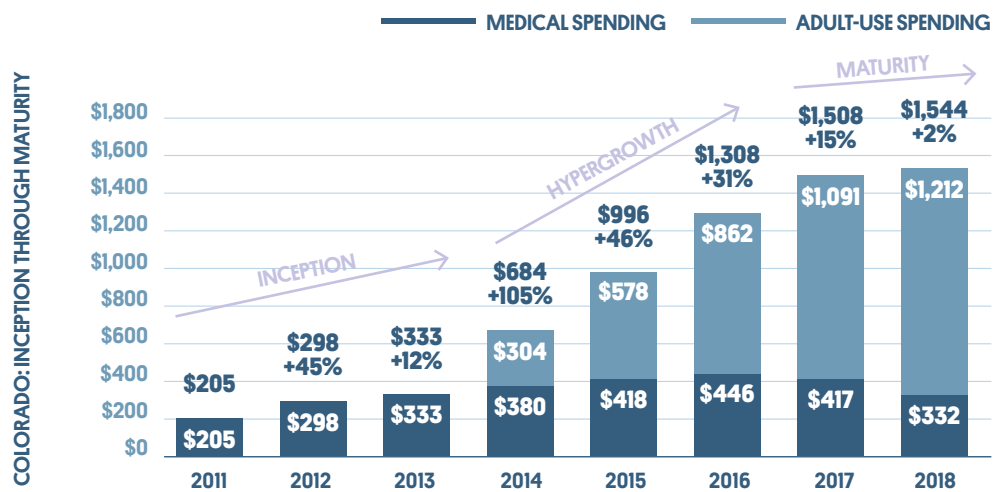
up over 3000%
FROM CA\$107,000 DURING Q1 2018. AURORA ALSO IDENTIFIED CA\$2.35 MILLION IN PATENT-RELATED ACQUISITIONS IN THE LAST TWO YEARS [SINCE JULY 2017].

Unlike other regions, in North America cannabis patents can be issued based on the chemical composition of a specifically bred cannabis plant. This enables cross-breeders to create new strains of cannabis. However, in Canada, unlike the US, a patent cannot be issued for a unique natural strain of the cannabis plant. Instead, the creator would need to apply for a Plant Breeders' Right (which offers intellectual property protection and breeder exclusivity rights on the variety for between 20 and 25 years).

MARKET LIFECYCLE

While cannabis itself is not new, the retail cannabis consumer and corresponding commercial landscape is. Though not a blueprint for every region, Colorado retail tracking data from BDS Analytics is helpful in establishing a picture of a mature, functioning, legal cannabis marketplace in terms of product trends, consumer habits and competitive market dynamics.

How Does a New Market Grow? Three Phases of Growth



Source: BDS Analytics GreenEdge™

Among the lessons:

- Adult-legal markets are retail markets, and retail markets are the big spending markets.** Medicinal legalisation is more pervasive, especially outside North America, but retail opportunities are booming in adult-legal markets. Medical-only sales in Colorado were growing at a decent rate during the market’s Inception period, but exploded with adult-use legalisation in 2014. Now, tracking data from hundreds of reporting stores show that the market is exhibiting key signs for entering a Maturity stage, with year-on-year growth rate slowing significantly in 2018.
- Concentrates and vapes are the key growth categories, while traditional**

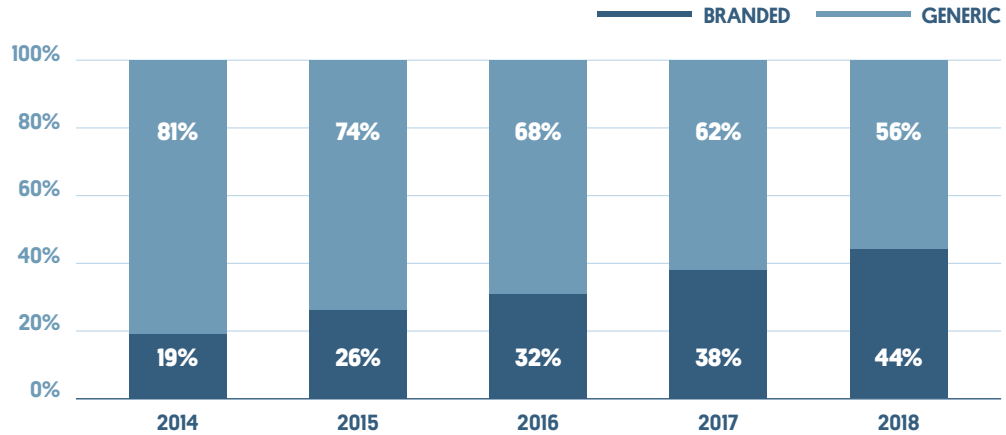
flower is in decline as a share of total spending. A convergence of competition and technology is driving product innovations with a greater emphasis on quality, discretion, precision formulation and dosing.

- Supply-chain competition favouring economies of scale.** Branding, consolidation and vertical integration characterise the cannabis supply chain in Colorado, as the simultaneous effects of competitive pricing pressures, a high cost attached to legal compliance, and the relative benefits of economies of scale allow larger players to emerge and drive the percentage of the market going to branded product to more than double from 2014 to 2018, according to BDS Analytics’ point-of-sale tracking.

• **Regulation details have significant impact.** The kind of Hypergrowth seen in Colorado, with 3-year CAGRs above 50%, appeared to be typical since Washington and Oregon saw similar trends. However, California became the first state to actually

shrink legal sales when it legalised adult-use, due to local bans on stores and a 77% tax-and-regulatory load saddling legal operators in their competition with the illicit market.

Top 5 brands share in concentrates CO %



Source: CDC/ Yahoo News/ Marist College/ National Institute on Drug Abuse/ JAMA/ University of Pennsylvania/ Prohibition Partners

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COMPANY AND BRAND ACTIVITY

- 1 **Products with increasingly higher dosages of CBD levels are entering the market. This is mirrored by the development and launches of microdose products (tinctures, etc.).**
- 2 **Topical and transdermal cannabis formulations are a growth area and are as attractive to the small niche players as they are to the major companies.**

The following section provides an overview of key players in the market. Companies have been selected to feature due to either their size or their activity.

KEY PLAYERS

Canopy Growth Corp.

This is a diversified cannabis company that produces and sells to the legal medical and recreational markets in Canada. In the cannabis industry's largest investment, Corona beer maker Constellation Brands added US\$4 billion to its US\$200 million investment (which equals a 38% stake) in Canopy Growth in August 2018 to help fund the Canadian cannabis producer's global expansion.

Tilray, Inc.

Medical cannabis producer and Canada-based Tilray, Inc. did not even exist in 2012, but by July 2018 it was listed on Nasdaq. In December 2018, Anheuser-Busch InBev, the world's largest brewer, and Tilray, Inc. announced their US\$100 million joint venture to research cannabis-infused non-alcoholic drinks for the Canadian market. In February 2019, Tilray acquired hemp food maker Manitoba Harvest for US\$318 million thus opening up the market for Tilray to develop wellness products and hemp-based consumer food products. Founded in 1998, Manitoba Harvest is the world's largest hemp food manufacturer and a leader in the natural foods industry. Its products are sold in over 16,000 stores in major retailers across the US and Canada. Following its Nasdaq listing in July 2018, shares jumped nearly nine-fold before settling back down.

'It's too early to know how big cannabinoid-based beverages will be, but we think it's a massive opportunity and it's something

we're interested in investing aggressively in,'
Brendan Kennedy,
Chief Executive Officer, Tilray

Aurora Cannabis Inc.

A Canadian start-up company focused on growing and selling medical cannabis. In July 2018, the company acquired grower CanniMed for US\$1.1 billion, and in May 2018, Aurora paid US\$2.5 billion to acquire MedReLeaf, another Canadian cannabis grower.

In January 2019, Aurora entered into a definitive agreement to acquire Whistler, which was the first company to be certified as a licensed producer of organic cannabis products in April 2014. Whistler has a certified premium and differentiated organic product portfolio, which will help further expand its medical and consumer offerings in Canada. The last 12 months have seen Aurora further diversify its retail strategy, opening up additional retail opportunities across Canada. In Q2 2018, Aurora increased its investment in Choom Holdings, a consumer cannabis company that has secured one of the largest retail networks in Canada, and invested in High Tide Inc., an Alberta-based, retail-focused cannabis and lifestyle accessories company. Aurora is also reportedly eyeing up the Ontario retail market.

Aurora's acquisition of Whistler is not just about expanding its offerings to the Canadian market. In December 2018, Aurora entered into a Letter of Intent to acquire Farmacias, Mexico's first and only federally licensed importer of raw materials containing THC, which

is also licensed to manufacture, store and distribute medical cannabis products (containing over 1% THC). This acquisition and early move give Aurora a significant advantage in Mexico, with opportunity for international expansion of its medical and consumer product portfolio.

Scotts Miracle-Gro Co.

Its position as a leading supplier for indoor cannabis growers is underpinned by its programme of acquisitions of hydroponic growers. The US\$2.6 billion sales company saw its market cap fall by about 45% in 2018. In May 2019, the company experienced a turnaround as it rose the most in a decade after its Round-up herbicide and cannabis-supplies business earnings rose above expectations. In addition, sales tripled at its subsidiary Hawthorne, which specialises in speciality fertilisers and growing equipment for cannabis farmers.

GW Pharmaceuticals PLC

A UK biopharmaceutical company that develops and commercialises therapeutics using a proprietary cannabinoid product platform. The firm's CBD treatment Epidiolex was the first CBD product to receive US FDA approval for sale in 2018. The company site states that over 7,600 patients have received Epidiolex prescriptions and more than 1,900 physicians have generated dispensed prescriptions since the launch.

Currently, the pharmacy distribution network totals 145 distribution points.

Cronos Group Inc.

A geographically diversified and vertically integrated cannabis group that is licensed under *Health Canada's Access to Cannabis for Medical Purposes Regulations* and is actively engaged in the recreational cannabis market selling dried cannabis, pre-rolls and cannabis oils to Ontario, British Columbia, Nova Scotia and Prince Edward Island (representing over 50% of the Canadian population).

Cronos Group operates two wholly-owned Canadian licensed producers:

- Peace Naturals Project Inc., (the first to be granted a medical cannabis licence by *Health Canada*), and
- Original BC Ltd (British Columbia).

Production

Cronos has an annual production capacity of around 6,650 kilograms, but, with the addition of a fourth indoor building at its Peace Naturals facility in Ontario, capacity will be boosted by 33,500 kilograms per year. With ongoing expansion, the company expects to secure additional listings in other provinces as more of its production capacity comes online. In the tobacco industry's first major foray into cannabis, Altria Group (Marlboro-brand owner) has invested US\$1.8 billion for up to 55% of Cronos Group, as a declining tobacco market offers less and less value and the cannabis market opens up. The price paid was a fraction of the US\$12.8 billion Altria paid for a 35% stake in e-cigarette maker Juul.

Corporate activity

In May 2019, Cronos announced that it had entered into a supply agreement with MediPharm Labs Corp., a leader in cannabis extraction and cannabinoid isolation. MediPharm Labs will supply Cronos Group with approximately US\$30 million worth of high-quality private-label cannabis concentrate over the next 18 months. The deal anticipates the opening up of the derivative market in Canada in October 2019.

Cronos Group announced a 50/50 strategic joint venture with an affiliate of Agroidea SAS in August 2018, a leading Colombian agricultural services provider with over 30 years of research, development, production operations and expertise managing industrial-scale horticultural operations in Colombia. This partnership seeks to develop, cultivate, manufacture and export cannabis-based medical and consumer products for the Latin American and global markets.

In July 2018, Cronos Group announced a 50/50 joint venture with a group of investors led by Bert Mucci, a leader in large-scale greenhouse operations in Canada, to create a new partnership, Cronos Growing Company Inc.

In early 2018, Cronos Group entered into a supply agreement with the US company Cura Cannabis Solutions. The five-year supply agreement (for the purchase of a minimum of 20,000 kilograms of cannabis per annum from Cronos GrowCo) is dependent on Cura receiving all the necessary licences from *Health Canada*. An update on the licences was unavailable at the time of writing.

Aphria Inc.

This company is another Canada-based (Ontario) grower and seller of medical cannabis through retail stores and wholesale distribution. However, in January 2019 the company was facing questions about its deals in Latin America, a recent slump in its shares and the resignation of its co-founder and Chief Executive Officer Vic Neufeld. In May 2019, the company announced several new executive appointments, including James Meiers to the role of Chief Operating Officer. Also, in May 2019, the company reported that its German subsidiary Aphria Germany (which is the sole licensed producer to cultivate all three approved strains of cannabis in Germany) had been awarded a fifth licence for the cultivation of medical cannabis in Germany.

Hexo Corp

The Canada-based grower went public in early January 2018, and from January 2019 was listed on the NYSE in the US. Its major contract is a deal to supply up to 200,000

kilograms of cannabis over five years to the Quebec Crown corporation responsible for the cannabis trade in the province, but it made headlines when it struck up a deal with Molson Coors, the second largest beer maker in North America, to make cannabis drinks. In March 2019, the company announced its acquisition of Newstrike Brands Ltd. thus boosting its production capacity to 150,000 kilograms annually, diversifying its domestic market penetration to nine provinces and adding infrastructure. In April 2019, the company announced its first cannabis harvest from its 1 million square foot greenhouse in Canada.

Organigram Inc.

Notable for a steep 287% rise in their first quarter results for fiscal 2019 (attributed in large part to the impact of Canada's federal legalisation on 17 October 2018), Organigram Inc. is a licensed producer of cannabis and cannabis-derived products, targeting both the medical and recreational markets in Canada. In May 2019, the company's cannabis plants and growing processes were certified organic with Pro-Cert Organic Systems Ltd. Its recreational brand portfolio includes The Edison Cannabis Company, Ankr Organics, Trailer Park Buds and Trailblazer. Adopting a multi-disciplinary approach to treating conditions such as chronic pain, post-traumatic stress disorder (PTSD) and various trauma therapies, Organigram produces medical cannabis for patients. At the same time, it is considering entering the cannabis edibles market in collaboration with one of Canada's leading food product development companies, Smartest Kitchen.

PharmaCielo

PharmaCielo boasts over 150 registered strains, 260 football fields worth of growing space and 6,095 tonnes (5,530,000 kilograms) of annual capacity. Its stated intention is to become the world's leading supplier of 'naturally grown and processed, standardised medicinal-grade cannabis oil extracts and related products'. Its focus on medicinal patients (and not recreational users) is through CBD-focused cannabis oil extracts, not dried flowers. PharmaCielo Ltd. is headquartered

in Canada and publicly traded on the TSX. Its wholly owned operating subsidiary PharmaCielo Colombia Holdings S.A.S. is headquartered in Rionegro, Colombia, which was chosen as an operational base for its optimal climatic and economic conditions, as well as its long history in the cut-flower industry and clear legal framework for cannabis licensing. PharmaCielo also owns Colombia's only patient and e-clinic platform with 80,000 patients registered. PharmaCielo is completing the construction of its GMP2 certified (Good Manufacturing Practices) oil processing facility and expects to begin commercial-scale production and sale of both CBD-focused and THC-focused cannabis oil extracts during the second half of 2019.

MedMen Enterprises

Founded in 2010, MedMen Enterprises (or MedMen) is a publicly traded United States-based cannabis company with operations in California, Nevada, New York and Florida, and a dispensaries/delivery service in 21 locations. In October 2018, MedMen Enterprises Inc. and Chicago-based PharmaCann LLC announced the signing of a binding letter of intent for MedMen to acquire PharmaCann in a deal valued at US\$682 million. One of the largest medical cannabis providers in the US, PharmaCann (founded in 2014) currently operates ten retail stores and three cultivation/production facilities across multiple states. Through the transaction, MedMen will add licences in Illinois, New York, Pennsylvania, Maryland, Massachusetts, Ohio, Virginia and Michigan. Its 2018 acquisition of Chicago-based PharmaCann LLC will result in a company comprising a portfolio of cannabis licences in 12 states that will permit the combined company to operate 79 cannabis facilities.

MERGERS, ACQUISITIONS AND JOINT VENTURES

As laws and regulations have become less restrictive, some of the national giants in the tobacco, pharmaceutical, food and beverage industries have started to enter the marketplace (although US activity has not been as frenetic as has been evident in Canada).

Because they already make products that can be re-formulated to contain cannabis, the cannabis sector is a natural area of expansion for these large and established industries. They also have the advantage of production and distribution networks that are able to bring new products and brands to market at scale.

In March 2018, Cronos Group announced a strategic joint venture with MedMen Enterprises USA, and as a result owns a 50% equity interest in the joint venture MedMen Canada Inc. The aim is to create a Canadian branded retail chain in provinces that permit private retailers, underpinned by brand development along with research and development activity.

Altria, the owner of Marlboro cigarettes, made two major acquisitions. It recently invested in e-cigarette and vape specialist Juul, which was rapidly followed by the purchase of a 45% stake in the cannabis company Cronos for around US\$1.8 billion with an option to gain a majority interest in Cronos in the future.

The recent acquisition of PharmaCann by MedMen will add licences in several US states with a total estimated market potential, as of 2030, of approximately US\$40 billion, according to Cowen Group.

Hot on the heels of news of the AB InBev/Tilray joint venture in December 2018 came news of Tilray's acquisition of hemp food maker Manitoba Harvest for US\$318 million, opening up the market for Tilray to develop wellness products and hemp-based consumer food products. The acquisition will expand Tilray's product portfolio into the natural foods category and bring Manitoba Harvest Tilray's expertise in working with cannabinoids, including CBD. By leveraging Manitoba Harvest's established distribution network, Tilray plans to accelerate its expansion into the US and Canadian markets, where legal, for CBD products. Manitoba Harvest also brings to Tilray two more BRC (British Retail Consortium) AA+ certified manufacturing facilities as well as sales and distribution capabilities.

Acquisition activity over the border in Canada points to the spotlight on the US as a growth market. Canadian cannabis producer Aurora Cannabis announced the acquisition of Mexico City-based pharmaceutical supplier Farmacias Magistrales S.A., unlocking potential access to its neighbouring market the US, amongst others.

In January 2019, Aurora entered into a definitive agreement to acquire Whistler. Described as one of Canada's most iconic cannabis brands, it was the first company to be certified as a licensed producer of organic cannabis products in April 2014. Whistler offers Aurora a certified premium and differentiated organic product portfolio, which will help further expand its medical and consumer offerings in Canada.

US cannabis specialist Bhang, who make infused chocolates, gums, oral sprays and vapes, has expanded its presence to Florida, and is already available in California, Illinois and New Mexico. Bhang established a new Florida headquarters location in Miami and an agreement with Trulieve to bring its products to the Florida market. In addition, in June 2018, Bhang entered into a joint venture with Indiva for entry into Canada.

In December 2018, Altria paid US\$12.8 billion for a 35% stake in e-cigarette maker Juul. Could this be the forerunner to joint venture activity with cannabis company Cronos Group in which Altria also invested in 2018?

BRAND DEVELOPMENT

‘In 2019, cannabis companies will increasingly focus on building their brands and investing in their technology, pursuant to establishing global intellectual property portfolios,’

Tom Zuber, partner and founder of Zuber Lawler & Del Duca

Brand development has not been enabled simply by acquisition. Companies previously targeting the medical market are now exploring and launching recreational/lifestyle brands.

- Following on from its launch of the premium COVE brand, in October 2018, Cronos Group rolled out the Spinach cannabis brand on to the Canadian market.
- Heineken-owned craft brewer Lagunitas has been quick off the blocks with a new brand: Hi-Fi Hops is an ‘IPA-inspired’ sparkling water infused with THC, which it has rolled out in California.

With multiple international production and distribution platforms across five continents, market leading Cronos Group’s intention is to continue to expand at a global level by building an ‘iconic’ international brand portfolio and establishing ‘disruptive’ intellectual property. In the first quarter of the 2018 fiscal year, the company completed a rebrand of Peace Naturals, which included new brand packaging, modifications to the brand’s logo, refreshed marketing materials, a website update, an improved shopping portal experience, and new products such as strain-specific oils and limited-edition cultivars.

In anticipation of the forthcoming legalisation of topicals, Vancouver-based Ovation Science is focusing heavily on the opening up of the Canadian topical transdermal cannabis market. Under the name BASKiN GLOW, its latest transdermal product (which contains 500 milligrams of THC and 59 milligrams of CBD in a 59-gram jar) had previously only been available for sale in the US.

NEW PRODUCT DEVELOPMENT

The 2018 *Health Canada* survey revealed significant changes in the consumption behaviour of people who used cannabis for medical purposes in the past 12 months. Notable increases in consumption were recorded for cannabis oil cartridges/vape pens, which experienced the greatest percentage point increase between 2017 and 2018 (from 5% to 13%). These changes are having a bearing on product development activity as the market leading companies focus on product and strategic development that seeks to generate a broad portfolio of high-margin targeted medical and consumer products.

In October 2018, Aurora Cannabis received the necessary compliance go-ahead from *Health Canada* to commence sales of the first product from the company’s new high-potency, vape-ready CBD-oil product line, Aurora Cloud. The initial product release claims to be the first in a broader line of full-spectrum cannabinoid-based, vape-ready cartridge products that the company intends to launch in the near future.

Aurora’s launch of SoftGel Capsules took place in December 2018, when the company commenced shipments of cannabis softgel capsules to the Canadian medical and consumer markets from its Aurora Vie facility.

Zynerba Pharmaceuticals, Inc. (NASDAQ: ZYNE) is a market leader in pharmaceutically produced transdermal cannabinoid therapies for rare and near-rare neuropsychiatric disorders. Zynerba’s current product development programme includes clinical trials for the ZYN002 transdermal gel for children and adolescents with developmental and epileptic encephalopathies (DEE) who have few, if any, therapeutic options available.

‘Our aspirations and expectations are clear: To work closely with the US Food and Drug Administration to expand the opportunity for pharmaceutically developed CBD treatments that meet their rigorous medical

and manufacturing standards, and, in doing so, continue toward our goal of addressing significant unmet medical needs in neuro-psychiatric disorders.'

**Armando Anido,
Chairman and Chief Executive Officer**

For CBD products commonly consumed orally, including CBD oils in edibles and beverages, absorption is typically below 10%. Pressure BioSciences (PBI) has come to the market with ground-breaking technology that has the ability to create extremely small, nanometre-scale oil droplets that effectively dissolve in water (nanoemulsions) to provide optimised bioavailability for absorption into the bloodstream and stability. This opens up possibilities for more effective oil-water emulsions of nutraceuticals and supplements and potential for more effective oral and transdermal therapies. PBI claims that processing with the Ultra Shear Technology (UST) platform will deliver greatly improved absorption results (90% or higher) for CBD and other oil-based supplements. Nanoemulsions will also improve a product's visual appearance and sensory presentation.

Offering consumers a smoke-free alternative, Aphria Inc. has come to the market with its proprietary QuickStrip technology, an oral fast-dissolving drug delivery system ('Quick, Convenient, Precise, Discreet'). Exclusive rights have already been granted to license, manufacture, distribute and sell QuickStrip delivery technology for the German cannabis market in spring 2019. The company points to the potential for such expertise to be deployed in the US as a cancer support treatment.

Product development opportunities for medicinal cannabis are also being explored through joint venture activity.

'In 2019, I predict an increasing number of major pharmaceutical companies will be evaluating cannabinoid-based drug development programmes.'

**Sid Taubenfeld,
CEO of Jay Pharma**

Early in 2019, pharmaceutical company Sandoz Ltd, a division of Swiss drug-giant Novartis, linked up with Tilray to research medical-grade cannabis products. Tilray also stands to benefit from Sandoz's extensive Canadian distribution network.

In October 2018, Cronos Group Inc. announced that it had entered into a sponsored research agreement with the *Technion Research and Development Foundation of the Technion - Israel Institute of Technology* to explore the use of cannabinoids in regulating skin health and skin disorders (specifically three skin conditions: acne, psoriasis and skin repair).

“North America has a real opportunity to show the world the right approach to the legalisation of cannabis, for both medicinal and recreational use. Canada provides a great example of how to do it right from a regulatory standpoint.”

Andrew Grieve,
CEO,
Zenabis



Canada

MARKET OVERVIEW

 POPULATION
36.95M


 GDP
US\$1.7T


 RULING GOVERNMENT PARTY
LIBERAL PARTY

 TOTAL HEALTHCARE EXPENDITURE*
US\$253.5B

 ALCOHOL CONSUMPTION (LITRES PER CAPITA PER YEAR)
8.2

 PREVALENCE OF TOBACCO USERS
16%

 ESTIMATED NO. OF CANNABIS USERS, 2019
6.5M

 ESTIMATED NO. OF LEGAL CANNABIS PATIENTS, 2019
0.4 M

 AVERAGE COST PER GRAM OF CANNABIS
US\$28

*Estimate based on most recent expenditure as % of GDP

Source: World Bank/ WHO/ UNODC/ StatsCan/ Health Canada/ Prohibition Partners

Up from 36.62 million in 2017, the population of Canada grew to 36.95 million in 2018 (*Worldometers*) and is forecast to increase to 37.28 million in 2019. The three most populous cities are Toronto, Ontario (population: 2,930,000); Vancouver, British Columbia (population: 1,953,252); and Montreal, Quebec (population: 1,780,000).

Canada's Gross Domestic Product (GDP) was valued at US\$1,653 billion in 2017 (World Bank). The latest published figures highlight that YOY change in GDP for the third quarter of 2018 was 2.1%, up from 1.9% recorded in the second quarter of 2018.

As a result of major investments made in healthcare from the late 1990s and into the 2000s, the health-to-GDP ratio in Canada trended upward and peaked at 11.6% in 2010 (Canadian Institute for Health Information). Thereafter, healthcare spend per capita decreased in real terms (average of 0.2% per annum), negatively impacted by Canada's low-level economic growth and the government's imposition of fiscal restraint aimed at balancing budgetary deficits. In 2018, healthcare spending in Canada is estimated to have reached US\$253.5 billion (US\$6,839 per person), which represents 11.3% of Canada's GDP. Hospitals (28.3%), drugs (15.7%) and physician services (15.1%) continued to use the largest share of health dollars in 2018.

Beauty and personal care sales in Canada are estimated at US\$7.6 billion in 2019, up 1.8% on

2018 (Statista.com), with a CAGR of 1.4% forecast for the 2019–2023 period. The market's largest segment is skin care: US\$1,895 million in 2019, up 2.3% on 2018 and forecast to rise by 1.7% per annum (CAGR 2019–2023). Cosmetics sales (2019) are valued at US\$1,322.8 million (1.0% CAGR for 2019–2023) whilst hair care amounts to US\$1,259 million (2019) with a forecast annual CAGR of 1.3% for 2019–2023.

Against the backdrop of a 14% increase in per capita alcohol consumption since 1996, the Canadian federal, provincial and territorial health ministers launched Canada's Low-Risk Alcohol Drinking Guidelines (LRDG) in November 2011, which consisted of five guidelines and a series of tips to help Canadians (age 15+) reduce 'chronic alcohol-related harm'. Data collected from the yearly *Canadian Tobacco, Alcohol and Drugs Survey (CTADS)* would seem to indicate some success: alcohol consumption has dropped steadily from 10.20 litres in 2010 to 8.9 litres in 2016 and 8.2 in 2018 (significantly lower than in the US: 8.7 litres).

In 2015, 17.7% (4.45 million adults aged 15+) used tobacco every day. Since then the rate has levelled off, and an estimated 16% of Canada's population continue to smoke (with an estimated 45,000 smoking-related deaths each year). In May 2018, the Canadian government released a new federal tobacco control strategy to achieve a tobacco consumption target of less than 5% by 2035 (fewer than 1.8 million tobacco users). According to the most recent national survey (June 2018) by the International Tobacco Control (ITC) Policy

Evaluation Project at the University of Waterloo, most smokers in Canada support 'new and radical tobacco endgame strategies'.

Figures for Q4, 2018 released by the Canadian national statistics office (Statistics Canada) in February 2019 indicate that about 4.6 million people (15% of Canadians) aged 15+ reported using cannabis, unchanged from Q3, 2018, which indicated that legalising cannabis had not significantly changed how many people have been using the drug in the immediate aftermath of the legalisation of recreational use (October 2018). However, around 19% (around one in five) were considering using cannabis in the first quarter of 2019.

Unsurprisingly, the highest usage is reported in Toronto (22.75 tonnes per annum), but the city ranks as the tenth largest in terms of cannabis consumption and is low compared with the 77.44 tonnes per annum in New York (*Mass Roots* website 2019).

When Canada fully legalised the recreational use of cannabis on 17 October 2018, it became the world's first G7 country to do so, arguing that it would serve to quell the illicit drug trade and improve public safety. Industry commentators predict that 2019 will be an 'exciting year in the cannabis industry' (*Verano* company website, 2019) and a year of more change as edible cannabis, cannabis extracts and cannabis topicals become legal (forecast October 2019).

Key market trends:

- Consumption of cannabis for prescribed medical purposes has grown substantially in recent years and continues to rise: the number of patients prescribed cannabis between April and September 2018 rose by over 11% to reach over 342,000.
- Legalisation of recreational cannabis in October 2018 does not seem to have much changed how many people use the drug – at least in the immediate aftermath i.e. Q4, 2018.
- Consumers look at the quality and safety of

cannabis when deciding where to purchase it. Price and accessibility were second and third on the list.

- Cannabis is significantly cheaper in Canada compared with the US because there has been a longer history of a legal supply.
- Supply grew strongly in 2018 in anticipation of nationwide recreational legalisation in 2018 and continues to grow.
- High-level capitalisation is evident on the CSE, which lists about CA\$5 billion in cannabis-related companies out of a total of nearly CA\$9 billion market capitalisation in 354 companies (September 2018).
- Canadian licensed producers are attracting huge investment from major players in other consumer product segments. A key mover was the beverage giant Constellation Brands with its US\$4 billion investment in Canopy Growth, thereby increasing its stake to around 37% (August 2018).
- As tobacco use declines, the tobacco industry is eyeing up what potential the cannabis market has to offer: in its first major foray into cannabis, the tobacco-market leader Altria Group announced (December 2018) a US\$1.8 billion investment and increase in ownership (to 55%) in the Canadian cannabis producer Cronos Group.
- The Canadian cannabis market regulators are expected to approve cannabis-based products including beverages and edibles in October 2019.
- Alternative drug delivery methods (e.g. transdermal products, vape cartridges) are proliferating as companies rush to the market with smoke-free products.
- Canadian companies are also looking to international markets for growth with news of product development and distribution opportunities in the medical segment hitting the headlines. For example, Tilray has announced it will be working with Sandoz AG,

owned by Swiss drug company Novartis AG, to develop and distribute medical cannabis worldwide.

However, for all its promise and potential, the nascent cannabis industry is not free from problems. Cannabis legalisation is proving to be a double-edged sword for start-ups in Canada, of which there are a lot. On the one hand, sales growth can be robust, but the downside is high taxation and regulatory

costs. Major start-ups such as Aurora Cannabis Inc., founded in 2013, may have posted a huge revenue rise (430% in Q4, 2018), but losses have stacked up (net loss of CA\$238 million for the same period).

Perhaps this is why the market valuation explosion in Canada (which saw five of the country's licensed producers reach a combined market capitalisation of nearly US\$20 billion in 2018) is reported to have come to a close.

Price per gram of cannabis

	2015	2016	2017	2018	% POINT CHANGE 2015–18
CONSUMER PRICE	8.06	7.7	7.15	7	-13%
PRODUCER PRICE	5.1	4.94	4.68	4.58	-10%

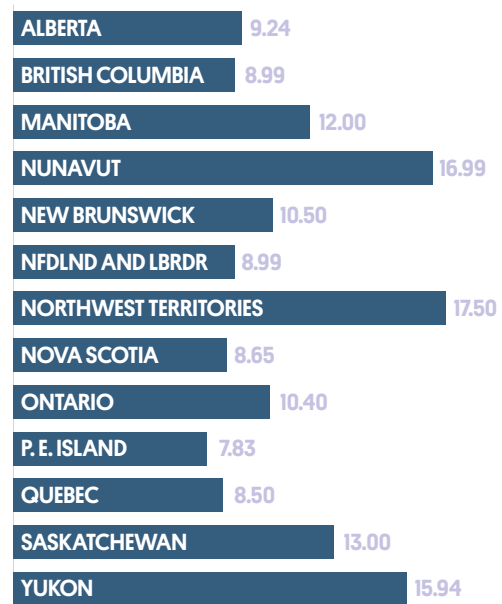
Source: Statistics Canada/ Prohibition Partners

The Statistics Canada figures demonstrate that the differential between the prices for producer and consumer favours the consumer.

It looks as though suppliers will continue to face an uphill struggle: producer prices have been falling steadily since 2015 as more companies come to the market. Producer prices in 2018 are down over 10% when compared with 2015.

The downturn was even steeper in certain segments: the licensed cannabis producer Aurora Cannabis Inc. cited a 21% drop in the average net selling price of dried cannabis and an even steeper decline in the price for cannabis extracts (25%) for its downturn in gross-profit margin in fiscal 2018.

TERRITORY OR PROVINCE | CA\$ PER GRAM



Source: Canadian Press/ CTV New Survey (October 2018)

Sales tracking figures are also available from other sources. *Wikileaf* (which tracks dispensary sales in North America in ounces – the usual measure for cannabis sales) puts the price of an eighth of an ounce of cannabis at US\$8 per gram (or US\$28 for the 3.5 grams) in Canada, which is 30% cheaper than in the US (US\$40). Underpinning this differential is the much longer history of legalisation in Canada and thus a larger supply of legal growers and sellers. This can present an attractive prospect to US visitors: someone from San Francisco visiting Vancouver can reportedly pay 39% less than at home.

A survey carried out by *CTV News* in October 2018 on online pricing revealed that the cost per gram was far higher in the territories of Nunavut, the Northwest Territories and Yukon than it was in the cheapest province.

It is the case that some companies are province-specific in their reach and this affects the price, but it is also the case that there are price differences for the same product across different states. For example, the price of Lemon Skunk (DNA Genetics) ranges from CA\$10 a gram in British Columbia to CA\$15.50 in New Brunswick. As online sellers can ship only to the province they are licensed to supply, consumers have no choice but to pay the

set price or get in their car and drive to a lower-price-point state.

In the CTADS of 2018, respondents were questioned on the average prices they had paid for cannabis in the previous 30 days. Results showed that people spent the most per unit on cannabis oil cartridges or vape pens (CA\$46 per cartridge), solid concentrates (around CA\$36 per gram) and liquid concentrates (just under CA\$44 per gram). The average price per unit for the more frequently used product types was CA\$8.6 per gram of dried flower/leaf; this represents a decrease in cost from CA\$11.4 per gram in 2017 and mirrors the findings of *Statistics Canada* in terms of it being a decrease although slightly higher in terms of the amount. Users paid CA\$13 per gram of hashish/kief, down from CA\$16.6 per gram in 2017.

Statistics Canada also tracks prices and sales of illegal as well as legal cannabis. The agency reported that the average price of a legal gram of medical cannabis in Q4 of 2018 was CA\$9.70, compared with the black-market price of CA\$6.51. *Statistics Canada* also revealed that nearly one third of consumers reported that they did not spend anything on the cannabis products they consumed.

Forecast Cannabis Market, Canada, 2019–2024

	2019 (EST.)	2020 (PROJ.)	2021 (PROJ.)	2022 (PROJ.)	2023 (PROJ.)	2024 (PROJ.)	CHANGE 2019–24
PROJECTED MEDICAL MARKET VALUE (US\$M)	876	922	970	1,021	1,075	1,131	+29%
PROJECTED RECREATIONAL MARKET VALUE (US\$M)	1,698	1,803	1,917	2,038	2,167	2,304	+36%
TOTAL (US\$M)	2,574	2,725	2,887	3,059	3,242	3,435	+33%

Source: *Prohibition Partners*

As legalisation continues apace, and as the industry evolves and market opportunities proliferate, the internet is awash with widely differing estimates for market values and projected growth rates across the globe, Canada included.

Nearly half of Canadians who reported using cannabis (to *Statistics Canada*; 2018) said they did so for non-medical reasons, while one-quarter said they used it for medicinal purposes. Spending on recreational products exceeds per capita spend on medical usage by a considerable margin.

In its national cannabis survey for Q4, 2018, *Statistics Canada* revealed that, in the immediate aftermath at least, legalising cannabis does not seem to have significantly changed how many people use the drug. Figures (Q4, 2018) released in February 2019 indicate that about 4.6 million people (15% of Canadians) over the age of 15 reported using cannabis in the previous three months, broadly in line with Q3. However, *Statistics Canada*'s data suggests it is likely to increase as one in five people are considering cannabis usage in 2019, and this will kickstart higher levels of market growth.

Taking into account a variety of factors and forecasting at a conservative level, Prohibition Partners (PP) forecasts that by 2024 the Canadian market will be worth around US\$3.4 billion, up 33% on 2019 estimates. Growth in recreational product sales is likely to increase (36%) as the market opens up for wide-ranging commercial expansion on the back of legislative changes in 2019.

But opening up shop or planting some seeds is not a guarantee of financial success for the companies seeking to cash in on the forecasted cannabis boom, because with legalisation has come more regulation, and this often means more costs in the form of higher taxes and regulatory costs.

Aurora Cannabis, the Edmonton, Alberta-based cannabis producer, shored up first mover advantage. Aurora, which holds an estimated 20% share of consumer sales in Can-

ada, saw revenue in the last quarter months of 2018 quadruple (rising to CA\$62 million, up 430% from the last three months of 2017). However, its net loss increased by a comparable percentage during the same period. Aurora reported a net loss of CA\$238 million in the same period, against a net profit of CA\$7.7 million for the previous year. The reasons for that growing loss are various and some of them underscore why the nascent cannabis industry is not free from the problems many start-ups face.

A dramatic fall in the net selling price of dried cannabis negatively impacted the company, the average net selling price of dried cannabis fell 21% and the price for cannabis extracts fell by 25%. The result was a marked reduction in the gross-profit margin. At the same time, the cost of sales per gram of cannabis that the company produced rose 36% in Q4/2018 to CA\$1.92.

These included operational costs such as increased or tighter packaging requirements imposed by the *Cannabis Act*.

Legal and regulatory environment

Health Canada first established regulations on access to cannabis for medical purposes in 2001, when the organisation granted access to cannabis for medical purposes to Canadians under the *MMAR*. Those who were licensed through *Health Canada* had three options for obtaining a legal supply of dried cannabis:

- 1) access *Health Canada*'s supply of dried cannabis;
- 2) apply for a personal-use production licence; or
- 3) designate someone to cultivate on their behalf with a designated-person production licence.

However, several years into the programme, few Canadians had obtained *MMAR* approval and many reported obtaining their supply of medical cannabis through illegal sources, suggesting many and substantial obstacles to access. Obstacles included a lack of information, product quality concerns and a confusing application process. As a result, the regulatory

framework underwent further change in 2013 and was reissued as the *MMPR* framework (*Marihuana for Medical Purposes Regulations*). Further amendments took place in 2014 and 2016. Then, in 2017 the Canadian House of Commons started discussions regarding non-medical cannabis.

Health Canada stated that ‘The legalisation of cannabis should eliminate or substantially restrict the illegal cannabis market, but if that occurs it will take time.’ (*A cannabis economic account – The framework*, November 2017)

Following on from the *Cannabis Act* of 2018, adults aged 18 or over (depending on province or territory) are able to:

- Possess up to 30 grams of legal cannabis, dried or equivalent in non-dried form in public.
- Share up to 30 grams with other adults.
- Purchase cannabis products from a provincial or territorial retailer.
- Grow up to four plants per residence (not per person) for personal use from licensed seeds or seedlings.

According to *Health Canada*, the protection of the health and safety of young people is a top priority and the purpose of the *Cannabis Act* is to:

- Prevent youth from accessing cannabis.
- Displace the illegal cannabis market.

The Act lays down serious criminal penalties for those who sell or provide cannabis to young people and has established for the first time that those who use youth to commit a cannabis offence are committing an offence that will incur strict penalties.

In addition, the Act prohibits:

- Products that are appealing to youth.
- Packaging or labelling cannabis in a way that makes it appealing to youth.
- Selling cannabis through self-service displays or vending machines.
- Promoting cannabis that could entice young people to use cannabis, except in narrow circumstances where it will not be seen by a young person.

The Act also stipulates that:

- Legal cannabis products can be sold only through retailers authorised by their provincial or territorial government.
- Legal cannabis products must have an ‘excise stamp’ on the package. The stamp has security features to prevent forgery, just like passports and banknotes. Each province and territory are assigned a colour for their excise stamp.
- Legal cannabis products must also carry the standardised cannabis symbol and mandatory health warning messages to provide information on risks of use.
- Adults are able to legally purchase fresh and dried cannabis, cannabis oils and seeds or plants for cultivation from authorised retailers.
- Adults are permitted to cultivate up to four cannabis plants per household (not per person). Provinces and territories may apply added restrictions on personal cultivation.
- Authorisation must be obtained from *Health Canada* to be able to grow cannabis for sale.

On 22 December 2018, *Health Canada* published in the *Canada Gazette, Part I*, draft regulations for edible cannabis, cannabis extracts and cannabis topicals. These regulations cover the production and sale of cannabis topicals and permit their legal sale by 17 October 2019.

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The biggest differences we see are 1) the broad competition in the North American market, which has a multitude of product offerings available, and 2) the strong awareness that already exists around CBD.



Alvaro Torres,
CEO,
Khiron Life Sciences

LICENCES AND AVAILABILITY

The latest report (November 2017) on the medical cannabis market by Canada.ca (the Government of Canada's digital presence) cited 73 licensed producers serving the Canadian market at the time, up from 55 earlier in the year, with numbers reportedly growing rapidly in anticipation of the legalisation of cannabis for recreational use.

The following restrictions apply to the medical market: clients have to submit their prescriptions to licensed producers online or by mail; licensed producers can advertise their products on web sites; there are no retail or wholesale intermediaries; importation and exportation of cannabis for medical purposes is rare and requires special circumstances (e.g. research projects) and government permits.

Licence costs and requirements

COUNTRY	TYPE OF LICENCE	REQUIREMENTS	PRICE
CANADA	<ul style="list-style-type: none"> Standard cultivation Standard processing Sale for medical purposes 	<p>Original police criminal record check(s). Global Positioning System (GPS) coordinates (for those cultivating). Original signatures on all documents. Appropriate schedules with the industrial hemp licence application. All supporting documents (from the Canadian Seed Growers' Association or Canadian Food Inspection Agency if required). Please note that a faxed application is enough to begin the application process, but the originals are needed before your licence can be issued.</p>	CA\$3,277
CANADA	<ul style="list-style-type: none"> Micro-cultivation Micro-processing Nursery 	<p>Original police criminal record check(s). Global Positioning System (GPS) coordinates (for those cultivating). Original signatures on all documents. Appropriate schedules with the industrial hemp licence application. All supporting documents (from the Canadian Seed Growers' Association or Canadian Food Inspection Agency if required). Please note that a faxed application is enough to begin the application process, but the originals are needed before your licence can be issued.</p>	CA\$1,638

COUNTRY	TYPE OF LICENCE	REQUIREMENTS	PRICE
CANADA	<ul style="list-style-type: none"> Security clearance application 	<p>Original police criminal record check(s). Global Positioning System (GPS) coordinates (for those cultivating). Original signatures on all documents. Appropriate schedules with the industrial hemp licence application. All supporting documents (from the Canadian Seed Growers' Association or Canadian Food Inspection Agency if required). Please note that a faxed application is enough to begin the application process, but the originals are needed before your licence can be issued.</p>	CA\$1,654
CANADA	<ul style="list-style-type: none"> Import/export permit fee 	<p>Original police criminal record check(s). Global Positioning System (GPS) coordinates (for those cultivating). Original signatures on all documents. Appropriate schedules with the industrial hemp licence application. All supporting documents (from the Canadian Seed Growers' Association or Canadian Food Inspection Agency if required). Please note that a faxed application is enough to begin the application process, but the originals are needed before your licence can be issued.</p>	CA\$610
CANADA	<p>Minimum fee per licensed site for:</p> <ul style="list-style-type: none"> Standard cultivation Standard processing Sale for medical purposes 	<p>Original police criminal record check(s). Global Positioning System (GPS) coordinates (for those cultivating). Original signatures on all documents. Appropriate schedules with the industrial hemp licence application. All supporting documents (from the Canadian Seed Growers' Association or Canadian Food Inspection Agency if required). Please note that a faxed application is enough to begin the application process, but the originals are needed before your licence can be issued.</p>	CA\$23,000

COUNTRY	TYPE OF LICENCE	REQUIREMENTS	PRICE
CANADA	Minimum fee per licensed site for: <ul style="list-style-type: none"> • Micro-cultivation • Micro-processing • Nursery 	Original police criminal record check(s). Global Positioning System (GPS) coordinates (for those cultivating). Original signatures on all documents. Appropriate schedules with the industrial hemp licence application. All supporting documents (from the Canadian Seed Growers' Association or Canadian Food Inspection Agency if required). Please note that a faxed application is enough to begin the application process, but the originals are needed before your licence can be issued.	CA\$2,500

Source: Prohibition Partners/ Canada Government

New licence applications

In 2018, Neptune Wellness Solutions Inc. announced that it had received its licence to process cannabis from *Health Canada*. Ethanol (solvent) processing capacity expansion is expected to start this fiscal year (subject to regulatory approval). Neptune Wellness Solutions Inc. aims to position itself among Canada's largest cannabis processors. There is additional and significant capacity for expansion in the Sherbrooke facility, which has a capacity of up to 6,000 metric tonnes to help meet the global demand for medical cannabis products.

Alongside applications for new licences are frenzied business development and expansion amongst the established players in the market. In the second half of 2018, Cannara Biotech succeeded in securing two private financing rounds that brought over CA\$55 million for the firm, adding to its already strong cash position of over CA\$40 million. With its newly completed 625,000 square foot indoor facility, the Quebec-based firm, which focuses on cannabis derivative products, then announced that it would begin trading on the CSE as of 14 January 2019.

TORONTO

FAIRMONT ROYAL YORK

NEW YORK

METROPOLITAN CLUB

5 & 7

CANNABIS EUROPA



November

2019

TRANSATLANTIC FORUM

Toronto, 5 November

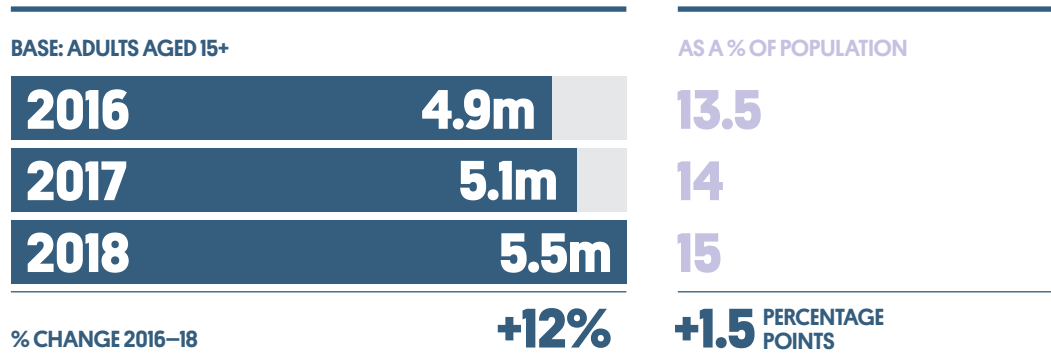
LEADERS SUMMIT

New York, 7 November



RECREATIONAL CANNABIS

Trends in recreational use



In 2018, *Health Canada* conducted its CTADS, which indicated that 15% of Canadians aged 15 and older (or 4.4 million) had used cannabis in the previous 12 months, up from 12% in 2015. Consumption peaks (33%) in the 20 to 24 years age group (19% among ages 15 to 19 years and 13% among ages 25 years and older). Although the percentage of the population in the 20–24 age bracket is forecast to further decline, it could be offset by an increase in consumption in older age groups as habits shift in the wake of legalisation.

Attitudes towards recreational cannabis

Following on from the CTADS, the 2018 Canadian Cannabis Survey aimed to gather additional data, such as changes to the willingness to publicly report cannabis use if legal, perceived risk of using cannabis in various ways and expected source of cannabis once it is legal. The findings were as follows:

When asked about their cannabis use for non-medical purposes, 22% of people reported having used cannabis in the previous 12 months, unchanged from the previous year. More men (26%) reported previous 12-month use compared with women (18%), unchanged from 2017. Full- or part-time students reported cannabis use during the previous 12 months (34%) at a higher proportion compared with non-students (19%).

The average age of initiating cannabis use was 18.9 years, unchanged from 2017, which is

comparable with the average age of 18.6 years reported in CTADS 2017. Females were slightly older than males when they first tried cannabis (19.2 and 18.5 years, respectively).

Smoking (89%) was the most common method of cannabis consumption reported by people who had used cannabis in the previous 12 months, a decrease from 2017 (94%). Other methods of consumption: eating it in food (42%), an increase from 34% in 2017; vaporising using a vape pen (26%), an increase from 20% in 2017; and vaporising using a vaporiser (14%), unchanged.

When asked about the number of sources that they used to obtain cannabis, the majority of people reported that they obtained cannabis from one source (55%), an increase from 52% in 2017, followed by two or three sources (34%), a decrease from 38% in 2017. Less common responses included growing their own (3%), four or five sources (4%), and six or more sources (3%).

When asked about their intentions if cannabis were to become legal for adults, 52% of people who had used cannabis in the previous 12 months expected to obtain their cannabis from a legal retail store, 10% expected to obtain it from a legal retailer by mail order; 6%, from a *Health Canada* licensed producer; 12%, grow at home; 16%, from someone sharing with them; and 5%, from an illegal source.

MEDICINAL CANNABIS

Trends in medicinal use

Trends in cannabis patients, April – September 2018

	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER
CANADA	307,397	320,073	330,344	337,480	341,402	342,103
Alberta	114,513	116,428	117,305	117,564	116,044	112,776
British Columbia	11,393	12,126	12,808	13,051	13,724	14,112
Manitoba	9,989	11,348	12,336	12,903	12,775	13,129
New Brunswick	6,709	7,050	7,231	7,497	7,655	7,715
Newfoundland and Labrador	3,274	3,506	3,704	3,768	3,778	3,879
Northwest Territories	162	167	170	162	171	168
Nova Scotia	12,689	13,003	13,416	13,658	13,869	13,800
Nunavut	62	67	61	60	61	63
Ontario	129,431	136,528	143,082	147,861	152,189	155,217
Prince Edward Island	1,279	1,286	1,413	1,515	1,577	1,610
Quebec	8,844	9,410	9,663	10,053	10,439	10,667
Saskatchewan	8,930	9,027	9,024	9,252	8,968	8,807
Yukon	122	127	131	136	152	160

Source: Health Canada, December 2018

Under the Cannabis Act 2018, the new regulations remove personal storage limits for patients. Like any adult Canadian, authorised cannabis patients can store as much cannabis as they want at home. Public possession limits remain the same for authorised patients who are registered with a federally licensed seller or with *Health Canada*: the lesser of 150 grams or a 30-day supply of dried cannabis (or the equivalent in cannabis

product) in addition to the 30 grams allowed for non-medical purposes.

The medical cannabis consumer

Some 70% of medicinal cannabis users are more likely to use it daily or almost daily, and these people are less likely to smoke it. Medical users are more likely to report spending on cannabis than those who use it for

non-medical reasons, according to a 2018 study from *Statistics Canada*. Some 95% of medical cannabis users with documentation and 85% of medical users without documentation purchased cannabis in the last three months of 2018.

A 2017 survey by *Health Canada* of medical cannabis users found that 97% of users said medical cannabis helped to manage their symptoms/disease, whilst 68% said medical cannabis helped to decrease their use of other medications. The number of Canadians using legal cannabis in the first three months of 2019 grew from 23% of users (954,000) to 47% of users (2.5 million). Some 5.4 million people aged 15 and over reported using cannabis in the first three months of 2019, a 4% increase on 2018.

The Canadian user demographic remains fairly steady; predominantly male and young – 22% of Canadian men consume cannabis, compared with 13% of women.

USAGE TRENDS

Canada

The 2018 *Health Canada* survey revealed significant changes in the consumption behaviour of people who used cannabis for medical purposes in the previous 12 months. Notable increases in consumption were recorded for:

Cannabis oil from a *Health Canada* licensed producer (21%, an increase from 14% in 2017), liquid concentrate (16%, an increase from 11% in 2017), tinctures (16%, an increase from 10% in 2017), topical ointments (14%, an increase from 7% in 2017) and cannabis oil cartridges/vape pens (13%, an increase from 5% in 2017).

Product development in these subsectors is on the increase with Aurora Cannabis receiving the necessary compliance go-ahead from *Health Canada* in October 2018 to commence sales of the first product from the company's new high-potency, vape-ready CBD oil prod-

uct line, Aurora Cloud. In addition, PharmaCielo is focusing on medicinal-grade cannabis oil extracts and related products and not dried flowers for medical patients in Canada.

The 2018 Canadian Cannabis Survey asked questions of cannabis users about cannabis use for medical purposes: 13% of respondents aged over 16 indicated that they used cannabis for medical purposes, an increase from 12% in 2017. Provincial and territorial estimates ranged from 4% to 20%.

Significantly, the majority of people who used cannabis for medical purposes reported that cannabis use helped decrease their use of other medications (68%).

Those people who used cannabis for medical purposes in the previous 12 months and who completed the medical section of the survey spent approximately CA\$115 on cannabis for medical purposes in a typical month. These amounts were unchanged from 2017.

People who used cannabis for medical purposes in the past 12 months were also asked about how they sourced their medical cannabis. The results were revealing: the highest percentage (30%) obtained it from a friend, 28% from a dispensary or compassion club (a not-for-profit medical cannabis dispensary), 24% from a *Health Canada* licensed producer, 13% from an online source other than a *Health Canada* licensed producer, and 13% from a dealer.

Significantly, the proportion reporting compassion club/dispensary and *Health Canada* licensed producer as a source was unchanged from 2017, but the proportion reporting obtaining cannabis from the black market decreased from 22%.

Other products reportedly used by the respondents for medical purposes included cannabis oil from a *Health Canada* licensed producer (21%, an increase from 14% in 2017).

HEALTHCARE ANALYSIS

Healthcare overview, Canada, 2018 or most recent year

TOTAL HEALTHCARE EXPENDITURE 2018

TOTAL PHARMACEUTICAL SPENDING

US\$ 253.5 b

US\$ 45.1 b

Source: CIHI/ OECD/ INCB/ Prohibition Partners

The *Canadian Institute for Health Information* states that in 2017, US\$10.8 billion (42.7%) of total prescribed pharmaceutical spending (US\$253.5 billion) was financed by the public sector. Canadians, whose drug costs equalled CA\$10,000 or more, represented 2% of claimants and accounted for more than one third of public drug spending that year. An estimated one in four Canadians received a benefit from a public drug programme (2017).

In 2018, healthcare spending in Canada was estimated to have reached US\$253.5 billion, 11.3% of Canada's GDP. Industry sources high-

light the Canadian government's determination to embrace a wide-ranging plan to reduce the cost of healthcare to the state, and the legalisation of cannabis is one such measure.

Data from *Health Canada* shows that in June 2017, there were 201,398 registered medical cannabis clients in Canada. This figure rose steadily over the next 12 months to reach 330,758 in June 2018, rising to 342,103 in September. The Alberta and Ontario regions combined accounted for over 78% of the total number.

COMMERCIAL OPPORTUNITIES

Forecast value of Canadian cannabis market, by sector, 2024

	FORECAST MEDICAL CANNABIS MARKET VALUE 2024	FORECAST RECREATIONAL CANNABIS MARKET VALUE 2024	TOTAL 2024
TOTAL	US\$1.1b	US\$ 2.3 b	US\$ 3.4 b

Source: Prohibition Partners

One year on from fully legalising the recreational use of cannabis, further legislation change in October 2019 is expected to approve the production and sale of edible cannabis, cannabis extracts and cannabis topicals, which will open up the market for cannabis-based beverages and foodstuffs as well as for consumer products such as skincare and other topicals.

New product development

Preferred product formats are changing and this is impacting on product innovation as the market-leading companies focus product and strategic development on generating a broad portfolio of high-margin targeted medical and consumer products.

In November 2018, Mark Hunter, CEO of Molson CoorsCBD, when talking about the Canadian CBD beverage market in Canada, was quoted as saying: 'I think, if you take an average, then it suggests that this market may be somewhere between \$7 billion and \$10 billion in market value, with beverages somewhere between 20% and 30%. And that's obviously non-alcoholic cannabis-infused beverages.'

Aurora's launch of SoftGel Capsules took place in December 2018 when the company commenced shipments to the Canadian medical and consumer markets from its Aurora Vie facility.

In September 2018, Aleafia Health Inc. and Cronos Group Inc. announced the launch of a joint medical cannabis study to improve the

management and treatment of insomnia and daytime sleepiness. The study was funded in part by Peace Naturals Project Inc., a licensed producer of medical cannabis that is wholly owned by Cronos Group.

In terms of sales, skincare is one of the most vibrant sectors of the Canadian beauty and personal care market and a significant focus for producers and retailers alike. Consumers are expanding their skincare basics with new and different textures, and hydration products and trends. For example, the Korean beauty trend, which aims to create the appearance of dewy and luminous skin, continues to grow in popularity; it follows that CBD-enhanced topicals are a focus for product development activity.

In anticipation of the forthcoming legalisation of topicals, Vancouver-based Ovation Science is focusing heavily on the opening up of the Canadian topical transdermal cannabis market. Under the name BASKiN GLOW, its latest transdermal product (which contains 500 milligrams of THC and 59 milligrams of CBD in a 59-gram jar), which is currently only available for sale through dispensaries in Nevada and California, will be launched in Canada.

Clinical trials

As of March 2019, Aurora Cannabis had completed or had in progress 40 clinical trials and case studies, had in progress seven pre-clinical trials, and was developing six new partnerships with leading academic institutions. CanniMed was undertaking ongoing research into the efficacy of medical cannabis through

its clinical trial programme involving patients with osteoarthritis of the knee, Tourette's syndrome and juvenile epilepsy.

In August 2018, *Health Canada* approved Canopy Animal Health to undertake clinical trials to test the efficacy of cannabidiol as a treatment for anxiety in animals. This marked the first time that a company had requested federal regulatory approval to use cannabidiol as a therapeutic treatment for animals.

Brand development

Competition is intensifying and margins are declining, and as the market matures, consumer requirements are becoming increasingly sophisticated, with expectations of products that deliver consistent and predictable experiences. There is increasing pressure on consumer brands to offer a differentiated brand promise.

In anticipation of Canada becoming the first G7 country to federally legalise recreational cannabis, September 2018 saw Cronos Group Inc. announce the launch of its second cannabis brand for the domestic recreational market (the first being the premium COVE brand). With a playful tagline (Warning: Spinach may be a gateway to pizza), Spinach is focused on offering Farm-To-Bowl products and a way to 'Get-Your-Greens' with no additives.

'Cronos Group's first priority is responsible distribution so we made sure to select a brand name that we felt would not appeal to kids.'

Mike Gorenstein, CEO of Cronos Group

Companies are also looking to wide-ranging brand portfolios as a means of covering the widest range of tastes and market niches. Branding identities are strong as firms seek to stand out in the cannabis marketplace. Cannara's initial product portfolio included seven brands.

Joint venture activity in medical and recreational

Product development opportunities are also being explored through joint venture activity. In October 2018, Cronos Group Inc. entered into a sponsored research agreement with the

Technion Research and Development Foundation of the Technion – Israel Institute of Technology to explore the use of cannabinoids in regulating skin health and skin disorders (specifically three skin conditions: acne, psoriasis and skin repair).

We believe that the potential applications of cannabinoids to regulate skin health and treat skin disorders are vast, and we are excited to begin exploring these applications through our partnership with Technion



Mike Gorenstein, CEO of Cronos Group

The rising demand for cannabis, together with a decline in alcohol consumption and smoking, has led to alliance activity from the alcohol and tobacco industries.

As described in the 'Company Activity' section of this report, in December 2018, Anheuser-Busch InBev and Tilray, Inc. announced that they would enter into a US\$100 million joint venture to research cannabis-infused non-alcoholic drinks for the Canadian market. AB InBev's Labatt Breweries of Canada, owner of the Labatt Blue and Budweiser brands, will work with Tilray's Canadian cannabis subsidiary, High Park Co., which develops and sells cannabis products in Canada. AB InBev and Tilray are reported to be investing up to

US\$50 million into research of drinks containing CBD and THC. Commercialisation is highly likely to follow, and Tilray seems to be aiming to have the beverages ready for launch as soon as Canada makes it legal to do so.

In a more modest deal that same month, Molson Coors, the second largest beer maker in North America, struck a Canadian joint venture with cannabis producer Hexo Corp to make cannabis drinks.

Neptune Wellness Solutions entered into collaboration (announced December 2018) with the Swiss company Lonza for the production of value-added capsules. The aim is to combine Lonza's Licaps liquid-filled hard capsule technology with Neptune's extraction and purification capabilities, thereby allowing Neptune to expand from being a service provider to other licence holders to being a provider of differentiated cannabis products to Canada's consumers.

In anticipation of edibles becoming legal in the Canadian cannabis market in October 2019, the American company Bhang entered into a joint venture with Canadian cannabis producer Indiva for the manufacturing and distribution of its products. The edible products from Bhang, most notably its line of award-winning chocolates, are already on sale in the US cannabis market, and Bhang hopes its early partnership move into the nascent Canadian edibles market will be fruitful.

'We are excited to bring future Canadian consumers the opportunity to learn more about the benefits and safe usage of our edible products.'

Scott Van Rixel, CEO of Bhang, Feb 2019

Growth in vertical integration and supply ventures

In July 2018, Cronos Group announced a 50/50 joint venture with a group of investors led by Bert Mucci, a leader in large-scale greenhouse operations in Canada, to create a new partnership, Cronos Growing Company Inc. ('Cronos GrowCo'). The aim is to construct a purpose-built, GMP-standard greenhouse

(850,000 square feet) on land to be acquired by Cronos GrowCo in Ontario. Construction of the greenhouse has commenced and once fully operational (2020), the facility could reach an annual production capacity of 70,000 kilograms of cannabis.

The aim of the partnership between Cronos Group and Ginkgo Bioworks Inc. is to produce cultured cannabinoids through fermentation that will replicate those extracted from the cannabis plant. The three-year research and development partnership (US\$22 million) is focused on producing large volumes of eight cannabinoids from 'custom yeast strains' using existing fermentation infrastructure, including with breweries or pharmaceutical contract manufacturing operations, so as not to incur major capital expenditure. In addition, tranches of Cronos Group's common shares will be issued to Ginkgo if it can demonstrate that the microorganisms are capable of producing the target cannabinoids for less than US\$1,000 per kilogram of pure cannabinoid at a scale of greater than 200 litres.

In August 2018, Cronos Group entered into a supply agreement with the US company Cura Cannabis Solutions. The five-year supply agreement (for the purchase of a minimum of 20,000 kilograms of cannabis per annum from Cronos GrowCo) is dependent on Cura receiving all the necessary licences from *Health Canada*.

In 2018, Neptune Wellness Solutions Inc. (which specialises in the extraction, purification and formulation of health and wellness products) announced that it had received its licence to process cannabis from *Health Canada*. It had anticipated completion of Phase II capacity investment by March 2019, which would increase its facility's input capacity to 200,000 kilograms of dried cannabis, up from a current capacity of 30,000 kilograms. The company reckons it will position Neptune among Canada's largest cannabis processors. Neptune is also in the process of applying for additional authorisation for sale of cannabis products to complement the processing licence, allowing for more vertical integration

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help grow your products



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access to licensed producers and product globally



DISTRIBUTION

help create distribution agreements



MEDIA

access to leading media organizations



FEE STRUCTURE

cash, equity and cash-equity



SUCCESS

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pjmccartan@astellae.com

and direct distribution of finished cannabis products to consumers and patients.

Acquisitions

Canopy Growth's ambitions for expansion are looking favourable with the cannabis industry's largest investment by Corona beer maker Constellation Brands into the Canadian cannabis producer.

In the tobacco industry's first major foray into cannabis, Altria Group invested US\$1.8 billion for up to 55% of the Canadian cannabis producer, Cronos Group, as a declining tobacco market offers less and less value and the cannabis market opens up.

In January 2019, Aurora entered into a definitive agreement to acquire Whistler. Described as one of Canada's most iconic cannabis brands, it was the first company to be certified as a licensed producer of organic cannabis products in April 2014. What Whistler offers Aurora is a certified premium and differentiated organic product portfolio that will help further expand its medical and consumer offerings in Canada.

Hot on the heels of news of the AB InBev/Tilray joint venture came news of Tilray's acquisition of hemp food maker Manitoba Harvest for US\$318 million, opening up the market for Tilray to develop wellness products and hemp-based consumer food products.

Retail innovation and expansion

In March 2019, The Hunny Pot Cannabis Co. store in Toronto achieved a historic milestone when it was awarded the first cannabis retail licence by the *Alcohol and Gaming Commission of Ontario (AGCO)*, which is a move that signals a sea-change in cannabis retail.

The last 12 months have seen Aurora further diversify its retail strategy, opening up additional retail opportunities across Canada. In 2018 (Q2), Aurora increased its investment in Choom Holdings, a consumer cannabis company that has secured one of the largest retail networks in Canada, and invested in High

Tide Inc., an Alberta-based, retail-focused cannabis and lifestyle accessories company. Aurora is also reportedly eyeing up the Ontario retail market.

In pursuit of a retail presence, Indiva made an investment (January 2019) in RetailGo aimed at accessing leases for ten proposed retail locations in Ontario.

International expansion

The partnership between Cronos Group and Colombian company Agroidea SAS has led to the establishment of a newly formed entity, NatuEra S.à r.l. (NatuEra in Colombia will develop, cultivate, manufacture and export cannabis-based medical and consumer products for the Latin American and global markets).

Neptune Wellness Solutions Inc.'s licence from *Health Canada* to process cannabis was a major step in a huge business expansion scheme that aims to harness the potential for huge expansion at its Sherbrooke facility (up to 6,000 metric tonnes) to meet global demand for medical cannabis products.

The purpose of Aurora's acquisition of Whistler was not simply to expand its offer to the Canadian market but was an opportunity for international expansion of its medical and consumer product portfolio.

When, in late 2018, Aurora acquired ICC Labs Inc., a leading producer and distributor of CBD and cannabinoid products in South America, it reportedly established Aurora as the industry leader in South America. ICC Labs claims to have a 70% market share in Uruguay and is licensed to produce medical cannabis in Colombia.

In December 2018, Aurora entered into a Letter of Intent to acquire Farmacias, Mexico's first and only federally licensed importer of raw materials containing THC, which is also licensed to manufacture, store and distribute medical cannabis products (containing over 1% THC). Aurora now has a significant advantage in Mexico, where more than 130 million people will have legal access to a range of Aurora's medical cannabis THC products.

LOCAL EXPERT ANALYSIS:

MEGAN MCCRAE, BOARD CHAIR OF CANNABIS COUNCIL OF CANADA, VP OF MARKETING, APHRIA

What are the key considerations for cannabis producers in Canada at present?

I believe there are a tremendous amount of opportunities for the cannabis sector here in Canada, but globally as well. Where to focus to drive the best value for your organisation is on the mind of each LP [licensed producer] at present. Where to play? How to play? How to leverage your organisation's core competencies?

How will the legalisation of cannabis edibles (suggested timing is mid-December 2019) affect and drive the market?

I expect that, with the introduction of new product categories, Canada will see a significant shift in the market. Our research shows that new users to the category are eagerly anticipating these new products, mainly driven by a disinterest in smoking. There are many people out there who are 'canna-curious' but quite opposed to smoking. Edible products offer a different alternative and a new way to experience the category. Innovation is going to be key – flavours, textures, something different. We're going to see this category evolve

as a true CPG [Consumer Packaged Goods] category in every sense.

That said, we can't underestimate the importance of the traditional flower category, and the upcoming vape category as well. What's great about cannabis is that each product type, and even strain, can offer a different type of experience. So, long story short, the cannabis industry will absolutely grow as a result of these new products coming online.

Where do you think the biggest growth in the Canadian cannabis industry will come from?

I believe that the wellness category represents a massive opportunity – that is, once regulations allow it to be treated as such. CBD infused products are known to provide so many benefits, from anxiety and pain relief to sleep support. The plant has an incredible amount of beneficial properties – and I'm sure that, with time, we will see it represented as such in the market. I'd love to see a world where CBD/wellness products are sold alongside vitamins and supplements, and not through a dispensary.

What will be the key drivers?

Regulation, innovation.

” In Canada, the support of the government to recognise the incredible opportunity we have as a country to be world leaders in cannabis would be a key factor in my mind. We have the chance to be world leaders in cannabis, but we need support to make this happen.

Megan McCrae,

Board Chair of the Cannabis Council of Canada



What else needs to change in order to unlock potential in the industry?

In Canada, the support of the government to recognise the incredible opportunity we have as a country to be world leaders in cannabis would be a key factor in my mind. We have the chance to be world leaders in cannabis, but we need support to make this happen.

How do you see North America's involvement in the global cannabis industry evolving? What is your 12-month and five-year outlook for the industry?

I believe the next 12 months will see the stabilisation of supply, increased retail certainty and presence and, of course, the first wave of new emerging categories. Within five years? The market evolves so quickly, and external influences, like the US participation in the category and further globalisation, can shift how the industry develops in such significant ways. I am sure, however, that we will see a much more stable market, globalisation, recognised brands, a constant pipeline of product innovation and the emergence of the wellness category. This will no longer be such an emerging category, and will surely develop into a stable and growing industry that is multi-faceted and ever evolving.

United States of America

MARKET OVERVIEW



POPULATION
328.3M



PREVALENCE OF TOBACCO USERS
14%



GDP
US\$19.4T



ESTIMATED NO. OF CANNABIS USERS, 2019
55M



RULING GOVERNMENT PARTY
REPUBLICAN



ESTIMATED NO. OF LEGAL CANNABIS PATIENTS, 2019
3.9 M



TOTAL HEALTHCARE EXPENDITURE*
US\$3.5T



AVERAGE COST PER GRAM OF CANNABIS
US\$11.5



ALCOHOL CONSUMPTION (LITRES PER CAPITA PER YEAR)
9.8

*Estimate based on most recent expenditure as a % of GDP

Source: World Bank/WHO/UNODC/Prohibition Partners

According to a 2017 survey by Yahoo News and Marist College:

50%
OF AMERICAN ADULTS HAVE TRIED CANNABIS (AT LEAST ONCE IN THEIR LIVES)

22%
[AROUND 55 MILLION] CURRENTLY USE IT ('CURRENT USE' DEFINED AS HAVING USED CANNABIS AT LEAST ONCE OR TWICE IN THE PAST YEAR).

NEARLY
35 million
ARE REPORTED TO USE CANNABIS AT LEAST ONCE OR TWICE A MONTH ('REGULAR USERS')



Source: Yahoo News and Marist Poll

The US is the world's largest cannabis market even though it has not allowed legalisation of cannabis on a federal scale. Developments in individual states with regards to legalisation are helping to drive the market forward: at the time of writing this report, 33 states

and Washington DC had approved the medical use of cannabis, and 11 states and Washington DC had legalised recreational adult use.

Industry research indicates that the citizens of New York City smoke more cannabis than do citizens of any other city in the entire world, by some considerable margin: 77.4 tonnes of cannabis per annum compared with Karachi (42) and Delhi (38.3). Other major centres for cannabis consumption in the US are Los Angeles (36.1) and Chicago (24.5).

In 2018, *Wikileaf* looked at the prices at various cannabis dispensaries across the US and found that, on average, consumers paid US\$40 for an eighth of an ounce of cannabis (the equivalent of US\$11.5 per gram). It remains to be seen whether the legalisation of industrial hemp will negatively affect legal cannabis sales, but it is generally agreed that it will give the pro-cannabis movement even more momentum.

Future expectations

The federal government is expected to increasingly embrace the notion of removing cannabis from Schedule I of the Controlled Substances Act. The key drivers will remain recognition that cannabis prosecution disproportionately impacts minorities, that legalisation can reduce opioid addiction and deaths and that cannabis tax revenue is an obvious attraction to local authorities. Nevada has reportedly earned nearly US\$20 million in tax revenue from cannabis sales since the recreational market was legalised in January 2017.

In 2017, Oregon was able to access US\$85 million from taxation revenue on cannabis to fund schools, public health initiatives, state police and local government.

There has been further and rapid movement to legalise recreational cannabis in some major conurbations and although New York failed in its bid, Illinois legalised in June 2019. Other states will likely follow their lead.

As the world's largest cannabis market, California will continue to attract investment and attention: significantly, its tighter regulations and policing of non-compliant operators are creating an attractive business climate for professional national operators who have been waiting on the side-lines for entry and to be able to operate as they do in other states.

The number of cannabis companies listing on public exchanges will continue at a rapid pace and further market consolidation will ensue.

Cannabis companies will increasingly focus on building their brands as they engage with state-to-state licensing deals and invest in technology with the aim of establishing global intellectual property portfolios.

Regulatory change has also allowed manufacturers to produce cannabis not only in forms of flower, but also in different formats such as capsules, tinctures, creams and oils.

LEGAL AND REGULATORY ENVIRONMENT

Cannabis prohibition in the US began 80 years ago when the federal government banned the sale, cultivation and use of the cannabis plant. On a federal level, cannabis is still classified (along with heroin, ecstasy and peyote) as a Schedule I drug with a 'high potential for abuse'. But there are anomalies: one medication, GW Pharma's epilepsy treatment, Epidiolex, has been approved by the FDA.

As growing numbers of politicians consider it counterproductive not to legalise cannabis, or at least try to back states to have the right to make their own decisions, and the majority of consumer opinion is in favour of legalisation, the pro-cannabis movement gathers momentum. Congress introduced the bipartisan *Strengthening the Tenth Amendment Through Entrusting States (STATES) Act* in June 2018, which was intended to protect states' rights to determine their own cannabis laws without federal interference.

There has been no shortage of surveys on consumer attitudes to cannabis consumption, and the findings are, broadly speaking, the same, with support for legalisation reaching new highs in 2018. This view prevails despite the federal government's official classification of cannabis production and distribution as a felony.

In addition to the 11 states (plus Washington DC) that have legalised recreational as well as medical cannabis, by mid 2019, the following 22 states had legalised cannabis for medical purposes only: Arizona, Arkansas, Connecticut, Delaware, Florida, Hawaii, Louisiana, Maryland, Minnesota, Missouri, Montana, New Hampshire, New Jersey, New Mexico, New York, North Dakota, Ohio, Oklahoma, Pennsylvania, Rhode Island, Utah and West Virginia.

Pivotal to industry change was the passing of the *2018 Farm Bill* in December 2018 that amended the term 'marihuana' (a term currently found in the 1972 Controlled Substances Act) to exempt hemp, which is defined as a cannabis plant containing less than 0.3% THC. The passing of the bill has opened up a huge new industry to farmers across the country.

However, industry experts highlight a huge obstacle – is it feasible that the US *Food and Drug Administration* (FDA) – the federal agency responsible for deciding on what is a 'drug' and on which drugs are 'safe' and 'effective' – could approve the cannabis plant as a safe and effective drug or the smoking of cannabis as a non-hazardous medical intervention?

The active ingredients and directions for use are specified for pharmaceuticals and their inclusion on packaging is a legal requirement. There are no comparable measurements for the components of smoked cannabis nor could directions for use specify number, depth or length of inhalations. It is, therefore, not known how much cannabis a patient is consuming and this makes it impossible for a doctor to prescribe precisely.

The movement to end cannabis prohibition in the US continued its steady advance in the 2018 midterm elections, with voters in three states approving ballot measures to regulate and not prohibit the use of cannabis for medical purposes by adults.

Utah and Missouri became the 31st and 32nd

states to adopt comprehensive medical cannabis laws, while Michigan (December) became the tenth state to legalise cannabis and authorise a regulated cannabis market for recreational use among adults over 21. However, an initiative in North Dakota failed.

Vermont became the first state to legalise cannabis through legislature rather than a ballot initiative in January 2018, when the governor signed the bill into law. Oklahoma also voted to legalise medical cannabis in June 2018.

ALASKA

In early 2015, the northernmost US state made it legal for residents aged over 21 to use, possess and transport (up to an ounce of) cannabis for recreational use. The first 'pot shop' opened for business in late 2016 and paved the way for these shops becoming tourist destinations (an estimated two million people visit Alaska every year, spending around US\$2 billion).

CALIFORNIA

With almost 40 million residents and the longest-running medical cannabis programme in the US (it was the first state to legalise medical cannabis back in 1996), California is easily the largest cannabis market in the US (more than US\$2.2 billion in sales through state-licensed channels in the first 11 months of 2018) and will continue as top dog for the foreseeable future.

Recreational use became legal in California in 2016 and allowed for the use and transportation of up to an ounce of cannabis. Adults over 21 are also legally permitted to buy up to eight grams of cannabis concentrates (e.g. in edibles) and grow up to six cannabis plants (per household). However, not all Californians can legally smoke cannabis. In many cities in the Central Valley, including Fresno and Bakersfield, campaigning to ban recreational sales is vigorous.

COLORADO

Colorado joined Washington in becoming the first to fully legalise cannabis in 2012 (and is now known for more cannabis dispensaries than for Starbucks and McDonalds combined).

In 2015, nearly 55% of Coloradans voted for legalisation, and nearly three years after implementing recreational sales (2016), residents and tourists (over the age of 21) could buy up to one ounce of cannabis or eight grams of concentrates. However, like California, some counties and cities in Colorado have passed more restrictive laws.

ILLINOIS

On 25 June, Illinois became the first state to legalise a comprehensive adult-use cannabis market through its legislature.

Starting on 1 January, Illinois residents over the age of 21 will be allowed to possess up to 30 grams of cannabis, and adult visitors will be allowed to possess up to 15 grams. Medical cannabis patients will be allowed to grow up to five plants at home, though growing at home for social use will not be allowed. Cannabis flower containing less than 35% THC will be taxed at 10%; products that contain over 35% THC (such as vape oils and other concentrates) will be taxed at 25%; and cannabis-infused products will be taxed at 20%.

MAINE

Although a ballot initiative gives Mainers the right to possess more than double the limit than in most other states (up to 2.5 ounces of cannabis), residents have, to date, been unable to buy the drug. This looks set to change as lawmakers in Maine reached an agreement in May 2018 to make the legalisation bill law, and cannabis dispensaries are expected to open state-wide by 2019.

MASSACHUSETTS

Back in 2016, 54% of Massachusetts residents voted in favour of Question 4, a legalisation measure designed to regulate cannabis like alcohol, which gave residents the green light to carry and use an ounce of cannabis and grow up to 12 plants in their homes. However, red tape has been a major impediment in getting product into licensed dispensaries, and it was only in late 2018 that the first two recreational dispensaries in the state opened for business with Northampton Mayor (David Narkewicz) reportedly being the very first customer for one of the two newly opened dispensaries.

MICHIGAN

In November 2018, voters in Michigan passed Proposition 1, making it the first state in the Midwest to legalise the possession and sale of cannabis for adults 21 and over. The law is more permissive than in other states that have legalised cannabis and will allow possession of up to 2.5 ounces of cannabis and home cultivation of up to 12 plants.

NEVADA

Less than two weeks after sales of recreational cannabis began on 1 July 2017, many stores in Nevada ran out of the product to sell to residents and tourists (aged 21 and over, who can legally buy an ounce of cannabis or one eighth of an ounce of edibles or concentrates). However, it is not all good news if you want to grow your own; in order to be eligible for a grower's licence, Nevada residents must live more than 25 miles from the nearest dispensary.

OREGON

Oregonians gained the right to carry an ounce of cannabis, grow up to four plants at home in 2015 and give edibles as a gift, as long as they are consumed in private.

VERMONT

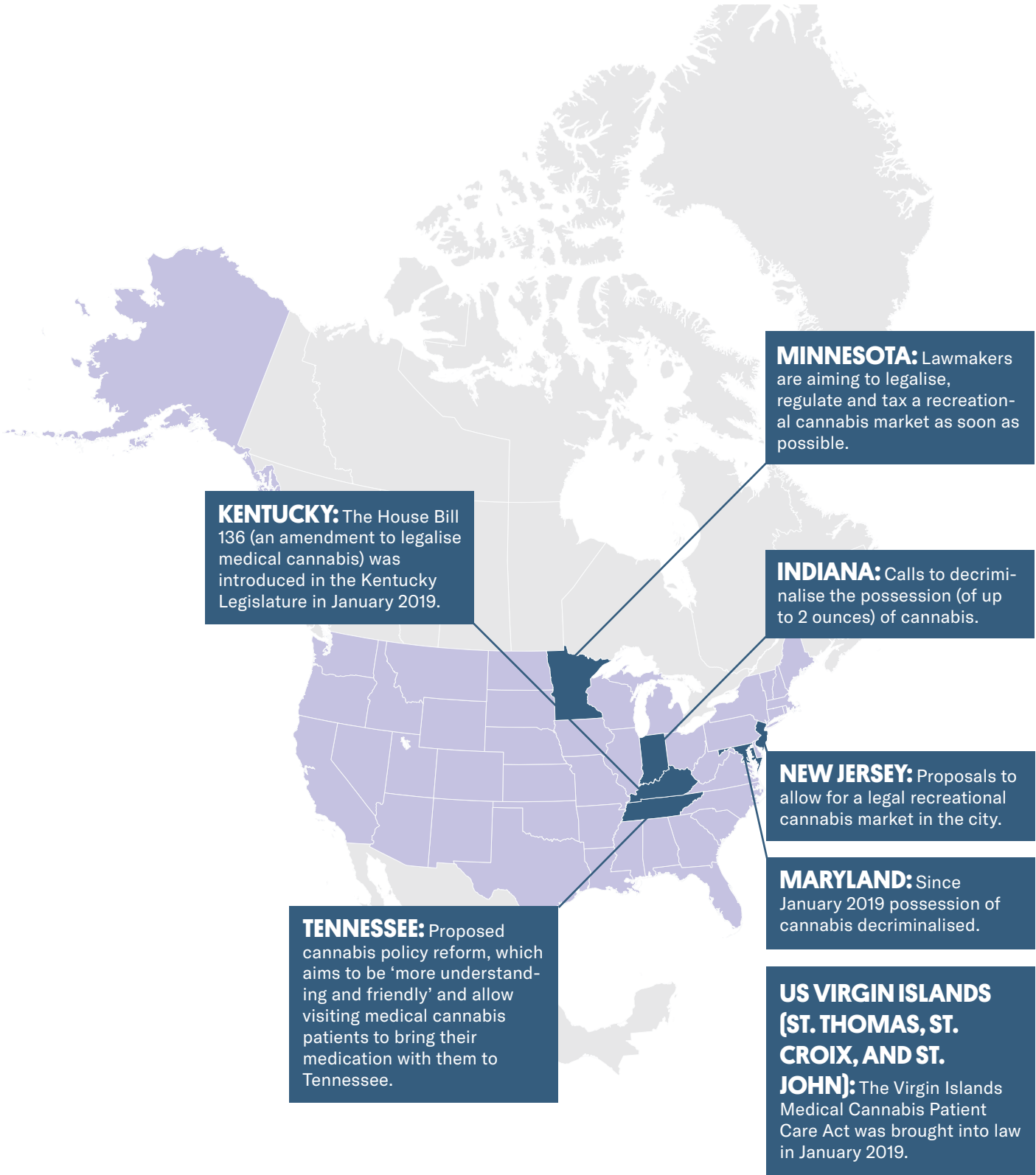
In January 2018, Vermont became the first state to legalise cannabis through the legislature (rather than a ballot initiative). From July, adults (over 21) will be able to carry up to an ounce of cannabis and grow up to two plants for recreational use. However, the bill has its limitations and has not allowed for a legal market for production or sale of the drug.

WASHINGTON

Washington legalised cannabis for recreational use in 2012 and the law allows adults to carry up to an ounce of cannabis, but to be eligible for a grower's licence they must have proof that they require the drug for medicinal purposes.

WASHINGTON, DC

Having voted overwhelmingly to legalise non-medical cannabis in November 2014, the bill took effect in 2015, allowing the populace in the nation's capital to possess two ounces or less of cannabis and to 'gift' up to an ounce (as long as neither money nor goods or services are exchanged).



Legislative change

Taking the initiative to reform local cannabis policy, Maryland State's Attorney Marilyn J. Mosby declared that from January 2019 Marylanders will no longer be prosecuted for possession of cannabis.

Two pieces of companion legislation introduced in January 2019, in both the House and the Senate, would seem to indicate that Minnesota lawmakers are aiming to legalise, regulate and tax a recreational cannabis market as soon as possible. According to Senator Mike Freiberg (DFL-Golden Valley): 'Minnesota's outdated prohibition policy has become more of a problem than a solution ... it is forcing cannabis into a shady underground market, which creates more potential harm for consumers and communities than cannabis itself.'

The cannabis policy reform in Tennessee, which is being backed by Democrats Gloria Johnson and Sara Kyle, will allow visiting medical cannabis patients to bring their medication with them to Tennessee. Sara Kyle states on her Facebook page: 'We don't tell folks from other states, "Please come visit us, but leave your Lipitor, Zocor, Ambien, or other Rx drugs at home" ... It should be the same for the law-abiding citizens, in the 33 other states, who have legal prescriptions for cannabis.' If approved, a patient with a valid medical cannabis ID card from a legal state would be allowed to bring up to one half of an ounce of dried cannabis flower with them when visiting Tennessee.

Calls for legislation to decriminalise cannabis possession (of up to two ounces) are finally being given a hearing in Indiana, which is known to have some of the US' most stringent penalties for cannabis (e.g. possession of a single joint is punishable with up to 180 days in jail and a US\$1,000 fine). Democrat Karen Tallian's case for cannabis policy reform is deemed to have gathered momentum on the back of neighbouring states having moved to legalise medicinal/recreational use.

Legalisation of medical cannabis is on the cards in Kentucky with the *House Bill 136* (an

amendment to legalise medical cannabis) introduced into the Kentucky Legislature in January 2019. Rep. St. Onge stated: 'The intention of this legislation is not to generate tax revenue, but rather to provide relief to the thousands of Kentuckians who suffer from conditions that have not responded to traditional medicine.' In April 2019, the bill passed the first step of the legislative process by passing out of the House Judiciary Committee with a successful vote of 16 in favour and a reported one against, with one pass ballot. In order to pass fully, the measure would need to advance quickly through the full House and Senate.

Voters in Arkansas approved Issue 6 in November 2016, which legalised cannabis for medicinal purposes, followed by cannabis seed legalisation in January 2019. The state awarded a total of five licences for medical cannabis producers, and local company Bold Cultivation was the first. *Arkansas Department of Finance and Administration* has also approved a total of 32 licensed dispensaries to be issued by the *Arkansas Alcoholic Beverage Control*.

After a four-year battle, medical cannabis was legalised in the US Virgin Islands (St. Thomas, St. Croix, and St. John) in January 2019 when newly appointed Governor Albert Bryan Jr. (D) signed the *Virgin Islands Medical Cannabis Patient Care Act* into law.

New Jersey lawmakers, in late 2018, revealed a proposal to allow for a legal recreational cannabis market in the city. Governor Phil Murphy had been pushing for this reform since taking office earlier in 2018, and Senator Cory Booker appears to be succeeding in drumming up congressional support for his proposed *Marijuana Justice Act*, which would end federal prohibition of cannabis and also attempt to ameliorate the situation in communities most affected by cannabis arrests.

In New York, Governor Andrew Cuomo signed off the *Compassionate Care Act* in 2014 to legalise cannabis for medical use, and in 2018 Cuomo proposed the MRTA. This would legalise cannabis for adults (over 21) and establish an *Office of Cannabis Management (OCM)*

” We believe the next 12-24 months will be an enormous growth opportunity in the retail channel, both in Canada and internationally as countries look to federal legalisation. We are already seeing an oversupply of product in Canada, which should allow us to enjoy increasing margin.



Trevor Fencott,
Chief Executive Officer,
Fire & Flower

to implement and oversee a new recreational cannabis programme alongside the existing medical programme. A vote on the bill took place in June 2019, but was not passed.

MedMen Enterprises, the California-based cannabis company, opened New York City's first dispensary on Fifth Avenue in Manhattan in April 2018. Significantly, MedMen considers itself to be a lifestyle and wellness business not a healthcare company, and as such it has set about avoiding a clinical image. Instead, the dispensary's open-plan floorspace and touch screen displays draw comparisons with a modern Apple store aesthetic.

Licences and availability

When President Donald Trump signed the bipartisan *Farm Bill* into law in December 2018, which legalised hemp cultivation, he paved the way for a wave of licensing applications. However, it is not a given that a licence application will be granted simply because the Farm Bill is now law.

Federal cannabis prohibition laws create various challenges for regulating cannabis markets and putting in place policies to govern them. For example, all pesticides must be approved for their use on specific crops by the *US Environmental Protection Agency* (and at the time of writing no pesticides are approved for use on cannabis, because the federal government still considers cannabis an illegal drug). There are also other very fundamental challenges to business operability and include the difficulty cannabis businesses have accessing basic banking services and the resulting complexities of managing cash.

Additionally, to meet the challenges created by legalising cannabis, state governments must address matters that are typically handled by the federal government. Yet state regulators lack institutional knowledge in areas such as packaging and labelling. This has led law enforcement bodies (which essentially operate as the cannabis regulatory agencies) to develop standards for the packaging and labelling of cannabis products but these can fall short of best-practice models in other consumer markets.

One of the key benefits of regulation is the need it creates to address cannabis-related concerns. The aim is to take the vast majority of commercial cannabis activity off the street and into state-regulated and tightly controlled businesses. This creates business opportunities:

- Labelling requirements need to be deployed to prevent accidental ingestion and over-consumption.
- Cannabis extracts need to be produced safely in controlled industrial settings rather than in residential areas (where home extraction methods have been known to result in explosions).
- Facilities must meet a variety of security and public health standards.
- Operators and workers will be licensed and subject to criminal background checks. Operators and workers are also subject to extensive regulations designed to protect minors, including restrictions on advertising and a strict requirement that they check customers for proof of age.
- Licensed businesses will pay taxes that can be used to support public education campaigns aimed at preventing impaired driving and teen use.
- Cannabis tax revenue will be used to fund substance abuse treatment and prevention – and not just for cannabis, but also for alcohol, opioids and other drugs.

New licence applications

Case study: California

California might be the biggest cannabis market in the US but it is a minefield of contrasting and contradictory regulations. Only 161 of California's 482 municipalities and 24 of the 58 counties allow commercial cannabis enterprises, according to *CannaRegs*, which tracks local cannabis-rule developments in the state. Those that do restrict what types of cannabis businesses they will allow permit testing labs or medical cannabis specialists but not companies targeting the recreational sector.

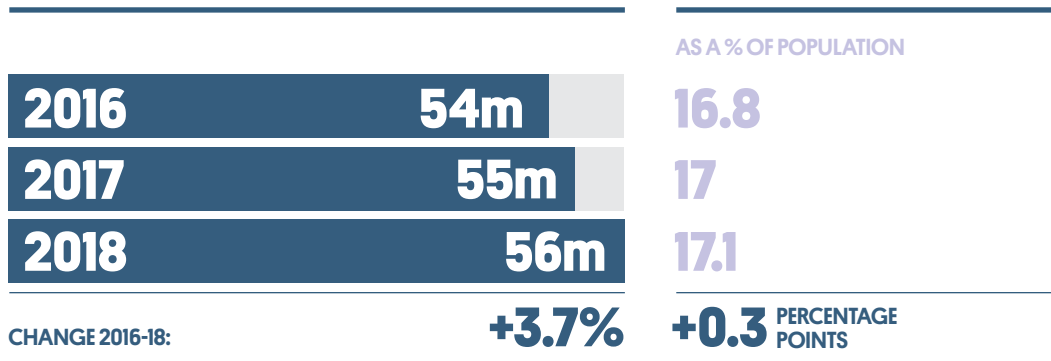
Licences fall into two categories: temporary and permanent. Documents required for a temporary licence are a seller’s permit and lease or proof of property ownership. For a permanent licence, further documentation is required: inventory control plan, personnel plan, insurance information and a fire safety plan. The average time to obtain a licence is five months.

Local authorities will also cap the number of cannabis businesses and much of that licence capacity has already been exhausted as most business opportunities were snapped up immediately in 2018 by existing companies rushing to transition into the legal market. This has meant that tens of thousands of legacy operators who fuelled California’s grey medical cannabis market for decades have been shut out of the legal market, either by local licence caps or by city/county rejection of their business model.

RECREATIONAL CANNABIS

Trends in recreational use

Number of recreational cannabis users, 2016–18



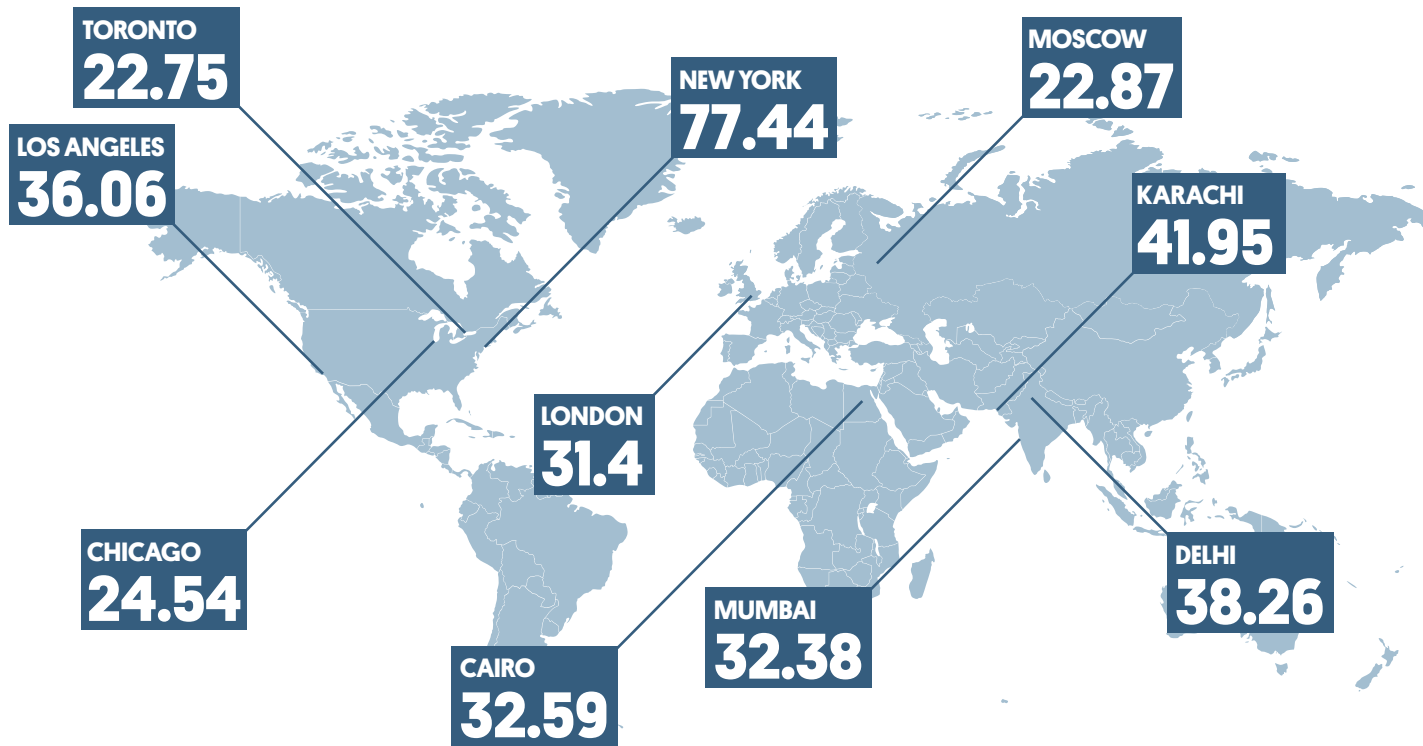
Source: Prohibition Partners

Most surveys have not asked respondents what legalising cannabis means to them – they ask simply whether cannabis should be legal or not (support for legalisation hovers around 60%).

The *2018 Cannabis Price Index*, commissioned by the German agency ABCD, produced a list of the top ten highest cannabis-consuming cities around the world. With 77.44 tonnes of cannabis reportedly being consumed in 2018, and in spite of the illegal status of recreational cannabis, New York City ranked as the number

one city for cannabis consumption, well ahead of the second ranking (Karachi) and third ranking (Delhi) cities.

Total consumption of cannabis (metric tonnes), 2018



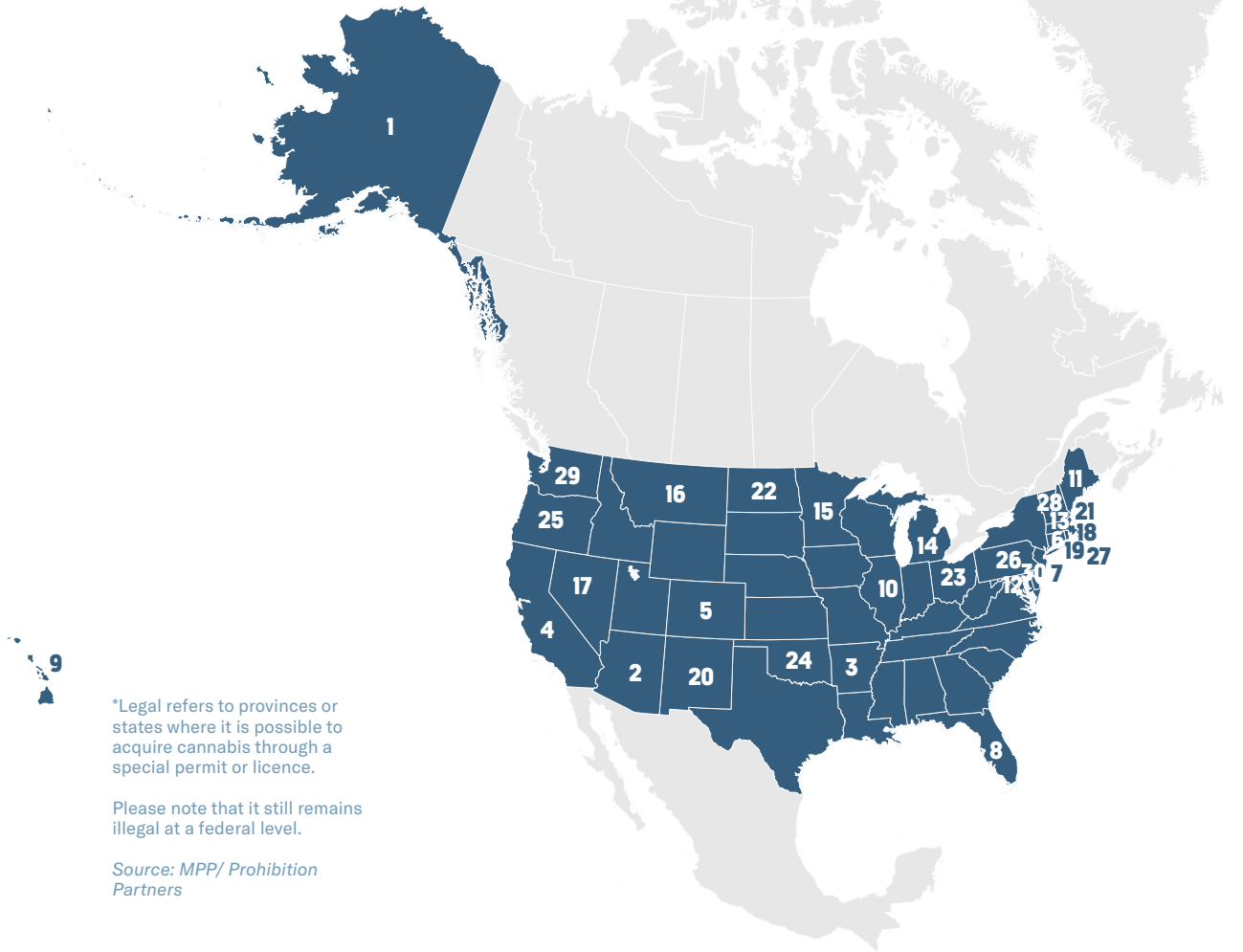
Source: WeedIndex

Cannabis offers cheaper alternatives to prescription medication and a less addictive alternative to opioids, which is being utilised across the healthcare system in both Canada and the US.



MEDICINAL CANNABIS

Number of legal* medical cannabis patients in the US, December 2017 and July 2018, by states where medical cannabis sales have commenced.



*Legal refers to provinces or states where it is possible to acquire cannabis through a special permit or licence.

Please note that it still remains illegal at a federal level.

Source: MPP/ Prohibition Partners

	PATIENT NUMBERS	PERCENT OF THE POPULATION WHO ARE PATIENTS					
1	Alaska	621	0.08%	16	Montana	34,413	3.24%
2	Arizona	200,164	2.79%	17	Nevada	17,623	0.58%
3	Arkansas	15,743	0.52%	18	New Hampshire	6,480	0.48%
4	California	1,238,136	3.44%	19	New Jersey	49,559	0.56%
5	Colorado	83,984	1.47%	20	New Mexico	57,700	2.75%
6	Connecticut	34,501	0.97%	21	New York	103,639	0.53%
7	Delaware	7,699	0.80%	22	North Dakota	753	0.10%
8	Florida	240,070	1.13%	23	Ohio	35,162	0.30%
9	Hawaii	26,125	1.84%	24	Oklahoma	146,381	3.71%
10	Illinois	76,939	0.60%	25	Oregon	28,156	0.67%
11	Maine	45,940	3.43%	26	Pennsylvania	80,000	0.62%
12	Maryland	48,236	0.80%	27	Rhode Island	18,200	1.72%
13	Massachusetts	59,288	0.86%	28	Vermont	5,209	0.83%
14	Michigan	284,088	2.84%	29	Washington	39,331	0.52%
15	Minnesota	17,234	0.31%	30	Washington, D.C.	6,061	0.86%

Attitudes towards medicinal cannabis

In 2017, around 47,600 Americans died from overdosing on opioids, and the figures are rising. Fatalities related to opioid overdoses have grown at a staggering rate: the state of Maryland alone saw the number of opioid-related deaths almost double between 2015 and 2017, with overdose deaths climbing from 1,089 to 2,009. In February 2019, Maryland became the fourth state to allow medical cannabis to be used as a treatment for opioid-use disorder. Patients in Maryland can now opt for medical cannabis instead of opioids for conditions such as chronic pain.

In August 2018, former Illinois Governor Bruce Rauner signed the Alternative to Opioids Bill, making it possible for patients in the state who had been prescribed opioids to opt for medical cannabis instead. Advocates hope that this and other such legislative moves will boost awareness of medical cannabis's potential as a cure for the opioid epidemic along with other addictions, including heroin and Percocet.

The well-established OTC pharmaceuticals market (valued at US\$23,962 million in 2019; US\$72.81 per person) might not be expected to grow strongly (annual growth of 1.6%: CAGR 2019–2023); however, as legislation is opening up the CBD sector and consumers shift away from pharmaceutical companies to look for natural remedies, CBD sales have been taking off.

The signing of the December 2018 *Farm Bill* allowed and paved the way for an increased amount of research to be conducted on an estimated 400 other cannabinoids in hemp, which include CBN, CBG and CBC. CBN is another non-intoxicating compound of cannabis, which develops as THC oxidises. Benefits include pain relief and anti-inflammation, but its primary use is for sleep issues. According to a study conducted by the University of Pennsylvania School of Medicine in 2018, data shows that 25% of the population experience acute insomnia each year. This represents huge market potential for CBN.



HEALTHCARE ANALYSIS

Healthcare overview, US, 2018 or most recent year

TOTAL HEALTHCARE EXPENDITURE 2018	TOTAL ESTIMATED PHARMACEUTICAL SPENDING 2018	TOTAL ESTIMATED MEDICAL CANNABIS ALLOWANCE, 2019	APPROVED CANNABIS-BASED PRODUCTS
US\$ 3,650 b	US\$449 b	150,000 g	EPIDIOLEX MARINOL SYNDROS CESAMET

Source: OECD/ INCB/ Prohibition Partners

At the time of writing, the FDA had approved one cannabis-derived and three cannabis-related drug products. The approved products are available only with a prescription from a licensed healthcare provider.

In June 2018, Epidiolex became the first cannabis-based medication to be approved by the US FDA. Available on prescription in all 50 states, it has been approved for use in the treatment of severe epilepsy (Dravet syndrome and Lennox-Gastaut syndrome) for patients aged two and older.

The FDA has also approved Marinol and Syndros for therapeutic uses, including for the treatment of anorexia associated with weight loss in HIV/AIDS patients. Another FDA-approved drug, Cesamet, contains the active ingredient nabilone, which is synthetically derived.

According to the CDC, around 45% (133 million) of all Americans suffer from at least one chronic disease (notably cancer, diabetes, hypertension, stroke, heart disease, respiratory diseases, arthritis and obesity), and numbers are rising.

North America is a global leader in the medicinal cannabis industry. However, cannabis and cannabinoid drugs represent only a fraction of the market. Currently, approval of cannabinoids in the US varies from state to state. In Georgia, CBD oil can be prescribed for 12 medical condi-

tions (including cancer, multiple sclerosis, Parkinson's disease and seizure disorders).

Limited amounts of CBD oil are permissible in Iowa for patients suffering from certain medical conditions, including HIV/AIDS, cancer, amyotrophic lateral sclerosis (ALS) and seizures. The law in North Carolina has only legalised CBD for patients with intractable epilepsy, and in South Carolina, CBD can be prescribed for sufferers of severe epilepsy disorders (including Dravet Syndrome, the condition Epidiolex was created to treat).

The potential exists for cannabinoids to help address a wide range of other medical conditions. As a result of its varied potential therapeutic effects, researchers have been exploring the use of cannabis as a form of treatment and supplement: CBD can supplement a depleted endocannabinoid system (ECS: a group of neuromodulatory lipids and their receptors, which are widely distributed in mammalian tissues, and regulate various cardiovascular, nervous and immune system functions inside cells) by working to ease symptoms and help the body achieve homeostasis (just as a calcium supplement could help someone with a calcium deficiency). These active CBD components and their beneficial effects on the body make them popular options for the treatment of other mild to severe medical conditions such as chronic pain, for example arthritis.

It is projected that the demand for medical cannabis will increase throughout the forecast period as increasing numbers of patients gain access to CBD and as more companies come to the table with new product development. Key players (including Pressure BioSciences, Inc., Aphria Inc., Neptune Wellness Solutions

Inc., Zynerba Pharmaceuticals, Inc., and AXIM Biotechnologies, Inc.) are driving ahead with ambitious product development programmes.

COMMERCIAL OPPORTUNITIES

Forecast value of the US cannabis market, by sector, 2024

	FORECAST MEDICAL CANNABIS MARKET VALUE 2024	FORECAST RECREATIONAL CANNABIS MARKET VALUE 2024	TOTAL 2024
TOTAL	US\$ 24.1b	US\$19.8b	US\$ 43.9 b

Source: Prohibition Partners

Forecast Cannabis Market, US, 2019–2024

	2019 (EST.)	2020 (PROJ.)	2021 (PROJ.)	2022 (PROJ.)	2023 (PROJ.)	2024 (PROJ.)	CHANGE 2019–24
PROJECTED MEDICAL MARKET VALUE (US\$ M)	9,722	13,057	16,630	20,078	22,048	24,074	148%
PROJECTED RECREATIONAL MARKET VALUE (US\$ M)	4,814	6,329	6,614	6,889	17,310	19,834	312%
TOTAL MARKET VALUE (US\$ M)	14,536	19,386	23,244	26,967	39,358	43,908	202%

Source: Prohibition Partners

Valued at an estimated US\$14.5 billion in 2019, the US accounts for a significant chunk of the value of the global legal cannabis industry. As the epicentre of the legal cannabis market, the US is likely to further strengthen this position on the back of continued regulatory change that is opening up consumption and supply. Industry observers highlight a dramatic transformation of the legal cannabis industry since 2013 when the US market was 'medical-only'. Several crucial factors are driving the growth of the medical cannabis market, including increased research and development activity, growing recognition of the medical benefits of cannabis, and increasing consumer demand for cannabis to help with disease management and treatment of disease, but it is the explosive growth and breadth of the recreational market that will be the market driver. By 2022, legal cannabis revenue in the US market is projected to hit US\$27 billion (and forecast to reach approximately US\$44 billion by 2024). Fuelling market growth are:

- The cannabis legalisation initiatives that swept the US in 2018. Michigan became the tenth state to legalise recreational cannabis during last year's midterm elections. Utah and Missouri both voted to legalise medical cannabis.
- The signing of the *Farm Bill* into law in December 2018, which legalised hemp, a plant that is roughly identical to cannabis but does not contain THC, an intoxicating psychoactive compound in cannabis, but is a source of CBD.
- Dispensaries are expected to flourish because they can offer a wide range of products, including pain treatment remedies, whilst the medical institutions will look increasingly to pharmaceutical manufacturers' products to treat more severe conditions as biotechnological expertise evolves.
- The explosion of CBD innovation in nutraceuticals, topicals and cosmetics, as well as food and beverages (estimates vary widely but put growth potential at 10% to 50% per annum; Biosciences).

- The emergence of a mass market in terms of brands and retailer involvement.
- The significant implications of the finding that, on the whole, people who have experienced using cannabis think it should be legal. As legalisation continues apace, more people will try it, which could lead to greater support for legalisation, followed by legalisation from even more states, and more potential consumers, etc.

Significantly, if legislation at federal level is introduced in Congress regarding the legalisation of medical cannabis, the US would easily remain the world's most lucrative market for cannabis.

One obstacle to short-term growth that has been mooted is a shortage of hemp-based CBD products. When the *Farm Bill* was passed it threw a spotlight on hemp-based CBD products. In the short term, there is the potential for a global shortage of supply because **'it is much harder to harvest and process hemp than other crops. New farms will have a tough time being first-timers.'**

Khurram Malik, CEO of Biome Grow

Growth potential in key states

Certain states offer more cash-cow potential for the cannabis industry than others. California, the fifth-largest economy in the world by GDP, boasts the highest number of medicinal cannabis patients as a percentage of the state's population and this also outstrips the number of medicinal cannabis patients in all of Canada. Strong growth is anticipated as consumers migrate to fully legal retailers and as the illicit market shrinks (although wholesale prices are trending downward and mitigating sales growth potential). Colorado is also expected to enjoy further strong growth in the legal cannabis industry. Sales in Washington State, which legalised at the same time as Colorado, has one of the highest aggregate taxes (37%) on cannabis among legalised states, making it a valuable source of income.

Massachusetts amassed sales of US\$440,000 on the day recreational cannabis went on sale in November 2018, but once the licencing of additional points of sale are approved and cultivation/growers establish themselves, sales are expected to soar into the millions.

It is estimated that there were more than 20,000 cannabis businesses in operation in the US as of 2017. With the *Farm Bill* opening up the field, huge growth is expected in numbers as is the level of large-scale corporate activity, which is reflected in the buzz around higher levels of investment in cannabis stocks.

Industry commentators are predicting that cannabis will become federally legal in 2019. **'This is the year to do it. Canada and several states are seeing the benefits from it. It's too tempting not to, and it's increasingly popular and a non-partisan issue...'**

Carly Bodmer, Director of Sales and Communications, GrowFlow Inc.

Such a move would fuel an already fast-growing market and sales growth would likely soar.

Is California the new capital of cannabis?

'There's more cannabis commerce happening in the state of California than any other state or Canada for that matter,'

Nick Kovacevich, KushCo, Sep 2018

With a medical programme dating back to 1996 and recreational use legalised in 2016, all eyes are on California. Companies are eyeing up the opportunities that the adult-use state offers. KushCo (the parent company of innovative cannabis industry leaders such as Kush Bottles, Kush Energy, The Hybrid Creative, and Koleto Packaging Solutions, which provide a range of services and products for the regulated cannabis, CBD and other related industries) maintains that it has a commitment to servicing the state's 'cannabis community and providing the best-in-market products and services to this thriving marketplace'. The company was a key member of the panel at the Cannabis World Congress & Business Exposition held in the Los Angeles Convention Center in September 2018.

Retail developments

2017/18 saw CBD products spread to natural food stores, beauty aisles and cafés. 2019/20 is seeing something bigger with regards to the national chains, who, though eager, were holding back until CBD regulation widened in territorial reach and made it more viable to drive forward a 'lifestyle product'.

Although a shoe retailer would not seem like an obvious choice for a cannabis company looking to expand, in January 2019 Green Growth Brands Inc. (GGB), the company behind a hostile takeover of Aphria, announced a partnership agreement with DSW to sell hemp-derived CBD personal care products at 96 of its DSW retail stores in the US. These include muscle balms, body lotions, body washes and CBD-infused foot creams. This agreement came as a result of a successful test phase in autumn 2018: when GGB put products into ten DSW stores, 74% of them met their sales targets. As a result of the announcement, GGB saw its share prices hit a record high (which may help to push the stock closer to the minimum valuation needed for GGB to proceed with its planned hostile takeover of Aphria).

At a more mundane level, there is evidence of everyday purchasing incentive activity. Direct seller Liberty Health Sciences, for example, offers points for every purchase and free delivery across the entire state with no minimum order.

Drug delivery

Niche brand Dr. Kerklaan Therapeutics is a California-based manufacturer of creams and sprays that target pain and inflammation. The range includes products focused on premenstrual syndrome (PMS), sleep, skin and pain.

In January 2019, Ovation Science Inc. announced the licencing of its recently developed proprietary topical and transdermal cannabis formulations made with its patented Invisicare skin delivery technology that claims to enhance the delivery of CBD and THC to and through the skin.

Packaging developments

KushCo (2018 revenue of US\$51 million) announced in 2018 that it would be focusing on the growing demand for supplies such as concentrate packaging and vape hardware, along with innovative and customised solutions for retail brand building, notably ultra-pure gas and solvents. In October 2018, KushCo was the first cannabis related business to join the Sustainable Packaging Coalition alongside global brand leaders in other industries, including The Coca-Cola Company; McDonald's; Mars, Incorporated; Procter & Gamble; Starbucks Coffee; United Parcel Service (UPS) and Walmart.

Cultivation

US cannabis cultivation has historically been limited to small independently held entities. However, in January 2019, Arkansas awarded five licences for the cultivation of medical cannabis. In the same month, Arkansas Alcoholic Beverage Control gave Bold Cultivation LLC the go ahead to begin cultivation. Cannabis products including edibles, oils and gummies have been available through dispensaries since the end of May 2019.

On the back of such ventures are opportunities for corporate development in cannabis cultivation optimisation, and this has opened up a market to both large and small enterprises. Niche player Growcentia, for instance, is the company behind Mammoth P, 'a blend of microbial nutrients specifically optimised for cannabis cultivation'.

Festivals and lifestyle events

With medical cannabis legal in 33 states and Washington DC, and a recreational cannabis market established in 11 states and Washington DC, high-profile music events boast an increasing cannabis-brand presence and more CBD-themed spaces.

The annual Suwannee Hulaween (a four-day music event attended by 20,000 people that takes place in Live Oak, Florida over Halloween weekend) is an example of how the 'healing plant culture' is expanding into states after medical legalisation. A reiki and canna-

bis-terpene pairing workshop was one of the medical-cannabis-related events offered at the festival's Spirit Lake. Guests were invited to inhale therapeutic terpenes, the aromatic compounds that give cannabis and many other plants their scents, during a guided meditation led by a shamanic buffalo drum.

The 2018 Sundance Film Festival featured its first-ever CBD concept house, known as WELLHAUS. Coachella and other high-profile music events around the country boasted a bigger cannabis brand presence and more CBD-themed spaces.

PRODUCT DEVELOPMENT IN 2018/19

Beauty and personal care (BPC)



In July 2018, MILK makeup launched vegan CBD-infused 'Kush' mascara and brow gel, following on from the launch of a high-volume mascara that made its market debut on 20 April 2018.



In January 2019, Josie Maran launched Skin Dope CBD and Hemp Seed Facial Oils.

The CBD oils are full spectrum to ensure product quality.



In February 2019, Kiehl's launched Cannabis Sativa Seed Oil Herbal Concentrate, a calming facial oil for problem skin.

The cannabis sativa seed oil used by Kiehl's is cold pressed from hemp seeds and is sourced in Germany.

Microdosing

AXIM Biotechnologies ('a world leader in the research and development of cannabinoid-based pharmaceutical products') has brought a new cannabinoid-based controlled-release gum nutraceutical product to the market.



CanChew+ Plus Gum is hemp oil gum. It has been developed by a team of doctors, and each piece consists of 10mg of phytocannabinoids as well as 50mg of full-spectrum natural hemp oil.

In January 2019, AXIM Biotechnologies secured a significant initial purchase order (7,500 boxes containing 225,000 pieces) from Kannaway, which plans to sell as a white label through its direct sales force.



Two Roots has launched 'cannabier', which it describes as a 'responsibly formulated (micro-dosed) beverage that emulates the rapid onset of alcohol as well as its rapid dissipation from the body'.

The company's mission is to unite cannabis with craft quality beer, whilst also shifting perceptions of cannabis for both medical and adult-use users.

Effects-based products

[statemade]^{ny}

Statemade (from MedMen) is an effects-based cannabis product available in a variety of formats, including tinctures and pre-rolls, that claims to offer users the opportunity to achieve a desired mood e.g. Joy, Zen, Ebb, ZZZ. Mood products are growing in popularity, and industry observers point to further potential for customised cannabis experiences.



Mirth Provisions produces a range of cannabis-infused tonics and sub-lingual sprays. The range of cannabis-infused herbal beverages claim to offer four 'unique experiences: Waking, Gentle, Jolly and Mental'.

vireo 

Olive-oil brand Vireo has recently launched a THC- and CBD-infused variant.

The CBD variant offers 'a low dose of chill', whilst the THC variant offers 'a low dose of just high enough'.

Home appliances

LEVO 

The LEVO Oil Infuser is a kitchen appliance that enables householders to make cannabis-infused food at home such as canabutter or cannabis cooking oil, so the product can be incorporated into most dishes or baked goods.

Magical Butter 

Founded in 2012, Magical Butter (based in Port Richey, Florida) was generating more than US\$7 million in sales within five years. Its latest product range includes a blender for users to create their own butters, infusions and tinctures made from cannabis. Gifting and accessories.

Source: Prohibition Partners

LOCAL EXPERT ANALYSIS:

MATT KARNES, FOUNDER AND MANAGING PARTNER, GREENWAVE ADVISORS, LLC

To what extent do you think that the disconnect between federal and state legislation is inhibiting market growth potential for both medicinal and recreational use?

The complexity of the US cannabis industry has been exacerbated by the consequences of states operating within the confines of closed economies that strive for their own interpretations of legitimacy under the shadow of existing federal laws. This dichotomy between state and federal law precludes interstate commerce, a widespread deployment of institutional capital, as well as traditional debt financing that is typically provided by most financial institutions. We believe these headwinds have collectively inhibited the US cannabis industry's growth potential.

What do you think it will take for the federal government to change its stance on legalisation of cannabis?

Increasing public support for cannabis legalisation could accelerate the timeline for change. Regardless, we believe the rescission of federal cannabis prohibition is inevitable, the timing of which remains unknown. Given

the confluence of reform measures at both the state and federal levels, we are optimistic that a first step for meaningful change to federal policy could come as early as the end of this year/early 2020 with the passage of *The STATES Act* (a bipartisan bill providing state protections under the *Tenth Amendment*).

Where do you think the biggest growth in the US cannabis industry will come from?

We expect the most amount of revenue growth will come from states with newly enacted cannabis laws (either through ballot initiative or legislative measure) with limited contribution from existing markets.

What will be the key drivers?

Before such time as federal prohibition ends, changes to existing laws in those states that have yet to legalise cannabis (either by ballot initiative or legislative measure).

What else needs to change in order to unlock potential in the industry?

The general public's understanding of medical cannabis and its benefits, and why recreational use is not a greater risk to public safety than alcohol.

How do you see North America's involvement in the global cannabis industry at present, and how do you think this might change as more countries legalise?

As the first real mover, we believe the rest of the world will likely look to North America for its established best practices. As the industry continues to evolve internationally, we expect that other countries will innovate and complement existing technologies and best practices.

What is your 12-month and five-year outlook for the industry?

For 2019, we expect US retail cannabis sales of US\$12.2 billion with a spike in 2020 to US\$20 billion as additional states (2018 election, etc.) come online. By 2023, it is likely that prohibition will have ended in the US but, at the very least, we expect every state to permit either a medical only or a fully legal (medical and recreational) market totalling near US\$32 billion (this is not to suggest what the US market will look like at full maturity).

What do you see as the biggest challenge for this industry to overcome in the next 12 months and who/what do you think is needed to overcome it?

The ability for the US Congress to compromise and pass pro-cannabis legislation remains a big challenge. Ultimately, we

expect both sides of the aisle to effectively collaborate and end the federal prohibition on cannabis but, at the very least, we expect banking laws to become less restrictive within the next 12 months.

” As the first real mover, we believe the rest of the world will likely look to North America for its established best practices. As the industry continues to evolve internationally, we expect that other countries will innovate and complement existing technologies and best practices.

Matt Karnes,
Founder and Managing Partner
GreenWave Advisors, LLC

Appendix



CANNABIS LICENSING FEES BY US STATE

Alaska

New application fee: US\$1,000
 Standard cultivation facility licence: US\$5,000
 Limited cultivation facility licence (500 square feet or less): US\$1,000
 Product manufacturing facility licence: US\$1,000
 Concentrate manufacturing facility licence: US\$1,000

Arizona

Application fee: US\$5,000 (US\$1,000 of which is refundable)
 Initial registration fee: US\$5,000
 Annual registration renewal fee: US\$1,000
 In Arizona, medical cannabis non-profit dispensary licensees are permitted to grow cannabis.

Arkansas

Annual cultivation licence fee: US\$100,000
 Performance bond: US\$500,000

California

Annual licence application fees:
 Specialty Cottage Outdoor US\$135
 Specialty Cottage Indoor US\$205
 Specialty Cottage Mixed-Light Tier 1 US\$340
 Specialty Cottage Mixed-Light Tier 2 US\$580
 Specialty Outdoor US\$270
 Specialty Indoor US\$2,170
 Specialty Mixed-Light Tier 1 US\$655
 Specialty Mixed-Light Tier 2 US\$1,125
 Small Outdoor US\$535
 Small Indoor US\$3,935
 Small Mixed-Light Tier 1 US\$1,310

Small Mixed-Light Tier 2 US\$2,250
 Medium Outdoor US\$1,555
 Medium Indoor US\$8,655
 Medium Mixed-Light Tier 1 US\$2,885
 Medium Mixed-Light Tier 2 US\$4,945
 Nursery US\$520
 Processor US\$1,040
 Annual licence fees:
 Specialty Cottage Outdoor US\$1,205
 Specialty Cottage Indoor US\$1,830
 Specialty Cottage Mixed-Light Tier 1 US\$3,035
 Specialty Cottage Mixed-Light Tier 2 US\$5,200
 Specialty Outdoor US\$2,410
 Specialty Indoor US\$19,540
 Specialty Mixed-Light Tier 1 US\$5,900
 Specialty Mixed-Light Tier 2 US\$10,120
 Small Outdoor US\$4,820
 Small Indoor US\$35,410
 Small Mixed-Light Tier 1 US\$11,800
 Small Mixed-Light Tier 2 US\$20,235
 Medium Outdoor US\$13,990
 Medium Indoor US\$77,905
 Medium Mixed-Light Tier 1 US\$25,970
 Medium Mixed-Light Tier 2 US\$44,517
 Nursery US\$4,685
 Processor US\$9,370

Colorado

New application fee: US\$4,000
 New application for converting medical cultivation facility to adult-use: US\$1,750
 Annual renewal fee (1,801 to 3,600 plants): US\$1,100
 Annual renewal fee (3,601 to 6,000 plants): US\$1,800

Annual renewal fee (6,001 to 10,200 plants):
US\$3,300

Annual renewal fee (10,201 to 13,800 plants):
US\$5,300

Connecticut

Initial application fee: US\$25,000

Cultivation licence registration fee:
US\$75,000

Annual cultivation licence renewal fee:
US\$75,000

Delaware

Application fee: US\$5,000

Certification fee: US\$40,000 (paid every two
years)

Florida

Application fee: US\$60,830

In Florida, medical cannabis treatment centres (MMTCs) are authorised to cultivate, process, transport and dispense medical cannabis. A 'supplemental licensing fee' of US\$174,844 was rescinded in 2018.

Hawaii

Application fee: US\$5,000

Annual licensing fee: US\$75,000

In Hawaii, medical cannabis dispensary licensees are permitted to grow, process, transport and dispense cannabis. The state does not offer a cultivation licence.

Illinois

Application fee: US\$25,000

Annual cultivation licence fee: US\$100,000

Louisiana

No cultivation licensing process. Two cannabis companies have successfully placed bids for growing permits awarded to Southern University and Louisiana State University.

Maine

Application fee: US\$300 per patient (caregiver model)

Annual cultivation licence fee: US\$300 per patient

Maryland

Application fee: US\$6,000

Annual cultivation licence fee: US\$125,000

Massachusetts

Licence type: Indoor or Outdoor Cultivation
(5,000 square feet - 100,000 square feet)

Application fees: \$100-\$600

Annual Licence Fees: \$625 - 25,000

Michigan

State licence application fee: US\$6,000

Class A licence fee (500 plants): US\$150,000

Class B licence fee (1,000 plants):
US\$300,000

Class C licence fee (1,500 plants):
US\$500,000

Processor licence fee: US\$300,000

Minnesota

Application fee: US\$20,000

Minnesota requires vertical integration, and has thus far licensed two companies.

Missouri

Cultivation licence application fee: US\$10,000

Missouri began accepting medical cannabis business licence applications in January 2019.

Montana

Annual caregiver licence fee (up to 10 patients): US\$1,000

Annual caregiver licence fee (11-49 patients):
US\$2,500

Annual caregiver licence fee (50 or more patients): US\$5,000

Nevada

Application fee: US\$5,000

Annual licence fee: US\$30,000

New Hampshire

Application fee: US\$3,000

Annual licensing fee: US\$40,000 or
US\$80,000 (depending on geographic area)

In New Hampshire, alternative treatment centres (ATCs) are authorising to grow, process and dispense medical cannabis.

New Jersey

Application fee: US\$20,000 (US\$18,000 refundable to unsuccessful applicants)

In New Jersey, ATCs are authorising to grow,

process and dispense medical cannabis. The state has licensed six ATCs as of February 2019.

New Mexico

Application fee: US\$10,000 (US\$9,000 refundable to unsuccessful applicants)
 Annual licence fee: US\$30,000 for first 150 plants, and US\$10,000 for each additional 50 plants (up to a 450-plant limit). The state limits licensed medical cannabis providers to 1,750 mature cannabis plants.

New York

Application fee: US\$10,000
 Initial registration fee: US\$200,000

North Dakota

Application fee: US\$5,000
 Annual licensing fee: US\$110,000

Ohio

Application fee: US\$2,000 (up to 3,000 square feet of cultivation area), US\$20,000 (up to 25,000 square feet of cultivation area)
 Initial licence fee: US\$18,000, US\$180,000
 Annual licence renewal fee: US\$20,000, US\$200,000

Oklahoma

Application fee: US\$2,500

Oregon

Application fee: US\$250
 Annual licensing fees:
 Micro Tier I US\$1,000
 Micro Tier II US\$2,000
 Tier I US\$3,750
 Tier II US\$5,750
 Medical Canopy: US\$100

Pennsylvania

Application fee (non-refundable): US\$10,000
 Application fee (refundable if application is not successful): US\$200,000
 Annual licence renewal fee: US\$10,000
 Proof of funds: US\$2 million, with US\$500,000 liquid in applicant's bank account

Rhode Island

Application fee: US\$5,000
 Annual licence fee:
 Micro-licence (up to 2,500 square feet): US\$5,000
 Class A (2,501 to 5,000 square feet): US\$20,000
 Class B (5,001 to 10,000 square feet): US\$35,000
 Class C (10,001 to 15,000 square feet): US\$50,000
 Class D (15,001 to 20,000 square feet): US\$80,000

Utah

Application fee: US\$500

Vermont

No regulated licensing structure

Washington

Application fee: US\$250
 Annual licence fee (Tier 1, 2, 3): US\$1,480

West Virginia

Application fee: US\$5,000
 Annual licence fee: US\$50,000

GLOSSARY

AGCO	Alcohol and Gaming Commission of Ontario
ALS	amyotrophic lateral sclerosis (also known as motor neurone disease)
ATC	Alternative Treatment Center
BPC	beauty and personal care
BRC	British Retail Consortium
CAGR	compound annual growth rate
CBC	cannabichromene
CBD	cannabidiol
CBG	cannabigerol
CBN	cannabinol
CDC	Centers for Disease Control and Prevention
CIHI	Canadian Institute for Health Information
CPG	Consumer Packaged Goods
CSE	Canadian Securities Exchange
CTADS	Canadian Tobacco, Alcohol and Drugs Survey
D	Democrat (as, for example, in D-Ogden Dunes)
DEE	developmental and epileptic encephalopathy
DFL	Democratic-Farmer-Labor (Party)
ECS	endocannabinoid system
FDA	Food and Drug Administration

GDP	Gross Domestic Product
GGB	Green Growth Brands Inc.
GMP	Good Manufacturing Practices
GPS	Global Positioning System
INCB	International Narcotics Control Board
ITC	International Tobacco Control
JAMA	Journal of the American Medical Association
LP	licensed producer
LRDG	Low-Risk Alcohol Drinking Guidelines (Canada)
MMAR	Marihuana Medical Access Regulations
MMPR	Marihuana for Medical Purposes Regulations
MMTC	medical marihuana treatment centre
MRTA	Marihuana Regulation and Taxation Act
NCCDPHP	National Center for Chronic Disease Prevention and Health Promotion
NIH	National Institutes of Health
NYSE	New York Stock Exchange
OCM	Office of Cannabis Management
ODC	Office of Drug Control
OECD	Organisation for Economic Co-operation and Development
OTC	over-the-counter (medicines)

PBI	Pressure BioSciences
PP	Prohibition Partners
STATES Act	Strengthening the Tenth Amendment Through Entrusting States (Act)
THC	tetrahydrocannabinol
TSX	Toronto Stock Exchange
UNODC	United Nations Office for Drug Control
USPTO	US Patent and Trademark Office
UST	Ultra Shear Technology
WCC	World Cannabis Congress
WHO	World Health Organisation



DETAILED METHODOLOGY

UNITED STATES

Users

MEDICINAL

- Used Procon.org percentage of medical cannabis patients per state (May 2018) and projected to 2019
- For states with no data/where not legal, we have assumed that they would reach the 2019 average after 12 months once legalised
- Assumed maximum medicinal cannabis patient penetration at 7.5%
- Calculated growth rates per year for legal US states and Canada
- Calculated 'most recent 4/5-year average growth rate' for each
- Averaged these values for growth rate per year

RECREATIONAL

- SAMDHA usage rates of cannabis in last month by state
- Used difference between states where cannabis is legal and cannabis is illegal medicinally to adjust and remove medicinal users from these figures
- Weighted to allow for one-off users, black-market users, possible medical overestimation and other factors
- Past monthly cannabis use by state 2002–2018 was forecast to 2019
- Medicinal usage calculated by using multiplier based on difference between average of medicinal and recreational states
- Average yearly growth rate is calculated over the five most recent years for each state.

Dosage

MEDICINAL

Assumed daily dosage to remain constant over the forecast period

RECREATIONAL

Assumed constant per user annual consumption to remain constant over the forecast period

COSTS

- Used average dispensary medical and recreational cannabis prices by state
- Where values for medicinal were not available, a multiplier based on other values was used
- We depreciated values to account for anticipated price decline owing to increase in supply

CANADA

Users

MEDICINAL

- Statcan source for medical patients 2019 per region

RECREATIONAL

- Adjusted Statcan cannabis use in last 3 months to Q1 2019 to remove medical users based on multiplier created from other Statcan source
- Forecasted this forward to Q2 2019
- Weighted to allow for one-off users, black market, etc.
- For three regions without data, used average of others

Dosage

MEDICINAL

Assumed daily dosage to remain constant over the forecast period

RECREATIONAL

Assumed constant per user annual consumption to remain constant over the forecast period

COSTS

- Statcan source for prices for 'medical' and 'non-medical' up to 2017. Projected this forward to 2019
- Assumed that Canada's hike has finished and follows US from here on with a steady annual decline in prices



CONTACT DETAILS:

London

A: 33 Foley St, Fitzrovia, W1W 7TL,
London, United Kingdom
T:+44 203 928 2812

Barcelona

A: Carrer d'Estruc 9, 08002,
Barcelona, Spain
T:+34 936 818 019

Dublin

A: 22 Temple Lane South, Temple Bar,
Dublin, Ireland
T:+353 87 1200539



E: info@prohibitionpartners.com
TW: @prohibition_p



