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HOW TO LEGISLATE RECREATIONAL CANNABIS

**What can the Netherlands learn
from Uruguay & Colorado**

Celine Leemhuis
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How to Legislate Recreational Cannabis:

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By Celine Leemhuis

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Abstract

Introduction

Globally, cannabis is the most commonly used illicit substance and for a long time, a topic of interest within the international drug control regime. Today, the international drug control regime faces challenges and democratic decisions, as it turned out that under a system of prohibition, the enforcement of cannabis laws results in undesirable effects. In order to avoid these effects, nations seek other approaches to regulate cannabis. Uruguay as the first country and Colorado as the first jurisdiction chose the approach where cannabis is fully legalized. As the Netherlands is a few steps away of a bill that proposes cannabis legislation as well, lessons can be drawn from Colorado and Uruguay regarding policy design and implementation resulting in the research question that was put central in this literature review: What lesson can be learned from Uruguay and Colorado regarding the legislation of recreational cannabis?

Theoretical background

A theoretical framework concerning eight topics in regulatory decisions has served as a guideline in this study. This framework covers the eight topics, namely the Production of cannabis, the Profit motive of cannabis, the Promotion of cannabis, the Prevention of cannabis use, the Potency and Purity of cannabis, the Price regulation of cannabis and the Permanency of the cannabis laws.

Methodology

A literature review was conducted to collect literature concerning the legalization of recreational cannabis in Uruguay, Colorado and Washington. PubMed and Web of Science was used as the database to find the literature and Google Scholar was used for reference tracking. After applying the exclusion criteria and scanning and reading the found papers, the total amount of included articles were 13.

Results

Of the 13 analyzed articles, 10 of them contained information concerning the cannabis regulation in Colorado. In addition, 6 out of the 13 articles contained information concerning the cannabis regulation in Uruguay. No data was reported regarding the purity of cannabis and the permanency of the cannabis laws in Uruguay. The reported data regarding the prevention of cannabis use in Uruguay was considered as limited.

Conclusion

In Uruguay, the cannabis production and cultivation is state owned, leading to strict rules in the sales and promotion of cannabis. This model seems to decrease the negative effect on health associated to cannabis. However, as the model is considered as too restrictive, it does not solve the problem of the illegal cannabis market.

In Colorado, cannabis is regulated in a similar way as Alcohol, resulting in a commercialized market where producers are allowed to be retailers. Thus, the state has limited control over price regulation and the promotion of cannabis. In addition, the multinational Big Cannabis has, similar to Big Alcohol, a lobbying influence which is considered as undesirable.

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1. Introduction

Globally, cannabis is the most commonly used illicit substance and for a long time, a topic of interest within the international drug control regime (Davis, 2017; Bewley-Taylor, Blickman, & Jelsma, 2014). The psychoactive substance is governed by the international drug control convention, which is signed by most of the world's nations. The commitment of the nations to the international drug control convention, also known as the 1961 Convention on Narcotic Drugs, has led to the implementation of national prohibition laws that extend to both cannabis use and production (Rehm & Fischer, 2015).

Today, the international drug control regime faces challenges as it turned out that under a system of prohibition, the enforcement of cannabis laws results in extensive costs, high levels of arrests and criminal records in the population (Rehm & Fischer, 2015). In order to avoid these effects of cannabis prohibition, some nations choose a more tolerated approach towards their regulation of cannabis (Bewley-Taylor, Blickman, & Jelsma, 2014). The Netherlands is one of those nations; the monarchy maintains a tolerated attitude regarding the regulation of cannabis. The Dutch tolerate the buying and selling of small amounts in strictly controlled locations (coffee-shops), although the production and import of cannabis remains illegal (Spithoff, Emerson, & Spithoff, 2015; Monshouwer, van Laar, & Vollebergh, 2011; MacCoun, 2011). This remarkable regulation has resulted in the so-called backdoor problem of an illegal supply chain; as coffee-shop owners cannot obtain their stock supply legitimately, they are forced to buy their cannabis supply at the illegal market.

Currently, the backdoor problem remains unsolved in the Netherlands, leading to high pressure on the police and juridical system as the current policy is not considered as easy to control (Trimbos Instituut, 2009). As a solution to this, the Dutch parliament debated a bill that aims to legislate cannabis from seed to smoke. This regulation can solve the controversies of the current cannabis policy, as removing the cultivation and distribution of cannabis for commercial purposes from criminals and shoving it into the hands of licensed entrepreneurs or the government will undercut the black market and corresponding harms from corruption and violence (Armentano, 2010). Hence, Dutch coffee-shop owners can legitimately obtain their supplies. In addition, criminal justice resources will save time and can be redirected towards other priorities, as the burden of cannabis-related crimes will be downsized (Caulkins et al., 2011).

If the bill passes the parliament, the Netherlands can take multiple models into account regarding the design and implementation of the cannabis legalization policy. Namely, the road to the legalization of recreational cannabis is not unknown; in 2012, Colorado became one of the first two jurisdictions of the United States of America that approved the legalization of cannabis (Ghosh, et al., 2017). Not short after, Uruguay followed in 2013, being the first country in the world that legalized cannabis from seed to smoke (Hoffman, 2016).

The success and failures of both Colorado and Uruguay can be a source of great information for researchers and policy makers who consider the legalization of cannabis. Therefore, the aim of this study is to create insight into the recreational cannabis policy of Uruguay and Colorado by conducting a comparative literature study. Consequently, this literature review can contribute to future research regarding the design and implementation of the legalization of cannabis in the Netherlands. The following research question is put central in this literature review: *What lesson can be learned from Uruguay and Colorado regarding the legislation of recreational cannabis?*

2. Theoretical background: The eight P framework

This chapter describes the theoretical background of a scientific model that can be used to investigate the regulatory decisions policy makers face regarding the design and implementation of a legalized cannabis policy. Cannabis can be consumed on a medical base as well. However, this study focuses only on cannabis from the recreational perspective, as medicinal cannabis is already legalized in the Netherlands (Ministerie van Volksgezondheid, Welzijn en Sport, 2017).

In order to design a policy that legalizes recreational cannabis from seed to smoke, different design options should be considered to obtain a desirable effect. This study uses a framework designed by *Kilmer (2014)*, which serves as a guideline throughout the whole study. According to *Kilmer (2014)* 'whether legalization is net positive or negative for public health and public safety largely depends on regulatory decisions and how they are implemented'. These regulatory decisions can be divided into eight topics, namely Production, Profit motive, Promotion, Prevention, Potency, Purity, Price and Permanency (the eight Ps). The following paragraphs explain each of the eight Ps.

Production

The first topic of the regulatory decisions concerns the production of cannabis. According to *Kilmer (2014)*, policy makers should think of how to regulate the production as it can be fully regulated by the government or commercialized. Both options have their (dis)advantages, but a major concern of the commercialized option is the rise of Big Cannabis (*Spithoff, Emerson, & Spithoff, 2015*). This concept is similar to Big Alcohol and Big Tobacco; powerful multinationals with revenues and market expansion as their point of interest. Big Alcohol and Big Tobacco are blamed for the lack of consideration of the impact on public health. By funding marketing campaigns and by lobbying for beneficial regulations, the multinationals are able to increase the alcohol and tobacco use (*Gornall, 2014; Jernigan, 2009*). According to *Spithoff, Emerso & Spithoff (2015)*, cannabis remains a harmful substance and therefore,, it is important that the establishment of Big Cannabis should be hampered.

Profit motive

The second topic of the regulatory decisions concerns the profit motive. According to *Kilmer (2014)*, 80% of the cannabis market is driven by the past year users who use on a daily or near-daily basis. Consequently, companies that focus on maximizing the profit of the cannabis market will have strong incentives to retain these past year users. Retaining past year users does not fit in the public health practice, which is maintained by most countries. As an alternative to this, governments could decide to permit home production, non-profit cooperatives or a state monopoly (*Kilmer, 2014*).

Promotion

The third topic of the regulatory decisions concerns the way of how cannabis is promoted. As the cannabis market is predominantly driven by heavy users, cannabis-related companies may attempt to create and maintain this particular group of users by extensive marketing and advertising (*Kilmer, 2014*). In addition, there are health and social problems that are associated with cannabis use. In some countries cannabis is even the second only to alcohol as the 'principal drug of concern' for which users seek specialized treatment. According to *Room (2013)*, policy from the public health perspective should therefore aim to reduce the amount of users by control measures that include restricting or prohibiting advertising and promotion.

Prevention

The fourth topic concerns how cannabis use is prevented. According to *Carnevale, Kagan, Murphy, & Esrick (2017)*, protecting the community and particularly the well-being of

underaged people must be an important regulatory goal. If cannabis becomes legal, the amount of use is expected to rise as legalizing cannabis could make the drug more appealing to youth. Therefore, *Carnevale, Kagan, Murphy & Esrick (2017)* argues that the prevention of cannabis use should include limiting access or exposure to the substance. Possible starting points could be public health service campaigns, deterrence and youth education. The legalization of cannabis can raise questions as how these campaigns messages should be framed and presented (Kilmer, 2014).

Potency

The fifth topic of the regulatory decisions concerns the potency of the cannabis plant. Delta-9-tetrahydrocannabinol (THC) is predominantly responsible for the intoxicating effects of cannabis. According to *Kilmer (2014)*, an important question for countries that consider to legislate cannabis, is whether the total percentage of THC in cannabis should be regulated. However, regulating the total percentage of THC could push the users that seek the cannabis with a high percentage of THC towards the black market, which is seen as an adverse side-effect (Kilmer, 2014).

Purity

The sixth topic of the regulatory decisions concerns the purity of cannabis. According to *Kilmer (2014)*, countries that debate bills that will legalize recreational cannabis, should consider whether the purity of cannabis should be regulated or not. In the case of regulation, countries should debate regarding the limits; how much information should be included on the product labels. Since forensic testing can be used to identify other products, such as moulds, pesticides, alcohol and nicotine, countries should decide whether these additives are permitted. And if these products are permitted, *Kilmer (2014)* mentions that will the countries take responsibility and attempt to test and regulate the ingredients.

Price

The seventh topic of the regulatory decisions concerns the price of cannabis. According to *Kilmer, Caulkins, Bond, & Reuter (2010)*, the retail price of cannabis will determine what happens to the consumption, tax revenues and diversion to other countries. It can be stated that cannabis users are sensitive to the price of the drug, as a 10% decline in price is likely to lead to approximately a 3% increase in cannabis usage (Gallet, 2013; Pacula, 2010). Countries are in a position to determine the direction of the retail cannabis by influencing the tax rates, number of producers allowed and the type of production.

Kilmer (2014) mentions that taxes deserve special attention. The author warns for that if the taxes are set too high, users could easily turn to the black market for an untaxed cannabis product. Maximizing the tax revenues conflicts with the goal to minimize consumption by heavy users, which is the case in the Netherlands (Trimbos Instituut, 2009). According to *Pacula, Kilmer, Wagenaar, Chaloupka, & Caulkins (2014)*, the minority of heavy users are responsible for the majority of consumption and, hence, the tax revenues. Since it can be difficult to identify tax rates that will create the right balance, they may need to be adjusted over time (Kilmer, 2014).

Permanency

The eighth and topic of the regulatory decisions model concerns the permanency of the cannabis legalization policy. *Kilmer (2014)* states that it would be wise to build some flexibility into the cannabis legalization system, as the mood of the population can change, which could demands changes in the yet implemented laws. This flexibility is represented as an escape clause, where after a number of fixed years policy makers or the population will vote whether to continue with the current policy or not.

3. Methodology

This section describes the methodology that is used to conduct the comparative analysis of Uruguay and Colorado. The chapter justifies the choices for the literature review, the used search strategy and process. Furthermore, the chapter presents the inclusion and exclusion criteria and the flowchart. Lastly, the data analysis of the comparative analysis is described.

3.1 The literature review

A literature review with a meta-ethnography approach is used to collect the data. According to *Bryman (2008)*, a meta-ethnography approach allows an interpretative synthesis of the qualitative research and aims to translate qualitative studies into one another rather than to generalize. As both Colorado and Uruguay are studied in their own context. The meta-ethnographic is considered as a suitable approach. It is known that the approach is typically used to synthesize and analyze information about topics that have already been studied. The legalization of cannabis is not considered as a novel topic and in the context of Colorado and Uruguay, the topic is already extensively investigated. Therefore, a meta-ethnography approach is considered as legitimate. The meta-ethnography approach consists of seven phases, which are followed and maintained during the comparative analysis (see *Table 1*):

Phase	
1	Getting started
2	Deciding what is relevant to the initial interest
3	Reading the studies
4	Determining how the studies are related
5	Translating the studies into one another
6	Synthesizing translations
7	Expressing the synthesis

Table 1 The seven phases of a meta-ethnographic approach

3.2 Search strategy

To identify published and unpublished data regarding the legalization of cannabis in Uruguay and Colorado, a structured literature search was conducted in PubMed and Web of Science. The structured search was conducted within a timeframe from November 2017 until December 2017. PubMed was chosen as the literature database, as it contains articles of more than 5.000 journals that entails more than 26 million publications (Maastricht Universiteit, 2017). Web of Science was chosen as a second database, as this database contains articles from more than 9.500 scientific journals with added keywords and abstracts (Universiteit Leiden, 2017). In addition, Google Scholar was used for reference tracking. According to *Shultz (2007)*, in 8 out of 10 searches the author conducted, Google Scholar contained a higher yield than PubMed. But since Google Scholar does not allow detailed literature search as PubMed and Web of Science does, the results might end up as not reproducible. Therefore, Google Scholar is only used for reference tracking, as it was assumed that reference tracking remains reproducible.

With a structured literature search, relevant keywords in titles, abstracts and subject descriptors were identified. The following core concepts were used: 'cannabis' and 'legalization' and 'Colorado' or 'Uruguay'. For the core concept cannabis, the synonym 'marijuana' was used. For the concept legalization, truncations '*' were used (see *Annex 1 & 2* for the complete search syntax).

3.3 Search process & flowchart

Searches included all literature with full text available that was published before November 2017. The search was restricted to peer-reviewed articles published in English or Dutch, as these are the two languages the researcher of this study fully comprehends. The articles

should be online available in order to avoid a limited accessibility of the literature. In addition, articles from a publication date between 2011 and 2017 are included. In 2012, Colorado was the first jurisdiction that legalized cannabis, so publications before 2012 are expected not to be relevant (see *Table 2* for a complete overview of the inclusion and exclusion criteria). A bibliographic database was created in Microsoft Word and used to store and manage the retrieved references.

Inclusion criteria	Exclusion criteria
Peer reviewed journal articles,	Not peer-reviewed journal articles
Online, full-text available articles	Abstracts, dissertations and conference proceedings, commentaries
Articles written in Dutch or English	Articles written in other languages than English or Dutch
Articles concerning Colorado or Uruguay	Articles concerning other nations than Colorado or Uruguay
Articles that focus on the policy aspect of the legalization of cannabis	Articles that focus on other aspects of cannabis legalization
Articles with a publication date between 2012 and 2017	Articles with a publication before 2012

Table 2 Overview of the inclusion and exclusion criteria

Following the aforementioned process, the search syntax resulted into a total of 55 articles. From these 55 articles, 7 were left out based on duplicates. The 48 remaining articles were screened on their title and abstract. This resulted into the exclusion of 39 articles, as these articles did not contain any data concerning the eight Ps in regulatory decisions of cannabis legalization. The remaining 9 articles were used for reference tracking. The reference tracking resulted into the addition of 4 articles that were considered as relevant for the comparative analysis. This resulted in a total of 13 papers that were used for this literature review (see *Annex 3*). Below the flowchart of the search process is presented (*Figure 1*).

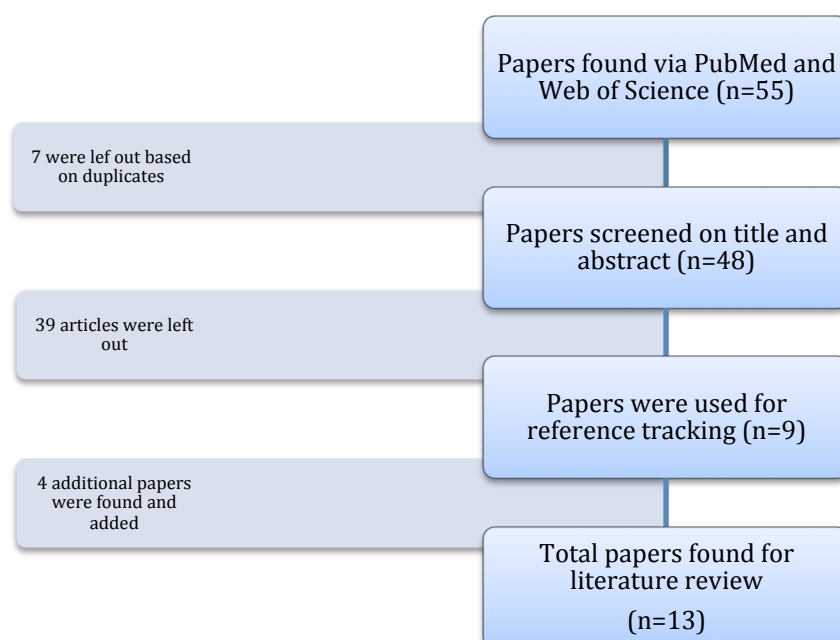


Figure 1 Flowchart of the data collection

3.4 Data analysis

The literature that was considered as relevant for this study was scanned, organized into content areas and coded according to different variables. Following the meta-ethnographic approach, the 13 papers were investigated how the studies are related. For this, the eight Ps framework in regulatory decisions served as the guideline to collect the data. Firstly, studies were coded per country/state (Uruguay and Colorado) or coded if the papers covered both nations of interest. Secondly, the papers were read through thoroughly and eight different codes were designated regarding the framework. If other topics than the eight Ps repeatedly popped up, new codes were designed and designated. Using the framework, the different studies were translated into one another. After this, the translations were synthesized and expressed by designing a comparative table that covers the policy of both Colorado and Uruguay.

4. Comparative analysis of the cannabis policy

This chapter presents the results of the comparative analysis concerning the cannabis legalization policy of Uruguay and Colorado. At first, the general characteristics of each nation is described. Secondly, the eight Ps that are described in the theoretical background are presented in the context of each nation. Third and lastly, a comparative table of the cannabis policy in Uruguay and Colorado is presented.

4.1 General characteristics of Uruguay and Colorado

Uruguay

Of the 13 analyzed articles, 6 contained information regarding Uruguay and its cannabis policy. In 2013, Uruguay became the first country in the world that regulated the possession, cultivation and distribution of non-medical cannabis. This regulatory reform was introduced by the then ruling president José Mujica and passed by the Uruguayan Congress. At the 20th of December 2013, the law was signed although more than 60% of the public was not in favor of this policy change (Boidi, Queirolo, & Cruz, 2016; Pardo, 2014).

For the legalization of cannabis, Uruguay claims to follow the public health best practice. Thus, the country was able to avoid its commitment to the 1961 Convention on Narcotic Drugs. As no regulatory body existed before the new law, the country assigned the central, governmental Institute of Regulation and Control of Cannabis (IRCCA) (Spithoff, Emerson, & Spithoff, 2015). The IRCCA is a commission that controls and regulates cannabis by registering its users (Pardo, 2014). Only Uruguayan citizens can be registered and are entitled to a maximum of 40 gram of cannabis per month. Individuals who acquire cannabis without a registration at the IRCCA are considered as violating the Uruguay law.

Colorado

Of the 13 analyzed articles, 10 contained information regarding Colorado and its cannabis policy. As a result of a public referendum, Colorado became in 2012 one of the two first jurisdictions of the United States of America that legalized the production, distribution and sale of cannabis. From this point, cannabis became state-legal in Colorado, although cannabis remained illegal from the federal perspective (Carnevale, Kagan, Murphy, & Esrick, 2017; Pardo, 2014).

The legalized cannabis policy states that cannabis would be regulated similarly to alcohol (Gourdet, Giombi, Kosa, Wiley, & Cates, 2017). Colorado assigned a commission to create and maintain the new cannabis policy (Spithoff, Emerson, & Spithoff, 2015). This commission has limited control; localities are granted autonomy as well. The localities are allowed to set their own regulations, which gives municipalities the right to prohibit local cannabis stores and cannabis cultivation businesses (Pardo, 2014; Carnevale, Kagan, Murphy, & Esrick, 2017).

4.2 The production of cannabis

Uruguay

Of the 6 analyzed articles, 5 contained information regarding the production of cannabis in Uruguay. The articles describe three different forms of the cannabis production. The first form is self-cultivation where residents are allowed to have 6 plants at home (Room, 2013). Residents of Uruguay are permitted to grow their own cannabis and to form growing cooperatives (Spithoff, Emerson, & Spithoff, 2015). The residents that grow cannabis will be registered and fingerprinted to prevent consumers from buying more than 480 gram per year. However, this approach do concerns rise regarding the privacy of the growers. In addition, concerns to issue and enforce regulations controlling the market and to advise the governments are there as well (Room, 2013). *Spithoff, Emerson, & Spithoff (2015)* reports

that the approach can also encourage some purchasers of cannabis to the illegal market, as they prefer to stay anonymous.

The second form is through users' cooperatives, also known as the cannabis social clubs (CSCs), where until an amount of 45 members, cannabis can be produced legally (Room, 2013). Up to 99 flowering plants at the same time is allowed for the CSCs. The goal of these CSCs is to provide legal and affordable cannabis products by co-production. In this way, the CSCs try to provide the single growers a solution to the problem of underproduction (Queirolo, Boidi, & Cruz, 2016). According to *Queirolo, Boidi, & Cruz (2016)*, the owners of the CSCs organize themselves in informal networks to maximize their production and to avoid buying cannabis products from dealers. Thus, the CSCs try to undermine the black market.

The third form is for licensed producers who are obliged to sell their stock to the government (Room, 2013). Buyers of the commercially produced cannabis will have to sign up a confidential registry and purchases will be capped at 40 gram per month. The registry is run by the IRCCA, which enforces regulations in order to control the market and to advise the government (Room, 2013). In addition, the commission has control over the sell to distributors as well. Consequently, the commission possess the power over the production of cannabis (Spithoff, Emerson, & Spithoff, 2015).

Colorado

Of the 10 analyzed articles, 4 contained information regarding the production of cannabis in Colorado. As mentioned before, Colorado regulates cannabis in a similar way to alcohol. *Gourdet et al., (2017)* reports that in practice, this means overseeing and granting licenses for the products' sale and distribution. For liquor, the government has a monopoly, but the assigned commission that is responsible for creating and maintaining the cannabis policies, does not have a monopoly on the production of cannabis. Instead, the jurisdiction permits direct sales from producers to retailers (Spithoff, Emerson, & Spithoff, 2015). Therefore, the commission has little to no control over the production of cannabis.

However, *Pardo (2014)* describes that until October of 2014, cannabis producers must grow at least 70% of the cannabis they sell. In addition, producers are not allowed to sell more than 30% of what they produce to other retailers. The production itself is capped at three different levels: type 1 is no more than 3600 plants; type 2 is no more than 6000 plants; type 3 is no more than 10,200 plants. Since the local municipalities can prohibit the establishment of cannabis producers, the amount of locations of cannabis producers is limited to 20 (Pardo, 2014).

An interesting point was discussed by *Carnevale, Kagan, Murphy & Esrick (2017)*. This authors recommend that in order to extenuate the federal concerns regarding the diversion of cannabis, a seed-to-sale tracking system should be implemented. Colorado has such a tracking system; Colorado implemented its Marijuana Inventory Tracking system in order to track supply and to prevent the diversion of cannabis. This can be considered a step in the right direction of responsible regulation (Carnevale, Kagan, Murphy, & Esrick, 2017).

4.3 The profit motive of cannabis

Uruguay

Of the 6 analyzed articles, 2 contained information regarding the profit motive of cannabis in Uruguay. *Pardo (2014)* describes in an article that Uruguay is free to establish a monopoly system and control every aspect from seed to sale. Initially, it was projected that the government would be in charge of the entire cannabis industry. However, the law licensed production and the IRCCA contains the oversight capacity.

Commercial cultivation is allowed for at-home growers, pharmacies and the CSCs. The IRCCA is in charge of licensing and regulating those who are interested in commercial cultivation. Presumably, the position and rights of the IRCCA prevents overproduction and cannabis diversion, as industry capture of the cannabis market is avoided. In addition, the

retail market price of cannabis should be as low as possible in order to compete effectively with the street prices (Pardo, 2014).

Queirolo, Boidi, & Cruz (2016) mentions in their study that the CSCs, that are considered as legal and private organizations of adult users, cultivate cannabis collectively for their own consumption and with no motivation for profit. The CSCs are allowed through decriminalization policies and as the CSCs contain no motivation for profit, they can be used as an efficient way to undermine the power of illegal supply chain.

Colorado

Of the 10 analyzed articles, 3 contained information regarding the profit motive of cannabis in Colorado. In this jurisdiction, the cannabis market is commercialized. *Carnevale et al., (2017)* and *Kilmer & Pacula (2016)* report that the market structure is commercial, competitive and highly regulated. Cultivation and production is allowed, together with the sale in the private for-profit sector.

As mentioned before, Colorado maintains a similar policy for cannabis as alcohol. The commission that is assigned has however, no monopoly on aspects of the cannabis control system (which is the case for alcohol). *Kilmer (2014)* explains that in order to give the commission the right over the cannabis control system, the commission has to violate the federal law. As this is considered as impossible, the power of the commission concerning the control of the cannabis production is limited.

Since Colorado has limited control over the profit-motive of cannabis, there is little to no stop of the rise of the Big Cannabis. Big Cannabis is similar to Big Alcohol and Big Tobacco; powerful multinationals with revenues and market expansion as their point of interest. *Spithoff, Emerson, & Spithoff (2015)* explains that Big Alcohol and Big Tobacco are blamed for the lack of consideration of the impact on public health. By funding marketing campaigns and by lobbying for beneficial regulations, the multinationals are able to increase the alcohol and tobacco use (Gornall, 2014; Jernigan, 2009). As cannabis remains a harmful substance, it is important that the establishment of Big Cannabis should be hampered (Spithoff, Emerson, & Spithoff, 2015).

4.4 The promotion of cannabis

Uruguay

Of the 6 analyzed articles, 4 articles contained information regarding the promotion of cannabis in Uruguay. *Room (2013)* reports that Uruguay bans all sorts of promotion of cannabis products. This is backed up by *Pardo (2014)*, which also mentions that all public events, tournaments or contests that promote cannabis consumption are not authorized. *Spithoff, Emerson, & Spithoff (2015)* adds that the pharmacies are restricted by selling the cannabis in plain bags. These bags are labelled only with the THC percentage and generally known warnings (Spithoff, Emerson, & Spithoff, 2015). Concerning the CSCs in Uruguay, *Queirolo et al., (2014)* explains that these places are promoted as a harm-reduction policy as the CSCs provide information of the cannabis products, giving the users more control of their levels of consumption.

Colorado

Of the 10 analyzed articles 5 contained information regarding the promotion of cannabis in Colorado. According to *Spithoff, Emerson & Spithoff (2015)*, the promotion of cannabis is allowed as prohibition on promotion is impossible due to the commercial of free speech doctrine in the United States. The jurisdiction permits promotion such as advertisement, branding and sponsorship. Advertising is allowed via television, radio, print and the internet. Licensed retailers are allowed to advertise outdoor if the used signs point out the location of the store (Ghosh, et al., 2016).

Although Colorado permits the promotion of cannabis, the government targets the cannabis retailers that try to market the drug that appeals to minors as a priority of enforcement. In addition, policy makers attempt to limit the cannabis advertising by

maintaining strict requirements concerning the promotion (Kilmer, 2014; Room, 2013). These requirements include outright bans on the Internet, pop-up advertisements and any other type of advertisement that targets the underaged residents. Also, the advertisement via television, radio, print, internet or sponsorship is only allowed when it can be documented that less than 30% of the audience is underaged (younger than 21 years) (Ghosh, et al, 2016; Spithoff, Emerson, & Spithoff, 2015).

For edible cannabis products, Colorado maintains additional requirements. The product containers should carry specific warning elements; a common known health warning that the product cannot be used by those under an age of 21 years and that it is illegal to consume the product outside the jurisdiction (Room, 2013). In addition, the edibles are prohibited to be wrapped in a package that could be attractive to minors (Gourdet, Giombi, Kosa, Wiley, & Cates, 2017).

4.5 The prevention of cannabis use

Uruguay

Of the 6 analyzed articles, 2 articles contained information concerning the prevention of cannabis use in Uruguay. *Pardo (2014)* has conducted a literature study to the cannabis reform in Uruguay. In this study, the author described that the national health and education systems are required to promote and avail prevention resources in order to address the problematic use of cannabis. *Queirolo, Boidi, & Cruz (2016)* describes that some CSCs have their own prevention methods; some of the CSCs see activism as crucial. These clubs want to raise awareness and share knowledge regarding cannabis among their members. Typically, these clubs are easy to reach for the society in general as well. In addition, owners and staff of the CSCs are keen to explain the benefits of the clubs and the challenges they face. Also, most of the CSCs have a tight relationship with the IRCCA commission, other clubs and the Federation of Growers (Queirolo, Boidi, & Cruz, 2016).

Colorado

Of the 10 analyzed articles, 3 articles contained information concerning the prevention of cannabis use in Colorado. The jurisdiction maintains policy strategies that aim to promote a healthy environment. *Ghosh, et al, (2016)* reports that the policy strategies aim to prevent cannabis use for children and adolescents by designing and applying smoke-free policies and public consumption bans. An example is the Colorado's Clean Indoor Air Act, where the government added cannabis to the treaty. The Act aims to prevent exposure to second-hand smoke from cannabis in public places. Also, the Act explicitly prohibits the public and open consumption of (edible) cannabis products (Ghosh, et al., 2016).

Colorado prevents the cannabis use also by the spread of educational materials. These educational materials provide more information regarding the safety concerns associated with cannabis. In addition, Colorado spreads prevention messaging campaigns as one of the evidence-based interventions shown to increase awareness of harms and reduce cannabis use at the population level when integrated with community-, school-, and family-based prevention effort (Ghosh et al., 2016). Concerning the edible cannabis products, Colorado prohibits the manufacture and packaging of products that may appeal to children. Thus, the policy aims to decrease the probability that children may unknowingly consume the edibles (Gourdet, Giombi, Kosa, Wiley, & Cates, 2017).

The protective attitude of Colorado towards its residents concerning cannabis seems to be effective; an American study to the lessons learned from Colorado after three years of legalized, recreational cannabis found out that both among adults and youth, cannabis use does not appear to be increased. The authors conclude that no change was observed in past 30-day cannabis use among adults between 2014 (13.6%) and 2015 (13.4%). Similarly, the authors concluded that there was no statistically significant change in 30-day or lifetime cannabis use among students between 2013 (lifetime: 26.9%, 30-day: 19.7%) and 2015 (lifetime: 38.0%, 30-day: 21.2%) (Ghosh, et al., 2017).

An important note, pointed out by *Ghosh, et al., (2016)*, is that Colorado already started to collect data regarding cannabis use before the legalization. By population-based surveys, which are conducted after the legalization as well, trends associated to cannabis are monitored. Thus, Colorado is able to develop public health campaigns in time concerning youth prevention (Ghosh, et al., 2016).

4.6 The potency of cannabis products

Uruguay

Of the 6 analyzed articles, only one article contained information concerning the potency of the cannabis products in Uruguay. *Queirolo, Boidi, & Cruz (2016)* investigated the levels of cannabinoids in the CSCs. The authors concluded that the CSCs contained little knowledge regarding the levels of cannabinoids. The level of THC, the most potent psychoactive agent in cannabis, is reported around 15% or higher. However, this remained an estimate as the only information the CSCs have is that provided by the seed producer (Queirolo, Boidi, & Cruz, 2016).

Colorado

Of the 10 analyzed articles, only two articles reported information concerning the potency of cannabis products in Colorado. *Gourdet, Giombi, Kosa, Wiley, & Cates (2017)* reports about the regulation of cannabis edibles. The article describes that Colorado put regulations into place after a deadly accident occurred. These regulations concern packaging and labelling that limit the amount of THC in the edibles. Currently, a single serving of an edible can contain to 10 miligram THC. In addition, Colorado requires that the concentration of THC cannot vary more than 15% throughout the edible (Gourdet, Giombi, Kosa, Wiley, & Cates, 2017; Carnevale, Kagan, Murphy, & Esrick, 2017).

4.7 The purity of cannabis

Uruguay

Of the 6 articles that report data concerning the cannabis legalization in cannabis, none of them discussed the purity of cannabis.

Colorado

Of the 10 analyzed articles, 3 articles report about the purity of cannabis in Colorado. According to *Kilmer (2014)*, the jurisdiction expressly forbids cannabis or any other cannabis related products to contain alcohol or nicotine. In order to enforce this regulation, Colorado instituted testing for the THC concentration in the cannabis edibles (Gourdet, Giombi, Kosa, Wiley, & Cates, 2017).

Gourdet, Giombi, Kosa, Wiley, & Cates (2017) and *Ghosh, et al., (2017)* report in their articles that in the absence of federal standards, it is the state's duty to oversee testing and quality control of the cannabis edibles. Consumers of the cannabis edibles can only rely on the information of labels if its accurate and credible. Labels that provide information about an edible product's ingredient list, serving size, and expiration date can help consumers make informed decisions about what they are ingesting.

4.8 The price regulation of cannabis

Uruguay

Of the 6 analyzed articles, only one article reported information regarding the price regulation of cannabis in Uruguay. According to *Pardo (2014)*, appropriate pricing and taxation can be used as a tool by regulations and laws to promote public health. Lower cannabis prices can encourage consumption, which should be avoided. However, *Pardo (2014)* reports that Uruguayan officials have declared retail market price point of only 1 US Dollar per gram of cannabis. Thus, there can effectively be competed with the street prices of the illegal market.

Colorado

Of the 10 analyzed articles, 4 articles reported data concerning the price regulation of cannabis in Colorado. As mentioned earlier, Colorado assigned a commission to create and enforce the cannabis policy (Spithoff, Emerson, & Spithoff, 2015). As Colorado permits producers to be retailers, the commission has therefore little to no control over the prices. The commission also does not control the cannabis taxation. Consequently, Colorado remains to struggle with a much higher price of legal cannabis compared to the price of illegal cannabis (Spithoff, Emerson, & Spithoff, 2015). This is supported by an American study, which investigated the early impacts of the cannabis legalization by evaluating the prices in Colorado (Hunt & Pacula, 2017). The authors found that the retailers generally increased the advertised price for the most common strain types.

Although the commission has no direct control on the prices, it can appeal to the state legislature for changes (Spithoff, Emerson, & Spithoff, 2015). The government of Colorado imposes taxes on the value of cannabis by passing a 15% tax on the wholesale product and a 10% sales tax in order to increase the price of cannabis (Kilmer, 2014; Ghosh, et al., 2016).

The findings of the American study provide an important note to governmental managers who want to estimate tax revenues from the cannabis market; if the tax revenues are tied to the cannabis prices, high prices and the corresponding benefits of the taxes will not be maintained. *Hunt & Pacula (2017)* argues that the only way tax revenues can remain stable once high prices eventually drop, is for consumption to change by a greater amount than the price declines that will naturally occur as the market transitions on the long run. Thus, understanding who those consumers are that make up the long run demand is considered as fundamentally important for governments to understand whether they can expect a net gain or cost associated with the policy (Hunt & Pacula, 2017).

4.9 Permanency of the cannabis legalization laws

Uruguay

Of the 6 analyzed articles concerning the cannabis legalization in Uruguay, none of them reported information about the permanency of the cannabis laws.

Colorado

Of the 10 analyzed articles, 2 articles reported data concerning the permanency of the cannabis legalization laws in Colorado. From the moment that Colorado became one of the first jurisdictions that implemented the legalization of cannabis, a lot has been changed in the design of the policy. Especially regarding the edibles, the law has been adjusted over the years. This concerns how edible products are packaged, labelled, tested and sold. Colorado recently tightened its restrictions on edibles due to these unique concerns (Gourdet, Giombi, Kosa, Wiley, & Cates, 2017).

When Colorado allowed sales of recreational cannabis in 2014, edibles were immediately available for purchase, along with other forms of cannabis. However, Colorado did not begin passing laws that specifically regulated and restricted the manufacturing, packaging, and labelling of edibles until after they had been commercially available for some time. For example, edibles were first available for sale in Colorado on January 1, 2014. However, it was not until February 1, 2015, that the state put laws in place restricting the labelling, packaging, and manufacturing of edibles. These laws include the requirement that cannabis stores are only restricted to sell edibles with child-resistant packaging. In addition, the edibles should include specific label information, such as a disclaimer about health risks and a warning not to drive while under the influence of cannabis (Gourdet, Giombi, Kosa, Wiley, & Cates, 2017).

Policy development remains hampered by the diversities between the federal, state and local laws. Research that aims to assess both the beneficial and the adverse effects of cannabis is often considered as difficult to conduct, since cannabis remains illegal from the federal perspective. According to *Ghosh et al., (2016)*, researchers of Colorado are

hampered in conducting cannabis-related research, since researchers are unable to obtain federal funding. Hence, institutes that provide prevention programming are restricted.

4.10 Comparative table of Uruguay and Colorado

The comparative analysis of Uruguay and Colorado is based on the previously described eight topics in regulatory decisions. An overview of the findings is given in *Table 3* (see below).

Topic	Uruguay	Colorado
Production	Monopoly of the IRCCA	Commercialized.
Profit motive	Commercial cultivation is allowed for at-home growers, pharmacies and the CSCs. IRCCA remains in charge of licensing and avoiding overproduction.	Commercial cultivation and production is allowed, together with the sale in the private for-profit sector.
Promotion	All sorts of promotion is banned.	Permitted, but restricted to avoid reaching minors.
Prevention	The national health and education systems are required to promote and avail the prevention resources. Some CSCs have their own, specific prevention methods.	Law mandates that aim to promote a healthy environment and prevents cannabis use by children. Additional education materials are spread as well.
Potency	THC level estimated at 15% or higher	10 milligram per serving for the edibles.
Purity	Unspecified	Cannabis and related products are prohibited to contain alcohol and nicotine. Facilities are up and running to test this.
Price	Low as possible to compete with street prices.	15% tax on the wholesale product and a 10% sales tax. Struggle with higher price of legal cannabis compared to street prices.
Permanency	Unspecified.	Policy has been adjusted over the years, especially concerning the labelling and packaging of edibles.

Table 3 Comparison of the cannabis policy of Uruguay and Colorado according to the eight P framework

5. Discussion

This section discusses the findings of the comparative analysis regarding the cannabis policy in Uruguay and Colorado. As Kilmer (2014) mentioned, 'whether legalization is net positive or negative for public health and public safety largely depends on regulatory decisions and how they are implemented'. This literature review investigated eight different topics of regulatory decisions in the context of Uruguay and Colorado in order to answer the research question: *What lesson can be learned from Uruguay and Colorado regarding the legislation of recreational cannabis?* At first, the key findings of this study are described where the situation in the Netherlands is discussed as well. Secondly, the strengths and limitations are presented. Lastly, the possible future prospects of this study are discussed.

6.1 Key findings

The production and profit motive of cannabis

One of the biggest differences between Uruguay and Colorado is visible when looking to the policy regarding the production and the profit motive of cannabis. In Colorado, recreational cannabis is regulated in a similar way to alcohol (Gourdet, Giombi, Kosa, Wiley, & Cates, 2017). Analogous to alcohol, the cannabis market is commercialized. This approach is itself not without any controversy. As the commercialization of alcohol consequently has led to the rise and existence of Big Tobacco and its inevitable but undesirable influence, Coloradean residents fear the influence of Big Cannabis as well since the powerful multinational has market expansion as the point of interest, regardless the impact on public health (Gornall, 2014). The rise of Big Cannabis could not be stopped since there is only limited control over the production and profit motive of cannabis, although cannabis remains a harmful substance (Gourdet, Giombi, Kosa, Wiley, & Cates, 2017; Spithoff, Emerson, & Spithoff, 2015).

At the same time, Uruguay maintains a different method of working. In this country, the IRCCA has, as a governmental commission, the monopoly of controlling the cannabis production and consequently, the profit motive of the cannabis cultivators. According to Gruenewald (2011) and Siegel, DeJong, Albers, Naimi, & Jernigan (2013), a state monopoly has less incentives to promote the use and abuse of cannabis. Therefore, a state monopoly can be considered as better suited to control the production and profit motive of cannabis. As the IRCCA is fully responsible regarding the production and profit motive, the result is that there is no Big Cannabis present. However, the strict regime of the IRCCA contains disadvantages as well. Long waiting times to obtain a license and privacy concerns are a pitfall of this system, experienced as a bureaucratic nightmare by the Uruguayan citizens (Queirolo, Boidi, & Cruz, 2016).

In the Netherlands, cannabis is currently produced by small cultivators, hired by the larger cartel (van Dun & Vugts, 2017). Relocating the cultivation from the illegal to the certified producers will possibly have a major impact. More jobs will be created, as people are allowed to start a legal cannabis cultivation farm. Also, the burden on the police and juridical system will decline, as these governmental systems do not have to prosecute the cannabis cultivators any more. However, it remains impossible to predict the behavior of the illegal market as we cannot say if the illegal market will halt the cannabis cultivation.

The potency of cannabis

For both Uruguay and Colorado, the analyzed articles contained limited information concerning the potency of cannabis. As mentioned in the result section, the authors of the analyzed articles concluded that in Uruguay the retailers of cannabis contained little knowledge of the cannabinoids levels (Queirolo, Boidi, & Cruz, 2016). This can be considered as dangerous, as high levels of THC are not without any harm (de Wolff, 2001).

In the Netherlands, the THC levels of cannabis has risen over the past few years (Rigter & Niesink, 2017). However, for most cannabis users this remains unknown, as it

remains difficult to check the levels of THC as a cannabis user. From the public health perspective, controlling the THC levels by systematic inspections has major advantages. Systematic inspections provides transparency for the cannabis users. In addition, it will make it able for the government to maintain its power regarding THC level threshold and its quality.

The cannabis social clubs

A novel topic were the cannabis social clubs in Uruguay. The Uruguayan experience with these CSCs is considered as special due to their regulated context. As a result, the description the CSCs present can help the academic community and policy makers in Uruguay and elsewhere to evaluate the CSC alternative regimes where cannabis is highly regulated (Queirolo, Boidi, & Cruz, 2016). It can be considered as a unique experience because it is the first time that cannabis social clubs have operated in a post-cannabis regulation regime; all other examples have operated in pre-regulated regimes.

From the perspective of the Netherlands, a concept similar to the CSCs already exist. The Netherlands harbors 573 coffee shops, spread over 103 municipalities (Tweede Kamer, 2018). Taking Uruguay as an example, the Netherlands can use the coffee shops in a similar way. In October 2017, the Dutch government published the coalition agreement, stating that the policy makers want to execute an experiment with the regulated cultivation of cannabis for recreational sale (Regeerakkoord , 2017). The rules for the coffee shops that will participate within the experiment will mostly stay the same, although the backdoor problem is solved as the coffee shops do not have to buy their supply at the illegal market. The aim of this experiment is to see what the effects of this regulated cultivation, distribution and sale are on public health, crime, safety and nuisance (Grapperhaus & Bruins, 2018). However, questions do rise concerning this experiment, as implementing the regulated cultivation at the local level, will still allow the illegal market to co-exist. As mentioned before, it is impossible to predict the behavior of the illegal market after implementing the regulated cannabis cultivation. Nevertheless, implementing the regulated cultivation on the national level will probably discourage the illegal market more in comparison to the current situation.

Missing Ps in the eight P framework

In the perspective of the eight P framework, eight different topics were investigated concerning the legalization of both Colorado and Uruguay. However, the obtained data from the literature review did not cover all the eight topics. For Uruguay, none of the obtained articles reported data concerning the purity of cannabis and permanency of the cannabis law. In addition, the data concerning the prevention of cannabis use in Uruguay is considered as limited. Therefore, additional research should be conducted with a different search syntax in order to investigate these topics more extensive. Also, as the author only fully comprehends the Dutch and English language, it could be that the articles that obtained the missing Ps were excluded. As the native langue of Uruguay is Spanish, articles could be missed during the data collection. From the reference tracking it turned out that multiple article were written in Spanish.

6.2 Strengths and limitations

When interpreting the data from this literature review, limitations of the study should be taken into account. First, and perhaps foremost, this literature review was conducted in a relatively short timeframe of two months. Due to this time constrain, only specific aspects of Uruguay and Colorado could be investigated. Consequently, the conclusion is limited, as it cannot cover the whole cannabis legalization policy of the two nations.

As a second limitation, it has to be mentioned that the collected data was often only available for countries in their specific context. Hence, it is hard to say of the different policies of Uruguay and Colorado will work in other nations as well. Therefore, the generated data of the comparative analysis can be considered as limited, affecting the reliance of the research (Gray, 2014).

Besides limitations, there are a few strengths of this study that are worth to mention. The first strength of this literature is that the author chose to maintain a theoretical

proposition strategy by using the eight P framework of *Kilmer (2014)* as a guideline during the comparative analysis of Uruguay and Colorado. This strategy helped the author to make choices between what was needed to be investigated and what could be ignored (Gray, 2014).

A second strength of this limitation is that this literature review can be of added value when reforming the Dutch cannabis laws. The literature review provides insights into the cannabis policies of Uruguay and Colorado and the results can be used for the yet exploratory topic in the Netherlands.

6.3 Future prospects

This research has not taken a position whether cannabis legalization is a good or a bad idea. Rather, this research provided a comparative analysis of two different nations that already implemented a legalization of cannabis policy. This research offers multiple directions for further research, which is discussed in the following paragraph.

At first, a greater effort needs to be given to the data collection of Colorado and Uruguay, as some topics of the eight P framework remained unspecified. Future research should dive deeper into the permanency, purity and prevention concerning cannabis in Uruguay. In addition, future research should investigate which Ps of the framework are explicitly context-associated. Thus, a distinction can be made of which data can be used to make generalizations and which cannot.

Secondly, follow-up research could investigate the legalization of cannabis of new and other nations. Colorado and Uruguay are not the only nations at the moment; Washington, the District of Colombia, Nevada, Oregon and Alaska are other nations that maintain a legalized cannabis policy. A comparative analysis of these states regarding the design and implementation of their specific cannabis policy, could help to identify possible successes and failures that are corresponding to the policies. Thus, other countries that are just a few steps away of the legalization of cannabis, such as the Netherlands, can learn from the experience of these nations.

6. Conclusion

At the moment, the Netherlands is just a few steps away from reforming the current cannabis laws towards a policy that legalizes the substance. As it makes sense not to boil the ocean, the Netherlands can take Uruguay and Colorado as an example for the design and implementation of their cannabis legalization policy. As mentioned earlier, 'whether legalization is net positive or negative for public health and public safety largely depends on regulatory decisions and how they are implemented'. For this reason, this literature review used the eight P framework of regulatory decisions in order to answer the research question: *What lesson can be learned from Uruguay and Colorado regarding the legislation of recreational cannabis?*

6.1 What lesson can be learned from Uruguay?

Uruguay maintains a restrictive model of registries and tracked distribution. It seems that this model is likely to reduce the negative health impacts of legal cannabis. At the same time, the model is considered as too restrictive, since the country remains unable to eliminate the illegal cannabis market. In addition, there are concerns regarding the price regulation and tax structure in the country, leading to questions about how Uruguay will employ to pay for new regulations and the prevention of cannabis use.

In Uruguay, the cannabis clubs are one of the three legal ways in which users can obtain their cannabis. The cannabis social clubs enjoy a supportive legal framework that makes them less vulnerable compared to other countries where the clubs have become a popular alternative source. The legal status of the clubs can be considered as a strong point; the clubs and its members are protected by comprehensive regulation. Until this moment, no significant problems have been reported.

6.2 What lesson can be learned from Colorado?

In Colorado there is limited control over the supply and price of cannabis, since the government commercialized cannabis in a similar way to alcohol. Besides that producers are allowed to be retailers, Colorado permits promotion of cannabis (under strict requirements) as well. Thus, the rise of Big Cannabis and its associated lobbying and marketing power is not prevented. The rise of Big Cannabis can be considered as undesirable; for other nations the lesson that can be learned from Colorado is not to fall into the trap of commercialization.

Another lesson that can be learned from Colorado, is that the jurisdiction contains a thoughtful collection of baseline cannabis use data through population-based surveys before legalization and the timely development of public health campaigns for youth prevention and responsible for adults. Other nations should consider that, before reforming the cannabis laws, population-based survey should be conducted in order to monitor trends that are associated to health and cannabis use.

As the debate on the regulation of cannabis evolves, policy makers need to consider adjustments in the current policies. In the Netherlands, the legalization of cannabis will probably not halt forever. Like all policies, the Dutch cannabis policy will grow within its political landscape. As once taken actions are often not easily reversed, incremental adjustments based on former research and experience could help to increase the chance on success, and, decrease the risk of failures.

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Annex 1: Search syntax Web of Science

AND	OR	NEAR	NOT
Cannabis [TS]	Marijuana [TS]	Legali*	Treatment
Uruguay [TS]	Colorado [TS]		Medi*
			Fatal*
			Tourism
			Genetic

Annex 2: Search syntax PubMed

AND	OR	NOT
Cannabis	Marijuana	Treatment
		Genetic
Legali*		Medi*
Colorado [title/abstract]	Uruguay [title/abstract]	College
		Student*
		Fatal*
		Tourism
		Physician
		Canada

Annex 3: Literature list

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