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Alternatives to profit-maximising commercial models of cannabis supply for non-medical use

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Preface

This report presents the findings from a study mandated and funded by the Swiss Federal Office of Public Health to identify and analyse alternatives to profit-maximising commercial models of cannabis supply for non-medical use. This report provides a detailed overview of the regulatory frameworks which have introduced such models and considers the available evidence on the consequences of their implementation. Data collection and analysis primarily took place during the first half of 2022, so any subsequent developments in this area may not be captured in this report. This study will be of interest to policymakers and professionals in the field of cannabis and drug policy more broadly.

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Executive summary

Introduction

The supply and possession of cannabis for non-medical purposes is now legal in multiple jurisdictions throughout the world, with various US states and Canadian provinces allowing for-profit companies to produce and sell cannabis to adults. However, there are several options between prohibition and a for-profit commercial model.^{1,2} Home production, for instance, is also legal in most jurisdictions that allow commercial sales in North America and there are some Canadian provinces that exclusively authorise retail sales through government stores. Jurisdictions in Spain and Uruguay have implemented Cannabis Social Clubs (CSCs). The conversations about alternatives to cannabis prohibition have become more pronounced in other countries in Europe, with an increased interest in non-profit or “middle ground” options that step away from prohibition without allowing a profit-oriented market to emerge.

Scope and research questions

This study examines the available alternatives to profit-maximising commercial models for the supply of cannabis for non-medical use. The aims are threefold:

1. Identifying jurisdictions (national and subnational) with implemented regulatory frameworks alternative to profit-maximising commercial models for the supply of cannabis for non-medical use and describing their characteristics with a special focus on how they safeguard public health, public safety/security and public order.³
2. Comparing and evaluating which alternatives to profit-maximising commercial models might be effective in terms of strong health and safety/security protection based on evidence in regulatory frameworks for other substances or activities (e.g., alcohol, tobacco, gambling) and/or theoretical models which are not implemented.
3. Analysing the advantages and disadvantages, trade-offs and challenges in implementing the alternatives to profit-maximising commercial models for the supply of cannabis for non-

¹ Caulkins et al. (2015).

² Seddon & Floodgate (2020).

³ We do not discuss the cannabis regulatory framework in India. For more on this, see: Room (2018).

medical use in terms of public health and public safety/security based on available evidence and anticipated consequences.

The study scope excludes analysing jurisdictions where a decriminalisation or depenalisation of cannabis possession and/or distribution have occurred but not an introduction of a legal framework that allows for the supply of non-medical cannabis through an alternative to profit-maximising commercialisation. In this study, we focus on models of legal supply – as a result of legalisation policies, rather than models of cannabis supply based on tolerance, deprioritisation, or decriminalisation policies.

Research methods

The methodological approach used in this study is designed to explore the three research questions outlined above in a comprehensive manner. The research methods are threefold:

1. Targeted document review

We conducted a targeted document review as a primary source for the identification and description of the design of the alternative models to profit-maximising commercialisation of cannabis already regulated to date. Academic sources and policy reports reviewed in the first instance were consulted during the expert interviews and additional suggestions were then followed up by the research team. The extent to which specific public health, public safety/security and public order goals were integrated in the design of the frameworks were given special focus.

2. Systematic literature review

Through a search strategy protocol tailored specific to the review of evidence related to the consequences of implementations of alternative models to profit-maximising commercialisation of cannabis for non-medical use, the research team identified and fine-tuned suitable search terms with which they collected and screened relevant resources from selected databases. A final of 27 papers have been reviewed in detail, capturing broadly the same types of information from each (e.g., supply model reported, characteristics, reported impacts, methodological approach and limitations). Consistency and replicability were key priorities throughout this phase.

3. Interviews with experts

To complement and triangulate against the evidence gathered through the targeted document review and systematic literature, the research team conducted 14 1-hour-long online semi-structured interviews with academics and policy experts in the field during June 2022, selected specifically based on their expertise on cannabis policy and specialist knowledge about regulated alternative models to profit-maximising commercialisation.

Main findings

1. There are important differences in how models for home cultivation and CSCs have been regulated and implemented throughout the world.

The experiences of regulation and implementation of home cultivation in five countries (Australia, Canada, Malta, Uruguay, and the US), either nationally (Canada, Malta, Uruguay) or sub-nationally (Australia, US), provide interesting insights about some of the key choices made concerning the design of this model. These jurisdictions have typically introduced restrictions concerning who can legally cultivate cannabis, how much cannabis can be cultivated, and whether that cannabis may be shared with others. CSCs can be found in multiple countries in Europe and beyond,⁴ but there are only a few examples where regulation has been developed for this model: in Malta, two Spanish autonomous regions (albeit no longer in force), and Uruguay. In this regard, we found different approaches to the set-up of the associations, how much cannabis they can produce, and the number of members they can have and serve.

2. Parts of Canada and Uruguay demonstrate that it is possible to implement versions of government sales.

While there are still jurisdictions in the US which sell alcohol at government-run stores, this approach for cannabis has not been implemented there except for one small town in Washington State. This is not the case in Canada where there are some provinces/territories that exclusively sell cannabis via government-owned stores and others where both government and private stores are authorised to sell (there are also some that exclusively allow sales by physical for-profit stores). The Uruguayan case is unique. While retail sales are allowed in licensed pharmacies that are for-profit businesses, the government controls the price of the products, determines which products can be sold, who can purchase, and how much can be purchased. While it is not technically a state store approach, the pharmacy sales model in Uruguay achieves some of the same goals with respect to cannabis (e.g., avoidance of price competition).

3. In jurisdictions which offer multiple supply models, there is very little research attempting to isolate the effects of the different models.

In Uruguay, Canada, and all the US states that legalised except Washington and Illinois, multiple supply models were enacted (and this will also be the case in Malta). This can make it difficult to isolate the effect of a particular model on various outcomes of interest, especially when analyses use a simple binary measure to denote whether legalisation had been enacted. We are only aware of one study which focuses on specific mechanisms (examining Uruguay), finding that there was a positive and consistent association between the number of people registered for home growing and traffic crashes involving injuries (the effects were not consistent for the other supply mechanisms).⁵

⁴ Pardal (2022).

⁵ Kilmer et al. (2022).

4. Rigorous outcome evaluations of alternative models to profit-maximising commercialisation of cannabis for non-medical purposes are rare but increasing.

Our review of the empirical evidence yielded a small number of studies focused on alternative models, and even fewer that use rigorous methods with credible control groups to measure the impacts of policy change on public health and safety. While pre-post analyses compare how an outcome changes (or doesn't change) before and after enactment of a policy, these do not allow researchers to identify whether the policy changes *caused* a change in the outcomes of interest. Pre-post analyses leave open the possibility that something else may have happened simultaneously that could be driving the results. That is why it is crucial to incorporate a credible control group into these analyses. Some notable exceptions exist in the literature. There are two studies examining the association of legalisation in Uruguay with youth cannabis outcomes used data from students in Chile as a control group.⁶ Another Uruguayan study used variation in the number and type of registrants at the department level to examine the association with traffic crashes involving injuries.

5. There are other non-profit models that have not yet been implemented.

In addition to the actual supply models which have already been regulated and implemented, we identified some other theoretical proposals which explore non-profit options for the supply of cannabis for non-medical use. These other models have been designed by typically drawing on regulatory experiences with other substances or potentially addictive behaviours/activities. For instance, Wilkins proposes an adaptation to a gaming machine model which had been introduced in New Zealand and considers how it may be a useful frame for the supply of cannabis for non-medical reasons, showing how such a model can be applied in practice.⁷ In turn, Rychert and Wilkins discuss whether alcohol licensing trusts, which are community-owned enterprises, could constitute a relevant model for the supply of cannabis, in the sense that it would, in theory, allow for community governance over cannabis sales – thus removing commercial interests from the market, and would oblige trusts to re-distribute revenues for community purposes.⁸ We also identified two other proposed models which resemble or expand on the experiences with the CSC model. Wilkins proposed the creation of Cannabis Incorporated Societies, based on earlier experiences with non-profit collectives in a range of areas (music, sports, cultural).⁹ Decorte developed a detailed framework for how CSCs could be regulated, detailing some of the key areas that should be safeguarded in potential legislation of the model.¹⁰

⁶ Laqueur et al. (2020); Rivera-Aguirre, et al (2022).

⁷ Wilkins (2018, 115-122).

⁸ Rychert & Wilkins (2019, 72).

⁹ Wilkins (2016, 74-77).

¹⁰ Decorte (2018).

Table of contents

Preface	ii
Executive summary	iii
Figures	ix
Tables	x
Boxes	xi
Abbreviations	xii
Acknowledgements	xiii
1. Introduction.....	1
1.1 Looking beyond profit-maximising commercial models for supplying cannabis for non-medical purposes.....	1
1.2 Desirability of profit-maximising commercial models for cannabis.....	3
1.3 Goals and scope of the study.....	4
1.4 What this study does not cover	5
2. Methods.....	7
2.1 Targeted literature and document review	7
2.2 Systematic review of the literature.....	8
2.3 Expert interviews	11
2.4 Limitations	11
3. Mapping the regulatory frameworks that introduce alternative models to profit-maximising commercialisation of cannabis supply for non-medical use	12
3.1 General features of the regulatory frameworks of interest	12
3.2 The stated public policy goals of the regulatory frameworks reviewed	17
4. Home cultivation	21
4.1 What is home cultivation and where has the model been implemented?.....	21
4.2 How has home cultivation been regulated across jurisdictions?	22
4.3 Evidence on the consequences of legal home cultivation for non-medical use for public health, safety and order	27
5. Cannabis Social Clubs (CSCs).....	29

5.1	What are CSCs and where has the model been implemented?.....	29
5.2	How has the CSC model been regulated across jurisdictions?.....	30
4.4	Evidence on the consequences of legal CSC model for public health, safety and order	36
6.	Government sales	40
6.1	What is understood as government sales and where has the model been implemented?	40
6.2	How have government sales for cannabis been regulated across jurisdictions?.....	41
6.3	Evidence on the consequences of government sales for cannabis for public health, safety, and order.....	50
7.	Other insights for the design of alternative models to profit-maximising commercialisation of cannabis for non-medical use	56
7.1	Alternative theoretical proposals and their anticipated consequences for public health and security	56
7.2	Lessons from regulatory experiences with other substances and activities, focusing on alternatives to profit-maximising commercialisation	61
8.	Conclusions.....	64
	References	73
	Appendix A: list of references included in systematic review phase.....	88

Figures

Figure 1: Overview of the literature review screening process.....	10
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Tables

Table 1. Research questions and data sources.	4
Table 2. Search terms used.	8
Table 3. Inclusion and exclusion criteria.....	9
Table 4. An overview of the regulatory frameworks of interest.....	13
Table 5. Share of cannabis consumers in 2019/2020 reporting last use was from cannabis they grew, for past month and daily users.	17
Table 6. Home cultivation: an overview of the main features of the regulatory frameworks allowing the model.....	26
Table 7. Government monopoly type of models: an overview of the main features of the regulatory frameworks allowing the model.	47
Table 8. Noteworthy empirical studies on the consequences of implementing alternatives to the profit-maximising commercial model for non-medical cannabis.....	68
Table 9: Insights concerning supply alternatives to prohibiting cannabis supply for non-medical purposes	71

Boxes

Box 1: Key examples of phased introduction of multiple supply models.	16
Box 2. Evolution of non-medical cannabis policy in South Africa.....	22
Box 4. Insights from the unregulated experiences with the CSC model in Spain.....	38
Box 5. Insights from the unregulated experiences with the CSC model in Belgium.	39

Abbreviations

ACT	Australian Capital Territory
ALT	Alcohol Licensing Trust
ARC	Autonomous Region of Catalonia
ARN	Autonomous Region of Navarre
ATVR	Áfengis- og tóbaksverslun ríkisins (State Alcohol and Tobacco Company of Iceland)
CatFac	Catalonian Federation of Cannabis Associations
CCS	Canadian Cannabis Survey
CIS	Cannabis Incorporated Society
CSC	Cannabis Social Club
ED	Emergency Department
EGM	Electronic Gaming Machine
EMCDDA	European Monitoring Centre for Drugs and Drug Addiction
FOPH	Swiss Federal Office of Public Health
IRCCA	Instituto de Regulación y Control del Cannabis (Institute for Regulation and Control of Cannabis, Uruguay)
OCS	Ontario Cannabis Store

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The views presented here only represent those of the authors.

1. Introduction

1.1 Looking beyond profit-maximising commercial models for supplying cannabis for non-medical purposes

There are now on the order of 180 million people around the world who live in jurisdictions that have passed laws to legalise the supply and possession of cannabis products capable of producing intoxication for non-medical purposes.¹¹ The vast majority of these individuals live in US states and Canadian provinces which allow for-profit companies to produce and sell cannabis to adults, sometimes aggressively promoting its use.^{12, 13} Thus, it is not surprising that this commercial approach to legalisation of cannabis supply, often modelled on alcohol policies, receives a large amount of attention in international policy discussions.

But the profit-maximising commercial model is only one approach to legalising the supply of non-medical cannabis.^{14, 15, 16} Indeed, home production is also allowed in most jurisdictions that allow commercial sales in North America and there are some Canadian provinces that have implemented government stores. Outside of North America, there appears to be even more interest in non-profit or “middle ground” options that remove the prohibition on supply and possession but do not allow profit-maximising firms to produce and sell cannabis. In 2013, Uruguay passed legislation to create three exclusive supply models: home cultivation, Cannabis Social Clubs (CSCs) and pharmacy sales (for non-medical supply).¹⁷ At the end of 2021, Malta passed a new law to allow home production and CSCs.¹⁸

The conversations about alternatives to cannabis prohibition have become more pronounced in other countries in Europe. In the Netherlands, the Dutch government has launched an experiment in ten medium to large municipalities to better understand whether and how cannabis can be legally supplied through a

¹¹ Under Swiss law, cannabis that contains a THC content of over 1% is considered psychoactive and is generally prohibited for use. For more information, see: Federal Office of Public Health (2021a).

¹² Fiala et al. (2020).

¹³ Asquith (2021, 79-98).

¹⁴ Caulkins et al. (2015).

¹⁵ Seddon & Floodgate (2020).

¹⁶ Transform (2022).

¹⁷ Queirolo (2020).

¹⁸ Times of Malta (2021).

closed supply chain involving coffee shops.¹⁹ The bill authorising the experiment has been adopted in 2019, and the experiment is currently in its preparatory phase with legally produced cannabis expected to be sold in coffeeshops from the second half of 2023.²⁰ In June 2022, the Luxembourg government has presented a new bill that aims to legalise and regulate home cultivation.²¹ If approved, adults in Luxembourg will be allowed to cultivate up to four cannabis plants per household (for personal, non-medical use). Germany is also considering revising its cannabis supply laws, although the details of the upcoming proposal are not known at the time of writing.²² Beyond Europe, other jurisdictions around the world have also initiated discussions around cannabis policy reform (e.g. Chile, Colombia, Mexico).

In Switzerland, local governments began to discuss the possibility of experimenting with cannabis regulation in a more “bottom-up” approach in the first decade of the 2000s. This began to gain traction in 2010 when the parliament of the city of Zurich greenlit a pilot study exploring the feasibility of cannabis sales. Similar pilot studies occurred in Basel City and the city of Bern over the following four years. The Federal Office of Public Health (FOPH) has, since 2011, also been given the ability to grant authorisations for manufacturing/marketing cannabis and related products. This ability is not just limited to a research and medical development context, as the FOPH can also grant authorisations for some medical applications. Further, a legal watershed moment occurred in 2021 when it was announced that an amendment to the Federal Act on Narcotics and Psychotropic Substances (NarcA) had been adopted by Parliament, which amended regulations regarding the medical use of cannabis.²³ Additionally, in late 2020, a new article, Article 8a, was added to NarcA which provided a legal basis for the conducting of scientific pilot trials involving the supply of cannabis for non-medical use, albeit limited in time and place.²⁴ The trials are “intended to create the basis for the future legal regulation”,²⁵ and require approval by the FOPH. In contrast to the Netherlands, within the Swiss pilot trials, multiple pilot trials might be introduced locally – and might propose a preferred model of supply (e.g., pharmacy sales, CSCs, etc.).²⁶

At this stage, the Swiss government is considering the array of existing and theoretical models to regulate the non-medical supply of cannabis. Specifically, the Swiss approach is driven by the desire to reduce the social and health costs associated with cannabis consumption, and includes four main priorities:

- Minimising health and social harms of cannabis use;

¹⁹ For more on the background and design of this experiment, please see: Government of the Netherlands (2022).

²⁰ Whilst the sale of cannabis to users through coffee shops has been tolerated in the Netherlands since the 1970s (within certain conditions), the production and distribution of cannabis to coffeeshops has remained illegal and consequently, unregulated (van Solinge 2017, 145-169).

²¹ Le Gouvernement Luxembourgeois (2022).

²² Deutsche Welle (2022).

²³ Chambers and Partners (2022).

²⁴ The article came into force in May 2021 and will remain in effect for a period of ten years. Federal Office of Public Health (2021b).

²⁵ Federal Office of Public Health (2021b).

²⁶ Each pilot project is run at the level of the municipalities (or communes) and can be organised by private or public organisations (e.g., local authorities, universities, research institutes, associations or foundations). Participation of a recognised research institute is required as well for each candidate pilot trial. For more on this see: Federal Office of Public Health (2021b).

- Promoting public order and reducing criminality;
- Ensuring the protection of minors;
- Establishing an effective and equitable governance.²⁷

In response, the FOPH has developed a research agenda to explore evidence-based approaches to regulating the non-medical supply of cannabis.²⁸

1.2 Desirability of profit-maximising commercial models for cannabis

For people who use cannabis, most will find it advantageous to have easy access to a variety of products at low prices. Those are things that the profit-maximisation commercial model can deliver better than other alternative models.^{29, 30} And the sooner prices drop after legalisation, the more attractive the legal market will be compared to the illegal market. Since the reduction of the illegal market is an important goal for some legalisation advocates, flooding the market with cheaper alternatives by allowing several profit-maximising firms to compete and promote their products can be attractive.

But the lower prices also affect other outcomes that matter to those participating in these debates. In general, it will lead to more consumption both at the population and individual levels.³¹

From a health perspective, the overall consequences of cannabis legalisation will not only be influenced by the amounts and types of cannabis being used, and who is using which products, but also how it affects the consumption of other substances such as alcohol and tobacco. The lower prices, and thus profit margins, will make it harder for smaller businesses to compete, meaning that larger corporations will likely control most of the market over time. The lower prices will also have implications for tax revenues if the taxes are set as a function of prices; as prices fall, so will tax revenues unless there is corresponding increase in consumption.

With bigger cannabis companies come bigger marketing budgets and more political power. The alcohol and tobacco industries are notorious for fighting against taxation and public-health focused regulations, and the emerging evidence from the US suggests some of the cannabis companies are doing the same thing.³² The ability of a government to ban or regulate cannabis marketing depends on the laws and practices of the particular jurisdiction, and it can become much harder in places where large corporations are active and competing with other companies for market share.

²⁷ Zwicky et al. (2021).

²⁸ Zwicky et al. (2021).

²⁹ Caulkins et al. (2016).

³⁰ Smart et al. (2017).

³¹ Caulkins (2019); Kilmer et al. (2010).

³² Roterling & Apollonio (2022).

1.3 Goals and scope of the study

This study supports this research agenda by assessing the available alternatives to profit-maximising commercial models for the supply of cannabis for non-medical use. The first goal is to identify the jurisdictions (national and subnational) which have implemented such regulatory frameworks, considering the public policy goals pursued (according to the relevant legal texts) and describing the characteristics of those frameworks. The study also systematically gathers and analyses the available evidence on such models of supply – with a focus on cannabis, but also drawing on lessons from the implementation of this type of models for the supply of other substances or the regulation of other activities (i.e., alcohol, tobacco, gambling). With a view to complement that knowledge base, the study integrates theoretical contributions which considered potential alternative models and discussed some of their anticipated effects. In Table 1 below, we provide an overview of the research questions and the data collected to address each of those. Chapter 0 offers additional information concerning the research methods.

Table 1. Research questions and data sources.

Research Questions	Research Methods
<p>RQ1. Which jurisdictions have introduced alternative models to profit-maximising commercialisation of cannabis supply for non-medical use?</p> <p>How are these models designed, particularly in terms of measures/regulations to safeguard:</p> <ul style="list-style-type: none"> • Public health • Public safety/security • Public order 	<p>Targeted literature and document review</p> <p>Interviews with experts</p>
<p>RQ2. Which alternatives to profit-maximising commercial models for the supply of cannabis for non-medical use (not yet implemented) might also be effective in terms of strong health and safety/security protection based on evidence in other fields (alcohol and other substances) and/or theoretical reflections?</p>	<p>Systematic review of the literature</p> <p>Interviews with experts</p>
<p>RQ3. What are the advantages and disadvantages, trade-offs and challenges of these alternatives to profit-maximising commercial supply models for non-medical use in terms of public health and public safety/security?</p> <ul style="list-style-type: none"> • What evidence is already available? • Which consequences, if any, can be anticipated from a theoretical point of view? 	<p>Systematic review of the literature</p> <p>Interviews with experts</p>

1.4 What this study does not cover

This report neither provides a cost-benefit analysis of alternatives to prohibiting cannabis supply nor conducts a cost-effectiveness analysis comparing alternative approaches on various outcomes. We were tasked with focusing on what is known about approaches to legalising cannabis that are not based on the profit-maximising commercial model. We note why some may find that model less or more desirable in Section 1.2.

This study focuses exclusively on supply models which have been introduced in the context of policies legalising non-medical cannabis production and/or distribution. Several jurisdictions around the world have reduced the penalties associated with cannabis possession and/or use, and some have allowed the supply of cannabis, which has led to a complex policy landscape. Policy discussions are further complicated because of the terminology used in this field. The European Monitoring Centre for Drugs and Drug Addiction (EMCDDA) defines decriminalisation as the absence of a criminal offense and/or presence of administrative sanctions with respect to an activity; and depenalisation as the relaxation of penal sanctions (i.e., no longer punished), while the activity itself remains a criminal offense. Moreover, experts sometimes refer to the terms *de jure* (e.g., removing criminal penalties from the law) and *de facto* decriminalisation (e.g., police guidelines to non-enforce criminal offences).³³ Differently, legalisation implies that a prohibited behaviour (criminal or not) is permitted (in accordance with the conditions established in the respective regulatory framework, if applicable). While both decriminalisation and depenalisation are terms typically used to describe drug possession, legalisation tends to be mobilised in relation to the supply of drugs.³⁴ In this study, **we focus on models of legal supply – as a result of legalisation policies, rather than models of cannabis supply based on tolerance, deprioritisation, or decriminalisation policies.** Nevertheless, we recognise that the classification of some policies might be challenging. For instance, several jurisdictions around the globe which have decriminalised cannabis possession have also decriminalised or depenalised the cultivation of a small number of plants, for personal consumption. As a result, home cultivation might in some instances be integrated under policies primarily targeting cannabis possession (as a case of both possession and self-supply).

Furthermore, we are aware there are other ‘self-regulatory frameworks’ in this area (e.g., regulatory codes developed by users themselves to organise the ways in which they produce or distribute cannabis). For instance, it has been documented that CSCs have developed their own ‘codes of practice’ in jurisdictions where their activities have not been formally recognised nor regulated.^{35 36} Such frameworks are not the focus of our analysis, as we are primarily interested in legal frameworks enacted by national or regional legislatures. Even so, to the extent that such self-regulated initiatives may provide interesting insights into the cumulated experiences with the model, we include some highlights from the literature on this.

³³ Belackova et al. (2019).

³⁴ EMCDDA (2022).

³⁵ Belackova & Wilkins (2018).

³⁶ Decorte et al. (2017).

Specific arrangements concerning the supply of cannabis for medical use can be identified today across several jurisdictions (e.g., in terms of granting access to the substance, the types of products available, etc.).³⁷ However, in our study we map and learn from the regulatory experiences concerning the supply of cannabis for non-medical purposes – therefore, **models designed specifically for the supply of cannabis for medical use are not addressed** in this report.

³⁷ For an overview of some key models, please see: Belackova et al. (2017).

2. Methods

This chapter provides an overview of the methodological approach used in this study and a discussion of the limitations. We conducted a targeted document review, systematically reviewed the literature, and interviewed individuals with expertise in cannabis policy.

2.1 Targeted literature and document review

The targeted document review serves as the primary source for the identification and description of the design of the alternative models to profit-maximising commercialisation of cannabis already regulated to date. The research team also conducted targeted literature searches to identify additional relevant materials complementing the sources found through the systematic review (please see 2.2).

In a first phase, academic sources and policy reports which provided an overview of the jurisdictions that have introduced regulatory frameworks allowing the introduction of models other than for-profit commercial schemes for the supply of cannabis and use of cannabis for non-medical use were reviewed.³⁸ During the expert interviews (please see section 2.3), we also consulted the respondents on our list of identified jurisdictions and asked whether this overview was accurate and complete. Any additional suggestions were followed up by the research team as well.

Subsequently, the research team prioritised the analysis of the relevant legal and policy texts of the identified jurisdictions. The analysis of legal texts and the consultation of national and subnational governments' websites allowed the research team to map the relevant features of each regulatory framework. To this end, the research team has both performed targeted searches for the relevant legislation as well as for other resources containing information on the regulatory frameworks.³⁹

We further aimed to understand whether and how public policy goals were integrated in the debate and in the actual design of the regulatory frameworks under analysis (especially, public health, public security and public safety). When available, we analysed the preambles and other sections of the legislative texts detailing the regulatory frameworks around non-medical supply of cannabis, to identify how these objectives were

³⁸ Those include, among others: United Nations Office on Drugs and Crime (2021); EMCDDA (2020); Gibbs et al. (2021).

³⁹ PDAPS (2017); NCSL (2023); Marijuana and the Law (2021); Canadian Centre on Substance Use and Addiction (2023).

articulated therein. To complement this analysis, we also discussed this matter with academic experts during the interviews (see section 2.3 below).

Additional literature suggested by the experts we interviewed or that the research team identified through snowballing or targeted searches was also integrated in our analysis.

2.2 Systematic review of the literature

The systematic review identifies and analyses the evidence related to consequences of implementation of alternative models to profit-maximising commercialisation of cannabis for non-medical use. We also integrate the available evidence for other potentially addictive substances (alcohol, tobacco) and activities (gambling), as well as theoretical considerations of potential effects of such regulatory frameworks. The research team developed a search strategy protocol tailored to this review. To ensure the consistency and replicability of the review, a combination of search terms was identified and tested. Following a pilot phase to fine-tune the suitability of the search terms, the final combination of keywords was inserted in the databases selected for this review. The search terms are outlined in Table 2.

Table 2. Search terms used.

Terms relating to the substances of interest:	cannabis OR marijuana OR resin OR hashish OR alcohol* OR spirits OR tobacco OR cigarette* OR nicotine OR gamb*
AND Terms relating to alternative models to -profit-maximising commercialisation:	"non-commercial" OR nonprofit* OR "not-for-profit*" OR "non-profit" OR "non profit" OR "home production" OR "home grow*" OR "self-supply" OR "self supply" OR "home cultivat*" OR "state monopoly" OR "state store" OR "government monopoly" OR "government store" OR "cooperative" OR "collective" OR "social club*" OR "community interest" OR "ABC stores" OR "legalisation*"
AND Terms relating to the measurement of impacts:	effect* OR outcome* OR result* OR impact* OR consequence* OR "associat*" OR lesson* OR evaluat* OR assess* OR implication
AND NOT Terms which were associated with irrelevant results:	medic* OR pharma* OR molecular OR chemistry OR physics

Given the scope of the review, the databases selected for the systematic review included several specialist databases, such as Criminal Justice Abstracts (criminal justice and criminology), EconLit (economics), PAIS (public policy and social issues), and two more general platforms (Web of Science and Scopus).

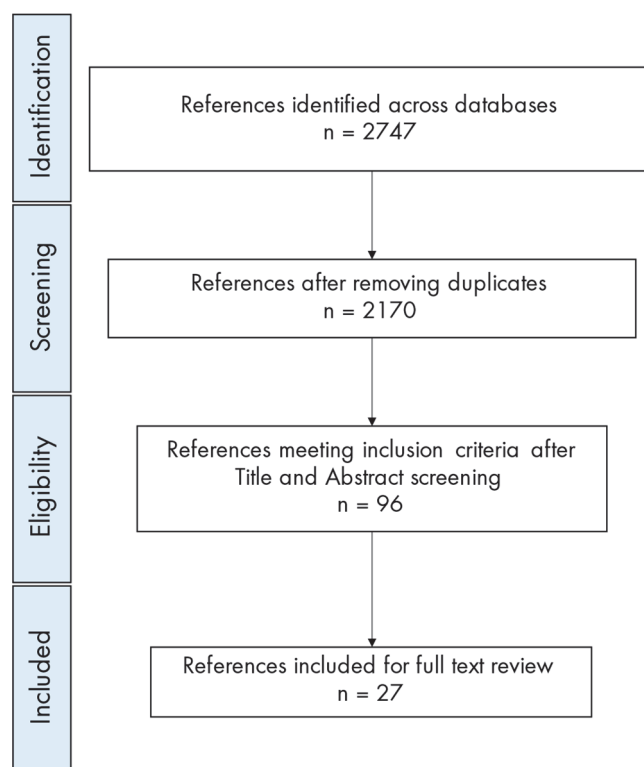
Following several pilot searches and after adjusting the protocol, the full search was performed relying on the keywords and databases listed above. The research team used EndNote to create a library of all the resources identified (n= 2747). Duplicate results (n= 577) were excluded using EndNote's 'find duplicates' function (Figure 1). Subsequently, the titles and abstracts of the remaining results (n= 2170) were screened

against the inclusion/exclusion criteria (Table 3) to confirm whether each source was relevant and should be selected for full text review.

Table 3. Inclusion and exclusion criteria.

Inclusion criteria	Exclusion criteria
Published from 2010 onwards	Published before 2010
Published in Dutch, English, French, Spanish	Published in languages other than Dutch, English, French, Spanish
Source type: journal articles, books, reports	Conference proceedings, letters, editorials, dissertations, and other undefined materials
The study focuses on cannabis, alcohol, tobacco, gambling	The study focuses exclusively on substances or activities other than cannabis, alcohol, tobacco, gambling
The study considers the outcomes (1) for public health, 2) public safety/security, 3) public order) of alternative models to profit-maximising commercialisation OR outlines alternative theoretical models applicable to cannabis and/or its expected outcomes (for the same public policy goals)	The study addresses other outcomes or focuses on commercial models for the supply of cannabis, or on models not applicable to cannabis

The screening process took place in two phases. Firstly, a pilot screening of a small number of random sources (n= 15) within the project EndNote library was conducted independently by two researchers. The screening process and decisions were then discussed among that team of researchers to ensure that the interpretation of the inclusion/exclusion criteria was clear and consistently applied. Following that phase, all the results identified were screened by one of the researchers, who classified them as ‘include’, ‘exclude’ or ‘uncertain’. In those cases where the inclusion or exclusion of specific sources was not clear, the researcher labelled the sources as ‘uncertain’, and the second reviewer was consulted to decide on inclusion/exclusion.

Figure 1: Overview of the literature review screening process.

Following the Title and Abstract screening of the sources identified, a total of 96 references were included for full text review. Two reviewers carried the full text review. A third member of the research team was consulted to reach a final decision on the inclusion or exclusion of files classified as ‘uncertain’ by the first reviewer. After this final phase of screening, out of the 96 sources reviewed, 27 were considered relevant (in light of the inclusion and exclusion criteria defined above). Please see Appendix A for the full references.

To facilitate and ensure consistency in the analysis of the relevant sources, the research team developed and used a data extraction sheet, which captured the following broad types of information:

- Full bibliographic details (authors, title, publication date, publisher, etc.)
- Summary of findings (abstract)
- Country or region of focus
- Substance(s) or behaviour(s) of focus (i.e., cannabis, alcohol, tobacco, gambling)
- Supply model reported
- Characteristics of alternative model to profit-maximising commercialisation (organisational features, production, packaging and labelling, storage and transport, distribution, and consumption)
- Implemented vs. theoretical/hypothetical model
- Impacts reported (in particular: 1) public health; 2) public safety/security; 3) public order)
- Anticipated effects (for theoretical or not yet implemented models)
- Methodological approach and limitations
- Other comments.

2.3 Expert interviews

The research team conducted online interviews with experts in the field, to complement the evidence gathered through literature and document review. The aims of these interviews were to gather insights on the regulatory frameworks currently in place, the associated public policy goals, as well as early outcomes associated with their implementation. In addition, the interviews also facilitated the gathering of information about theoretical models and other regulatory experiences (e.g., about other substances, such as tobacco and alcohol). The topic guide used in the interviews covered these topics.

The research team performed semi-structured interviews with 14 academic and policy experts during June 2022. The interviewees were selected based on their expertise on cannabis policy, and knowledge of particular cases of regulated alternative models to profit-maximising commercialisation (e.g., Canada, Uruguay). The interviews were conducted online and lasted approximately one hour. As agreed with the interviewees, we do not attribute any direct citations to individual experts and use a code system to refer to their statements in the reporting of findings. The data from the interviews were analysed thematically by creating a coding template that loosely followed the structure of the interview topic guide. After we coded the findings against those themes and pulled the key findings from all interview notes, we triangulated against the other data sources consulted.

2.4 Limitations

Our combined efforts to systematically review the literature and interview cannabis policy experts from around the world should reduce the risk of missing any important studies or policy innovations related to alternative approaches to profit-maximising commercialisation of the supply of cannabis for non-medical use. However, there is always the possibility that we missed a relevant resource, especially given the proliferation of articles and reports about cannabis legalisation that are now being published on a regular basis.

We have also worked hard to document the variation in national and subnational laws/policies related to non-profit models but acknowledge that there may be some variation in how some of these policies are implemented or enforced at lower geographic units (e.g., cities) that could influence various outcomes of interest.

Finally, and as noted earlier, we are not in a position to argue that one particular model is better than others. There are multiple goals related to legalisation and not everyone values them similarly. But we will note that it may be harder to make significant changes to a legalisation regime once there is a strong industry in place that prioritises maximising profit or promotes intemperate use.⁴⁰

⁴⁰ Caulkins et al. (2015).

3. Mapping the regulatory frameworks that introduce alternative models to profit-maximising commercialisation of cannabis supply for non-medical use

Alternative models to profit-maximising commercialisation of the supply of cannabis for non-medical use have been legalised and regulated in at least six jurisdictions: Australia, Canada, Malta, Spain, the United States, and Uruguay. Nevertheless, the scope of application of these regulatory frameworks is different, and so is the choice of supply model. In the next sections we introduce these frameworks and their stated policy goals.

3.1 General features of the regulatory frameworks of interest

3.1.1 Approval and entry into force

All the regulatory frameworks we identified have been approved in the past decade, from two US states in 2012 to the legal reform at the end of 2021 in Malta. Table 4 provides an overview of the timeframe of approval of these regulatory frameworks. In two of these jurisdictions, the regulatory frameworks are not in force currently. In fact, in the two Spanish autonomous regions of Catalonia and Navarre, rulings from the Constitutional Court (in September 2018 and in December 2017, respectively) annulled the regulatory frameworks, as those were considered unconstitutional.⁴¹ In Malta, implementation of the new legal framework has not yet begun. Even so, given the focus on understanding the choices made with regards to the regulatory frameworks, these three cases still offer valuable insights and have been integrated in our analysis.

⁴¹ Arana & Parés (2020).

Table 4. An overview of the regulatory frameworks of interest.

Country	Nationwide legal framework	Sub-national jurisdiction (if applicable)	Alternative models to for-profit commercialisation	Co-existence with for-profit commercial models	Year of passage of law ¹
Australia	No	Australian Capital Territory (ACT)	Home cultivation	No	2020
Canada	Yes ²	All provinces ⁴²	Home cultivation Government-run outlets ^{4, 5}	Yes ²	2018
Malta	Yes		Home cultivation Cannabis Social Clubs	No	2021
Spain³	No	Autonomous Region of Catalonia (ARC) Autonomous Region of Navarre (ARN)	Cannabis Social Clubs	No	2014
United States	No	16 U.S. states ⁴³	Home cultivation	Yes	2012
Uruguay	Yes		Home cultivation Cannabis Social Clubs Pharmacy sales ⁴	No	2013

Notes: ¹ First year a legal framework was approved in that country, in cases where multiple sub-national regulatory frameworks have been introduced. ² With variation at the province level. ³ These regulatory frameworks are no longer in force as of 2018 (Catalonia) and 2017 (Navarre). ⁴ As further explained in Chapter 6, we consider these regulatory options under the broader classification of government monopolies. ⁵

3.1.2 Process leading up to the approval of the regulatory frameworks

The process that led to the approval of these laws greatly varied across jurisdictions, which is something that also became evident based on the interviews we conducted with cannabis policy experts. While in the US, legalisation of cannabis for non-medical use has been implemented primarily through voter initiatives at the state level, in Canada, the Cannabis Act was approved at the federal level. This was the outcome of a process which started in 2016, with the creation of a Task Force on Cannabis Legalisation and Regulation by the Minister of Health, comprising experts coming from a variety of sectors (legal, public health, law enforcement, research/academia, and government), with the mandate of consulting and providing advice

⁴² Concerning non-commercial regulatory models: 9 provinces permit home cultivation and government-run stores (Alberta, British Columbia, New Brunswick, Newfoundland and Labrador, Northwest Territories, Nova Scotia, Ontario, Prince Edward Island, and Yukon); 2 permit government-run stores but not home cultivation (Nunavut and Quebec); and 1 permits home cultivation but not government-run stores (Saskatchewan).

⁴³ These 16 states are Arkansas, Arizona, California, Colorado, District of Columbia, Illinois, Maine, Massachusetts, Michigan, Montana, Nevada, New Mexico, New York, Oregon, Vermont, and Virginia. Regarding New York, it is not clear whether the law allowing for home cultivation for personal use is in place as it is conditional on the Office of Cannabis Management setting regulations first.

on the design of a new regulatory framework for legal access to cannabis.⁴⁴ In Malta, the new law was part of the government's election programme.⁴⁵ In Uruguay, the move to regulate the supply of cannabis was also primarily an initiative of the government in a context of public security concerns,⁴⁶ and initially passed in spite of popular opinion, with approximately two-thirds Uruguayan opposing the regulation in 2012-2013.^{47, 48, 49} In Spain, the legislative initiatives from the autonomous regions of Catalonia and Navarre were strongly driven by civil society: in Navarre, the bill was brought to the regional parliament (as a 'people's legislative initiative) after 10,000 signatures were collected; in Catalonia, 56,000 signatures were collected in support of the people's legislative initiative named 'La Rosa Verda'.^{50, 51}

3.1.3 Territorial scope of the regulatory frameworks and agencies overseeing its implementation

The regulatory frameworks adopting alternatives to profit-maximising commercial models for the supply of cannabis for non-medical use have been implemented at the regional, federal and national level. For instance, while Uruguay and Malta have adopted a national legislation regulating the cannabis market, from consumption to sale, Spain has not adopted a regulatory framework allowing the supply of cannabis at the national level, though two autonomous regions (Navarre and Catalonia) adopted regional laws in that respect, which have been subsequently annulled by the Constitutional Court. In the US, policy changes in this area have happened exclusively at the state level.⁵²

There are also different approaches to the monitoring and support of the regulatory frameworks. In Malta and Uruguay, new national agencies dedicated to overseeing the implementation of the regulatory frameworks were set up: respectively, the Authority on the Responsible Use of Cannabis (ARUC), and the Institute for the Regulation and Control of Cannabis (IRCCA). In Australia, albeit only limited to the ACT, a Cannabis Advisory Council was established as well. Differently, in Canada and in the US that responsibility has been in some cases granted to agencies that have also a role in terms of managing the supply market of other potentially addictive substances or activities. For instance, in Ontario, the Alcohol

⁴⁴ The final report of the Task Force on Cannabis Legalization and Regulation (Government of Canada, 2016). The Task Force engaged with, inter alia, provincial, territorial, municipal governments, experts, and representative organisations. Many Canadians also participated in an online public consultation that generated 30,000 submissions from individuals and organizations. In addition, the Task Force looked internationally to learn from jurisdictions that legalised cannabis for non-medical purposes, and they drew lessons from the way governments in Canada have regulated other substances, such as tobacco and alcohol.

⁴⁵ EMCDDA (2021).

⁴⁶ Queirolo et al. (2019).

⁴⁷ Walsh & Ramsey (2016).

⁴⁸ Cruz et al. (2018a).

⁴⁹ Since the approval of the law, support of the policy has increased though. See, for instance: Cruz et al. (2018b).

⁵⁰ Sánchez & Collins (2018).

⁵¹ Respondent 15.

⁵² Pardo (2020).

and Gaming Commission of Ontario is the provincial regulatory agency responsible for regulation in the following sectors: alcohol, gaming horse racing and cannabis retail.⁵³

3.1.4 Supply models introduced within these regulatory frameworks

We identified three broad supply models which have been regulated thus far and which constitute an alternative to profit-maximising commercialisation of the supply of cannabis: home cultivation (Chapter 4), Cannabis Social Clubs (Chapter 5), and other schemes with a strong government involvement which we group under government sales (Chapter 6). Each of these models is presented in detail in the next chapters. In some cases, only one supply model has been authorised (e.g., in the two Spanish autonomous regions, in some provinces in Canada, and a few US jurisdictions). But often these models have been introduced alongside other supply options. This is particularly the case with regards to home cultivation, which has been, in most cases, included in regulatory frameworks allowing also other supply options. For instance, in Uruguay, three legal supply options are available (albeit users can only obtain cannabis through one selected channel at a time): home cultivation, Cannabis Social Clubs, and pharmacy sales. In Malta, both home cultivation and Cannabis Social Clubs are allowed. In these cases, several alternative models to profit-maximising commercialisation co-exist. Several provinces in Canada as well as most US states have introduced commercial retail options in addition to home cultivation and, in the case of Canada, government-run sales.

⁵³ Alcohol and Gaming Commission of Ontario (AGCO) (n.d.).

Box 1: Key examples of phased introduction of multiple supply models.

Phasing the introduction of cannabis supply models has been argued for by drug policy scholars.^{54, 55, 56} Building from experiences in alcohol and tobacco regulation, Pacula et al. (2014) suggest that a slow implementation of a cannabis supply model with tight regulations is needed to reduce the risks of sudden changes in cannabis misuse rates and related health problems.⁵⁷ A slow implementation would facilitate evaluation of the cannabis supply framework and allow authorities to adjust the framework as needed to meet policy objectives. The authors contrast this cautious approach to implementing a supply model with a 'free market' approach, warning that such a commercialised supply system would likely see the rapid expansion of cannabis supply infrastructure and consequently be difficult to evaluate, modify, or rescind.

In many jurisdictions, cannabis supply models have been purposefully implemented in a phased or incremental manner. In the Australian Capital Territory, the process of home cultivation was legalised in 2020, but a legal market for cannabis has not been established – although the notion has received attention in parliament.⁵⁸ Malta and Luxembourg have announced the legalisation of home cultivation, with later plans to implement retail through Cannabis Social Clubs and a legal retail market respectively.⁵⁹ Switzerland currently permits localised trials of alternative supply models (including pharmacy sales and Cannabis Social Clubs), and the findings of that experiment are expected to inform future legal regulation policies at greater scales.⁶⁰

In other instances, the phased introduction of multiple supply models was not necessarily planned, but rather the result of unforeseen circumstances. In Vermont, home cultivation of cannabis was legalised in 2018, but retail sales were not legalised until 2020 and will not be implemented until October 2022; these delays have been attributed to disagreements on the specificities of a legal retail system amongst the state's General Assembly.^{61, 62, 63} In Ontario, after legalisation in 2018, cannabis could initially only be purchased through the online store of the government-run Ontario Cannabis Store, and whilst plans existed to introduce 150 brick-and-mortar government-run retail stores into Ontario, a change in provincial administration saw the introduction of a private, physical market being implemented alongside the existing government-run retail system from April 2019 onwards.^{64, 65, 66} In Uruguay, registries that granted permission for home cultivation and to establish Cannabis Social Clubs opened in August 2014 and October 2014 respectively, with the distribution through pharmacies not being implemented until July 2017.⁶⁷ This incremental approach has been attributed to a changeover in administration in 2015 to a government that did not fully support the previous administration's cannabis reformation policies, meaning the implementation of the full legalisation law was slower than in the previous presidential era.⁶⁸ Other administrative and financial obstacles in Uruguay further slowed the introduction of pharmacy sales.⁶²

⁵⁴ Kilmer (2019).

⁵⁵ Caulkins (2019).

⁵⁶ Decorte (2018).

⁵⁷ Pacula et al. (2014, 1021-1028).

⁵⁸ Barret et al. (2022, 1-9).

⁵⁹ EMCDDA (2021).

⁶⁰ Federal Office of Public Health (2021b).

⁶¹ Pardo (2020).

⁶² Note that this legal market will be privatised and regulated by the Cannabis Control Board. For further information, please see: Government of Vermont (2022).

⁶³ West et al. (2022).

⁶⁴ Ontario Cannabis Store (2018).

⁶⁵ Aversa et al. (2021).

⁶⁶ Canadian Centre on Substance Use and Addiction (2019).

⁶⁷ Queirolo (2020).

⁶⁸ Queirolo (2020).

In the US context, retail sales are believed to dominate the legal market; however, this is hard to quantify. The best publicly available state-level information about the share of past-month users or daily users who report the last time they used cannabis was from cannabis they grew. Table 5 presents this information for the period covering 2019/2020 for the entire country and the three states with the longest operating commercial markets as well as California (the sample sizes are too small to generate this figure for Alaska). This is not an ideal measure since people who grow still may purchase or obtain cannabis from other means (e.g., friends), but the low figures suggest home growing accounts for a small share of the overall market. We also have no evidence about the accuracy of self-reported growing in national surveys (there is some research on this for self-reported use).

Table 5. Share of cannabis consumers in 2019/2020 reporting last use was from cannabis they grew, for past month and daily users.

State	% of past-month users (95% Confidence interval)	% of daily users (95% confidence interval)
All states	3.3% (2.7% - 4.1%)	6.7% (4.9% - 9.1%)
Colorado	3.7% (1.7% - 7.7%)	N/A
Washington	3.2% (1.0% - 9.2%)	N/A
Oregon	10.5% (5.7% - 18.5%)	N/A
California	6.1% (3.7% - 9.8%)	12.5% (6.9% - 21.6%)

Note: Washington does not permit cannabis to be grown for non-medical purposes. N/A means the cell counts were too low to generate estimates. Source: Based on authors' analysis of the SAMSHDA 'National Survey on Drug Use and Health: 2-Year RDAS (2019 to 2020)', using variables MMGETMJ, IRMJFM, and STUSAB.

Given the wide confidence intervals for the state-level estimates, we should be cautious about making strong inferences; however, the numbers seem reasonable and suggest that home production accounts for a small share of the market in terms of volume of cannabis consumed. We would expect California and Oregon to have higher rates of home growing given their long history of cannabis production, and it is not surprising the figure for Washington is closer to the national average since they still prohibit home grows for non-medical purposes. We would also expect the rates for home growing to be higher for daily users than for those reporting any past month use (because, among other reasons, growing may be a cheaper option for those using cannabis more frequently, or they may be attracted to the properties of the plant and the growing process).⁶⁹

3.2 The stated public policy goals of the regulatory frameworks reviewed

Decisions on the different options for cannabis regulation often involve an assessment of competing goals, multiple outcomes, and trade-offs. Different governments may pursue different policy aims through regulation, depending also on the country-specific context in which they are embedded in.⁷⁰ The policy

⁶⁹ Potter et al. (2015).

⁷⁰ Respondent 8. Respondent 5 emphasised also the need to carefully think about the formulation of policy goals and how these may be measured.

goals of these regulatory frameworks are typically made explicit in the relevant legal texts, usually referred to as the objectives of the law in question. This section presents the main public policy goals and how they were detailed in the regulatory frameworks of the jurisdictions adopting one of the abovementioned models. Most of these models coexist with for-profit commercial models. Therefore, the public policy goals listed in the relevant legal texts might refer to frameworks regulating both not-for profit *and* for-profit models of cannabis supply.

3.2.1 A combination of public health, public security and public order policy goals

The Canadian approach, embodied in the Cannabis Act (commonly known as Bill C45) was explicit about the need to achieve more than one public policy objective, with a focus on public health, in order to attract and retain users from the illegal market without encouraging use.⁷¹ Indeed, the purposes of the Cannabis Act are, among others, to protect the health of young persons, provide for the licit production of cannabis to reduce illicit activities in relation to cannabis, provide access to a quality-controlled supply of cannabis, and enhance public awareness about the health risks associated with cannabis use. Similarly, several regulations enacted at the province and territorial level use a similar wording.⁷² The focus on public health among the public policy goals' discussion in Canada was mentioned by several of the experts we interviewed in the context of this study.⁷³ This “public health” approach is also reflected in the strict requirements that the Cannabis Act sets for, among others, packaging and labelling for cannabis products, as well as advertisement and promotion.⁷⁴ However, it appears that some provinces may be less restrictive than others on a number of factors, such as the availability of edibles, or on age limits.

In Uruguay, the regulatory framework takes into account public health goals by prohibiting any kind of advertising and promotion of cannabis, ensuring a legally produced and quality-tested cannabis, and establishing strict requirements on the operation of CSCs (e.g., distance from schools, monthly limit of cannabis that users can access to, no more than one membership per CSC). Importantly, the registration requirements with the IRCCA limits consumers to one method of supply (i.e., CSC, *or* pharmacies, *or* home cultivation), which reflects the aim of avoiding increased use among consumers.

However, in Uruguay, cannabis reform was primarily born from concerns about the illicit distribution of cannabis and driven by the goal of reducing the illicit market.⁷⁵ One of the experts interviewed explained that cannabis activists pushed for the introduction of home cultivation and CSCs, while the sale of cannabis at pharmacies was seen as a way to somehow achieve the public health goal. The combination of these goals

⁷¹ Gibbs B (2021).

⁷² For example, the Cannabis Act (Nunavut) provides that the purpose of the Act ‘*is to regulate cannabis, including by establishing prohibitions related to cannabis, in order to (a) protect the health and safety of Nunavummiut, especially minors; (b) provide for the safe distribution of cannabis to adults; (c) combat the illegal market for cannabis; and (d) increase awareness of the risks associated with cannabis.*’ (Government of Canada, 2018b).

⁷³ Respondents 4, 7, 13, 10, 11.

⁷⁴ Respondents 13, 12.

⁷⁵ Cruz et al. (2018b); Kilmer (2017); EMCDDA (2017); Cerdá & Kilmer (2017). One interviewee also confirmed this finding, Respondent 8.

is also apparent from the text of the Law, which is intended to ‘*protect, promote and improve the public health of the population*’, to ‘*protect the country’s population from the risks that imply the connection with illegal trading and drug trafficking*’ and ‘*to attack, through the Government, the devastating health, social and economic consequences of the problematic use of psychoactive substances as well as diminish the influence of drug trafficking and organized crime*’.⁷⁶

In addition, it is relevant to point out that several of these regulatory frameworks allocate to the relevant (often, *ad hoc*) regulatory authority some crucial responsibilities. For instance, in Malta, the Authority on the Responsible Use of Cannabis (ARUC) shall, among other responsibilities, assist law enforcement and regulatory authorities in the fight against crime in the field of dangerous drugs, monitor the use of cannabis, and organise or promote educational campaigns on the responsible use of cannabis.⁷⁷ In Uruguay, among the duties allocated to the IRCCA, the authority advises the government on the formulation and application of public policies aimed at regulating cannabis, develops strategies aimed at delaying user’s initial age, and contributes to scientific evidence by investigation and strategy assessment for the orientation of public policies for cannabis.⁷⁸ In Quebec (Canada), it is interesting to note that Bill 157 explicitly provides that the act constitutes the Société Québécoise du cannabis (SQDC), ‘*whose purpose is to ensure the sale of cannabis from a health protection perspective in order to integrate consumers into, and maintain them in, the legal market without encouraging cannabis consumption*’.⁷⁹

3.2.2 The co-existence with profit-maximising commercialisation

Of the 20 jurisdictions in the US that have passed some form of cannabis legalisation for non-medical purposes, 12 (60%) passed it through voter initiatives at the state level.⁸⁰ While more than 44% of the US population lives in jurisdictions that have passed legalisation, supply and possession of cannabis remains illegal under US federal law. One interviewee mentioned that, for this reason, some of the regulatory frameworks are a sort of “reaction” to what the public opinion expressed, thus lacking a specific consultation or a more structured process on how to legalise, but revealed the evidence of the growing public support for reforming cannabis laws.⁸¹ As of May 2022, 19 US States and the District of Columbia have enacted measures to regulate cannabis for adult non-medical use.⁸² Kilmer and MacCoun offer five hypotheses about

⁷⁶ Uruguay (Law19.172).

⁷⁷ Malta: Act to establish the authority on the Responsible use of cannabis and to amend various laws relating to certain cannabis activities (2021).

⁷⁸ Uruguay (Law19.172), Chapter III Duties and Powers of IRCCA, Article 27.

⁷⁹ See page 2 in Quebec Official Publisher (2018).

⁸⁰ See to Norml (n.d.). The eight states that passed legalisation through the traditional legislative process are: Connecticut, Illinois, New Jersey, New Mexico, New York, Rhode Island, and Vermont, Virginia. While voters in South Dakota did pass a legalisation measure, it was struck down by the courts and not included in these figures. See NPR (2022).

⁸¹ Seddon & Floodgate (2020).

⁸² NCSL (2023).

why previous legalisation of medical cannabis may have smoothed the transition to non-medical cannabis in the US⁸³:

- “1. Demonstrated the efficacy of using voter initiatives to change marijuana supply laws;
2. Enabled the psychological changes needed to destabilise the “war on drugs” policy stasis;
3. Generated an evidence base that could be used to downplay concerns about nonmedical legalisation;
4. Created a visible and active marijuana industry; and
5. Revealed that the federal government would allow state and local jurisdictions to generate tax revenue from marijuana.”

Overall, the US preference has been to establish a profit-driven commercial market.⁸⁴ Indeed, the public policy goals contained in the resulting regulatory frameworks include both public health and public safety, but some of them also mention the generation of tax revenues associated with the sale of cannabis. For instance, the Smart and Safe Arizona Act is stated to be ‘*in the interest of the efficient use of law enforcement authorities, enhancing revenue for public purposes, and individual freedom [...], and in the interest of the health and public safety of our citizens.*’⁸⁵ Similarly, the Adult Use of Marijuana Act (California, Proposition 64) provides that the purpose of the act is to ‘*establish a comprehensive system to legalise, control and regulate the cultivation, processing, manufacture, distribution, testing, and sale of nonmedical marijuana, including marijuana products, [...], and to tax the commercial growth and retail sale of marijuana.*’⁸⁶ Concerning advertising, states that have passed legalisation have imposed various restrictions ranging from prohibiting false statements to not targeting youth.⁸⁷ For example, a common stipulation is that advertisements must be restricted to media with no more than 30% of the audience under the age of 21.⁸⁸ But states have not banned advertising and Caulkins et al. report an interesting anecdote from Washington: ‘*Washington State’s lawyers told its marijuana regulators that any regulation of advertising that is not actively fraudulent or directed explicitly to children would violate sellers’ free-speech right under the state constitution.*’⁸⁹

Although the purely commercial models are not the focus of this study, it is important to mention that non-commercial models often coexist with profit-driven regulatory frameworks. This might happen for a variety of reasons. For instance, in Canada, although federal law reflects the intention of the government to primarily protect public health, provinces have a broad margin of manoeuvre in regulating the sale of cannabis, and some may shift towards a more profit-driven approach.

⁸³ Kilmer & MacCoun (2017).

⁸⁴ Decorte et al. (2020).

⁸⁵ Smart and Safe Arizona Act (n.d.).

⁸⁶ The Judicial Branch of California (2016).

⁸⁷ Decorte et al. (2020).

⁸⁸ Pardo (2020).

⁸⁹ Caulkins et al. (2016, 135).

4. Home cultivation

4.1 What is home cultivation and where has the model been implemented?

Globally, small-scale, home cultivation is now a wide-spread phenomenon.⁹⁰ Indeed, some jurisdictions which have decriminalised cannabis possession have also decriminalised or depenalised cannabis cultivation of a small number of plants. For this reason, the classification of home cultivation policies is particularly complex, since home cultivation can be classified as a case of both possession and (self-)supply.⁹¹ There are different ways through which depenalisation or decriminalisation policies of home cultivation have been implemented, such as criminal provisions pertaining to home cultivation being repealed by the Supreme Court (e.g., Colombia) or through legislature passed by Parliament (e.g. Jamaica), by guidelines determining that home cultivation (of a maximum of five plants) should not be prosecuted (e.g., the Netherlands), or should have low prosecutorial priority (e.g., Belgium).⁹² In addition, experts suggest that there might be cases that can be defined as *de facto* legalisation, opposed to *de jure* legalisation.⁹³ For instance, in South Africa, the Constitutional Court ruled that criminal provisions related to home cultivation of cannabis were unconstitutional, meaning that criminal provisions related to home cultivation were invalid, and needed to be repealed by the legislature – for more on this case, please see Box 2. As a result, adults may now cultivate cannabis plants in quantities that are sufficient for their personal consumption in any private, non-public place.⁹⁴ A similar court ruling has taken place in Mexico in 2018, whereby the Mexican Supreme Court declared that the absolute prohibition of non-medical cannabis use was unconstitutional, effectively paving the way for legal reform, which has started to be discussed since 2021.⁹⁵

⁹⁰ Potter et al. (2011).

⁹¹ Belackova et al. (2020).

⁹² For more information on Jamaica's cannabis reforms, please see: Hanson (2020).

⁹³ Decorte et al. (2020); Belackova et al. (2019).

⁹⁴ United Nations Office on Drugs and Crime (2022b).

⁹⁵ Beltrán-Velarde & Íñiguez-Rueda (2021).

Box 2. Evolution of non-medical cannabis policy in South Africa.

In 2018, a South African Constitutional Court ruled that it was unconstitutional to ‘criminalise the use or possession in private or cultivation in a private place of cannabis by an adult for his or her own personal consumption in private.’⁹⁶ The decision did not change the laws with respect to cultivating, possessing, or using of cannabis in public, and it noted that the amount of cannabis adults could possess in private would have to be decided by the Parliament.⁹⁷

The ruling created a number of questions, including those pertaining to how adults can obtain the seeds or seedlings to grow their own cannabis. As noted by Mary Nel, a senior lecturer in Public Law at Stellenbosch University in South Africa:⁹⁸

‘The user could grow their own. But they would need to obtain the seeds or buy them from someone else – who is, by definition, a dealer. The judgment’s implication seems to be that to exercise one’s (constitutionally protected) right to use marijuana in private, one must inevitably act illegally since any purchase of marijuana and related products makes one an accomplice to dealing in cannabis.’

In 2020, a bill was introduced to allow for ‘four flowering cannabis plants or cannabis plant equivalent per adult person; or(ii) eight flowering cannabis plants or cannabis plant equivalent per dwelling which is occupied by two or more adult persons’,⁹⁹ but it has not yet been approved by the Parliament. Conversations about creating a commercial regime have become more serious, with the president of South Africa noting that the development of a commercial industry was a priority because of its economic potential.¹⁰⁰ The ability of smaller farmers to participate in a commercial regime will likely continue to be a major topic of discussion in legalisation conversations in South Africa and elsewhere.¹⁰¹

Moreover, there are jurisdictions where home cultivation of cannabis has been *de jure* legalised – given the scope and goals of the study, our analysis will focus on these cases. The guiding principle for home cultivation is relatively simple: to allow users to grow their own cannabis. Nevertheless, the particular home cultivation policy designs may be more complex. For instance, some jurisdictions have introduced restrictions to the number of plants users are allowed to cultivate, there may be requirements regarding the location of the plantation, in some cases mandatory registration as home growers is foreseen, among other requirements. Table 6 provides an overview of the main characteristics of the regulatory frameworks for home cultivation in the jurisdictions that explicitly legalised it: the ACT (Australia), Canada (with exception of the provinces of Manitoba and Quebec), Malta, many states in the United States, and Uruguay.

4.2 How has home cultivation been regulated across jurisdictions?

4.2.1 Co-existence of regulated home cultivation and other supply models

Importantly, legal changes allowing home cultivation has usually been introduced in parallel to other supply options for cannabis.¹⁰² While the commercial model adopted in the US receives a lot of attention, it is also the case that every US state implementing this approach also allows home production of non-medical

⁹⁶ Constitutionnel Court of South Africa (2018).

⁹⁷ Parry et al. (2019).

⁹⁸ Nel (2018).

⁹⁹ The Department of Justice and Constitutional Development, Republic of South Africa (2020).

¹⁰⁰ CNBC Africa (2022).

¹⁰¹ Rusenga et al. (2022).

¹⁰² Belackova et al. (2019).

cannabis except for Washington State and Illinois.^{103, 104} Furthermore, in the District of Columbia (US), home cultivation and gifting are the only legal means to obtain cannabis. However, in DC there has been the emergence of “gifting” businesses, in which entrepreneurs get around the congressional prohibition on selling recreational marijuana in D.C. by giving a free “gift” of the drug with a purchase of some other item like a T-shirt or a poster.¹⁰⁵

In Uruguay and Malta, home cultivation is one of the regulated supply models alongside CSCs and – in the case of Uruguay, pharmacy sales. In Malta, the implementation of the new legal framework (approved in 2021) has not yet begun. In Uruguay, home cultivation seems to be the second most popular legal supply model in terms of registrants: there are a total of 14,028 registered home growers, while pharmacy sales have been appealing to near 50,000 users (according to the latest available data from June 2022).¹⁰⁶ In Canada, two provinces prohibit home cultivation of cannabis for non-medical use (Manitoba and Quebec), but in all other provinces, home cultivation is possible alongside government-run stores, private stores and/or online sales. According to data from the International Cannabis Policy Study for Canada, *home cultivation among past 12-month cannabis consumers increased to a modest extent following legalisation of non-medical cannabis in Canada, from approximately 6% in 2018, to 8% and 9% in 2019 and 2020.*^{107, 108} In the ACT, home cultivation is the only permitted option.

4.2.2 Limits to the number of plants that may be cultivated

Concerning the instances of *de jure* legalisation of home cultivation which we reviewed here, these regulatory frameworks have introduced quantity restrictions in terms of the number of plants that may be grown. Furthermore, some jurisdictions apply a cap per individual grower, while others refer to the total number of plants that may be cultivated per household. For instance, most US states set the limit at six female plants per person (three of which can be flowering), with a maximum of 12 plants per household (e.g., Michigan, Nevada). Uruguay also allows up to 6 in-flower plants per household, and an annual harvest of up to 480 grams. Canada and the (recently introduced) regulation in Malta set the limits to 4 plants per household, and the storage of up to 50 grams of dried cannabis product. In the ACT, the cultivation of 2 plants per person or a maximum of 4 plants per household is permitted.

¹⁰³ Dilley et al. (2022).

¹⁰⁴ There is currently a bill in Illinois to allow any adults to grow up to five plants in Illinois. See Illinois General Assembly (2022).

¹⁰⁵ Weil et al. (2022).

¹⁰⁶ IRCCA (2022c).

¹⁰⁷ Wadsworth et al. (2022, 5).

¹⁰⁸ The home growing rates for frequent users is likely higher than these figures suggest since occasional users are less likely to invest the time and resources into home cultivation.

4.2.3 Restrictions to who can legally cultivate cannabis at home

Age restrictions are a common element across the jurisdictions that have legalised home cultivation. In the ACT, Malta, and Uruguay, and Malta the threshold is set at 18 years old. Also in Canada, according to federal law, the minimum age is 18 years old, although most provinces have raised it to 19. In the US jurisdictions allowing home cultivation, the minimum age is 21 years old (in line with minimum age to purchase cannabis from retailers in the US states with legal cannabis stores).

In addition, Uruguay is the only jurisdiction to require mandatory registration of home growers. In that country, a licence for home cultivation must be obtained and renewed every three years. In addition, home growers may be asked to submit information about the varieties of cannabis grown, along with samples, to the national cannabis agency (IRCCA).¹⁰⁹ Other restrictions as to who is allowed to cultivate are based on residency and/or nationality in the jurisdiction at stake. For instance, in Uruguay only nationals or residents can legally grow cannabis at home, following registration with IRCCA. In both Malta and the ACT, a residency requirement applies, too.

4.2.4 Policies regarding the sharing and gifting of the cannabis produced at home

Several of the regulatory frameworks we reviewed explicitly authorise “gifting” (i.e., giving a certain amount of cannabis from own produce to another person without any monetary exchange). The majority of US legalisation states permit gifting and sharing of cannabis to others, and the limit usually reflects the personal possession limit, although there are differences across states.¹¹⁰ Uruguayan law also allows home cultivation of cannabis plants destined for personal or home-shared use. In all US states that allow home production for non-medical cannabis, growers are prohibited from selling what they grow. These states allow individuals to share or give away cannabis to other adults if there is no compensation, but there are some differences. For example, while California allows adults to give up to an ounce (28.35 grams) of flower away to any adult, Michigan allows gifts of flower up to 2.5 ounces (70.87 grams). Connecticut is a bit more restrictive, limiting gifting to adults with whom the individual has a “bona fide social relationship”.¹¹¹ Of course, illegal selling does occur and bundling likely happens as well (e.g., “I’ll sell you this rolling paper for \$50 and give you the cannabis for free”); however, it is unclear how often this is happening in places that license retail sales. As noted earlier, the DC “gifting storefronts” have flourished and there are approximately 40 of them operating in the District.¹¹²

¹⁰⁹ The IRCCA inspectors may also visit the address declared by the registered grower (to verify that the number of plants it is within what is allowed by law). However, it is not clear how frequent any of the two types of verification has taken place in practice.

¹¹⁰ United Nations Office on Drugs and Crime (2022b).

¹¹¹ Connecticut’s Official State Website (2021).

¹¹² Weil et al. (2022).

4.2.5 Other requirements

These regulatory frameworks establish certain additional requirements for home cultivation. For instance, Canada, the US states allowing home cultivation, Malta and Uruguay have legislation in place providing that cannabis plants must not be visible from public view and/or must be kept in a separate locked space. We also identified restrictions with regards to the location and distance between the potential home grower and other supply options. For example, in Nevada, home cultivation is only allowed if there is no state-licensed retail cannabis store within 25 miles (equals to 40.23 km) of the location of the home. Further requirements have also been introduced concerning the identification of the plants: in Maine and in Virginia, each plant needs to have a tag that details the grower's name, driver's license or ID number, and a note indicating that the plant is being grown as authorised by law. In addition, in several Canadian provinces and territories, landlords can prohibit the tenant to cultivate cannabis at home. We did not identify any legal requirements concerning quality testing of the cannabis produced at home, although Malta may offer free testing for home growers.

Table 6. Home cultivation: an overview of the main features of the regulatory frameworks allowing the model. ¹¹³

	Australia ¹¹⁴	Canada ¹¹⁵	Malta	United States	Uruguay
Co-existence with other supply models?	No	Yes	Yes	Yes	Yes
Limits to the number of plants that may be cultivated	Per grower: max. 2 plants per person Per grower and household: max. 2 plants per person or 4 plants per household at a time (excluding artificial cultivation)	Per household: max. 4 plants	Per household: max. 4 plants	Per grower: max. 2 flowering plants and 7 immature plants (Vermont) max. 3 flowering plants and 12 immature plants (Maine) max. 4 plants, 2 of which can be flowering (Montana, Virginia) max. 4 plants (Oregon) max. 6 plants, 3 of which can be flowering (Alaska, Arizona, California, Colorado, Connecticut, Rhode Island) Per grower and household: max. 6 plants per person, 12 plants per household (District of Columbia, Massachusetts, Michigan, Nevada, New Mexico, New York)	Per household: max. 6 flowering plants, annual production cannot exceed 480 grams
Restrictions to who can legally cultivate cannabis at home¹¹⁶	Age: 18 Residents only	Age: 18, although all provinces raised it to 19, except for Alberta -18	Age: 18 Residents only	Age: 21	Age: 18 Residents or nationals only Mandatory registration in national cannabis registry
Sharing and gifting of the cannabis produced	Not foreseen in legislation	Limited to 30 grams	Not allowed	Allowed. Same as personal possession limit (1 oz = 28.35 grams) in all states, except for Maine and Michigan (2.5 oz = 70.87 grams) ¹¹⁷	Allowed. No quantity limits established in the legislation on sharing.
Other requirements	Possession limit is up to 50 grams of dried cannabis herb or 150 grams of 'fresh' cannabis Consumption is prohibited in public places, and when less than 20m away from a child The plants are required to be inaccessible to the public and cultivated in the grower's residence The cannabis should be stored in a way that children cannot reach it	Cannabis plants should not be visible from public spaces In some provinces (e.g., Prince Edward Island, New Brunswick), plants must be kept in a separate locked space in order not to be accessible to minors	Cannabis plants should be grown within the residential address (place of residence) of the grower Cannabis plants shall not be visible to the public	In most US States allowing home cultivation, plants must be stored in a private residence, not subject to public view and protected by a lock to avoid access by minors Each plant must be tagged with a label that bears the owner's name, driver's license or state identification card number, and a notation that the plant is being grown as authorised by law (Maine, Virginia)	Cultivation shall be carried out within the home or annexes, including outdoor gardens Cannabis plants are not allowed to yield more than 480 grams of marijuana per year Cannabis seeds or cuttings to be purchased from producers authorised by IRCCA

¹¹³ Sources used for the table: United Nations Office on Drugs and Crime (2022b); Government of Canada (2018b); Uruguay (Law19.172); Malta: Act to establish the authority on the Responsible use of cannabis and to amend various laws relating to certain cannabis activities (2021); PDAPS (n.d.); NCSL (2023); Marijuana and the Law (2021); Canadian Centre on Substance Use and Addiction (2023).

¹¹⁴ This only applies in the ACT.

¹¹⁵ Please note that home cultivation is not permitted in Manitoba and in Quebec.

¹¹⁶ In many jurisdictions, landlords can prohibit tenants from cultivating cannabis at home through the inclusion of clauses in tenancy contracts.

¹¹⁷ We acknowledge that there is some variation in the legal possession limits. For more please see: Pacula et al (2021).

4.3 Evidence on the consequences of legal home cultivation for non-medical use for public health, safety and order

While there are a growing number of studies examining the consequences of legalising cannabis for non-medical purposes, we are only aware of one that attempts to isolate the effects of home production supply models on public health.¹¹⁸ Most of the studies using data from Canada, the US, and Uruguay use a binary measure to capture the implementation of legalisation.¹¹⁹ We found very limited evidence pertaining to the ACT cannabis supply model, and discussions of this jurisdiction are more limited than others. There are some Canadian and US studies that focus on retail store density or retail sales, but those do not address home production that also occurs in these jurisdictions.

As noted earlier, Uruguay requires those wanting to obtain legal cannabis to register with the government and choose one of three supply mechanisms: home production, CSCs, or pharmacy purchases. Using quarterly counts of the number of people registered for each mechanism at the department level (there are 19 departments in Uruguay), Kilmer and colleagues used this variation to assess whether there was an association between the number registrants and traffic crashes involving and injury. After running models separately for each mechanism as well as all three at the same time, and conducting a series of robustness checks, the authors found strong and consistent evidence that the number of people allowed to self-cultivate cannabis is positively associated with traffic crashes involving injuries. The associations for other supply mechanisms were inconsistent across the various model specifications.

While their aggregate level analysis did not allow the authors to identify the mechanisms underlying this associations, they offered two hypotheses:

‘Although our data preclude us from assessing the factors underlying this association, we wonder if the differential potencies of cannabis flower associated with different supply mechanisms may help explain the results. As noted, available data suggest that the flower grown by self-cultivators tended to be stronger than the 9% THC flower sold in the pharmacies.¹²⁰ Although the effects of THC can vary by individual¹²¹—and it may be the case that some of those using stronger cannabis are titrating—if self-cultivation, on average, is leading to more intoxication, this may partially explain the increase in traffic injuries. Because this argument could also be applied to those supplied by cannabis clubs, more research is needed to test this hypothesis.

¹¹⁸ Kilmer et al. (2022, 2325-2330)..

¹¹⁹ While there have been some studies in the US focused on the period between the passage of legalization and the time before retail stores open (during which home production was allowed in most places), the existence of commercial medical markets makes it difficult to isolate the effect on home growing.

¹²⁰ Queirolo (2020).

¹²¹ National Academies of Sciences, Engineering, and Medicine (2017).

Another avenue of future research should focus on diversion. Although those registered for self-cultivation are not permitted to sell or gift cannabis, there are reports of this is occurring.¹²² If those registered for self-cultivation are more likely to supply cannabis to others (especially if it is a relatively strong product), this may also help explain the differential findings by supply mechanism.¹²³

This issue of diversion, which affects all supply models, is further discussed in the concluding chapter.

¹²² IRCCA (2018).

¹²³ Kilmer et al. (2022, 2329-2330).

5. Cannabis Social Clubs (CSCs)

5.1 What are CSCs and where has the model been implemented?

Cannabis Social Clubs (CSCs) are legally constituted non-profit associations of cannabis consumers, that collectively cultivate cannabis plants for their adult members' personal consumption. This model can be seen as an extension to home cultivation, as rather than allowing individual cultivation only, non-profit collectives are allowed to cultivate and distribute cannabis among a group of registered users. Supply is typically restricted to members only. The first known CSCs emerged in an unregulated context as the result of grassroots initiatives of users.¹²⁴ The CSC model has a particularly long history in Spain, as the reports of the first initiatives of this kind date back to the early 1990s.¹²⁵ Today, albeit a popular model of supply across Europe (Pardal et al. found CSCs in at least 13 European countries circa 2018-2019),¹²⁶ CSCs continue to operate in the absence of a clear legal framework in several countries. However, the model has also been legalised and regulated in some jurisdictions to date.^{127, 128} For instance, Uruguay adopted a nationwide legal framework for CSCs in 2013, alongside two other models of supply (i.e. home cultivation, and pharmacy sales).¹²⁹ In Spain, although the model has never been regulated at the national level, there have been a number of attempts to pass regulation concerning the CSC model at the regional level – with the most noteworthy by the autonomous regions of Navarre and Catalonia.^{130, 131} These legislative pieces were approved in 2014 and 2017 respectively, but were subsequently challenged and annulled as they were considered unconstitutional by the Constitutional Court (which considered that the competence to legislate on the matter laid with the state legislator) – so these laws are no longer in force.¹³² Moreover, Malta recently allowed and regulated the establishment of non-profit organisations (hereinafter, CSCs, though the

¹²⁴ Pardal (2022).

¹²⁵ Jansseune et al. (2019).

¹²⁶ Pardal et al. (2020).

¹²⁷ Decorte et al. (2017, 44-56).

¹²⁸ Decorte et al. (2020).

¹²⁹ Queirolo et al. (2016).

¹³⁰ Arana & Parés (2020).

¹³¹ Sánchez & Collins (2018).

¹³² Arana & Parés (2020). Even though these frameworks are no longer being implemented, they offer interesting insights as to the design choices of the legislators.

regulation itself does not use this terminology, but refers to the term “organisation of individuals”,¹³³ *‘the only purpose of which being the cultivation of the plant cannabis exclusively for its members in a collective manner to distribute it only to those members.’*¹³⁴ Several differences exist between the requirements provided by the legal frameworks adopting a CSC model, which we detail in the next section.

5.2 How has the CSC model been regulated across jurisdictions?

5.2.1 Co-existence of regulated CSCs and other supply models

As noted in section 3.2, both Malta and Uruguay foresee the co-existence of CSCs and home cultivation within their respective regulatory frameworks. In addition, in Uruguay, a third supply model has also been regulated and thus functions alongside home cultivation and CSCs: pharmacy sales (please see section 6.2 for more on this). With regards to Malta, it is not yet possible to make any statements concerning the introduction of several models of supply and the preferences of users in relation to those. In the case of Uruguay, and albeit the presence of legal CSCs has continued to increase over the years,¹³⁵ among the three possible supply options, the CSCs have gathered the smaller number of interested (and registered) users. According to IRCCA, there are currently 7,085 registered CSC members, which are affiliated with one of the 243 CSCs currently in operation in the country.¹³⁶ We did not identify any cases where CSCs have been regulated alongside a profit-maximising commercial supply model for cannabis. Furthermore, in two Spanish Autonomous Regions (Catalonia and Navarre), CSCs were the only regulated supply model.

5.2.2 Registration requirements for CSCs

All jurisdictions introduced some form of registration for CSCs. In Uruguay, CSCs must be registered in a national register operated by the IRCCA. That is in addition to the individual registration of members (who must also fulfil certain requirements, as described further below). In Malta, the CSCs will also need to be registered with the national cannabis agency ARUC. In Spain, the two regional regulatory frameworks required CSCs to register in their respective regional public registers of associations, with the registration of individual members to be a responsibility of the CSCs.

5.2.3 Limits to the number of plants that may be cultivated

The CSCs produce the cannabis that is distributed to their members. The regulatory framework in Uruguay explicitly sets a limit on the number of plants each CSC is allowed to cultivate (i.e., up to 99 flowering

¹³³ House of Representatives, Malta (2021).

¹³⁴ House of Representatives, Malta (2021). Please note that the Act does not define these organisations as Cannabis Social Clubs, but uses the term “organisation of individuals”.

¹³⁵ Pardal et al. (2019, 49-57).

¹³⁶ IRCCA (2022c).

plants per CSC). In Malta, the law only states that CSCs ‘*shall not cultivate more cannabis plants than such number authorised by the Authority on the Responsible Use of Cannabis (ARUC)*’.¹³⁷ No specific number of plants was detailed in the regional laws in Spain (Catalonia and Navarre) concerning the number of plants allowed per CSC. However, in Catalonia, the legislation indicated that CSCs could not exceed a total annual production of 150 kg (of dry flower). We did not identify any requirements concerning the strains or cannabinoid profiles of the plants grown by CSCs in the regulatory frameworks reviewed.

5.2.4 Types of cannabis products supplied and quality control

The types of products that CSCs may produce and supply were explicitly noted in the Uruguayan and Maltese legal frameworks. In both cases, CSCs are only allowed to supply herbal cannabis to their members. In Malta, unsterilised seeds may also be available at CSCs. No further restrictions in terms of the THC or CBD content of the cannabis supplied by CSCs were introduced, as noted above.

Formal quality control requirements are foreseen in two of the legislative frameworks we reviewed: in Malta and the Autonomous Region of Navarre. In that regard, both legislations note that the CSCs will need to carry out quality controls of the cannabis distributed, but no other requirements are put forward. In Navarre, the CSCs were also expected to adhere to organic cultivation practices, though the regulatory framework did not provide further details as to the specific requirements for such practices.

5.2.5 Storage, packaging and labelling requirements

The legislative frameworks reviewed did not establish particular requirements with regards to the storage of the cannabis products at the CSCs. In Malta, those determinations were left at the responsibility of ARUC. In Uruguay, the legislation indicated that all the activities of the CSCs should take place at their respective headquarters – including the storage of the cannabis products (as well as the plantation, harvesting and distribution). Furthermore, in Uruguay, cannabis production and storage in CSCs may not exceed the quantity of 480 grams per member annually. According to that legal framework the IRCCA shall provide for the destination of the production exceeding that maximum annual limit of 480 grams per member. In Malta, the law specifies that at no time shall there be more than 500 grams of dried cannabis at the CSC’s premise.¹³⁸ As noted above, Law 13/2017 in the autonomous region of Catalonia established that CSCs could not exceed the annual production of 150 kg of dry flower.

Packaging and labelling requirements for the cannabis products were introduced in two of the jurisdictions: Malta and the autonomous region of Catalonia, albeit the latter only referred to the need of using packaging and sealing that ensured the integrity of the cannabis product during transportation. In Malta, more specific requirements were introduced. Accordingly: both the cannabis and seeds need to be placed in sealed

¹³⁷Malta: Act to establish the authority on the Responsible use of cannabis and to amend various laws relating to certain cannabis activities (2021).

¹³⁸ Given that Maltese CSCs may have a maximum of 500 members (as explained in 5.2.6), the storage cap might mean that, in practice, CSCs will only be able to distribute relatively small amounts of cannabis to their members.

containers with a particular wording and design approved by ARUC. Packaging and labelling requirements are non-existent for Uruguayan CSCs.¹³⁹

5.2.6 Access restrictions

CSCs are only allowed to distribute cannabis to their members. Furthermore, membership is explicitly restricted to one CSC at a time in both Uruguay and Malta. Limits to the number of members that a CSC may accept and register have also been introduced in those jurisdictions. In Uruguay, CSCs will be allowed to enrol between 15 and 45 members; in Malta, CSCs may have up to 500 members maximum.

To become members of a CSC, interested users meeting the general requirements (age, residency/nationality) will also need to complete a registration with their CSC (e.g., in the two Spanish autonomous regions) and/or in a national register (e.g., Uruguay). Additional requirements include a waiting period of 15 days between enrolment as CSC members and the first purchase of cannabis (Catalonia), as well as a restriction of CSC membership to prior users (Navarre).

5.2.7 Restrictions to the quantities supplied by CSCs

All jurisdictions considered the establishment of a maximum purchase quantity (on a daily/monthly basis). In Malta, CSC members can purchase a maximum of 7 grams of cannabis per day (or up to 50 grams per month), and a maximum of 20 seeds per month. In Uruguay, members can receive a maximum of 40 grams per month (or 480 grams annually). Law 13/2017 of the Autonomous Region of Catalonia foresaw a monthly limit of 60 grams per month per member. In addition, a lower threshold of 20 grams per month was established for CSC members aged between 18 and 21 years old. The regulatory framework in Navarre did not explicitly establish a maximum threshold that users could obtain from their CSC but noted that this limit was to be determined by the CSCs in light of “international standards” and other considerations.

5.2.8 Location restrictions

Some of the regulatory frameworks reviewed also provide restrictions as to where the CSCs may be located. In Uruguay, CSCs cannot be located within 150m of education, cultural or sport centres for minors, nor of addiction treatment centres. Additionally, CSCs cannot be located in same area (“padrón”) of a registered home grower, of other CSCs, nor of a cannabis-related outlet (for psychoactive or non-psychoactive cannabis-related products). In Malta, CSCs cannot be within a distance of less than 250m from the perimeter of a school, a club or a youth centre. Further, each CSC shall ensure that it does not cause nuisance in its vicinity and shall ensure that the premises are managed in conformity with the applicable regulations on health and safety. In Spain, the two regional laws only specified that CSCs could not share premises with other establishments (Catalonia), and that the CSCs should adhere to local rules with regards to location, structure, and hygiene (Navarre).

¹³⁹ Respondent 8.

5.2.9 Advertising and promotion

Advertising and promotion of cannabis products by the CSCs is prohibited in all the jurisdictions considered. In Malta, the law explicitly states that the CSCs shall not advertise their activities in any manner and no indication by signs, words or designs, or otherwise of activities related to cannabis or to the cannabis culture shall be allowed to be shown in any premises on the outside or in a way which is visible from the outside. In Uruguay, the law prohibits advertising of cannabis for all three legal supply models (i.e., CSCs, home cultivation, and pharmacy sales). Accordingly, any kind of advertising, whether direct or indirect, promotion, support or sponsorship for any psychoactive cannabis products shall be prohibited, and this prohibition shall be applied to any means of communication. Advertisement was also prohibited by law 13/2017 for Catalonia's CSCs, though CSCs could have exterior signs indicating the name of the association, and its register number.

Table 7. Cannabis Social Clubs: an overview of the main features of the regulatory frameworks allowing the model.¹⁴⁰

	Uruguay	Malta	Autonomous Region of Catalonia (no longer in force)	Autonomous Region of Navarre (no longer in force)
Co-existence with other supply models?	Yes	Yes	No	No
Registration requirements	Registration of CSCs with IRCCA Registration of individual CSC members in national registry	Registration of CSCs with ARUC Registration of individual CSC members by the CSCs	Registration of CSCs in regional public register for associations in Catalonia Registration of individual CSC members by the CSCs (CSCs to keep register of: name, ID number, membership number, membership start date, member vouching registration)	Registration of CSCs in regional public register for associations in Navarre Registration of individual CSC members by the CSCs (register to include personal data of members)
Caps on production	99 flowering plants	Number of plants and other conditions for cultivation to be determined by ARUC	Annual production of maximum 150 kg (of dry flower)	Not foreseen in legislation
Permitted products	Herbal cannabis	Herbal cannabis Unsterilised seeds	Not specified in legislation (but it refers only to cultivation of cannabis plants)	Not foreseen in legislation
Storage, packaging and labelling	Cannabis production and storage may not exceed the quantity of 480 grams per member annually The IRCCA will provide for the final destination of the production exceeding the maximum annual limit of 480 grams per member No requirements concerning packaging and labelling foreseen in legislation	No more than 500 grams of dried cannabis may be stored at the CSC premises Cannabis and seeds to be placed in sealed containers with specific wording and design approved by the ARUC	CSCs to keep register of: dates and quantities cultivated per year, as well as yield from that production; overall annual production Packaging and sealing to preserve the integrity of the substance during transportation	Not foreseen in legislation
Access restrictions	Members only Membership restricted to one CSC at a time Minimum of 15 and maximum of 45 members per CSC Age (18), residency or nationality Mandatory registration (see 'Registration requirements')	Members only Membership restricted to one CSC at a time Maximum 500 members per CSC Age (18), residency Mandatory registration (see 'Registration requirements')	Members only Waiting period of 15 days between enrolment and first purchase Age (18) Mandatory registration (see 'Registration requirements')	Members only Members should have consumed cannabis before registering with the CSC Age (18) Mandatory registration (see 'Registration requirements')
Restrictions to quantities supplied	40 grams monthly or 480 grams annually CSCs to keep register of all purchases and update IRCCA on a monthly basis	Herbal cannabis: 7 grams per day, 50 grams monthly Seeds: not more than 20 seeds per month per member	60 grams per month (limit may not apply to members using cannabis for medical purposes) 20 grams per month for members aged 18-21 years old CSCs to keep log of: monthly estimate and actual quantity purchased per member	To be determined by the CSC (in light of measures of prevention of risks and international standards)
Location restrictions	Cannot be located within 150m of education, cultural or sport centres for minors, nor of addiction treatment centres. Cannot be located in same area ("padrón") of a registered home grower, of other CSC, nor of a	Cannot be located within 250m of schools or youth centres Cannot cause nuisance in the locality where CSC is situated	Cannot share premises with other establishments	CSC should adhere to local rules with regards to location, structure and hygiene

¹⁴⁰ Sources used for the table: Uruguay (Law19.172); Malta: Act to establish the authority on the Responsible use of cannabis and to amend various laws relating to certain cannabis activities (2021); Autonomous Region of Catalonia (2017); Autonomous Region of Navarre (2014).

	Uruguay	Malta	Autonomous Region of Catalonia <i>(no longer in force)</i>	Autonomous Region of Navarre <i>(no longer in force)</i>
	cannabis-related outlet (for psychoactive or non psychoactive cannabis-related products)			
Advertising and promotion	Advertising is prohibited	Advertising is prohibited	Advertising is prohibited CSCs may have exterior sign indicating only the name of the association, its number of register (in the regional registry of associations of Catalonia, and the municipal registry) and an indication that it is a private space exclusively for members	Members should avoid advertising or promoting consumption of cannabis among non-members

Note: Data collection and analysis primarily took place during the first half of 2022, so any subsequent developments in this area may not be captured in this report.

4.4 Evidence on the consequences of legal CSC model for public health, safety and order

As noted earlier, in many jurisdictions, the CSC model has been introduced as the result of grassroots initiatives which have not been recognised nor regulated by the respective legislatures. As a result, much of the research in this area has focused on those (unregulated or self-regulated) experiences of implementation. While those are not the focus of our analysis, we summarise some highlights from that body of literature, as it may provide interesting insights regarding the model – for more on the insights from the unregulated experiences with the CSC model in Spain and Belgium, please see **Box 3 and Box 4** below. As the implementation of the regulated CSC model has not yet begun in Malta, and the legal frameworks in the two Spanish autonomous regions were rather short-lived initiatives, the amount of available evidence on the public health, safety and order implications of implementing a legal CSC model is thin, and mainly focused on the Uruguayan context.

Pardal et al.¹⁴¹ researched CSCs in Uruguay. By conducting interviews with 13 stakeholder and 15 representatives of registered CSCs, they sought to understand how the model had been implemented and what other variants or forms of the CSC model emerged since its inception. Interestingly, while the importance of providing good quality product to members has been stressed by the CSCs studied, no formal testing on quality control practice was in place in Uruguay at the time of the study, which is in line with the findings from other studies that concluded that the quality and potency control processes within CSCs are rather rudimentary. In terms of impacts, while this study has less explicitly aimed to look at the implications of the model in Uruguay, it has brought attention to the phenomena of ‘shared memberships’, whereby for at least some of registered CSC members there are a few non-registered members who benefit from using the cannabis. Furthermore, the Uruguayan context is an example where CSCs have not been present prior to the regulative frameworks being implemented, therefore the truly social form from community-organised club structure could more easily dilute into ‘quasi-dispensary clubs’ which raises a new array of challenges for policymakers to operationalise harm reduction or health intervention programmes within the framework of CSCs.

More recently, Álvarez et al. have examined Uruguayan CSC members’ socio-demographic characteristics and policy preferences, sketching a comparative analysis with the Belgian (unregulated) CSC context.¹⁴² Focusing on the Uruguayan case, the authors relied on data from an online survey conducted circa 2018-2019 among members of CSCs in that country. A set of the questions included in that survey focused on respondents’ self-perception of use of cannabis before and after joining a CSC in Uruguay. The authors reported that ‘almost three out of ten reported using ‘more’ or ‘much more’ cannabis after joining the CSC, and about the same proportion said that their use is variable.’¹⁴³ Álvarez and colleagues did not make any

¹⁴¹ Pardal et al. (2019, 49-57).

¹⁴² Álvarez et al. (2022).

¹⁴³ Álvarez et al. (2022, 100).

causal inferences about the relationship between enrolling with a CSC and increased cannabis use, and we should note that the survey drew on a relatively small and non-representative sample of CSC members. Among those participating in the survey, 85% declared only obtaining cannabis from their CSC, but 60% indicated they shared the cannabis with other users (only about 29% declared that the cannabis purchased was for own consumption only).

Box 3. Insights from the unregulated experiences with the CSC model in Spain.

Although two Spanish autonomous regions have introduced regulatory frameworks for the CSC model, these have been short-lived attempts to legalise the model in the country. Nevertheless, unregulated CSCs – tolerated by local authorities to varying degrees – have been active in Spain since the 1990s. Though the Constitutional Court rulings declared the two regional regulatory frameworks to be unconstitutional, CSCs have continued to operate in the country, including in those regions, even if in a vulnerable legal position. Furthermore, and despite earlier favourable court decisions (i.e. when individual CSCs were brought to court), the more recent verdicts seem to have left the Spanish CSCs in a position where they 'have very little room to maneuver and must use considerable creativity' to avoid sanctions (p. 319).¹⁴⁴ The experiences of the unregulated CSCs in Spain have nevertheless been studied over the years.

In a 2021 study by Obradors-Pineda and colleagues,¹⁴⁵ members of 15 CSCs operating in Spain as part of the Catalanian Federation of Cannabis Associations (CatFac) were surveyed. This study aimed to understand the extent to which the risk reduction potential of CSCs was realised through the presence or absence of offering information on risk reduction, health support or the testing of the cannabis being supplied by the CSC. Their survey pointed out that while the majority (11 out of 15) of the clubs do facilitate access to some form of information sharing on risk reduction and potential drug related harms, about a third (4 out of 15) lacked any form of harm reduction strategy in place. While their research does not explore what factors might contribute to or hinder the emergence of such harm mitigation practices within the CSCs, Obradors-Pineda and colleagues have pointed out that clubs can potentially act as agents of drug related harm reduction practices provided they address existing gaps and facilitate access to appropriate health information and services.

In a study of CSCs in Barcelona, which is allegedly the region in Spain with the highest number of CSCs with some 250 clubs, Parés-Franquero and colleagues¹⁴⁶ conducted a survey with members of 20 CSCs to understand their cannabis use patterns as well as the motives behind joining a CSC, among other aspects. Factoring in the limitations of relatively small sample size and limited comparability of the findings with other CSCs, they found that overall, the frequency and amount of cannabis used among members did not increase after joining a CSC. In terms of implications for public safety and order, their research showed that members have reduced their purchases of cannabis from the illicit market after joining a CSC. Further impacts upon joining a CSC were the significant decline in the number of fines members received for consuming or possessing drugs in public, and a reported decreased use in public spaces by members. Apart from these potential impacts, the research found that members have had a positive perception of joining a CSC, including improved access to information on the quality and effect of the products, on the risks of use, and valued the perceived protection and safety provided by the CSC.

Similar to Obradors-Pineda et al,¹⁴⁷ Belackova and colleagues¹⁴⁸ set out to assess the potential of CSCs to operate as strategic spaces for effective risk reduction related to cannabis use. Through focus groups with members of CSCs from four regions in Spain, they found that clubs can have a positive public health impact by offering what are seen by users as 'better quality products' and providing educative materials on cannabis effects and risks. Interestingly, the authors observed a reduction in self-reported cannabis intake since joining a club, which members attribute to the restricted but guaranteed supply to cannabis through the CSC. Furthermore, perceptions of safety increased upon joining a CSC, as many have felt a lesser fear of police and reduced feelings of social stigma or marginalisation due to using cannabis.

In later research by Belackova and Wilkins¹⁴⁹, the codes of conduct (CsoC) of CSC federations were studied through a systematic analysis of publicly available CsoC in Spain to understand what the potential strengths and limitations are arising from the self-regulatory organisation of the CSC model and to what extent their CsoC cover the areas understood to be of the main challenges by cannabis policy regulators. They analysed 6

¹⁴⁴ Arana & Parés (2020).

¹⁴⁵ Obradors-Pineda et al. (2021).

¹⁴⁶ Parés-Franquero et al. (2019).

¹⁴⁷ Obradors-Pineda et al. (2021).

¹⁴⁸ Belackova et al. (2016).

¹⁴⁹ Belackova & Wilkins (2018).

CsoC from 5 CSC federations in Spain. The CsoC of the clubs largely overlapped with the cannabis regulatory areas that are set out internationally, with the exception of covering price and potency related internal guidelines, and the authors highlight the opportunity CSCs represent to increasing the agency, awareness and responsible use of cannabis among members all the while providing a 'safe environment for peer-delivered harm reduction practice.'¹⁵⁰

Box 4. Insights from the unregulated experiences with the CSC model in Belgium.

Similar to the Spanish context, Belgian CSCs operate in an unregulated juridical environment. A qualitative SWOT (strengths, weaknesses, opportunities, threats) analysis by Decorte¹⁵¹ in 2015 explored the Belgian CSC model in detail, including an examination of the organisational features, internal protocols and administrative rules with regards to the cultivation of plants and distribution of the product, among other matters. Drawing on a review of the international literature, national Belgian media coverage on CSCs, as well as collecting primary data through interviews and field visits in five clubs, Decorte drew a complex picture of how Belgian CSCs operate. Decorte concludes that legalising the non-profit CSC model could have several advantages, including reducing problems related to the illicit cannabis market, generating legal employment as well as indirectly contributing to economic activity through involving various services and other actors in the supply of appropriate equipment for clubs. Furthermore, a legal supply of non-medical cannabis to the non-profit clubs could help monitoring consumption while ensuring a level of control over quality and potency. The weaknesses of the model, on the other hand, include the transient nature of the CSCs in an unregulated environment, as well as the rudimentary or superficial quality control processes applied. Furthermore, according to Decorte, the non-profit model is at risk of morphing into a profit-driven enterprise, which could be prevented through governmental regulation.

In 2018, Pardal conducted research^{152, 153, 154} to map the presence of CSCs in Belgium and to contribute to the understanding of the internal practices of the clubs as well as the cultivation process itself. Pardal corroborated Decorte's conclusions on the weaknesses of the CSC model, namely that CSCs in Belgium are rather transient and unstable, a phenomenon associated with the legal issues that nearly all have faced since their inception. In another study on the cultivation process within Belgian CSCs, and looking at the motivations and practices of cannabis growers in the clubs, Pardal found that CSC are assumably able to have some level of control over the production, which could contribute to better quality product. While both of Pardal's research on CSCs yields valuable insights on how the wider CSC movement evolved in the country and the ways in clubs regulate cannabis production internally, they have not been conducted with an evaluation approach in mind, therefore they lack discussions on the impacts the CSCs might have had on public health, public safety and public order.

¹⁵⁰ Belackova & Wilkins (2018).

¹⁵¹ Decorte (2015).

¹⁵² Pardal (2018a).

¹⁵³ Pardal (2018b).

¹⁵⁴ Pardal (2018c, 32-41).

6. Government sales

6.1 What is understood as government sales and where has the model been implemented?

Throughout history, governments have maintained monopoly control over the supply of certain intoxicants, including British control of the opium trade between India and China (through the East India Company), national monopolies on tobacco production in various European countries in the post–World War II era, and various levels of the alcohol supply chain at various times throughout the world. A government monopoly model seeks to ensure close oversight (e.g., over prices and products) and reduce potential adverse effects that the free market competition might generate.^{155, 156} It is important to point out that although a government monopoly is intended to constrain levels of use and harm through mechanisms such as price, limited availability in terms of times and places, and restrictions on who can purchase, the available evidence suggests that such monopolies can also shift in other directions, and may also be driven by the goal of generating public revenues.¹⁵⁷

Overall, among the jurisdictions that adopted a regulatory framework legalising cannabis, very few fully adopted a government monopoly model, though some features of this model can be identified in a number of jurisdictions. For instance, the Canadian province of Quebec adopted a government monopoly model, where the only authorised cannabis distributor and seller is the Société Québécoise du Cannabis (SQDC).¹⁵⁸ Other Canadian provinces that initially operated a government monopoly have migrated to private supply (e.g., Yukon).¹⁵⁹

As noted above, Uruguay authorises three models of supply for cannabis: home cultivation, CSCs, and pharmacy sales.¹⁶⁰ In many respects, Uruguay’s pharmacy sales model operates under close government oversight, though the government does not directly supply the substance through government stores.¹⁶¹ For instance, the government sets the retail price, determines what products can be sold, determines where the

¹⁵⁵ Room & Örnberg (2019).

¹⁵⁶ Caulkins et al. (2015).

¹⁵⁷ Room & Örnberg (2019).

¹⁵⁸ Fischer et al. (2020).

¹⁵⁹ Seddon & Floodgate (2020).

¹⁶⁰ Obradovic (2021).

¹⁶¹ Respondent 8.

product can be sold, and a central body determines who can cultivate for the market and how much they can produce. It even goes further than many monopoly models since it limits how much cannabis someone can purchase on a weekly and monthly basis. The national agency IRCCA's resources derive from state funding, as well as from the granting of licenses, other fees and proceeds from fines and other penalties applied.

6.2 How have government sales for cannabis been regulated across jurisdictions?

6.2.1 Co-existence of regulated government-led supply and other supply models

Overall, in most Canadian provinces and territories, retail arrangements can take different forms: government-operated stores, private-licensed stores, or a combination of both. Indeed, in Canada, the overarching framework for cannabis production is regulated at the federal level, while additional details regarding distribution and sale are determined by provinces and territories. Provinces and territories set further rules around how cannabis can be sold, where stores may be located, who is allowed to sell cannabis, and how stores must be operated. In addition, and as described above, home cultivation is also allowed in most Canadian provinces. As for Uruguay, the pharmacy sales model operates alongside home cultivation and CSCs, albeit users can only access cannabis through one of the channels at a time (i.e., registration as 'pharmacy purchasers' precludes simultaneously growing cannabis at home or joining a CSC, within the established legal framework).

6.2.2 Access restrictions

In Canada, the legal age to access non-medical cannabis is regulated on a provincial level, ranging from 18 to 21, Alberta being the province with the lowest minimum age set at 18 while Quebec the highest set at 21. While Canada offers a hybrid governmental and private retail system set by the provinces (see more under Arrangements concerning retail sales), in Uruguay, pharmacies need to apply for a license to be able to sell non-medical cannabis, as well as users need to register with IRCCA to be able to access cannabis through the pharmacy model. The minimum age for enrolment in this system is set at 18 years old in Uruguay.

6.2.3 Requirements concerning cultivation and wholesale

In Canada, a federal licence must be granted by Health Canada to cultivate and produce cannabis. There are three subclasses of licences for cannabis cultivation: 1) a standard cultivation licence for cultivation of cannabis on a large scale, 2) a micro-cultivation licence (for cultivation on a small scale up to 200m², and 3) a nursery licence for the production of plants and seeds in an area up to 50m².¹⁶² The federal government

¹⁶² Government of Canada (2018a).

oversees the regulation of cultivators and producers, disseminating guidelines on good production practices, reporting requirements, ethical conduct, and legislative compliance.¹⁶³ Health Canada, a federal government body, holds power to send inspectors to enforce compliance with cultivation and production laws.¹⁶⁴ The role of the government in the Canadian wholesale market varies by province/territory, but in most jurisdictions the provincial/territorial government serves as the sole purchaser of cannabis products from producers.

In Uruguay, the production of cannabis to be sold in pharmacies is done by a small number of private companies (at the time of writing: by five companies).¹⁷⁰ Those are tightly controlled by the government: for instance, they are only permitted to cultivate two varieties of cannabis with relatively low levels of THC (with a max. of 9% THC content).¹⁷¹ Furthermore, the licensed companies cultivating cannabis for distribution in the Uruguayan pharmacies, were growing the plants on government-owned land managed by the IRCCA.¹⁷² Security of the property and its facilities was also provided by the national police, as well as by private security companies.¹⁷³ The cannabis producers and the pharmacies pay a license and annual fees to IRCCA.¹⁷⁴ The premises used for the storage, cultivation, distribution or dispensing are subject to inspection to ensure they meet the required security regulations.¹⁷⁵ The IRCCA monitors the activities of pharmacies and can impose sanctions for breach of laws and regulations.

6.2.4 Arrangements concerning retail sales

Depending on the province/territory in Canada, retail sales are limited to government stores, private stores, or a combination of both. After legalisation in 2018, online sales were limited to government-run retailers. However, as confirmed by two of our expert interviewees, this changed during the COVID-19 pandemic; the widespread shift to online shopping during COVID-19 has led several provinces, including Ontario, to allow private cannabis retailers to start online sales and delivery as well.¹⁷⁶ However, there are a few provinces where both online and retail stores have always been operated privately (Saskatchewan, Manitoba), and there are examples to the contrary, where all sales have been operated by the government (Prince Edward Island, Nova Scotia, New Brunswick, Quebec).¹⁷⁷ Furthermore, Quebec has been highlighted by two interviewees as being notably different from the other provinces with regards to their conservative cannabis regulation and their overall stricter approach to commercial activity around cannabis supply with

¹⁶³ Government of Canada. (2022b).

¹⁶⁴ Government of Canada. (2022b).

¹⁷⁰ IRCCA (2022b).

¹⁷¹ Obradovic (2021).

¹⁷² Uruguay XXI (2020).

¹⁷³ IRCCA (2022a).

¹⁷⁴ As part of the administration of the license, the IRCCA retains a small margin of the sales. IRCCA (2020); IRCCA (n.d.); Rodríguez Llach et al. (2022).

¹⁷⁵ Seddon & Floodgate (2020).

¹⁷⁶ Respondent 7 and 13.

¹⁷⁷ Respondent 7.

significantly fewer stores.¹⁷⁸ The limit per single transaction is set at 30 grams of dried cannabis, both in the case of in-person and online purchases. Quebec has furthermore set limitations on THC content in products sold through government-run stores at 30%.^{179, 180} Furthermore, with regards to edible products: in solid form, these may not contain more than 10mg of THC per package (and a maximum of 5mg of THC is allowed per individual portion unit); in liquid form, products may not have more than 5mg of THC per container.

Mail distribution to the consumer from a legal online retailer is limited to addresses within the given province where the online purchase occurs, and couriers need to be provided a proof of legal age and adult signature from recipients. Individuals can also mail cannabis to other individuals, so long they purchased the product from a licensed producer or grew it at home. The shipping limit differs by product type but is 30 grams in the case of cannabis both shipped within and across provinces, or 4 plants per household. Cannabis plants and seeds, however, cannot be shipped to Manitoba and Quebec due to specific regulations in place in those provinces.

In Uruguay, pharmacies are the only retail locations where cannabis can be purchased under this scheme. Interested pharmacies in Uruguay need to follow an application process with IRCCA, which is the agency competent for the granting of licenses.¹⁸¹ The pharmacies participating in the supply scheme need to pay a license and annual fee to IRCCA. Individuals wishing to obtain cannabis through the pharmacies need to register in the national register maintained by IRCCA and can purchase up to 10 grams of dried cannabis weekly, with a maximum of 40 grams per month. There are currently (June 2022) 25 pharmacies participating in the supply of cannabis for non-medical use, primarily located in the capital of Montevideo.¹⁸² To prevent individuals from registering for more than one supply model (i.e., sale at pharmacies, home cultivation, or CSCs), registered users and their supply methods are tracked by the national cannabis agency IRCCA. A fixed price has been set by the government in pharmacies (1.79 € per gram).¹⁸³

6.2.5 Types of cannabis products supplied

We identified different approaches with regards to the types of cannabis products supplied within the cases of government monopolies we reviewed. In Uruguay, only herbal cannabis is available for sale in pharmacies, capped at 9% THC content and a minimum of 3% CBD content).¹⁸⁴ In 2019, the government of Canada published new regulations for edible cannabis, cannabis extracts and cannabis topicals, which

¹⁷⁸ Respondent 7 and 4.

¹⁷⁹ Government of Québec. (2022a).

¹⁸⁰ Government of Québec. (2022b).

¹⁸¹ IRCCA (2022d).

¹⁸² IRCCA (2022c).

¹⁸³ Please note that cannabis is sold in packages of 5 grams at Uruguayan pharmacies. See more at Infobae (2022).

¹⁸⁴ IRCCA (2022a).

came into force later in the year.¹⁸⁵ However, there are slight variations between the type of cannabis products available in different provinces. For instance, a few of our interviewees noted that Quebec implemented more restrictions on edible cannabis products compared to the federal requirements, legislating that *‘an edible cannabis product, in solid or liquid form, may not be sweets, confectionery, dessert, chocolate or any other product attractive to persons under 21 years of age.’*¹⁸⁶ Interviewees further noted that Quebec has prohibited the supply of vape oils to prevent appeal to youth and an increase in the number of users.^{187, 188, 189} Mandatory testing is required for pesticides and measuring cannabinoid levels.

6.2.6 Packaging and labelling requirements

In both cases (Canada, Uruguay) there are specific requirements concerning the packaging and labelling of cannabis products. In Canada, this is defined in the federal law which requires the following: plain packaging and labelling is required, including strict limits on the use of logos, colours, branding, mandatory health warnings, standardised cannabis symbols and specific information about the product.¹⁹⁰ Specifically, all packaging must be of a single uniform colour that contrasts with the yellow health warning message and the red standardised cannabis symbol, have a smooth texture, contain no hidden features, as well as a number of other requirements.¹⁹¹ With regards to shipping products in the mail, there are specific packaging requirements, including using *an ‘odour-proof, tamper-proof and leak-proof inner and outer packaging’*¹⁹² as well as an *‘anonymous outer packaging without any marking or advertising that indicates what’s in the package.’*¹⁹³ In Uruguay, the companies licensed to cultivate non-medical cannabis to be sold in pharmacies are also responsible for packaging and distribution. Cannabis sold in pharmacies must be in plain,

¹⁸⁵ Government of Canada (2019c).

¹⁸⁶ Government of Québec. (2022a).

¹⁸⁷ Respondents 4 and 13.

¹⁸⁸ Government of Canada (2021).

¹⁸⁹ Government of Québec. (2022a).

¹⁹⁰ Government of Canada (2019c).

¹⁹¹ More specifically: *“It is prohibited for a person that is authorized to sell cannabis to sell it in a package or with a label:*
(a) if there are reasonable grounds to believe that the package or label could be appealing to young persons;
(b) that sets out a testimonial or endorsement, however displayed or communicated;
(c) that sets out a depiction of a person, character or animal, whether real or fictional;
(d) that associates the cannabis or one of its brand elements with, or evokes a positive or negative emotion about or image of, a way of life such as one that includes glamour, recreation, excitement, vitality, risk or daring; or
(e) that contains any information that is false, misleading or deceptive or that is likely to create an erroneous impression about the characteristics, value, quantity, composition, strength, concentration, potency, purity, quality, merit, safety, health effects or health risks of the cannabis”. Government of Canada (2018b).

¹⁹² Canada Post (n.d.).

¹⁹³ Canada Post (n.d.).

unbranded, resealable packaging, displaying only the necessary information, such as the potency and regulations concerning consumption.¹⁹⁴

6.2.7 Advertising and promotion

The advertising and promotion of cannabis products may be limited within government monopoly models. We found somewhat different approaches in the two jurisdictions we reviewed. In Uruguay, all forms of advertisement, promotion and sponsorship are prohibited.¹⁹⁵ In Canada, the promotion of cannabis is strictly regulated at the federal level. The Cannabis Act provides that, with the exception of some limited authorisations, it is prohibited to promote cannabis, cannabis accessories, or any service related to cannabis: including communicating information about price or distribution, by doing so in a manner appealing to young persons, by means of a testimonial, depiction of a person, or by presenting it in a manner that associates it with a way of life that *'includes glamour, recreation, excitement, vitality, risk or daring.'*¹⁹⁶ Limited promotion is permitted at the point of sale, though such promotion must not extend beyond an indication of the availability and/or price of products.¹⁹⁷ As mentioned before, provinces and territories can set rules around how cannabis can be sold, where stores may be located, who is allowed to sell cannabis, and how stores must be operated. For this reason, it appears that while some provinces might more strictly regulating the retail system of cannabis, others might be less restrictive.¹⁹⁸ For instance, while the Quebec regulation sets out (additional) very specific rules on promotion, advertising and packaging (e.g., explicitly prohibiting the supply or distribution of cannabis free of charge for promotional purposes, offer rebates or gifts),¹⁹⁹ other provinces' regulations simply refer to the Cannabis Act (i.e. federal law),²⁰⁰ and/or add that the competent authorities may make regulations prescribing the advertisement and promotion of cannabis.²⁰¹

6.2.8 Price setting and taxation

In Uruguay, the retail price is set by the government (herbal cannabis costs 1.79 € per gram). In Canada, it is a bit more complex. Obviously, government stores set the retail prices in provinces/territories that allow them; however, the provincial and territorial governments also can influence the price since they serve as the sole purchaser of non-medical cannabis at the wholesale level in many jurisdictions. A contemporary overview of Canadian cannabis prices by type of source is available from Wadsworth et al. (2022).²⁰²

¹⁹⁴ Transform: Drug Policy Foundation (2018).

¹⁹⁵ Uruguay (Law19.172).

¹⁹⁶ Government of Canada (2018b).

¹⁹⁷ Government of Canada (2019d).

¹⁹⁸ Interviews with Respondents 7, 13 and 4.

¹⁹⁹ Quebec Official Publisher (2018).

²⁰⁰ Legislature New Brunswick (2017).

²⁰¹ General Assembly (2018).

²⁰² Wadsworth, Driezen et al. (2022).

With regard to cannabis-specific taxation in Canada, the tax base and rate depends on the product. For example, for flower and trim, the tax paid at the wholesale level is the greater of \$1/gram or 10% of wholesale price. For edibles, extracts, and topicals, the tax is \$0.01 per mg of delta-9 THC. Cannabis products must display an excise stamp that confirm that the product was legally produced. In Uruguay, the production and sale of cannabis has been exempted from taxation. As indicated above, the national agency IRCCA charges license and annual fees only. Note that with an exclusive state store model where the government sets the price, there is no need to apply a tax at the retail level.

Table 7. Government monopoly type of models: an overview of the main features of the regulatory frameworks allowing the model.²⁰³

	Canada	Uruguay
Co-existence with other supply models?	Yes (with exception of Quebec)	Yes
Access restrictions	Minimum age: ranging from 18 to 21, dependent on province	Minimum age: 18 nationwide
Cultivation	3 types of cultivation licenses granted by Health Canada, which allows license holders to cultivate and sell their product either to other license holders or to provincial/territorial wholesale distributors (both for medical and non-medical purposes): 1) standard cultivation license for cultivation of cannabis on a large scale 2) micro-cultivation license for cultivation on a small scale up to 200m ² 3) nursery cultivation license for the production of plants and seeds in an area up to 50m ²	Small number of private actors, licensed to cultivate cannabis – with tight governmental control (e.g. varieties cultivated, inspection of premises, etc.)
Retail and distribution arrangements	Hybrid public and private in-person and online retail, regulated on a provincial level 30 grams (per purchase)	Registered pharmacies (with license granted by IRCCA) Registered individuals (in IRCCA's national registry – users are permitted access to cannabis through one of the three legal supply channels: pharmacies, CSCs, or home cultivation) 10 grams weekly with a maximum of 40 grams per month for personal use
Permitted products	The types of products permitted for retail are provincially regulated, but can include herbal cannabis, edibles, cannabis extracts, cannabis topicals	Herbal cannabis only with a maximum 9% THC content

²⁰³ Sources used for the table: Retail Council of Canada (n.d.); Uruguay (Law19.172).

	Canada	Uruguay
Advertising and promotion	<p>Restricted at federal level: <i>inter alia</i>, plain packaging, uniform colour, yellow warning labels, red cannabis label, excise stamp</p> <p>Some examples from provincial regulations:</p> <ul style="list-style-type: none"> • No promotion, packaging or labelling that could be considered appealing to young people, and ensuring that important product information is presented clearly (Alberta) • It is prohibited to promote cannabis in a manner that is false, misleading or deceptive or that is likely to create an erroneous impression about its characteristics, value, quantity, composition, strength, concentration, potency, purity, quality, merit, safety, health effects or health risks (British Columbia) • No person other than an authorised vendor shall display cannabis, or any package or label of cannabis. No person other than an authorised vendor shall promote cannabis, where “authorised vendor” means the Prince Edward Island Cannabis Management Corporation, established under section 3 of the Cannabis Management Corporation (Prince Edward Island) • Any direct or indirect sponsorship that is associated in any manner whatsoever with the promotion of cannabis, a brand of cannabis, the Société Québécoise du Cannabis or a cannabis producer is prohibited. Neither the Société Québécoise du cannabis nor a cannabis producer may supply or distribute cannabis free of charge or furnish cannabis for promotional purposes of any kind to consumers; The Government may, by regulation, determine standards relating to promotion (Quebec) 	<p>Cannabis sold in pharmacies must be in plain, unbranded, resealable packaging, displaying only the necessary information, such as the potency and regulations concerning consumption.</p> <p>Any type of promotion or advertisement are prohibited, Article 4 of Law 19.172 notes that: ‘any kind of advertising, whether direct or indirect, promotion, support or sponsorship for any psychoactive cannabis products shall be prohibited, and this prohibition shall be applied to any means of communication: the press, radio, TV, cinema, journals, films in general, billboards, posters, leaflets, e-mail, internet technologies as well as any other suitable way.’ Publicity and advertisement are prohibited in similar terms.</p>

Alternatives to profit-maximising commercial models of cannabis supply for non-medical use

	Canada	Uruguay
Price setting and taxation	<p>Government stores set the retail prices; however, the provincial and territorial governments also can influence the price since they serve as the sole purchaser of non-medical cannabis at the wholesale level in many jurisdictions.</p> <p>The tax base and rate depends on the product. For example, for flower and trim, the tax paid at the wholesale level is the greater of \$1/gram or 10% of wholesale price. For edibles, extracts, and topicals, the tax is of \$0.01/mg of delta-9 THC</p>	<p>Price is set by the government (at the time of writing: 1.79 € per gram)</p> <p>Sales of cannabis are untaxed</p>
Other access restrictions	<p>Various restrictions, defined by the communities (e.g., 150m distance from school property lines in Ontario, Yukon)</p>	<p>IRCCA shall grant licences and determine the specific terms under which pharmacies will be allowed to sell cannabis to pharmacies</p>

Note: Data collection and analysis primarily took place during the first half of 2022, so any subsequent developments in this area may not be captured in this report.

6.3 Evidence on the consequences of government sales for cannabis for public health, safety, and order

The policies outlined above under the broad term of ‘government sales’ (in Canada and in Uruguay) have been introduced in the past 5 years. In Uruguay, legal access to cannabis (for non-medical use) through authorised pharmacies was possible since July 2017.²⁰⁴ The beginning of that implementation was challenging, in part because there was some resistance among pharmacies to be part of the distribution system of cannabis for non-medical purposes. Queirolo notes that, as of July 2017, only 16 pharmacies participated in the supply of cannabis, and about one year later (August 2018) that number had declined to 13 (from a reported total of 1200 pharmacies in the country).²⁰⁵ Currently, 28 pharmacies are distributing cannabis for non-medical use in Uruguay.²⁰⁶ In Canada, the Cannabis Act was approved and enacted in 2018. These are thus still in a relatively early phase of implementation and so the available evidence on its consequences is limited and should also be interpreted with caution (please see Box 5 for more contextual information on the implementation of legal supply).

6.3.1 Evidence from Canada

With regards to the Canadian context, there have been efforts to understand the introduction of legal supply of cannabis for non-medical use. The studies we included through our systematic review tended to have a public health focus, especially looking at children and youth in the pre-, and post-legalisation period in Canada with regards to changes in cannabis use patterns, problem use and cannabis related emergency department (ED) visits.

The contrasting cannabis policy approaches of Alberta and Quebec has been a focus of attention for Gibbs and colleagues²⁰⁷, comparing data from the two provinces on the effectiveness of population coverage through their respective retail models. In accordance with the political climate characteristic to the province, cannabis retail in Alberta is predominately relying on a private sector model, offering access to cannabis for adult use through licensed private in-person and online stores. This is in contrast with Quebec, which operates a government-monopoly model characterised by significantly fewer, but strategically placed stores that have proactively been chosen for their ideal location to efficiently cover the province. Even though Quebec has far fewer stores, the direct supply chain between producers and the province as the sole buyer and distributor allows for lower supply chain costs and thereby lower prices of the product itself than in Alberta. Whether these discrepancies remain over time remains to be seen.

Vignault and colleagues²⁰⁸ have studied the impacts of legalisation of non-medical cannabis in Quebec by conducting a retrospective observational study on emergency unit visits related to cannabis. The legal supply of cannabis for non-medical purposes in Quebec is only possible through government-operated in-person

²⁰⁴ Queirolo (2020).

²⁰⁵ Queirolo (2020).

²⁰⁶ IRCCA (2022c).

²⁰⁷ Gibbs et al. (2021).

²⁰⁸ Vignault et al. (2021).

and online stores which fall into the category of a government monopolies we described above.^{209, 210} By comparing data in an emergency unit in Quebec from the 5 months immediately following legalisation of non-medical cannabis with data from the same emergency unit 2 years earlier, they shed light on the increased cannabis use and cannabis use disorder among the 18+ population immediately following the passage of the law in 2018. The active use of cannabis among those aged 18+ has increased from 28% (in 2016-2017 period) to 37% (post-legalisation in 2018-2019 period) with a statistically significant increase in cannabis use between both 18-24 and 25-44 age groups. No statistically significant increase of active cannabis use was found in the 12-17 age group pre- to post-legalisation.

Furthermore, the prevalence of cannabis use disorder among patients above the age of 18 visiting psychiatrists in the emergency unit described above has shown a significant increase from 17.7% to 24.3% pre- to post-legalisation. The prevalence of psychiatric disorders among the 18+ group has not shown a significant difference pre- and post-legalisation. While the research findings suggest a correlation between the legalisation of cannabis in Quebec with an increased active use and diagnoses of cannabis use disorder among the adult population, drawing affirmative conclusions must take into account the caveat that the findings are potentially tentative and preliminary given its focus on the first 5 months following the introduction of cannabis regulation. Ongoing evidence from 2021 and 2022 show an overall decrease in cannabis use among both those aged 16-19 and 20-24²¹¹, suggesting that the initial increases in use in the first 5 months following legalisation that the research by Vignault and colleagues observed may have been an immediate fluctuation that has been followed by a significant decrease in usage since then. This is further supported by data from the Quebec Cannabis Survey 2021, which found a 3-percentage point decline in the proportion of cannabis users aged 15-17 between 2018 and 2021.²¹²

In a similar study, Yeung and colleagues²¹³ have studied the impacts of the legalisation of non-medical cannabis supply on cannabis related emergency department (ED) visits by the underaged in urban Alberta, contributing to a yet thin body of literature on provincial-level paediatric cannabis exposure in the wake of the nationwide legislation in Canada. The provincial regulation for the supply of cannabis for non-medical use in Alberta is primarily reliant on the private sector, having a large number of private licensed in-person and private licensed online stores. They also, however, offer government-run online stores, as well as allow home cultivation. While their research does not specify whether their outcomes are in direct relation to any of these supply models, the observations by Yeung and colleagues could potentially be outcomes associated with the non-commercial element of the supply framework, namely that of government-run online sales. Through an interrupted time-series analysis of cannabis related ED visits between 2013-2020 among different age groups among the underaged population, they concluded that the volume of visits has not changed post-legalisation in 2018 compared to pre-existing trends, however, unintentional ingestions among 0-11 age group and 15-17 age group increased substantially. The severity of presentation cases has

²⁰⁹ Government of Canada (2022a).

²¹⁰ Gagnon (2022).

²¹¹ According to the Canadian Cannabis Survey (CSC) from 2020 to 2021, cited in CCSUA (2022).

²¹² Institut de la statistique du Québec. (2020).

²¹³ Yeung et al. (2021).

been low, and the majority of the visits have continued to be by older adolescents. More recent data by the CCSUA report points out, however, that emergency department visits have been on a dramatic rise among children since the appearance of cannabis edibles.²¹⁴

Another study on cannabis-attributable emergency department visits was conducted by Myran and colleagues in Ontario,²¹⁵ with a similar interrupted time-series analysis focusing on pre-, and post-legalisation with strict retail controls, versus post-commercialisation. The unique case of Ontario allowed for a comparison of cannabis-related ED visits under considerably different policy environments, namely, 1) pre-legalisation, 2) post-legalisation through a combination of a single government-ran online store and strictly capped licensed in-person stores, 3) and post-legalisation with no cap on the number of retail stores, which is what the authors refer to as commercialisation. By analysing data from January 2016 to May 2021, their study is a significant contribution to understanding cannabis-attributable ED visits in the province and is possibly the largest of such research in the country since the legalisation of non-medical cannabis. The overall change in ED visits within the study period shows a substantial increase in cannabis-related health care visits among the 15+ population, even though the immediate changes following legalisation through a tightly regulated retail system attenuated the pre-existing upward trend. However, coinciding with the loosening of governmental regulations and large increases in cannabis stores and sales per capita since May 2020, ED visits have also risen. This is consistent with the hypothesis that the move towards a more commercialised retail model has been associated with an increase in ED visits in Ontario; however, this coincides with the emergence of COVID-19 pandemic which makes it difficult to separate and determine the extent to which the observable upward trend in ED visits was due to commercialisation.²¹⁶

Hawke and Henderson²¹⁷ studied the cannabis use patterns of vulnerable young people pre- and post-legalisation within the local regulatory framework of Ontario, Canada, where adults aged 19+ can purchase non-medical cannabis in private licensed in-person stores or government-operated online stores.²¹⁸ The research examined cannabis use profiles of youth seeking substance use services by using a cross-sectional cohort analysis of two cohorts of youth, one recruited prior to legalisation (N=101, April 2018 to October 2018) and one recruited after legalisation (N=168, April 2019 to January 2020). To allow a full rollout to be implemented and avoid potential early impacts to confuse the findings, Hawke and Henderson purposefully classified the post-legalisation period starting after 6 months immediately after the passage of the law. Their findings concluded that legalisation in Ontario has not been linked to a significant change in cannabis use patterns, polysubstance use behaviours, mental health symptomatology or substance use dependence levels, by high-risk, substance-seeking youth. The minimal changes in cannabis use included that the youth reported an increased likelihood to purchase cannabis through a legal source post-legalisation,

²¹⁴ According to the study by Myran et al. (2022), cited in CCSUA (2022).

²¹⁵ Myran et al. (2022, 1952-1950).

²¹⁶ An increase in cannabis sales during the COVID-19 pandemic has also been reported in research focusing on both the US context. See, for instance: Schauer et al. (2021). Also in Europe, in an early phase of the pandemic (ahead of the introduction of restriction measures) there are indications that stockpiling of cannabis products occurred. See: EMCDDA and Europol (2020).

²¹⁷ Hawke & Henderson (2021).

²¹⁸ Government of Canada (2022a).

furthermore, there is a decreased likelihood of hiding or concealing use from legal authorities among those aged 19+. While the findings of their research have not shown substantial differences to a negative direction in terms of mental health and substance use among vulnerable youth, they nevertheless caution policy makers and service providers to pay an increased attention to this social group who might face multiple challenges and could potentially be ‘sensitive to the post-legalisation social climate’.

Transitioning users from the illegal to the legal market is a key policy objective of Canadian legalisation, and as one interviewee noted, evidence is beginning to suggest that the Canadian approach is, to an extent, successful in this endeavour.²¹⁹ Recent data from Health Canada has found that 41% of Canadian cannabis users typically purchased cannabis from a legal physical or online store in 2020 – a significant rise from 24% in 2019.^{220, 221} Goodman et al. (2022) further investigate the reasons for transitioning from an illegal to legal source, finding that the price of a product and the convenience of a cannabis store’s location were the two most substantial factors for cannabis consumers to select purchasing source.²²² These findings are further supported by qualitative evidence from Donnan and colleagues, who additionally note the importance of perceived product quality to a consumer, with longer-term cannabis users taking preference to the quality found in the illicit market.²²³ Nevertheless these findings are amalgamative of both private and public retail stores.

6.3.2 Evidence from Uruguay

We are only aware of one study that has attempted to examine the consequences of the different approaches to supplying cannabis in Uruguay. As described in Section 4.3, Kilmer and colleagues,²²⁴ did not find a statistically significant association between the number of people registered for pharmacy sales and traffic crashes involving injuries. We review some other studies below which do not make this distinction; thus, it would not be appropriate to attribute the findings discussed below exclusively to the pharmacy sales model.

Nazif-Munoz and colleagues²²⁵ conducted research on the impacts of legalising the supply of cannabis for non-medical use in Uruguay on traffic fatality rates of light motor vehicle drivers and motorcyclists in two urban and four rural provinces. However, this study largely focused on the time period *before* pharmacy sales started in Uruguay (July 2017). Through an interrupted time-series analysis of weekly data on traffic fatality rates between 1 January 2012 to 31 December 2017, they found that legalisation (based on an implementation date of December 2013) was associated with a 52.4% immediate increase in driver’s fatality in light motor-vehicle crashes. In the case of motorcyclists’ fatality rate, however, no significant change has been observed. Interestingly, their research found noticeable differences between urban and rural settings, with drivers’ fatality in light-motor-vehicle crashes increasing significantly in urban areas, but no such

²¹⁹ Respondent 13.

²²⁰ Health Canada (2019).

²²¹ Health Canada. (2020).

²²² Goodman et al. (2022).

²²³ Donnan et al. (2022).

²²⁴ Kilmer et al. (2022).

²²⁵ Nazif-Munoz et al. (2020).

correlation is observed in rural settings. This could potentially be rooted in the problem described by Queirolo²²⁶ around the unequal coverage of pharmacies selling cannabis in the country, which could potentially be to the advantage of urban pharmacies compared to rural pharmacies. An important limitation of the study by Nazif-Munoz and colleagues, however, is that it does not account for events that co-occurred with the observed interruptions other than the passage of the law, which may have influenced traffic fatality in the given period (e.g., changes in alcohol policy). And similar to Kilmer et al., the authors were unable to assess whether the traffic crashes involved cannabis or other substances.

With respect to how legalisation may have affected adolescent cannabis use in Uruguay, Laqueur and colleagues²²⁷ used a synthetic control approach to compare cannabis use patterns for high school students in Montevideo and interior regions of Uruguay with data from students in 15 regions of Chile. While the results suggested that students in Uruguay observed an increase in perception of cannabis availability, there was no evidence of an impact on cannabis use (past year, past month cannabis use, or frequent cannabis use defined as use 10 days or more in the past month), or the perceived risk of use.

A more recent study by Rivera-Aguirre and colleagues²²⁸ measured the impact of legalising the non-commercial supply of cannabis in Uruguay on cannabis use among secondary school children, with a special focus on problematic, frequent and risky cannabis use behaviour. The study covered 2007-2018. Through a repeated cross-sectional analysis of secondary data derived from student surveys on drug use, they looked at the changes in prevalence of past-year, past-month, risky and frequent cannabis use pre-, and post-legalisation in Uruguay. Furthermore, to complement their study with a comparative element, they measured the changes in cannabis use among Chilean secondary school students in the same time period, where non-medical cannabis cultivation, adult use and sale remained illegal. Interestingly, they show that following enactment in 2014, frequent use and risky use increased temporarily among the Uruguayan 18-21 age group and decreased thereafter. This finding, as they suggest, could be evidence that immediate impacts on cannabis use following post-legalisation might be a potential outcome of changing social norms rather than a result of actual increase in substance availability. That transient increase, however, was not observed among school children aged 12-17 in Uruguay. Moreover, when looking at the difference in prevalence of past-year and past-month cannabis use pre- and post-legalisation, both the 12-17 and 18-21 age groups show a lesser change in Uruguay than in Chile, further strengthening the case that legalisation in Uruguay has not been associated with increased cannabis use.

Based on a literature review of the Uruguayan cannabis regulatory framework, Weinberger²²⁹ examined the potential impacts of legalisation on public order, with a focus on criminality and the presence of an illicit market. He argues that in the four years after legalisation was signed into law, the size of the illegal market was still larger than the legal market. This is an empirical question and it's unclear what the situation is in

²²⁶ Queirolo (2020).

²²⁷ Laqueur et al. (2020).

²²⁸ Rivera-Aguirre et al. (2022).

²²⁹ Weinberger (2018).

2022, but the shortcomings on the legal supply side have been studied by Queirolo²³⁰ as well, stating that it is a multifaceted issue rooted in the combination of a limited number of pharmacies selling cannabis, the authorised cannabis amount not meeting demands and the rigorous quality tests on the substance produced by cultivators – for more on Queirolo’s analysis please see Box 6.

Box 6. Some highlights from Uruguay on pharmacy sales.

A comprehensive overview of the Uruguayan legal framework for the supply of non-medical cannabis has been offered by Queirolo in 2020,²³¹ analysing the strengths and weaknesses of the implementation process five years into the approval of Law 19.172. By quoting official IRCCA’s records, she highlights the fact that about eight in ten registered individuals have actually purchased cannabis, albeit being registered. This gap, as she explores is a complex shortcoming on the legal supply side, both on the level of production and distribution. On the level of production, the authorised amount of cannabis produced has not seemed to have met the demand, while on the level of distribution, the number of pharmacies selling the substance is considerably lower than the demand, resulting in poor and uneven territorial coverage nationwide. These problems are combined with the strict quality tests that approved cultivators must meet before supplying their product to pharmacies, leading to further delays and shortages in the pharmacies. As a combined effect of these shortcomings, buyers turn to the black market again, accounting for the gap of about a fifth of registered buyers who appear not to purchase their substance through the legal system. This has been an issue brought up by one of our expert interviewees as well, who explained that the availability of cannabis through the pharmacies may not be meeting the demand.²³²

Despite these weaknesses in implementation, Queirolo highlights that there are considerable strengths taking shape already. The heavy control on product quality minimises the health risks and the presence of ‘*prensado*’, a particularly low-quality type of product on the black market have near disappeared. Furthermore, even though buying illegally is still an issue due to the weak implementation and unmet demands, there is still a market separation process on the way, with an increasing grey market due to the sharing of legally obtained products. Queirolo concludes that the passage of the law is associated with both positive and negative impacts, and that other jurisdictions considering a move towards a regulated cannabis framework must first ‘*build the data infrastructure necessary to evaluate the impact.*’²³³ Without collecting data on public health and public safety, the means to understand and judge the outcomes are based on weak associations.

²³⁰ Queirolo (2020).

²³¹ Queirolo (2020).

²³² Respondent 1.

²³³ Queirolo (2020, 126).

7. Other insights for the design of alternative models to profit-maximising commercialisation of cannabis for non-medical use

7.1 Alternative theoretical proposals and their anticipated consequences for public health and security

In addition to the cases of actual implementation of alternative non-profit models for the supply of cannabis for non-medical use, there has also been scholarly debate about other possible frameworks to arrange the production and distribution of that substance. The design proposed by these authors was inspired on models already introduced to regulate the supply of other substances and activities, namely alcohol (in particular: alcohol licensing trusts, alcohol state monopoly) and gambling (a regulatory regime for gaming machine gambling).

7.1.1 Government-operated outlets for tobacco sales

In 2017, Smith et al.²³⁴ proposed moving tobacco sales to existing government-operated alcohol outlets, broadly inspired on a government monopoly model for alcohol. The authors perceive this to allow governments more options for regulating tobacco sales. Under the measure suggested, retail prices would be increased, governments could eliminate point of sale advertising, limit the range of brands or products for sale, or set purchase limits, and could also create a ‘transition fund’ to pay previous retailers one-off for their missing tobacco profits. The authors expect that this move would therefore result in a reduction of use of tobacco, by making the product less visible and setting higher prices, and in a reduction of sales to underage individuals. Moreover, by emphasising a public health message (noting the harms associated with tobacco use), the authors consider that it could be a step towards the endgame goal of eliminating sales of commercial tobacco. The authors argue that jurisdictions that have already implemented retail monopolies for other substances (e.g., alcohol), are ideally situated to implement the model described.

²³⁴ Smith et al. (2017).

7.1.2 Applying a gaming machine gambling model to cannabis

In 2018, Wilkins²³⁵ proposed adapting a New Zealand non-profit regulatory regime implemented for gaming machine gambling (e.g., slot machines) to a legal cannabis market. This model was designed with the intention of limiting the expansion of gambling and ensuring that gambling machines would be used to benefit the community rather than profit. Under this regime, gaming machines are either owned by gambling societies or by not-for profit organisations which provide machines to pubs. In both instances, and according to the Gambling Act 2003, at least 40% of the net proceeds generated from the gambling machines must be redistributed to community purposes. The gaming societies are also required to provide funds to the government, the regulatory regime and support responses to problem gambling, and can use the remaining proceeds for operating costs. The gambling societies are also required to dedicate resources to preventing and minimising the harm associated with gambling and identifying problem gamblers. Similarly, under the proposed model for cannabis, *licensed non-profit cannabis societies*, local government authorities would be required to develop policies around how and where the revenues generated through the cannabis sales would need to be spent. In particular, the author proposed that 20% of cannabis sales revenues would be allocated to drug treatment and 20% to community purposes, including drug prevention. Moreover, grant committees independent from cannabis societies would be established, and 20% levy would be used to cover the wider health costs of cannabis use. Other important elements include establishing a minimum price for cannabis and taxation of cannabis products. In addition, advertising would be restricted to place-of-sale, internet sales would not be allowed, and there would be restrictions on industry involvement in regulation making and research. CBD content in cannabis products would also be regulated.

The author reports that, in New Zealand, the implementation of this model has contributed towards slowing down the increase in gambling spending, supporting local governments in restricting the number of gambling outlets, and ensuring that a part of the gross expenditure from machines is distributed to community purposes.²³⁶ However, the author highlighted some limitations to this regulatory regime, which include the prevalence of gaming outlets in more disadvantaged areas and the lack of redistribution of proceeds to the communities in which the machines are located. As a result of the establishment of this model to the supply of cannabis, the author anticipates a reduction in the role of illegal market purchases, and therefore in the scale of the illicit market – though enforcement of the illicit market would still be required. Moreover, philanthropic groups which would be focused on benefiting the community rather than making profit might be attracted into the sector. Overall, the author suggests that this model would help limit the potential harms associated with cannabis use and avoid having private interests’ drive the cannabis market.

²³⁵ Wilkins (2018).

²³⁶ Wilkins (2018).

7.1.3 A community enterprise model for cannabis

In 2019, Rychert and Wilkins²³⁷ proposed a *community cannabis licensing trust model* for non-medical cannabis based on the alcohol licensing trusts (ALTs) in New Zealand. Alcohol licensing trusts are community-owned entities which are responsible for operating alcohol retail outlets. As with the gambling model described above, part of the proceeds from the alcohol sales are redistributed to the local communities (in the form of grants, loans, or donations). This model seeks to limit the control of private entities over the market, ensures that revenues are re-distributed to the community, and provides local community with greater oversight and control of sales. However, cognisant of the lack of general oversight and difficulties in balancing the commercial and social aims experienced by the alcohol licensing trusts in New Zealand, and to ensure the non-profit nature of the model, the authors proposed new features for the *community cannabis licensing trust model*. Under their proposed model, the authors recommend that: 1) a minimum community distribution (30%) of gross cannabis sales would be spent to benefit the community; 2) communities would have the power to set up, continue, and discontinue trusts through their local councils; and 3) a national advisory committee with experts who can provide support would be established, and there would be grants for the trusts to enable the contracting of local farmers who are interested in growing cannabis. According to the authors, this could generate positive outcomes. For instance, the model would remove strong commercial incentives from the market; would establish statutory obligations on trusts to distribute part of the revenue from cannabis sales back to the community for beneficial purposes; and would establish community governance over cannabis retail sales. Nevertheless, the authors also cautioned that the lack of research and evaluation of the existing alcohol licensing trusts limits the understanding of its effectiveness. These positive and negative outcomes were further highlighted in a subsequent survey by the authors that asked two ALT communities whether they would support an application of ALT to cannabis regulation.²³⁸ Whilst many respondents supported the notion as it could fund public good causes and give the community greater control of the cannabis industry, some respondents opposed due to their ideological opposition to monopolies and their perception of higher prices of products under ALT-styled regulation. Further research in this area could inform an eventual application of the model to the supply of cannabis.

7.1.4 Establishing Cannabis Incorporated Societies

In an earlier paper by Wilkins,²³⁹ he proposes an alternative, non-commercial model for the supply of cannabis in the context of New Zealand. Building on an existing non-profit Incorporated Societies framework under the Incorporated Societies Act 1908 in the country - which forms the basis of various musical, sports and cultural community-led non-profit groups, he proposes the introduction of Cannabis Incorporated Societies (CISs). Similar to CSCs operating in regulated (e.g., Uruguay) and unregulated contexts (e.g., Spain, Belgium), the essential features of the proposed Cannabis Incorporated Societies model by Wilkins include being a membership-based, non-profit collective for adult cannabis users who wish to access a continuous but limited supply of the substance for personal use. The main difference,

²³⁷ Rychert & Wilkins (2019).

²³⁸ Rychert et al. (2020).

²³⁹ Wilkins (2016).

however, is that Wilkins ties the operation of CISs to clear health objectives, necessitating all societies to meet statutory requirements and prepare a clear yearly agenda on how the CIS will promote awareness of the health risks associated with cannabis use and contribute to specific cannabis and other drug related health initiatives from the predicted yearly budget available from membership fees and cannabis sales. The model proposed by Wilkins would only permit societies to sell cannabis products to their members up to a maximum level of THC and having a minimum level of CBD. With regards to cannabis production, Wilkins' model proposes government-led cultivation as the sole source of approved cannabis products to licensed CISs, whereby a set minimum price would ensure that products remain accessible and competitive with illicit market prices. Government revenues would be spent partly on enforcement and partly on substance use prevention and treatment. Wilkins notes that the main difficulty of the CIS model is to balance introducing sufficient restrictions on societies without risking overregulation, which could disincentivise members from signing up.

7.1.5 Non-profit supply

Decorte developed a comprehensive hypothetical scenario for a non-profit cannabis market with a view to contribute to the debate on cannabis policy reform.²⁴⁰ In this 2018 contribution, Decorte discusses the introduction of three supply models (in a first phase): 1) home cultivation; 2) CSCs; and 3) the supply of cannabis through pharmacies for medical use. Implementation would be integrated in broader context of education efforts (e.g., the launch of an education campaign and the dissemination of information about the new regulation), as well as of data collection and research. The three concrete supply models put forward draw on current experiences, but Decorte provides a detailed proposal of how these could be regulated. For instance, with regards to CSCs, the scenario envisions the creation of an agency for the regulation and control of cannabis, introduces a mandatory registration, and establishes that CSCs should be constituted as non-profit associations. Accordingly, membership would be restricted to a maximum of 250 members, who must be at least 18 years old and permanent residents – as well as registered with their preferred CSC (having to select one CSC only at a time). Decorte foresees the introduction of a number of restrictions concerning the cultivation and distribution of cannabis by the CSCs (e.g., number of plants that they may grow, types of products, limits to purchases, packaging and labeling requirements, among other).

It may also be possible to implement a similar non-profit model that does not require registration and where purchases could be anonymous. It could also be extended beyond the CSC model. An earlier RAND report²⁴¹ offers some useful insights about this potential approach:

‘For example, one could require licensees to be nonprofits whose boards include members who are chosen by child-welfare and public-health groups, whose charters include language about operating only to meet existing demand rather than promoting greater use, or that pledge to donate any excess operating revenue to drug treatment and use-prevention organisations.

²⁴⁰ Decorte (2018).

²⁴¹ Caulkins et al. (2015).

Note that this strategy is not so much an alternative to regulation as it is a supplement. Any of these restrictions on who is eligible to obtain a license could be overlaid on top of any other regulatory rules and strategies. So, for example, if Colorado had wished to follow this path, it would merely have needed to add a clause requiring licensees to be nonprofits. All of the other regulations and conditions governing licensee behavior could be retained, including tax revenue. Nonprofit should not be conflated with nonrevenue.

Of course, limiting participation in the marijuana market to nonprofits does not guarantee that the industry will not attempt to exert political influence or try to increase revenues. Although nonprofits should, in theory, not be inherently interested in expanding sales or streamlining production, nonprofit hospitals and universities compete aggressively. Board members might have a tendency to see growth as a sign of success. Term limits for board members of the nonprofit could be considered, along with other mechanisms to deter empire building.’

7.1.6 For-benefit corporations

Another alternative to the profit-maximising commercial model is to limit participation in the industry to for-benefit corporations which also focus on improving social and environmental outcomes (i.e., the triple-bottom line of people, planet, and profits). As noted by Caulkins et al.²⁴², ‘Although most companies have a fiduciary responsibility only to maximise profits for shareholders, for-benefit companies incorporate social goals into their governing documents.’ While profit would still be part of the equation, decisions would be made with additional goals in mind. Whether this type of legal structure is an option will depend on the laws and policies of the jurisdiction.²⁴³

²⁴² Caulkins et al. (2015).

²⁴³ Those interested in this type of approach may also want to review the protocols for becoming a B-Corporation. As of 26 September 2023: <https://www.bcorporation.net/en-us>

7. 2 Lessons from regulatory experiences with other substances and activities, focusing on alternatives to profit-maximising commercialisation

While not the primary focus of this study, below we include some highlights from research into other regulatory experiences that may be of relevance to inform the thinking on alternative models to for-profit commercialisation of cannabis. Currently, a study by Ritter et al. for FOPH is focused on understanding more comprehensively the body of research on alcohol and tobacco policies and will draw relevant lessons for the cannabis field. We refer readers to that more detailed analysis.

7.2.1 Alcohol

Through a narrative review of alcohol monopolies in multiple countries, Room and Örnberg²⁴⁴ distil key learnings that can aid understanding on cannabis related policy challenges from a public health and public order perspective. Through pulling together examples from how existing alcohol state monopolies influenced consumption patterns, welfare and illicit markets in Norway, Finland, Sweden, Canada, New Zealand and the US, they found that there is an abundance of evidence that monopolies reduce excessive consumption and alcohol related problems. Furthermore, from a public order perspective, monopolies at the wholesale level discourage illicit markets by replacing private interest, offering effective tax collection and ensuring quality of the supply. Additionally, monopoly of retail off-premises sales can have the benefit of limiting the number of outlets and their opening hours, can operate as effective instruments for introducing pricing structures and minimum pricing, and decisions can be made quicker than in the case of license systems. Overall, Room and Örnberg highlight that both from a public health and public order perspective, government monopolies of cannabis could be a potent strategy to make the substance available but within the framework of a carefully monitored system that may be more effective in reducing harm than a commercial model or a licensed private-enterprise model. Importantly, however, ‘how the monopoly is motivated, constructed and run and where it is located within government are crucial determinants of whether the monopoly makes a positive contribution to public health and welfare.’²⁴⁵

Jónsson and Kristjánsson²⁴⁶ studied the history of alcohol state monopoly in Iceland as well as public attitudes to it, through collating secondary data from public surveys and sales figures from the Statistical Office in Iceland and from the State Monopoly over the past two decades. While their research details the features of the state monopoly dating back to the first quarter of the 20th century, their discussion on the more recent changes in alcohol policy are more relevant for the purposes of understanding how experiences from the non-commercial regulatory framework impacted public health in the country. Since 2008, the Ministry of Finance introduced new rules for the ATVR (State Alcohol and Tobacco Company of Iceland), including that products from then on are not only selected by the ATVR according to monopoly

²⁴⁴ Room & Örnberg (2019).

²⁴⁵ Room & Örnberg (2019, 227).

²⁴⁶ Jónsson & Kristjánsson (2013).

regulations, but also in accordance with the Icelandic National Health Plan with a specific maximum alcohol consumption per year in mind and alcohol consumption reduction nationwide in general. Furthermore, the new regulation not only included health responsibility objectives in mind, but also social responsibility objectives in the form of keeping impartiality in consideration when it comes to which suppliers to obtain certain alcoholic beverages from. These rules are not applicable to hotels and restaurants however, who can purchase alcohol from the wholesaler and distributors. In terms of impacts on public health, while their paper did not aim to contribute to the understanding of the impacts of alcohol state monopoly, their discussion on the model includes some potentially relevant findings that may be linked to the presence or absence of this type of regulatory framework. Interestingly, while the sale of beer was initially banned in Iceland in 1915, there was a nationwide increase in beer consumption after the revocation of the ban in 1988.²⁴⁷

Through a literature review on the body of research having looked at the impacts of liquor license restrictions in New South Wales, Australia, Weatherburn²⁴⁸ analysed the collective impacts of liquor licensing reforms on alcohol consumption and alcohol related violence. In 2008, the New South Wales government introduced new restrictions on the top 48 licensed premises in terms of assaults occurring on their premises between Jan-Sept 2007, which included ‘mandatory 2 am lockouts; cessation of alcohol service 30 minutes before closing time; plastic or polycarbonate glasses for beer service after midnight; no “shots”; and drink purchase limits after midnight.’²⁴⁹ The restrictions have brought on positive public health and public safety impacts, including a decrease in alcohol consumption by young people and a decline in assaults on licensed premises (both in the case of the top 48 licensed premises but an observable impact in the case of the top 100 licensed premises). While these trends are evidence-based insights on the positive impacts of a form of alcohol state monopoly operating in New South Wales, there is, nevertheless, an important challenge from these learnings, namely that there is little known at the moment about which of these policy interventions elicited the observed impacts, or indeed whether or not they are a result of the multiplicity of liquor licensing interventions or are result of coincidental societal changes. Weatherburn calls for further research to tease out the above questions and lead to a clearer understanding on the impacts of the liquor licensing restrictions on public health and public safety.

Karlsson and colleagues²⁵⁰ studied the political milieu that led to the comprehensive reform of the Finnish alcohol policies in 2018 and offered a preliminary evaluation of the impacts associated with the new reform. The nationwide state monopoly on alcohol which explicitly aimed to mitigate the negative health consequences of alcohol consumption have been characterised by high taxation and strict regulations on the retail and advertising of alcohol. The Alcohol Act that came into force in 2018 maintained the essence of the state monopoly and the central aim to limit alcohol related harm, it loosened restrictions on grocery store availability, including extended serving hours in both off-premise state stores and on-premise sales, lifting the prohibition on advertising ‘happy hour’ discounts and easier application for license permissions.

²⁴⁷ Tyrfingsson et al. (2015).

²⁴⁸ Weatherburn (2016).

²⁴⁹ Weatherburn (2016, 98).

²⁵⁰ Karlsson et al. (2020).

While the authors point out that their study focused on preliminary impacts after the first year of the passage of the law and that a more comprehensive analysis on the outcome of the reform needs yet to be looked at, their findings nevertheless include important tentative impacts on public health. The greater physical availability of alcohol and the slightly reduced prices to the increased competition among stores that the reform generated led to a marginal growth in alcohol consumption, even though alcohol taxes have been increased simultaneously. This has meant that ‘the 10-year (2008–2017) downward trend in the total per capita alcohol consumption was discontinued despite the tax increase.’ While the reform of the Finnish Alcohol Act has stimulated a discussion on the role of alcohol state monopoly in the region against the backdrop of commercial interests, consumer freedom and public health challenges, the early learnings from the move of the case of weakening the alcohol retail monopoly in Finland suggest an increased consumption of the unhealthy substance.

7.2.2 Gambling

Rossov and Hansen²⁵¹ provide an overview of gambling policy in Norway, arguing that the country is an exceptional case to explore how the introduction of strict state monopoly in the case of a harmful activity such as gambling yielded positive outcomes. Electronic gaming machines (EGM) in Norway increased in popularity among gamblers in the 1990s due to technological developments and wider availability within the gambling regulative framework at the time. This has come to an end in 2007 as a temporary ban on EGMs took effect with new restrictions having been introduced the year before. While EGMs have been unavailable in the country for over a year, new ones have been introduced in 2009 which purposefully reduced additivity enhancing features, offered less sensory stimuli and were overall less aggressive. In addition, the new restrictions banned note acceptors in the country. The combined outcomes of the stricter gambling policy included fewer gambling problem related calls received by helpline services, a steady decrease in referrals to treatment units related to gambling, and a significant decrease in total gambling turnover. Moreover, no signs of illegal EGM market or knock-on effects with other substance misuse or substitution of EGMs with other forms of gambling have been observed. Based on their findings, the authors argue that the introduction of stricter state monopoly around gambling and specifically around EGMs in Norway is linked to a decrease in problem gambling and gambling expenditures.

²⁵¹ Rossov & Hansen (2016).

8. Conclusions

Based on our targeted review of cannabis regulatory options, systematic review of the literature, and interviews with cannabis policy experts, we offer five insights concerning alternatives to the profit-maximising commercial model for the supply of cannabis for non-medical purposes. We conclude with some additional thoughts about how these different models might compare across various outcomes of interest.

8.1 Insights on alternatives to the profit-maximising supply model for cannabis

8.1.1 There are important differences in how models for home cultivation and CSCs have been regulated and implemented throughout the world.

The experiences of regulation and implementation of home cultivation in five countries (Australia, Canada, Malta, Uruguay, and the US), either nationally (Canada, Malta, Uruguay) or sub-nationally (Australia, US), provide interesting insights about some of the key choices made concerning the design of this model. These jurisdictions have typically introduced restrictions concerning who can legally cultivate cannabis, how much cannabis can be cultivated, and whether that cannabis may be shared with others. The possibility of growing cannabis at home has been restricted to those aged 18 or above - in some cases 19 or 21 years old. Cultivation is limited to a small number of plants, ranging from 2-6 plants per grower or 4-12 plants per household across the jurisdictions we reviewed. Sharing and gifting of the cannabis produced is possible in some jurisdictions (e.g., Canada, US, Uruguay). Mandatory registration in a national database (managed by the national cannabis agency) is a feature specific to the Uruguayan regulatory framework. In addition, other requirements (for instance in relation to where the cannabis plants are cultivated, and how visible that is to third parties) apply in certain jurisdictions as well.

CSCs can be found in multiple countries in Europe and beyond,²⁵² but there are only a few examples where regulation has been developed for this model: in Malta, two Spanish autonomous regions (albeit no longer in force), and Uruguay. In this regard, we found different approaches to the set-up of the associations, how much cannabis they can produce, and how many users they may serve. Some general principles have been retained across jurisdictions: the CSCs take the form of non-profit associations and supply only members of the association. As such, the necessity of some form of registration (for the association but also for the individual users who become members of the CSCs) is a common aspect addressed in the regulatory

²⁵² Pardal (2022).

frameworks we reviewed. Advertisement and promotion by CSCs are also prohibited in Malta, Uruguay and Spain. A similar approach has also been taken in terms of the types of products CSCs are allowed to produce and distribute: herbal cannabis (and unsterilised seeds in Malta) is the only option across these jurisdictions. Beyond that, we found differences in terms of quality control requirements or storage, packaging and labelling. Only in Uruguay has a concrete cap on production been set (at 99 plants or 480 grams per member annually) while Catalonia introduced a threshold of 150 kg of annual production. The CSCs are allowed to distribute up to 40-60 grams of cannabis per month to each member. In Catalonia, the legislature introduced a differentiated threshold for members aged 18-21: these should only be able to obtain 20 grams of cannabis per month. In addition, the Catalan regulatory framework required a waiting period between CSC enrolment and first purchase. The size of the CSCs will also vary significantly across jurisdictions, from a maximum of 45 members in Uruguay to 500 in Malta. These different memberships caps may have several implications. For instance, lower membership caps may mean that more CSCs will be needed to supply the market. As a result, there would also be many CSCs to inspect and ensuring adherence to the regulatory framework may become burdensome. At the same time, setting a higher cap, and having a smaller number of CSCs, could reduce the burden in terms of enforcing the regulatory framework, but there is a risk the larger organisations may become more powerful actors, and some of the cooperative and community-oriented features may be less present.

8.1.2 Parts of Canada and Uruguay demonstrate that it is possible to implement versions of a model of government sales.

While there are still jurisdictions in the US which sell alcohol at government-run stores, this approach for cannabis has not been implemented there except for one small town in Washington State (North Bonneville). This is not the case in Canada where there are some provinces/territories that exclusively sell cannabis in government-run stores and others where both government and private stores are authorised to sell (there are also some that exclusively allow sales by private for-profit stores). With government stores, the “profits” go back to the state as opposed to private businesses and individuals; however, the social benefit of those revenues will depend on how they are allocated. Without competition, there may also be less incentive for advertising and marketing with the state store approach. However, if the government becomes dependent on the revenue, there could be incentives to step up these efforts (as we have seen with the government lotteries in the US). It is unclear whether this would be a concern in Europe.

As noted, the Uruguayan case is unique as the state holds very strong control over most facets of the cannabis supply chain related to pharmacy sales. While retail sales are allowed in pharmacies that are private businesses, the government controls the price of the products, which products can be sold, who can purchase, and how much can be purchased. In an initial phase, cultivation by the few licensed private companies also took place in government-owned land. While it is not technically a state store approach, the pharmacy sales model closely resembles one with respect to cannabis.

8.1.3 In jurisdictions which offer multiple supply models, there is very little research attempting to isolate the effects of the different models.

In Uruguay, Canada, and all the US states that legalised except Washington and Illinois, multiple supply models were enacted (and this is also the case in Malta). This can make it difficult to isolate the effect of a particular model on various outcomes of interest, especially when analyses use a simple binary measure to denote whether legalisation had been enacted.²⁵³ The ACT in Australia will offer a useful opportunity to identify the effect of legalising home growing for non-medical purposes, but the recently of that change means we still do not have evidence. But there are a few notable exceptions. First, the CSC model in Spain has a long history of implementation. Albeit not regulated, the body of research focusing on CSC practices in that jurisdiction can provide interesting insights on effects of interest and provides an opportunity to understand key changes over time. Second, since those in Uruguay who want legal cannabis must register with the government and choose one of the three supply mechanisms, it is possible to use the spatial-temporal variation in these registrations to attempt to isolate the effect of the various models. We are only aware of one study using this approach, finding that there was a positive and consistent association between the number of people registered for home growing and traffic crashes involving injuries (the effects were not consisted for the other supply mechanisms).²⁵⁴ It would be possible to use this approach to examine other outcomes, but it will depend on how granular the outcome data are in terms of geography and timing. Finally, there is also an opportunity to learn from the staggered timing in the implementation of supply models within a country. Since it takes time to license production and create a retail sales regime, many jurisdictions allow home growing and/or CSCs first (this is also the plan for Malta). But one needs to be careful here. For example, after voters in the US state of Colorado passed legalisation in November 2012, adult possession and home growing became legal in December 2012 and the retail stores did not open until January 2014. Attributing any changes that happened in 2013 to home growing versus other explanations (especially given the size of the illegal and medical markets in Colorado at the time, and also possible changes in enforcement practices), requires detailed analyses.

8.1.4 Rigorous evaluations of alternative models to profit-maximising commercialisation of cannabis for non-medical purposes are rare but increasing.

Our review of the empirical evidence yielded a small number of studies focused on alternative models, and even fewer that use rigorous methods that use credible control groups. While pre-post analyses which compare how an outcome changes (or doesn't change) before and after legalisation can provide some information, it does not allow researchers to identify whether the policy changes *caused* a change in the outcomes of interest. Pre-post analyses leave open the possibility that something else may have happened simultaneously that could be driving the results. That is why it is crucial to incorporate a credible control group into these analyses.

²⁵³ At the same time, it is possible the supply models serve overlapping segments of the market.

²⁵⁴ Kilmer et al. (2022).

Some notable exceptions exist in the literature. The two studies examining the association of legalisation in Uruguay with youth cannabis outcomes used data from students in Chile as a control group.²⁵⁵ Another Uruguayan study used variation in the number and type of registrants at the department level (including department level fixed effects to account for characteristics of these departments that did not change over time and year-quarter fixed effects to control for factors that may have changes nationwide during this time, in addition to other covariates) to examine the association with traffic crashes involving injuries. However, there are new approaches to addressing staggered adoption with a continuous treatment that should be incorporated into future analyses like this (see e.g., Callaway, Goodman-Bacon and Sant' Anna²⁵⁶).

Table 7 highlights the most noteworthy studies with respect to the consequences of implementing alternatives to profit-maximising commercial models for non-medical cannabis. It is worth noting the relative novelty of some of these regulatory frameworks. As more data becomes available in places that have legalised, and the field of policy analysis moves away from the simple two-way fixed effect difference-in-differences models, we suspect the quality of the evidence base will improve.

²⁵⁵ Laqueur et al. (2020); Rivera-Aguirre, et al (2022).

²⁵⁶ Callaway et al. (2021).

Table 8. Noteworthy empirical studies on the consequences of implementing alternatives to the profit-maximising commercial model for non-medical cannabis

Country	Source	Empirical strategy	Major findings	Major limitations (beyond external validity to other countries)
Uruguay	Lacquer et al, 2020	Uses a synthetic control approach to compare cannabis use patterns for high school students in Montevideo and interior regions of Uruguay with data from students in 15 regions of Chile.	While the results suggest that students in Uruguay observed an increase in perception of cannabis availability, there was no evidence of an impact on cannabis use (past year, past month cannabis use, or frequent cannabis use defined as use 10 days or more in the past month), or the perceived risk of use.	Unable to isolate the effect of specific supply models. Since the focus was on post-secondary students in areas with larger population, cannot generalise to all adolescents.
Uruguay	Rivera-Aguirre et al., 2022	Uses data from repeated cross-sectional surveys of secondary students in Uruguay and Chile (2007–2018) using in difference-in-differences framework, examining changes in the prevalence of past-year, past-month, any risky and frequent cannabis use following enactment and implementation of cannabis legalisation.	For those under 18, the study observed a decrease in past-year and past-month use following enactment or implementation. Among students ages 18 to 21 (for whom cannabis was legal), post-enactment, they observed a transitory increase in 2014 that decreased thereafter for: any risky use among those who reported past-year use frequent use in the full sample and frequent use among those who reported past-month use.	Unable to isolate the effect of specific supply models Since the focus was on post-secondary students areas with larger population, cannot generalise to all adolescents The authors note that for outcomes where the levels between Uruguay and Chile pre-legalisation differ, they assume the difference in the level between Chile and Uruguay have remained the same in the absence of legalisation. They note this is a strong assumption that may not be warranted.
Uruguay	Kilmer et al. 2022	Uses a two-way fixed effects model leveraging spatio-temporal variation in registrations for self-cultivation, CSC, and pharmacy sales (together and separately) to examine association with traffic crashes involving injuries.	Find strong and consistent evidence that the number of people allowed to self-cultivate cannabis is positively associated with traffic crashes involving injuries. The associations for other supply mechanisms were inconsistent across the various model specifications.	There are growing concerns about the traditional two-way fixed effect models. Unable to determine causal mechanisms driving these results.
Canada	Vignault et al. 2021	Uses retrospective observational data and generalised linear mixed model to	The active use of cannabis among those aged 18+ have increased from 28% (in 2016-2017 period) to	The findings could potentially be preliminary fluctuations given its focus on the first 5 months

Country	Source	Empirical strategy	Major findings	Major limitations (beyond external validity to other countries)
		analyse how cannabis use and cannabis-related psychiatric disorder prevalence changed among patients aged 12+ in Quebec in the 5 months following cannabis legalisation compared to 2 years before legalisation.	37% (post-legalisation in 2018-2019 period) with a statistically significant increase in cannabis use among both 18-24 and 25-44 age group. The prevalence of cannabis use disorder among adults have shown a significant increase as well from 17.7% to 24.3%. While among the 12-17 age group the difference in active cannabis use have not rose significantly, it nevertheless shown an upward trend as well.	following the introduction of cannabis regulation. The observed outcomes are generalised to cannabis legalisation but does not account for the specific supply models that are allowed, including home cultivation. The lack of a control group outside of Quebec precludes us from ruling out other potential explanations for the change.
Canada	Myran et al., 2022	Uses an interrupted time-series analysis focusing on cannabis-attributable emergency department visits between January 2016 to May 2021, under different cannabis measures in Ontario (pre-legalisation; post-legalisation through a combination of a single government-ran online store and strictly capped licensed in-person stores; and post-legalisation with no cap on the number of retail stores, which is what the authors refer to as commercialisation).	No significant increase in the first 6 months immediately after legalisation through strict government-controlled online stores beginning in October 2018, followed by a sharp increase starting in early 2020 coinciding with a large increase in retail outlets and with COVID-19.	The increase in ED visits not only coincided with the period of market expansion in cannabis sales but with COVID-19. This makes it difficult to separate the impacts of these events. The lack of a control group outside of Ontario precludes us from ruling out other potential explanations for the change.

Note: Some parts of this table are reproduced from the articles.

8.1.5 There are other non-profit models that have not yet been implemented.

In addition to the actual supply models which have already been regulated and implemented, we identified some other theoretical proposals which explore non-profit options for the supply of cannabis for non-medical use. These other models have been designed by typically drawing on regulatory experiences with

other substances or potentially addictive substances. For instance, Wilkins²⁵⁷ proposes an adaption to a gaming machine model which had been introduced in New Zealand and considers how it may be an useful frame for the supply of cannabis for non-medical reasons, showing how such a model can be applied in practice.²⁵⁸ In turn, Rychert and Wilkins²⁵⁹ discuss whether alcohol licensing trusts, which are community-owned enterprises, could constitute a relevant model for the supply of cannabis, in the sense that it would, in theory, allow for community governance over cannabis sales – thus removing commercial interests from the market, and would oblige trusts to re-distribute revenues for community purposes. We also identified two other proposed models which resemble or expand on the experiences with the CSC model. Wilkins²⁶⁰ proposed the creation of Cannabis Incorporated Societies, based on earlier experiences with non-profit collectives in a range of areas (music, sport cultural). Decorte developed a detailed framework for how CSCs could be regulated, detailing some of the key areas that should be safeguarded in potential legislation of the model.

These proposals make a two-fold contribution to the field. Firstly, they have merit as specific options for the supply of cannabis for non-medical purposes, and the authors have reflected on the potential advantages and disadvantages of its introduction. Secondly, they show that there are multiple “middle ground” options which may be considered when thinking about alternatives to profit-maximising commercialisation of cannabis.

8.2 Additional thoughts about how these different supply models might compare across various outcomes of interest.

We remind readers that this report neither provides a cost-benefit analysis of alternatives to prohibiting cannabis supply nor conducts a cost-effectiveness analysis comparing alternative approaches on various outcomes. That said, based on previous RAND research and insights we learned through this project, we offer some ideas about how some of these various supply models *might* compare across various dimensions. Since some of these models have not been implemented for cannabis and, if so, not rigorously evaluated on many of these dimensions, Table 10, which is a slightly modified version of a table published by Caulkins et al.,²⁶¹ should be seen as suggestive, not definitive.

²⁵⁷ Wilkins (2018).

²⁵⁸ Caulkins (2018).

²⁵⁹ Rychert and Wilkins (2019).

²⁶⁰ Wilkins (2016).

²⁶¹ Caulkins et al. (2015).

Table 9: Insights concerning supply alternatives to prohibiting cannabis supply for non-medical purposes

	Home cultivation	Cannabis Social Clubs	Government sales/government-led supply ²	Other non-profit organisations	For-benefit companies	Profit-Maximising Commercial Model
Jurisdictions Adopting this Approach	ACT, Malta, Uruguay, Canada, US	Uruguay, Spain, ¹ Malta	Some provinces in Canada, Uruguay	N/A	N/A	Most of US and Canada
Production Cost (w/o Fees, Taxes, Regulations)	Highest	Highest	Low/Medium	Low	Low	Very low
Feasibility of introducing Product Quality Assurance and Labelling	Limited	OK	Very Good	Very Good	Very Good	Good
Incentive for Legal Suppliers to Promote Use Harmful to Public Health	Status quo	None	Low	Low	Low	Very High
Likelihood of Promotion of Harmful Use	None	None	Low/Medium	Low	Low	Very High
Cost/Effort of Government Control Efforts	High on rest of market	High on remaining market	High	Low to Medium	Low to Medium	Low
Ability to Generate State Revenue	Very low, depends on seizures/fines	Very low, depends on seizures/fines	Best	Fair to Good	Fair to Good	Fair
Ability to Significantly Reduce Size of Illegal Market	Very low	Low, but depends on CSC coverage	Good, may take longer than other options	Good	Good	Likely best, but will depend on enforcement

Notes: Adapted from Caulkins et al. (2015). Red indicates that a strategy is among the worst or riskiest options with respect to that criterion. Orange indicates that a strategy is bad but not the worst. ¹ As discussed in section 3.1, the laws permitting CSCs in certain Spanish jurisdictions are no longer in place. ² We include the Uruguayan case of pharmacy sales here, albeit the distribution occurs in private pharmacies, as explained in Chapter 6.

Each of columns in Table 10 highlights a different supply mechanism while the rows present examples of where that approach has been implemented (if applicable) and different health, safety, and economic outcomes. We remind readers that these models are not necessarily mutually exclusive (e.g., it is possible to allow CSCs and retail sales) and it may be possible to transition from one model to another. However, if a jurisdiction implements a profit-maximising commercial model and eventually wants to make major changes, it may be difficult to fight against an entrenched industry and its lobbyists.

We do not include a row about diversion, which is possible with all these models. People could grow cannabis and illegally sell it to others. People could also buy cannabis and sell or give it to those who are under the legal age, or in the case of Uruguay, those who are not registered with the government. The amount of diversion will be shaped by many factors, including the amount of enforcement resources dedicated to addressing it. While many people are rightly concerned about youth consumption, one must also ask whether it is better for people to use diverted products that are tested and regulated compared to illegally produced products that might contain more harmful contaminants (e.g., see the e-cigarette or vaping product use-associated lung injury, or EVALI, crisis that happened in the US in late 2019).²⁶² This is just one of the many choices jurisdictions will confront as they consider alternatives to prohibiting cannabis supply.

We conclude by noting that the outcomes highlighted in the table rows are not exhaustive and, more importantly, there is not universal agreement about their importance. Indeed, if one's goal was to reduce the size of the illegal market as quickly as possible, a jurisdiction would likely choose the profit-maximising commercial model which can quickly drive down prices and make it hard for illegal suppliers to compete. On the other hand, if one is more concerned about minimising arrests and threats to public health, a government monopoly or non-profit model might be best. A CSC model might also be good here, but there are questions about scalability (how much of the market can they realistically supply?) and the extent to which governments can regulate the products that are distributed to members. And as noted in Section 3.2, policy makers are often trying to accomplish multiple goals when removing the prohibition on cannabis supply. Thus, answering the question about the best way to legalise cannabis is not straightforward.

²⁶² Centers for Disease Control and Prevention (2020).

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