

CRISM AND ALBERTA HEALTH SERVICES
ADVANCEMENT OF ANALYTICS IN SUBSTANCE USE

Cannabis Use and Concern among Clients Seeking Addiction Treatment: Demographics, Comorbidities, and Service Utilization Patterns Pre-Legalization (2012-2018)

February 25th, 2020

Table of contents

Project team.....	4
Overview.....	6
Method.....	7
Data Sources	7
Client Identification.....	7
Objectives	8
Data Linkage.....	8
Data Quality Assessment	10
Personal Health Number Validity over Time.....	11
Non-response Rates for Substance of Concern Question in ASIST	13
Results.....	14
Overall Client Counts	14
System-Wide Trends in Cannabis Use and Cannabis Concerns	16
Past-Year Cannabis Use by Sex.....	17
Past-Year Cannabis Use by Age.....	18
Cannabis Use versus Cannabis Concerns.....	19
Cannabis Concern Rates among Clients Who Used Cannabis in the Previous Year	20
Cannabis Concern Rates by Sex among Clients Who Used Cannabis in the Previous Year	21
Cannabis Concern Rates by Age among Clients Who Used Cannabis in the Previous Year	22
Objective 1: Comparing Clients Who Did and Did Not Report Past-year Cannabis Use	23
Cannabis Use: Demographics, Healthcare Utilization & Mental Health Comorbidities.....	23
Objective 2: Comparing Cannabis-using Clients Who Were and Were Not Concerned about Their Cannabis Use	28
Cannabis Concern in Those Who Used Cannabis in the Last Year: Demographics, Healthcare Utilization & Mental Health Comorbidities	28

Cannabis Use and Concerns among Clients Seeking Addiction Treatment (2012-2018)

Objective 3: Comparing Clients Who Were Concerned about Only Cannabis, Only Alcohol, and Other Non-cannabis-non-alcohol Substance Use	32
Clients Concerned with Cannabis Only, Alcohol Only, and Other Non-cannabis-non-alcohol Use: Demographics, Healthcare Utilization & Mental Health Comorbidities.....	32
Notes	40
Data Sources	40
Appendix A: Data Systems.....	41
Appendix B: ICD Codes	42

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Proposal title/overview

Cannabis in Alberta: Pre-legalization Treatment & Descriptions

Description of information

A description of clients who receive Alberta Health Services addiction service treatment who use cannabis, and comparison to other client groups.

Proposal number

18-003

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Revisions

Revised Date October 22, 2020

- Clarified the Data Quality Assessment section is referring to pre-PHN-linkage data
- Corrected cannabis use numbers in Figure 8
- Corrected duplicated Ns for Table 5, 6, & 7

Revised Date May 2, 2023

- Upon investigation of pre-legalization study code, it was found that the initial pulls for comorbidity data were not limited to a 2-year lookback window from index enrollment but instead looked at data for the whole study period with a 2-year lookback from the study start date leading to including comorbidity data for the following fiscal years 2010/11, 2011/12, 2012/13, 2014/15, 2015/16, 2016/17 and 2017/18 for all clients.
- Polysubstance definition as coded includes clients who were concerned with one or more substance that excluded cannabis and alcohol. Renamed Polydrug to Non-cannabis-non-alcohol.

Overview

Cannabis legalization became the new reality in Canada on October 17th, 2018. Some research in other jurisdictions found that legalization of medical cannabis use coincided with increased rates of cannabis dependence symptoms and more adults seeking treatment voluntarily (Hall & Lynskey, 2016). However, the literature addressing the effect of legalization of recreational cannabis consumption on health service use is nascent and comes primarily from single jurisdictions in the United States of America. Epidemiological research in Colorado found no increase in cannabis use since legalization for recreational use (Ghosh, et al., 2017) but in the first year, 2013 to 2014, after legalization there was an increase in ED visits followed by a decrease in the second year, 2014 to 2015, where ED visits decreased to a rate lower than 2013. There was an increase in accidental poisonings among children by 63% (measured through poison control calls) and this remained stable since legalization. (Ghosh, et al., 2017; Kim & Monte, 2016). The authors encouraged caution around the interpretation, since legalization may have reduced the stigma of disclosure and resulted in a reporting increase without an underlying increase in incidence.

With cannabis legalized in Canada, many stakeholders are interested in the impact on the health care system. This project linked specialty mental health and addictions treatment service data with wider health system data to provide information demographics of Albertans seeking treatment for cannabis misuse and their health care utilization.

While not without limitations, AHS administrative data can shed light on changes in substance misuse treatment within AHS post cannabis legalization.

The purpose of this project is to describe AHS substance use treatment attendance pre-legalization in relation to:

- 1) cannabis use,
- 2) concerns about cannabis use, and
- 3) demographics, other health service use, and comorbid mental health diagnoses.

A post-legalization analysis is not included in the current report; however, a supplement to this report will present results of post-legalization analyses in order to document possible changes findings.

Method

Data Sources

Clients were identified using the Addiction and Mental Health System for Information and Service Tracking (ASIST) database. ASIST is the clinical application used by AHS addiction staff throughout the province to capture enrollments and is the electronic health record for clients receiving addiction services. ASIST collects data on treatment, prevention, and information services provided and is entered by clinicians at the point of care. These services include outpatient, residential, detoxification, and opioid dependency program services. Client-level information available from ASIST includes demographics (age, sex, education, and employment) as well as information on substance use at time of enrollment in addiction services.

To identify diagnosed comorbid mental health conditions, we used the Discharge Abstract Database (DAD), the National Ambulatory Care Reporting System (NACRS, since 2010), and the Practitioner Claims Database. These databases capture admissions to acute care facilities, visits to emergency departments, and visits to physicians, respectively. Trained professionals code the visits with ICD9/10 diagnostic codes; these were used to identify the comorbidities described in this report.

Client Identification

Unique clients were identified and included for analyses based on their first enrollment in any AHS addiction service during a single fiscal year (April 1st to March 31st). To account for clients who had more than one addiction treatment service episode (enrollment) in a given fiscal year, aggregate service utilization variables were created to capture the number and type of enrollments. This allowed us to identify clients who had more than a single addiction treatment service episode in a single fiscal year. We investigated six fiscal years' worth of data starting with 2012/13 and ending with in 2017/18.

Upon enrollment in an addiction treatment service, client information is collected by a clinician. Substance use data is collected through the responses to the following two optional questions:

1. Have you used the substance 1 or more times in the past 12 months?
2. Have you been concerned about this substance use in the past 12 months?

For each question, clients respond either yes or no to a list of 17 substances, consisting of: alcohol, non-beverage alcohol (Lysol), cannabis, cocaine, opiates, psychedelics, tranquilizers, antidepressants, barbiturates, amphetamines, crystal methamphetamine, inhalants, Talwin & Ritalin, androgens, smoking tobacco, chewing tobacco, and other tobacco.

Objectives

This project linked specialty addiction treatment service data with health administrative data for 6 fiscal years preceding legalization of cannabis in Canada (i.e., 2012-2013 to 2017-2018) in order to:

1. Compare demographic characteristics, health care utilization, and psychiatric comorbidities between clients seeking addiction treatment services who did and did not report using cannabis in the year preceding treatment enrollment;
2. Compare demographic characteristics, health care utilization, and psychiatric comorbidities between clients seeking addiction treatment services who did and did not report a concern with their cannabis use in the year preceding treatment enrollment;
3. Compare demographic characteristics and health care utilization between (a) clients seeking addiction treatment services who used cannabis and reported *only* being concerned about their cannabis use, (b) clients concerned about alcohol use only, and (c) clients who reported concerns related to non-cannabis-non-alcohol use, excluding cannabis and alcohol, in the year preceding treatment enrollment. The rationale for this objective was to understand whether the profile of clients who were concerned only about cannabis differed from clients concerned only with other legal and illegal substance use.

Data Linkage

Using personal health numbers, acute care service use, inpatient service use, and practitioner claims data were linked for a two year period preceding index enrollment in an addiction treatment service. The linked data sets were then used to describe service utilization and to determine mental health comorbidities. Please see the data quality assessment section, following for details on personal health number (PHN) linkage rates in ASIST.

A client was considered to have a history of a comorbid condition if, within an 8-year window that included the full study period and two years before the study start date for substance use treatment in AHS, they had:

- At least one hospital record with an eligible corresponding ICD-10 code, OR;
- At least one emergency department record with an eligible corresponding ICD-10 code, OR;
- At least three physician claims, within a single fiscal year, with an eligible corresponding ICD-9 code.

Eligible ICD9/10 codes (see table in Appendix C) included codes for any mental health or addiction related problem as identified by the DSM-5. Readers should note that these

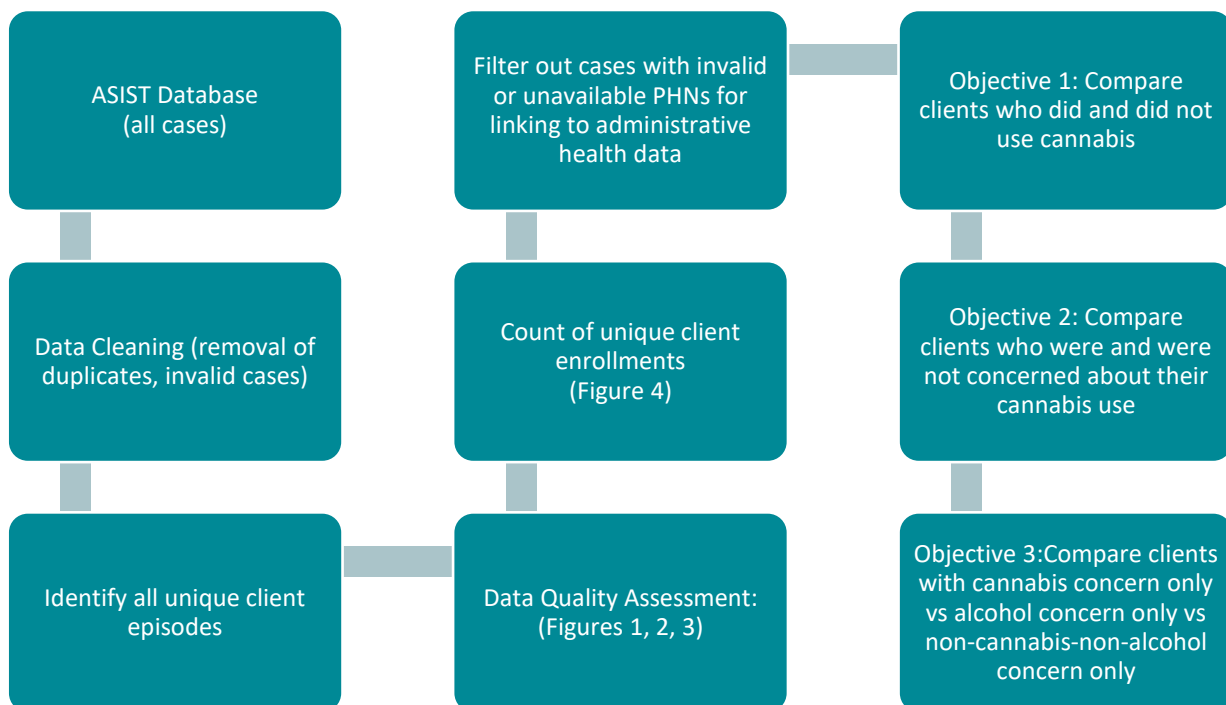
Cannabis Use and Concerns among Clients Seeking Addiction Treatment (2012-2018)

comorbidity profiles indicate a history of a comorbid mental disorder but may not be an accurate representation of current health status.

Objective	Comparison Cohorts	
1	Clients who entered substance use treatment and reported using cannabis in the previous 12 months (regardless of concern)	Clients who entered substance use treatment and did not report using cannabis in the last 12 months.
2	Clients who reported using cannabis in the previous 12 months but were not concerned with their cannabis use	Clients who reported using cannabis in the previous 12 months and were concerned with their cannabis use
3	Clients who reported using cannabis and were only concerned with their cannabis use in the last 12 months	Clients who were only concerned about their alcohol use in the last 12 months
		Clients who were concerned about two or more substances (excluding cannabis and alcohol) in the last 12 months

Flowchart 1, below, describes the analytical steps taken to produce this technical report.

Flowchart 1. Cohort creation and analysis logic model



Cannabis Use and Concerns among Clients Seeking Addiction Treatment (2012-2018)

The analysis was performed in SAS Enterprise Guide 7.1. Binary variables were presented as percentages, raw counts (n), and 95% confidence intervals. Means and standard deviations are presented for continuous variables.

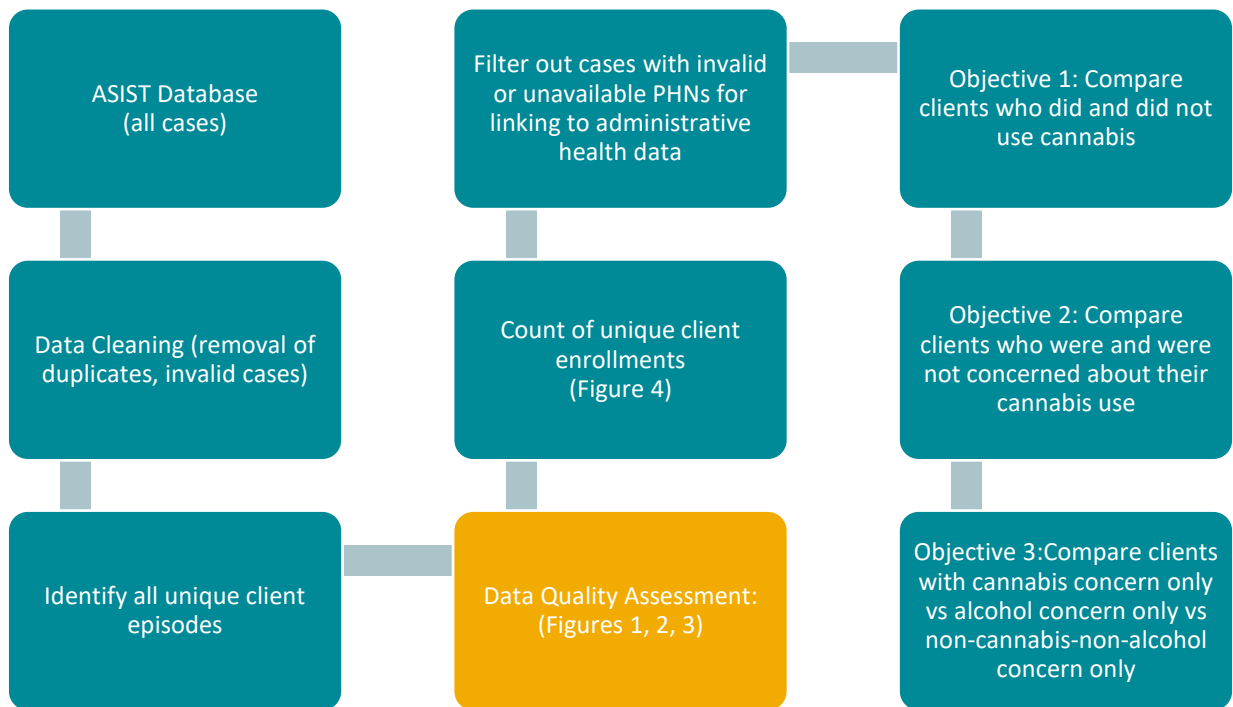
Data Quality Assessment

Data quality notes for the ASIST database. This assessment was done on unprocessed ASIST data, before data linkage was completed for the study.

- In 2012/13 37.7% of enrollments in ASIST did not contain a valid numeric personal health number (PHN); this decreased to 13.7% in 2017/18. Clients without a valid PHN could not be linked for the detailed analysis (e.g., linking with mental health diagnoses).
- Responses to the substance of concern question were unavailable for 14% of client enrollments in 2012/13, rising to 29% of enrollments in 2017/18.
- After stratifying by age and sex, a comparison of clients with a valid PHN versus missing PHNs indicated that clients with missing PHN data were younger and more likely to be male, compared to clients with a valid PHN.
- Clients missing substance of concern data were more likely to be female and less likely to be employed.
- Clients who indicated that they used or were concerned with cannabis were less likely to have a valid PHN for linking when compared to all other drugs, 78.57% of cannabis users had a valid PHN compared to 81.05% of all other drug users. This is not expected to impact the analysis due to a difference of only 2.48%.

Increased availability of linkable PHNs within ASIST over the study period introduced data artifacts with respect to sex and age trends over time. To correct for this, trend comparisons for both sex and age have been calculated on proportions instead of raw counts. For example, when describing client enrollments for cannabis use by sex we see an increase in males while females stayed relatively stable. This is due to increased male records being included in the analysis over time, which is demonstrated by the fact the trend disappears when looking at the proportion of male clients that used cannabis.

Cannabis Use and Concerns among Clients Seeking Addiction Treatment (2012-2018)



Personal Health Number Validity over Time

The number of clients with a valid PHN has increased from 15,833 in 2012/13 to 21,248 in 2017/18, while the number of overall clients has remained relatively stable, fluctuating between a high of 25,415 clients in 2012/13 and a low of 22,914 clients in 2016/17. These numbers should be taken into consideration when interpreting the results. For instance, an increase in volume could be due to an actual increase or could be due to a coinciding increase in PHN validity. For this reason we use proportions wherever appropriate.

Cannabis Use and Concerns among Clients Seeking Addiction Treatment (2012-2018)

Figure 1. Number of Unique Specialty Addiction Treatment Clients with a Valid PHN, 2012/13 to 2017/18, Alberta

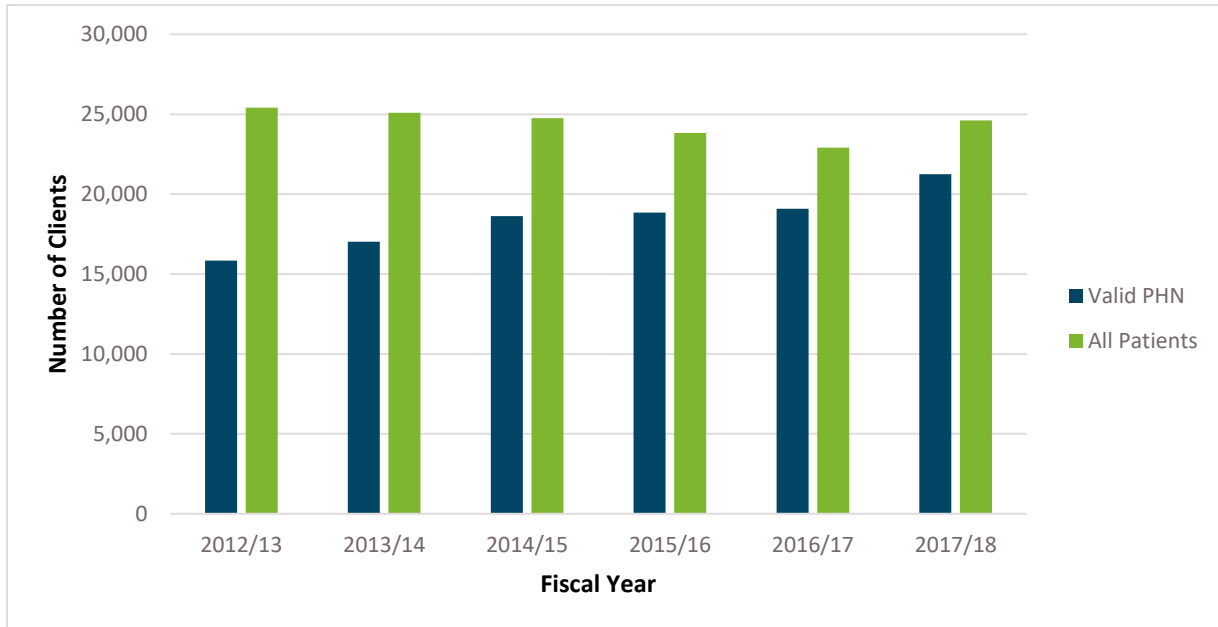
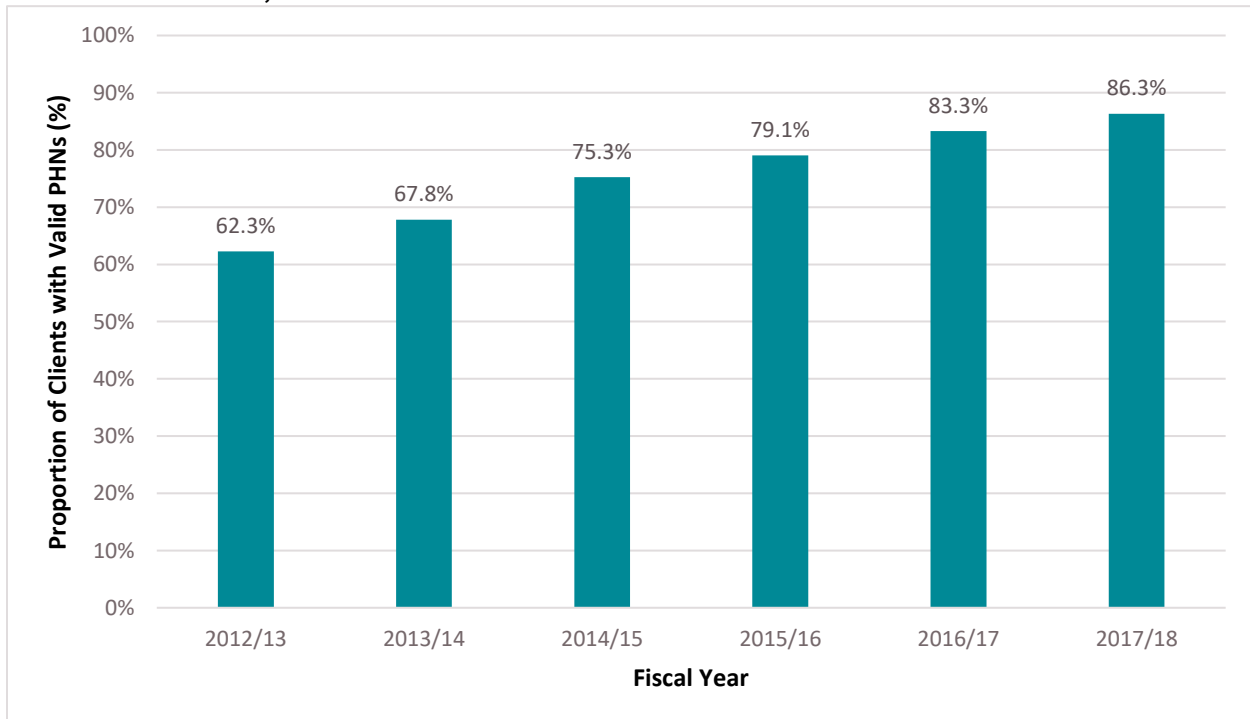


Figure 2. Proportion of Unique Specialty Addiction Treatment Clients with a Valid PHN, 2012/13 to 2017/18, Alberta

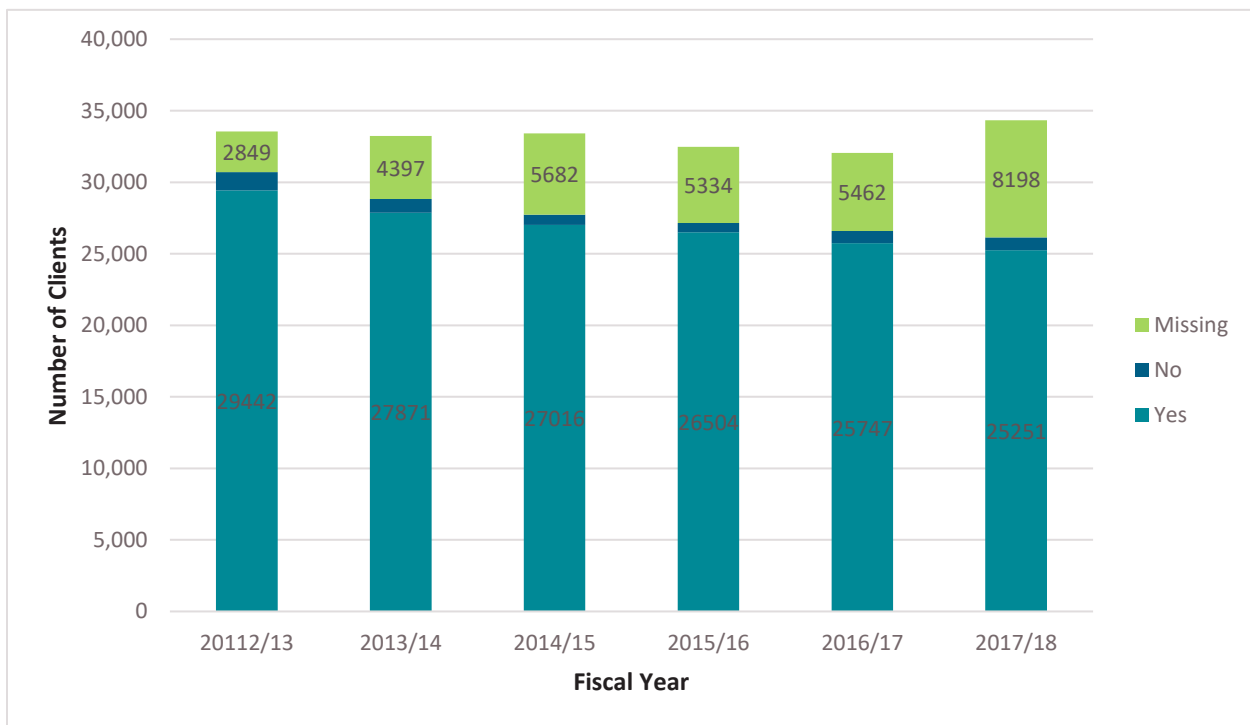


Cannabis Use and Concerns among Clients Seeking Addiction Treatment (2012-2018)

Non-response Rates for Substance of Concern Question in ASIST

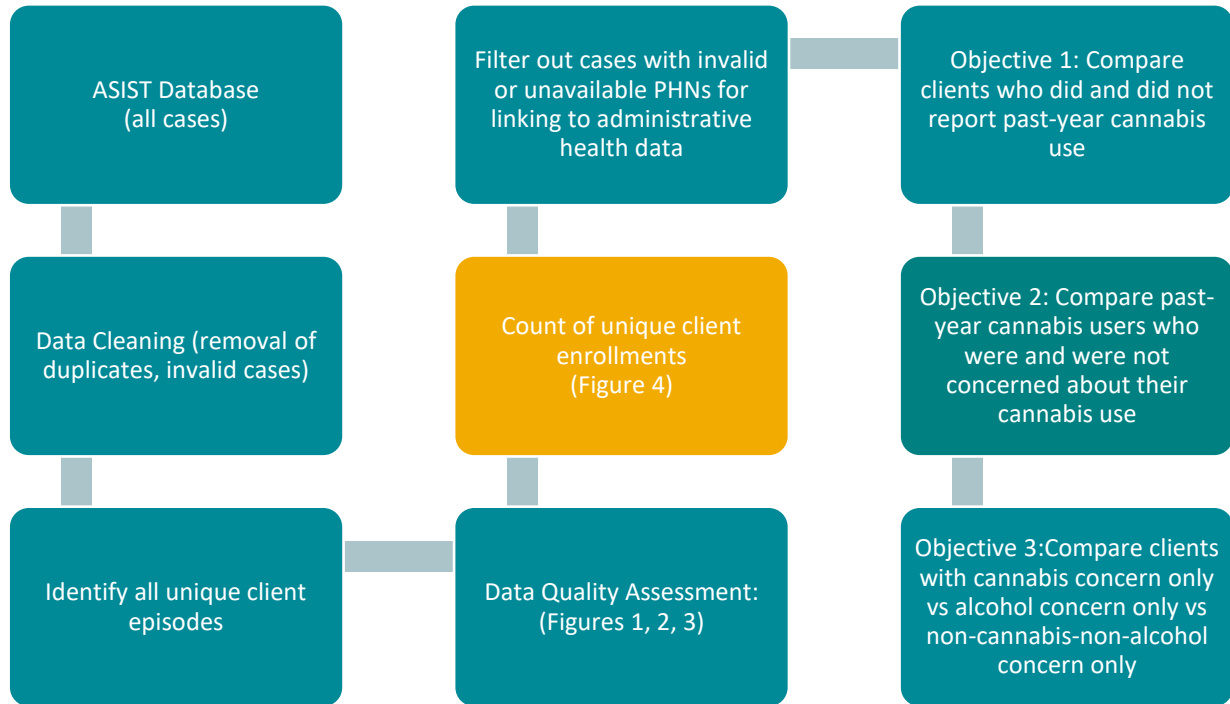
During the addiction treatment intake process, clients are asked if they are willing to disclose their concerns about alcohol, drugs and tobacco. The vast majority choose to complete this question with either a “yes” or “no”, with only a small proportion (2.6%) of clients responding “no”, in 2017/18. The percentage of people who do not answer the question about which substances they are concerned about (i.e., the percentage of missing data for this question) has increased from 8.5% to 23.9% from 2012-2018. This data quality trend should be considered when evaluating results. For example, a decrease in the volume of clients with a particular substance of concern could be due to an increase in missing data for the substance of concern fields. For this reason we use proportions wherever appropriate.

Figure 3. Non-response Rates for Substance of Concern Question, 2012/13 to 2017/18, Alberta



Results

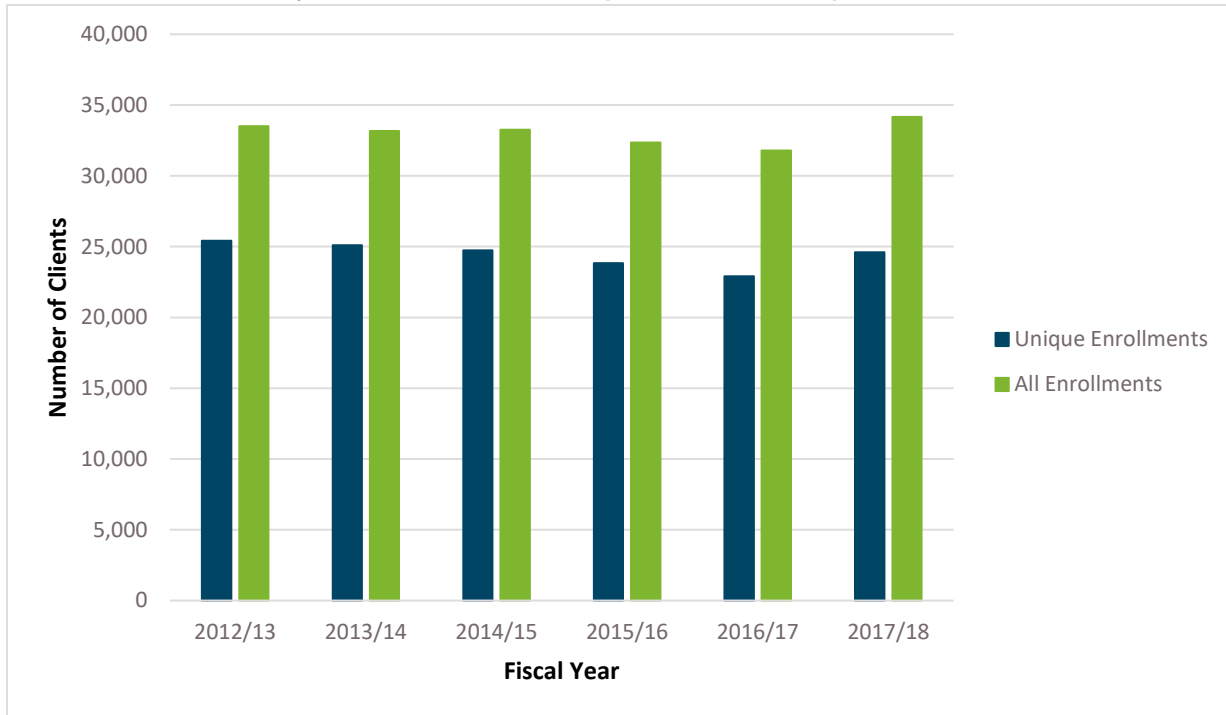
Overall Client Counts



The number of unique clients seeking addiction treatment services has been steady from 2012/13 to 2017/18, ranging from approximately 23,000 to 25,000 unique clients in each fiscal year. Across the entire study period (2012/13 to 2017/18), 102,392 unique clients were enrolled in a specialty addiction treatment service, of which 37.9% were enrolled two or more times. The total number of enrollments per year, including clients who had multiple enrollments in a single fiscal year, range from approximately 31,000 to 34,000.

Cannabis Use and Concerns among Clients Seeking Addiction Treatment (2012-2018)

Figure 4. Count of Unique Enrollments* and All Client Enrollments for a New Addiction Treatment Service, by Fiscal Year, Alberta (2012/13-2017/18)



*Unique enrollments are the incident enrollment into a specialty addiction treatment service by year.

Note: from this point on in the report, only unique clients who enrolled in specialty addiction services with a valid PHN are included in the analysis.

Cannabis Use and Concerns among Clients Seeking Addiction Treatment (2012-2018)

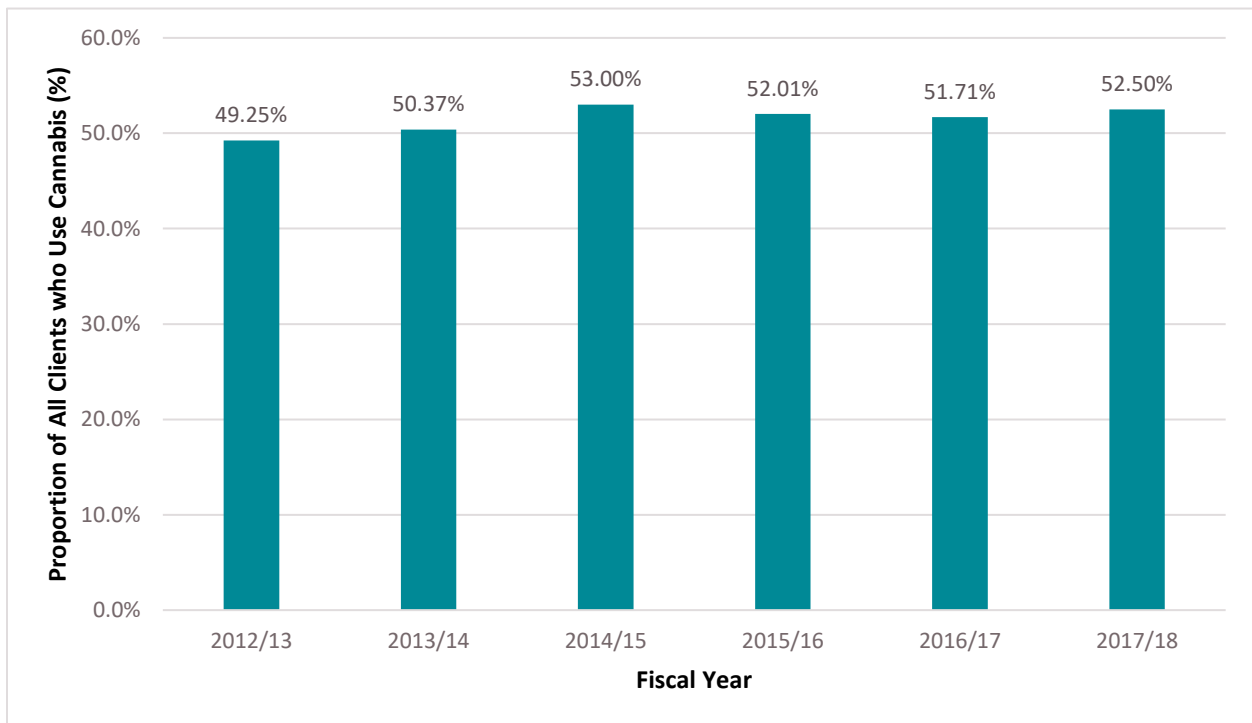
System-Wide Trends in Cannabis Use and Cannabis Concerns

This subsection presents results from analyses of cannabis use and cannabis-related concerns by age and gender.

Past-Year Cannabis Use

As shown in Figure 5, just over half of all clients reported using cannabis in the past 12 months prior to legalization (52.5%). The proportion of clients using cannabis has remained relatively stable over the 6-year study period, ranging from a low of 49.3% in 2012/13 to a high of 53.0% in 2014/15.

Figure 5. Proportion of Clients Enrolled in Specialty Addiction Treatment Who Reported that they Used Cannabis in the Past 12 Months, Alberta 2012/13-2017/18

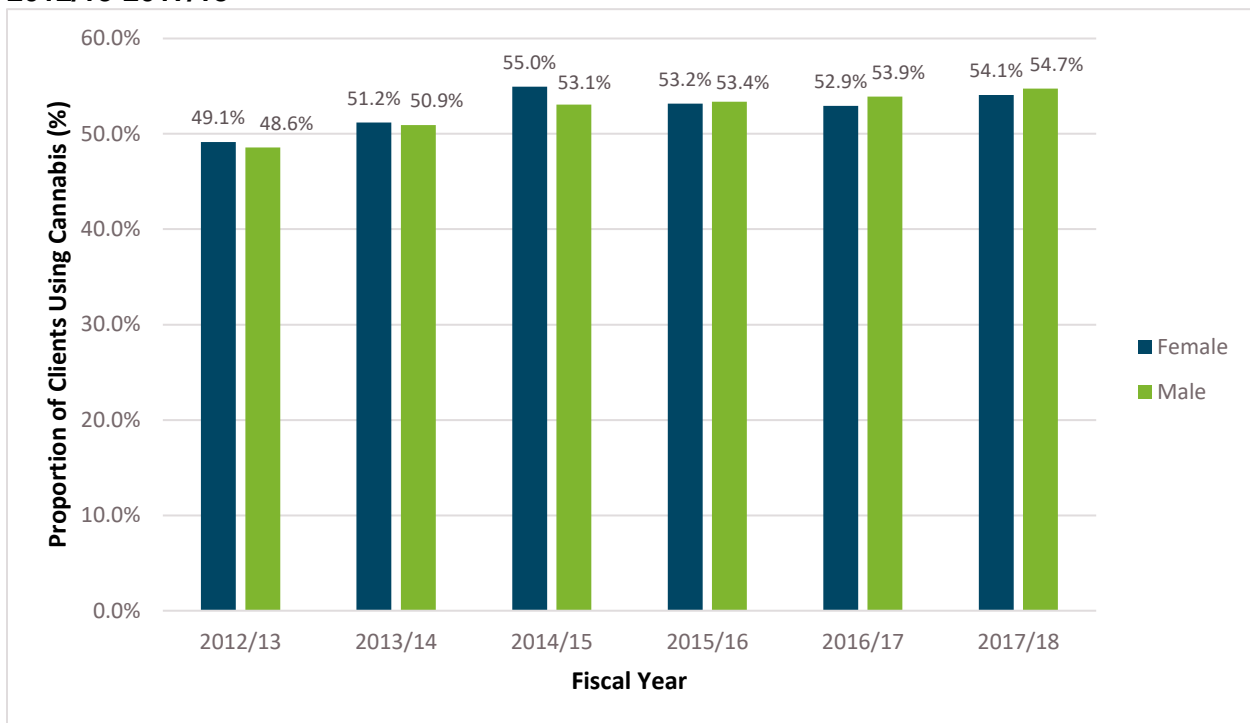


Cannabis Use and Concerns among Clients Seeking Addiction Treatment (2012-2018)

Past-Year Cannabis Use by Sex

As shown in Figure 6, reported use of cannabis in the 12 months preceding addiction services increased among both male and female clients from 2012/13 to 2017/18. However, males and females were quite similar with regard to past-year cannabis use in most reporting years.

Figure 6. Proportion of Unique Clients Reporting Past-Year Cannabis Use by Sex, Alberta 2012/13-2017/18

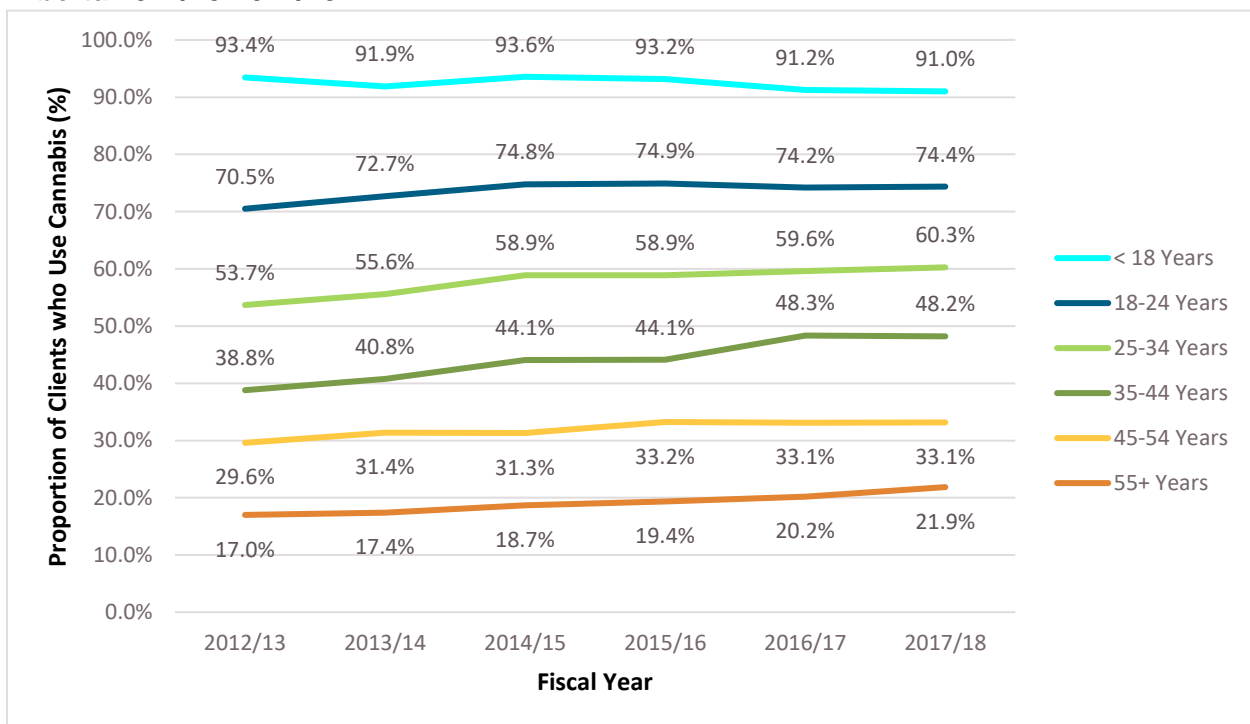


Cannabis Use and Concerns among Clients Seeking Addiction Treatment (2012-2018)

Past-Year Cannabis Use by Age

Across all reporting years, the proportion of clients who used cannabis was highest among younger clients, and lowest among older clients (Figure 7). Across all reporting years, over 90% of clients under age 18 who enrolled in a specialty addiction service reported past-year cannabis use, and over 70% of clients between 18-24 years reported cannabis use in the past 12 months. From 2012/13 to 2017/18, the proportion of cannabis use among clients aged 55+ years increased from 17.0% to 21.9% (28.6% relative increase). Clients aged 35-44 years had the second largest increase in cannabis use from 38.8% in 2012/13 to 48.2% in 2017/18 (24.2% relative increase). In contrast, from 2012/13 to 2017/18, the proportion of cannabis use in the past 12 months decreased among clients under 18 years with a 2.6% relative decrease (93.4% to 91.0%), this was the only age group that had a decrease in reported use.

Figure 7. Proportion of Unique Clients who Use Cannabis by Age Group and Fiscal Year, Alberta 2012/13-2017/18



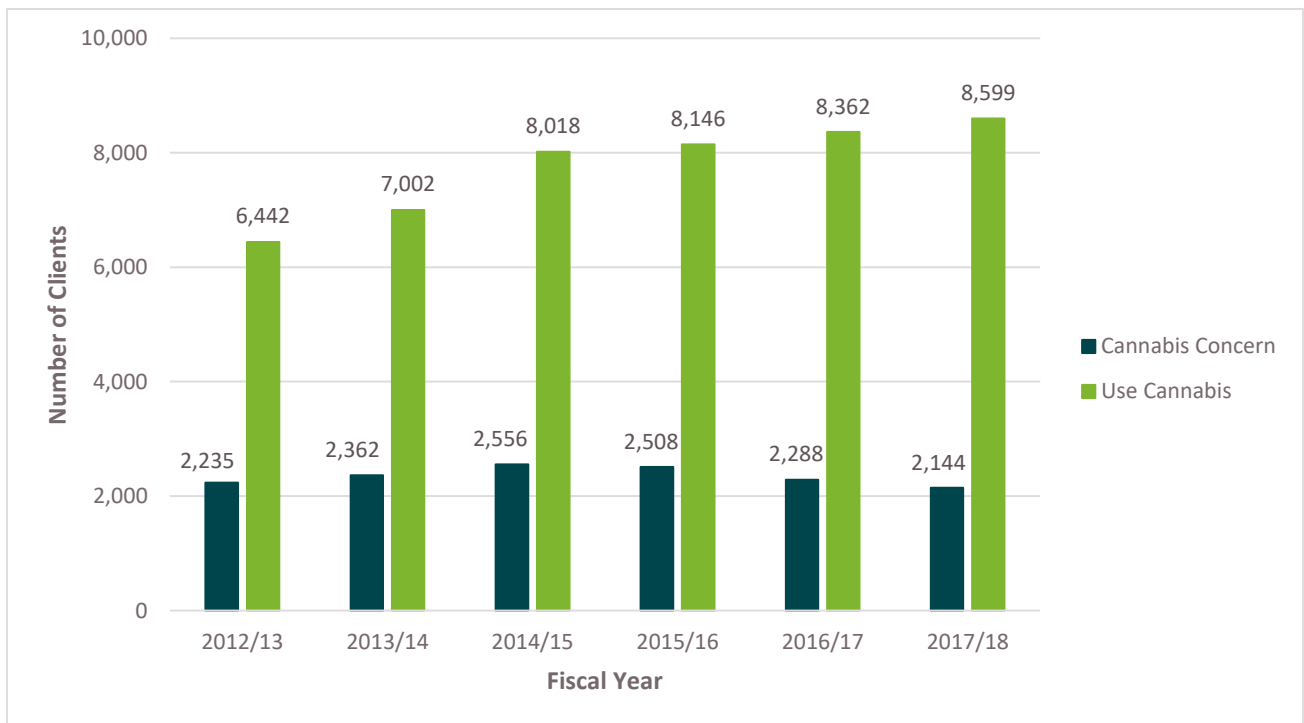
Cannabis Use and Concerns among Clients Seeking Addiction Treatment (2012-2018)

Cannabis Use versus Cannabis Concerns

When considering unique client counts, the overall number of clients indicating they have used cannabis in the past twelve months has increased by 33.5% from 6,442 in 2012/13 to 8,599 in 2017/18 (Figure 8). In contrast, the number of clients reporting that they were concerned with their cannabis use increased by 14.4% from 2,235 in 2012/13 to 2,556 in 2014/15 then decreased by 16.1% from 2,556 in 2014/15 to 2,144 in 2017/18.

Caution is warranted in that there was a 24.6% increase in the number of all clients with linkable PHNs and a 15.4% increase in missing responses for cannabis as a substance of concern. With this in mind at least some of the increase in cannabis use can be attributed to the increase in the number of clients who can be analyzed, due to overall PHN availability increasing. This is particularly relevant as the increase in linkable data was in younger clients, who are more likely to report having used cannabis in the past year.

Figure 8. Unique Client Counts, Past-Year Cannabis Use versus Cannabis Concerns Alberta 2012/13-2017/18

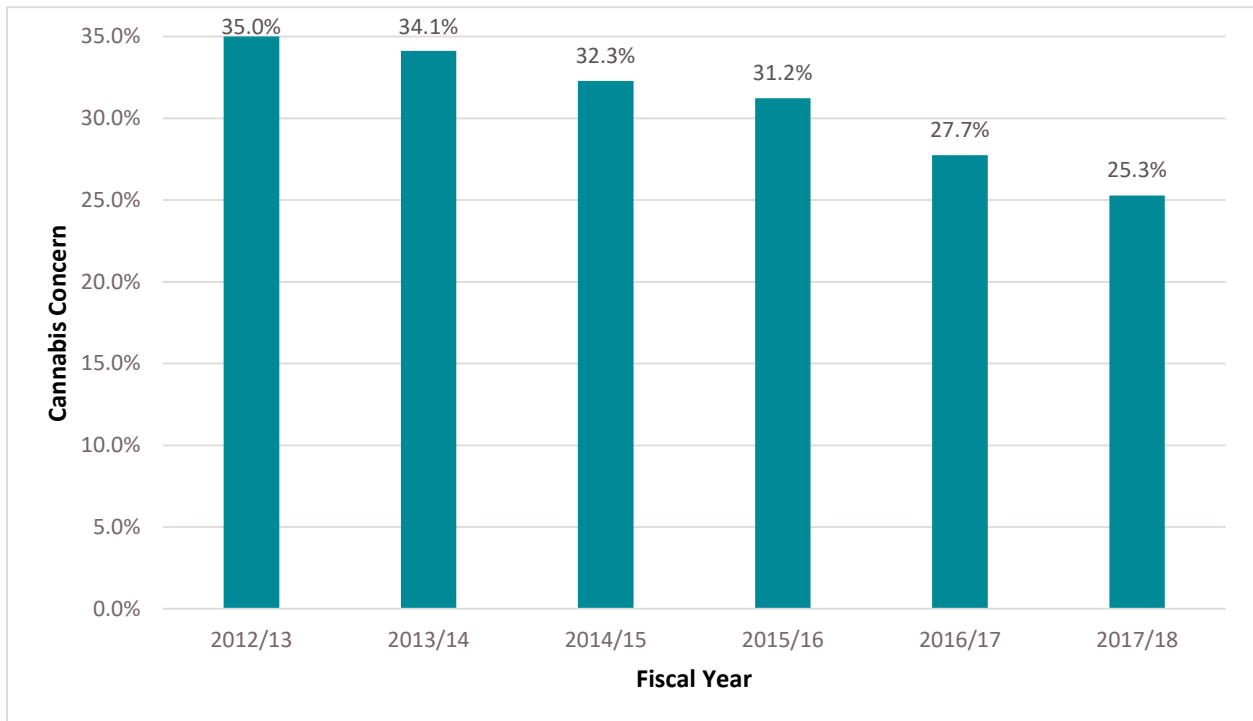


Cannabis Use and Concerns among Clients Seeking Addiction Treatment (2012-2018)

Cannabis Concern Rates among Clients Who Used Cannabis in the Previous Year

The proportion of past-year cannabis users who are concerned with their use has steadily decreased over the last six fiscal years from 35.0% in 2012/13 to 25.3% in 2017/18 (Figure 9).

Figure 9. Proportion of Cannabis Users who are Concerned with their Use, Alberta 2012/13-2017/18

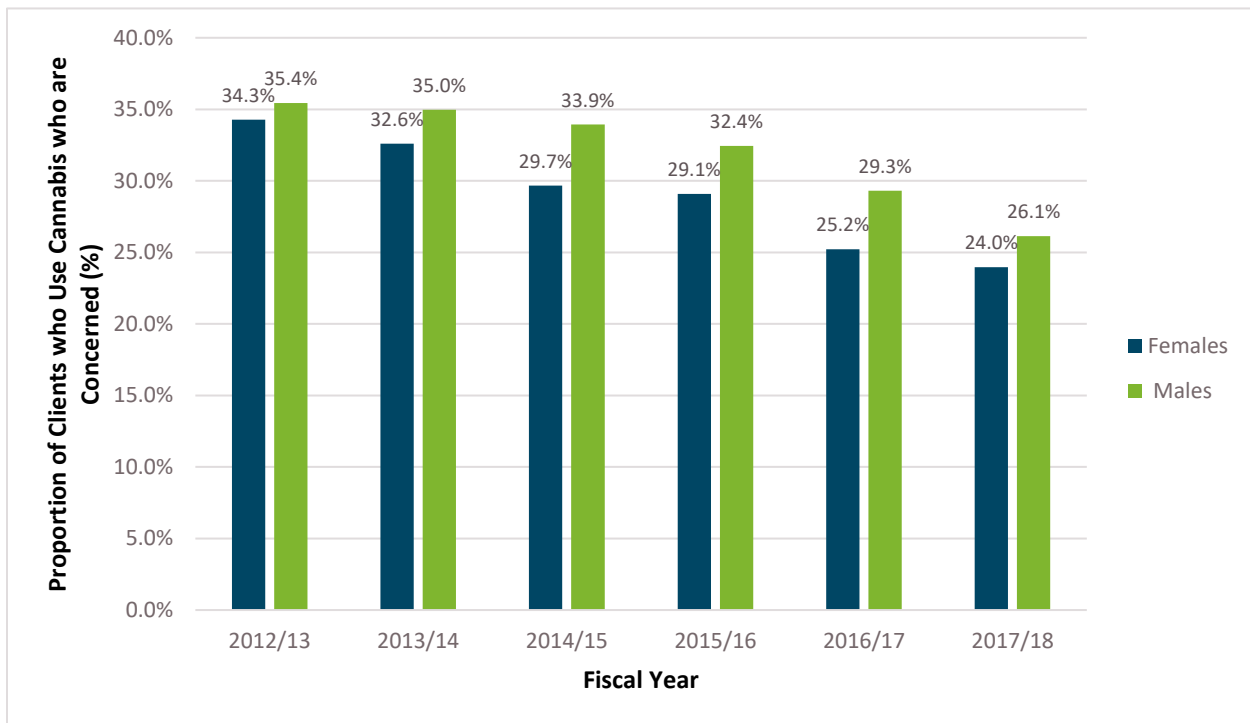


Cannabis Use and Concerns among Clients Seeking Addiction Treatment (2012-2018)

Cannabis Concern Rates by Sex among Clients Who Used Cannabis in the Previous Year

The proportion of past-year cannabis users who were concerned with their use decreased for both males and females over the study period (Figure 10). From 2012/13 to 2017/18, concern with cannabis use decreased from 35.4% to 26.1% among males. From 2012/13 to 2017/18, concern with cannabis use decreased from 34.3% to 24.0% among females.

Figure 10. Proportion of Unique Clients who Reported Past-Year Cannabis Use and Concern with their Cannabis Use, by Sex, Alberta 2012/13-2017/18

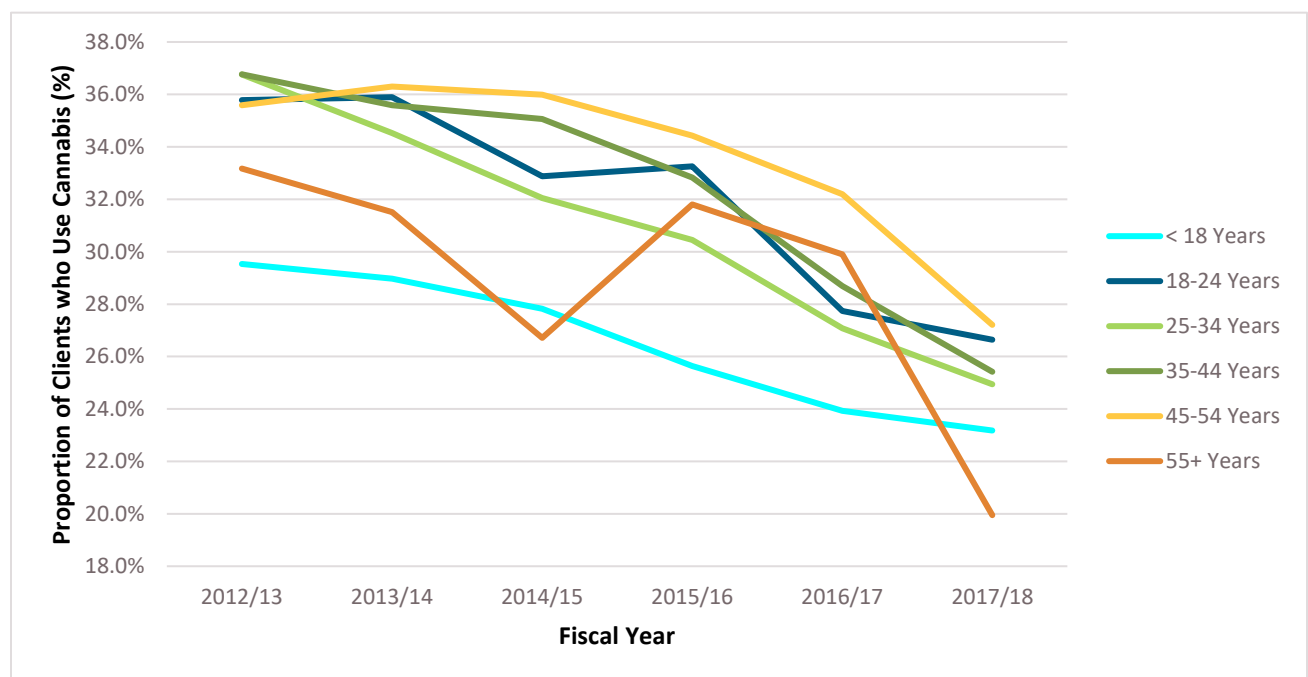


Cannabis Use and Concerns among Clients Seeking Addiction Treatment (2012-2018)

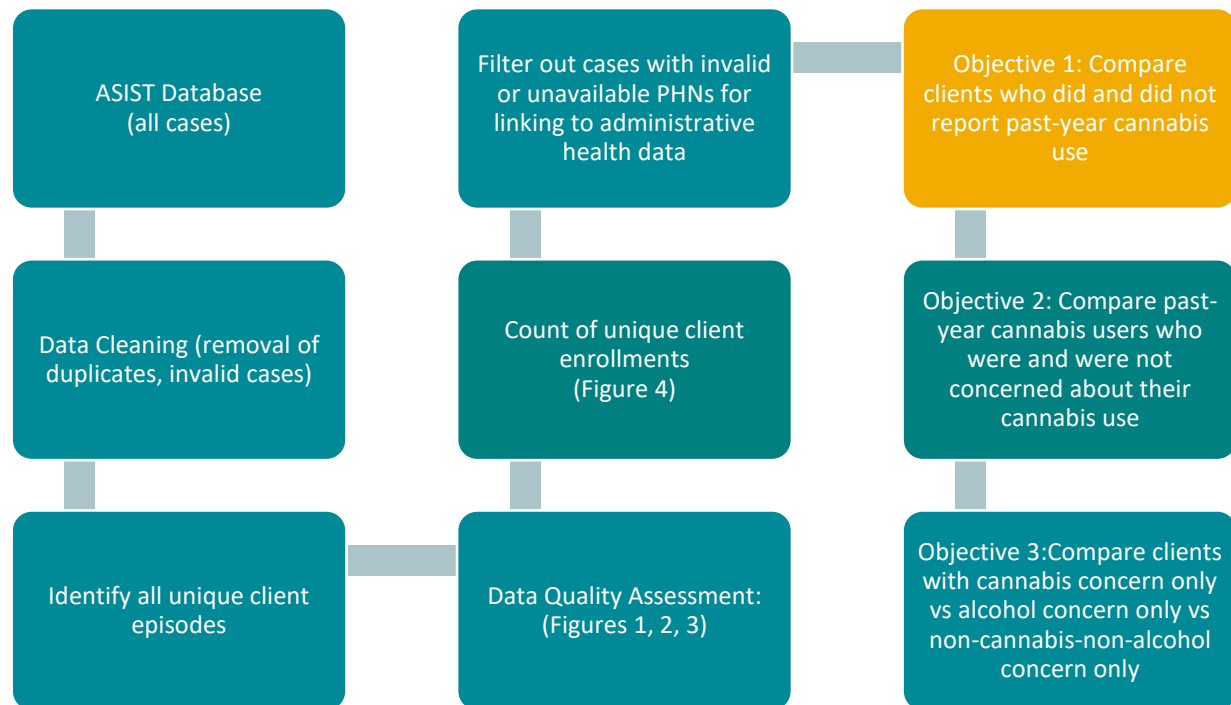
Cannabis Concern Rates by Age among Clients Who Used Cannabis in the Previous Year

Concerns about cannabis decreased for all age categories over the study period (Figure 11). From 2012/13 to 2017/18, the proportion of past-year cannabis users reporting concerns with their cannabis use decreased the most among clients aged 55+ years (from 33.2% in 2012/13 to 19.9% in 2017/18). Clients aged 25-34 years had the second largest decrease in cannabis concern from 36.8% in 2012/13 to 24.9% in 2017/18. From 2013/14 to 2017/18, 45-54 year olds had the highest proportion of cannabis concern. From 2013/14 to 2017/18 those younger than 18 years old had the lowest proportion of cannabis concern.

Figure 11. Proportion of Unique Clients who Reported Past-Year Cannabis Use and Concern about their Cannabis Use by Age Group, Alberta 2012/13-2017/18



Objective 1: Comparing Clients Who Did and Did Not Report Past-year Cannabis Use



Cannabis Use: Demographics, Healthcare Utilization & Mental Health Comorbidities

Compared to clients who did not report using cannabis in the year preceding the index enrollment in specialty addiction services, clients who reported past-year cannabis use were (a) about 10 years younger, (b) less likely to have achieved a high school degree, and (c) more likely to have been unemployed (Table 1). These trends occurred across each fiscal year in the study period.

Compared to clients who did not report using cannabis in the year preceding index enrollment in specialty addiction services, clients who reported past-year cannabis use had similar specialty addiction services and healthcare utilization rates on average (Table 2). These trends occurred across each fiscal year in the study period.

Compared to clients who did not report using cannabis in the year preceding index enrollment in specialty addiction services, clients who reported past-year cannabis use were more likely to

Cannabis Use and Concerns among Clients Seeking Addiction Treatment (2012-2018)

have a lifetime developmental, personality, or mood disorder diagnosis (Table 3). This trend occurred across each fiscal year in the study period.

TABLE 1. DEMOGRAPHIC PROFILES AMONG ENROLLED CLIENTS WHO DID (+) AND DID NOT (-) REPORT USING CANNABIS IN THE PAST 12 MONTHS, ALBERTA, 2012-2018

			2012/13		2013/14		2014/15		2015/16		2016/17		2017/18	
			+	-	+	-	+	-	+	-	+	-	+	-
AGE	Total	N	6442	6767	7002	6719	8018	6884	8146	7143	8362	7241	8599	7179
	Age	mean	30.41	41.60	30.19	41.28	30.01	41.08	30.82	40.98	31.32	41.30	31.11	41.05
		SD	12.00	12.69	11.67	12.86	11.35	12.76	11.22	12.71	11.09	13.02	11.31	12.99
		95%CI	30.12,30.70	41.30,41.90	29.92,30.46	40.97,41.59	29.76,30.26	40.78,41.38	30.58,31.06	40.69,41.27	31.08,31.56	41.00,41.60	30.87,31.35	40.75,41.35
GENDER	Female	%	38.67	38.11	36.96	36.73	37.50	35.81	36.90	37.04	36.67	37.66	37.47	38.14
		n	2491	2579	2588	2468	3007	2465	3006	2646	3066	2727	3222	2738
		95% CI	38.65,38.68	38.10,38.13	36.95,36.97	36.72,36.75	37.49,37.51	35.79,35.82	36.89,36.91	37.03,37.06	36.65,36.68	37.65,37.67	37.46,37.48	38.13,38.15
	Male	%	61.04	61.50	62.78	63.03	61.97	63.80	62.47	62.23	62.26	61.48	61.60	61.01
		n	3932	4162	4396	4235	4969	4392	5089	4445	5206	4452	5297	4380
		95% CI	61.02,61.05	61.49,61.52	62.77,62.80	63.02,63.04	61.96,61.98	63.79,63.81	62.46,62.48	62.22,62.24	62.25,62.27	61.47,61.50	61.59,61.61	61.00,61.02
EDUCATION	High School+	%	43.76	60.78	45.80	61.35	43.04	60.08	41.55	56.39	41.63	55.95	41.35	55.09
		n	2819	4113	3207	4122	3451	4136	3385	4028	3481	4051	3556	3955
		95% CI	43.74,43.77	60.77,60.79	45.79,45.82	61.33,61.36	43.03,43.05	60.07,60.10	41.54,41.57	56.38,56.40	41.62,41.64	55.93,55.96	41.34,41.36	55.08,55.10
	< High School	%	53.57	36.28	51.49	35.91	48.57	31.45	44.18	29.93	43.70	30.92	42.75	30.77
		n	3451	2455	3605	2413	3894	2165	3599	2138	3654	2239	3676	2209
		95% CI	53.56,53.59	36.27,36.29	51.47,51.50	35.90,35.93	48.55,48.58	31.44,31.46	44.17,44.19	29.92,29.94	43.69,43.71	30.91,30.93	42.74,42.76	30.76,30.78
EMPLOYMENT	Employed	%	37.67	45.46	38.39	46.42	36.83	45.86	32.92	38.15	29.65	36.62	27.76	36.89
		n	2427	3076	2688	3119	2953	3157	2682	2725	2479	2652	2387	2648
		95% CI	37.66,37.69	45.44,45.47	38.38,38.40	46.41,46.44	36.82,36.84	45.85,45.87	32.91,32.94	38.14,38.16	29.64,29.66	36.61,36.64	27.75,27.77	36.87,36.90
	Un-employed	%	59.53	51.75	58.60	50.86	59.07	50.48	56.06	50.90	57.03	51.39	56.95	50.34
		n	3835	3502	4103	3417	4736	3475	4567	3636	4769	3721	4897	3614
		95% CI	59.52,59.55	51.74,51.77	58.58,58.61	50.84,50.87	59.06,59.08	50.47,50.49	56.05,56.08	50.89,50.92	57.02,57.04	51.37,51.40	56.94,56.96	50.33,50.35

Notes: The percentage of patients with missing education information increased from 2.67% in 2012/13 to 15.90% in 2017/18. The percentage of patients with missing employment information rose from 2.79% in 2012/13 to 15.29% in 2017/18.

TABLE 2. HEALTHCARE UTILIZATION AMONG ENROLLED CLIENTS WHO DID (+) AND DID NOT (-) REPORT USING CANNABIS IN THE LAST 12 MONTHS, ALBERTA, 2012-2018

		2012/13		2013/14		2014/15		2015/16		2016/17		2017/18		
		+	-	+	-	+	-	+	-	+	-	+	-	
UTILIZATION**	Total	N	6442	6767	7002	6719	8018	6884	8146	7143	8362	7241	8599	7179
	Detox	%	19.08	22.51	18.34	22.01	20.36	20.86	22.16	23.39	19.85	22.99	21.12	23.18
		n	1229	1523	1284	1479	1632	1436	1805	1671	1660	1664	1816	1664
		95% CI	19.07,19.09	22.49,22.52	18.33,18.35	22.00,22.02	20.34,20.36	20.85,20.87	22.15,22.17	23.38,23.41	19.84,19.86	22.97,22.99	21.11,21.13	23.17,23.19
	Opioid Dependency Program	%	1.32	1.77	1.39	1.13	1.75	1.67	1.90	1.93	2.97	2.49	4.97	4.28
		n	85	120	97	76	140	115	155	138	248	180	427	307
		95% CI	1.32,1.32	1.77,1.78	1.38,1.39	1.13,1.13	1.74,1.75	1.67,1.67	1.90,1.91	1.93,1.94	2.96,2.97	2.48,2.49	4.96,4.97	4.27,4.28
	Outpatient	%	71.89	69.11	72.91	69.89	71.04	70.41	68.63	68.36	69.55	68.72	65.90	65.13
		n	4631	4677	5105	4696	5695	4847	5590	4883	5815	4975	5667	4676
		95% CI	71.87,71.90	69.10,69.13	72.90,72.92	69.88,69.90	71.02,71.04	70.40,70.42	68.61,68.63	68.35,68.37	69.53,69.55	68.69,68.72	65.89,65.91	65.12,65.15
	Residential	%	7.71	6.61	7.37	6.97	6.86	7.06	7.31	6.31	7.63	5.80	7.18	6.41
		n	497	447	516	468	550	486	595	451	638	420	617	460
		95% CI	7.71,7.72	6.60,6.61	7.36,7.38	6.96,6.97	6.85,6.87	7.05,7.07	7.30,7.31	6.31,6.32	7.62,7.64	5.79,5.81	7.17,7.18	6.40,6.41
	Addiction Treatment Enrollments	mean	1.61	1.41	1.59	1.41	1.60	1.40	1.58	1.40	1.63	1.41	1.65	1.44
SD		1.13	0.94	1.08	0.91	1.12	0.91	1.07	1.00	1.20	0.99	1.24	0.98	
95%CI		1.58,1.64	1.39,1.43	1.56,1.62	1.39,1.43	1.58,1.62	1.38,1.42	1.56,1.60	1.38,1.42	1.60,1.66	1.39,1.43	1.62,1.68	1.42,1.46	
Emergency Department Visits	mean	3.25	3.38	3.35	3.63	3.36	3.55	3.32	3.61	3.65	3.59	3.81	3.70	
	SD	6.18	6.35	6.42	7.14	6.00	6.67	5.52	7.15	6.83	6.94	7.10	7.49	
	95%CI	3.10,3.40	3.23,3.53	3.20,3.50	3.46,3.80	3.23,3.49	3.39,3.71	3.20,3.44	3.44,3.78	3.50,3.80	3.43,3.75	3.66,3.96	3.53,3.87	
Hospital Admissions	mean	0.92	0.96	0.95	1.04	0.91	0.96	0.89	0.95	0.96	0.96	0.98	0.99	
	SD	2.54	2.47	2.58	2.57	2.52	2.47	2.50	2.38	2.58	2.47	2.54	2.46	
	95%CI	0.86,0.98	0.90,1.02	0.89,1.01	0.98,1.10	0.85,0.97	0.90,1.02	0.84,0.94	0.89,1.01	0.90,1.02	0.90,1.02	0.93,1.03	0.93,1.05	

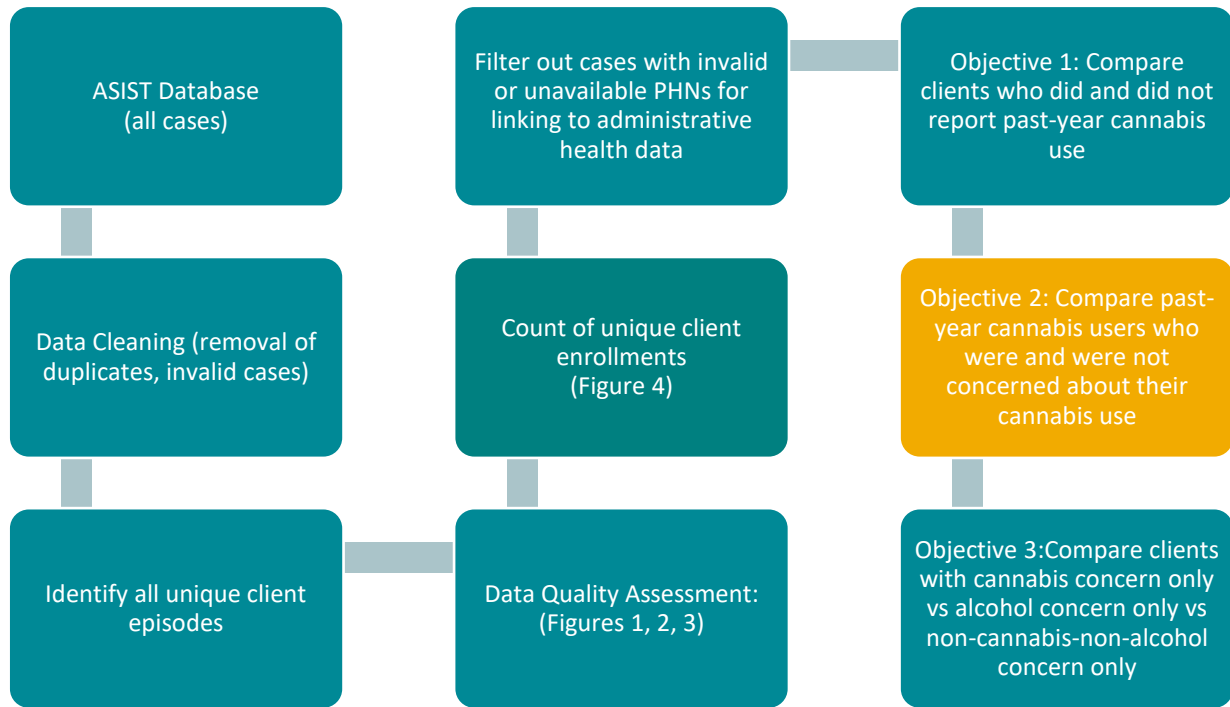
* A single client could have multiple new enrollments of various service types within a single year.

** Average number of times a client visited an emergency department for any reason, was admitted as an inpatient for any reason, and the number of addiction treatment enrollments that occurred within the same fiscal year as the index enrollment to a specialty addiction treatment service. For example, someone who used cannabis in the past 12 months had an average of 3.5 visits to an ED in the same fiscal year, compared to 3.6 visits by those who did not use cannabis in the past 12 months.

TABLE 3. MENTAL HEALTH COMORBIDITIES AMONG ENROLLED CLIENTS WHO DID (+) AND DID NOT (-) REPORT USING CANNABIS IN THE LAST 12 MONTHS, ALBERTA, 2012-2018

		2012/13		2013/14		2014/15		2015/16		2016/17		2017/18		
		+	-	+	-	+	-	+	-	+	-	+	-	
MENTAL HEALTH COMORBIDITIES	Total	N	6442	6767	7002	6719	8018	6884	8146	7143	8362	7241	8599	7179
	Substance	%	68.57	70.22	70.67	72.21	71.91	72.91	73.73	73.74	73.87	73.97	73.25	73.17
		n	4417	4752	4948	4852	5766	5019	6006	5267	6177	5356	6299	5253
		95% CI	68.55,68.58	70.21,70.24	70.65,70.68	72.20,72.23	71.90,71.92	72.90,72.92	73.72,73.74	73.72,73.75	73.86,73.88	73.96,73.98	73.24,73.26	73.16,73.18
	Mood	%	58.18	56.86	59.37	57.57	59.05	57.51	58.24	56.11	57.90	55.61	54.97	52.65
		n	3748	3848	4157	3868	4735	3959	4744	4008	4842	4027	4727	3780
		95% CI	58.17,58.20	56.85,56.88	59.36,59.38	57.55,57.58	59.04,59.07	57.50,57.52	58.23,58.25	56.10,56.12	57.89,57.92	55.60,55.63	54.96,54.98	52.64,52.67
	Anxiety	%	50.31	50.54	51.91	51.45	52.66	52.30	53.25	52.51	52.56	50.70	51.44	49.84
		n	3241	3420	3635	3457	4222	3600	4338	3751	4395	3671	4423	3578
		95% CI	50.30,50.33	50.52,50.55	51.90,51.93	51.44,51.47	52.64,52.67	52.28,52.31	53.24,53.27	52.50,52.53	52.55,52.57	50.68,50.71	51.42,51.45	49.83,49.85
	Other	%	47.19	46.30	49.07	46.72	48.87	47.14	49.26	46.59	49.50	45.79	48.87	43.68
		n	3040	3133	3436	3139	3918	3245	4013	3328	4139	3316	4202	3136
		95% CI	47.18,47.21	46.28,46.31	49.06,49.09	46.70,46.73	48.85,48.88	47.12,47.15	49.25,49.28	46.58,46.60	49.49,49.51	45.78,45.81	48.85,48.88	43.67,43.70
	Develop-mental	%	21.03	10.83	22.08	11.76	22.54	11.90	21.02	11.97	21.01	11.63	21.87	11.05
	n	1355	733	1546	790	1807	819	1712	855	1757	842	1881	793	
	95% CI	21.02,21.05	10.82,10.84	22.07,22.09	11.75,11.77	22.53,22.55	11.89,11.91	21.01,21.03	11.96,11.98	21.00,21.02	11.62,11.64	21.87,21.88	11.04,11.06	
Personality	%	19.84	14.75	19.09	15.03	18.45	14.54	17.27	14.13	17.65	13.45	16.26	12.75	
	n	1278	998	1337	1010	1479	1001	1407	1009	1476	974	1398	915	
	95% CI	19.83,19.85	14.74,14.76	19.08,19.11	15.02,15.04	18.44,18.46	14.53,14.55	17.26,17.28	14.12,14.14	17.64,17.66	13.44,13.46	16.25,16.27	12.74,12.76	
Schizo-phrenia	%	17.34	15.34	18.24	14.84	18.26	15.46	17.79	14.91	18.30	14.65	17.11	13.78	
	n	1117	1038	1277	997	1464	1064	1449	1065	1530	1061	1471	989	
	95% CI	17.33,17.35	15.33,15.35	18.23,18.25	14.83,14.85	18.25,18.27	15.45,15.47	17.78,17.80	14.90,14.92	18.29,18.31	14.64,14.66	17.10,17.12	13.77,13.79	
Cognitive	%	6.26	10.02	6.41	9.12	5.67	9.72	5.35	8.54	5.69	7.20	5.06	7.33	
	n	403	678	449	613	455	669	436	610	476	521	435	526	
	95% CI	6.25,6.26	10.01,10.03	6.41,6.42	9.11,9.13	5.67,5.68	9.71,9.73	5.35,5.36	8.53,8.55	5.69,5.70	7.19,7.20	5.05,5.06	7.32,7.34	
Eating	%	1.61	1.39	1.59	1.19	1.37	1.41	1.36	1.34	1.24	1.31	1.57	1.06	
	n	104	94	111	80	110	97	111	96	104	95	135	76	
	95% CI	1.61,1.62	1.39,1.39	1.58,1.59	1.19,1.19	1.37,1.37	1.41,1.41	1.36,1.37	1.34,1.35	1.24,1.25	1.31,1.32	1.57,1.57	1.06,1.06	
Sex	%	1.02	1.14	1.11	0.94	0.87	1.06	0.93	0.88	0.88	0.69	0.99	0.92	
	n	66	77	78	63	70	73	76	63	74	50	85	66	
	95% CI	1.02,1.03	1.13,1.14	1.11,1.12	0.93,0.94	0.87,0.88	1.06,1.06	0.93,0.94	0.88,0.88	0.88,0.89	0.69,0.69	0.99,0.99	0.92,0.92	

Objective 2: Comparing Cannabis-using Clients Who Were and Were Not Concerned about Their Cannabis Use



Cannabis Concern in Those Who Used Cannabis in the Last Year: Demographics, Healthcare Utilization & Mental Health Comorbidities

Compared to clients who did not report being concerned about using cannabis in the year preceding index enrollment in specialty addiction services, clients who reported past-year cannabis concern were more likely to have been unemployed (Table 4). This trend occurred across each fiscal year in the study period.

Compared to clients who did not report being concerned about using cannabis in the year preceding index enrollment in specialty addiction services, clients who reported past-year cannabis concern were less likely to enroll in an opioid dependency program (Table 5). This trend occurred across each fiscal year in the study period.

Compared to clients who did not report being concerned about using cannabis in the year preceding index enrollment in specialty addiction services, clients who reported past-year cannabis concern were more likely to have a mood, anxiety, developmental, and personality disorder diagnosis (Table 6). These trends occurred across each fiscal year in the study period.

Cannabis Use and Concerns among Clients Seeking Addiction Treatment (2012-2018)

TABLE 4. DEMOGRAPHIC PROFILES OF PAST-YEAR CANNABIS USERS WHO DID (+) AND DID NOT (-) REPORT A CONCERN ABOUT THEIR CANNABIS USE IN THE PREVIOUS 12 MONTHS, ALBERTA, 2012 – 2018

			2012/13		2013/14		2014/15		2015/16		2016/17		2017/18	
			+	-	+	-	+	-	+	-	+	-	+	-
AGE	Total	N	2235	4151	2362	4560	2556	5362	2508	5525	2288	5961	2144	6338
	Age	mean	30.76	30.18	30.59	29.90	30.49	29.76	31.30	30.56	32.02	31.05	31.18	31.04
		SD	11.64	12.15	11.57	11.69	11.27	11.39	11.29	11.17	11.28	11.02	11.26	11.31
		95%CI	30.28,31.24	29.81,30.55	30.12,31.06	29.56,30.24	30.05,30.93	29.46,30.06	30.86,31.74	30.27,30.85	31.56,32.48	30.77,31.33	30.70,31.66	30.76,31.32
GENDER	Female	%	37.90	39.12	35.39	37.92	34.62	39.11	34.37	38.03	33.30	37.90	35.63	38.25
		n	847	1624	836	1729	885	2097	862	2101	762	2259	764	2424
		95%CI	37.86,37.94	39.10,39.14	35.35,35.43	37.90,37.94	34.58,34.66	39.09,39.13	34.33,34.41	38.01,38.05	33.26,33.34	37.88,37.92	35.59,35.67	38.23,38.27
GENDER	Male	%	61.79	60.59	64.23	61.89	64.98	60.31	64.95	61.41	65.82	60.95	63.57	60.76
		n	1381	2515	1517	2822	1661	3234	1629	3393	1506	3633	1363	3851
		95%CI	61.75,61.83	60.57,60.61	64.19,64.27	61.87,61.91	64.94,65.02	60.29,60.33	64.91,64.99	61.39,61.43	65.78,65.86	60.93,60.97	63.53,63.61	60.74,60.78
EDUCATION	High School+	%	40.81	45.19	45.09	46.21	43.47	42.93	41.75	41.41	42.00	41.42	39.18	42.21
		n	912	1876	1065	2107	1111	2302	1047	2288	961	2469	840	2675
		95%CI	40.77,40.85	45.17,45.21	45.05,45.13	46.19,46.23	43.43,43.51	42.91,42.95	41.71,41.79	41.39,41.43	41.96,42.04	41.40,41.44	39.14,39.22	42.19,42.23
EDUCATION	< High School	%	56.38	52.18	52.92	50.66	48.83	48.34	45.45	43.55	44.71	43.25	46.22	41.59
		n	1260	2166	1250	2310	1248	2592	1140	2406	1023	2578	991	2636
		95%CI	56.34,56.42	52.16,52.20	52.88,52.96	50.64,50.68	48.79,48.87	48.32,48.36	45.41,45.49	43.53,43.57	44.67,44.75	43.23,43.27	46.17,46.27	41.57,41.61
EMPLOYMENT	Employed	%	34.85	39.07	34.80	40.11	34.23	38.06	32.66	32.98	29.20	29.83	26.40	28.21
		n	779	1622	822	1829	875	2041	819	1822	668	1778	566	1788
		95%CI	34.81,34.89	39.05,39.09	34.76,34.84	40.09,40.13	34.19,34.27	38.04,38.08	32.62,32.70	32.96,33.00	29.16,29.24	29.81,29.85	26.36,26.44	28.20,28.22
EMPLOYMENT	Un-employed	%	62.19	58.20	62.79	56.51	62.13	57.63	58.17	55.15	59.05	56.18	59.61	56.12
		n	1390	2416	1483	2577	1588	3090	1459	3047	1351	3349	1278	3557
		95%CI	62.15,62.23	58.18,58.22	62.75,62.83	56.49,56.53	62.09,62.17	57.61,57.65	58.13,58.21	55.13,55.17	59.01,59.09	56.16,56.20	59.57,59.65	56.10,56.14

Notes: The percentage of patients with missing education information increased from 2.82% in 2012/13 to 16.20% in 2017/18. The percentage of patients with missing employment information rose from 2.95% in 2012/13 to 15.67% in 2017/18.

Cannabis Use and Concerns among Clients Seeking Addiction Treatment (2012-2018)

TABLE 5. HEALTHCARE UTILIZATION OF PAST-YEAR CANNABIS USERS WHO DID (+) AND DID NOT (-) REPORT A CONCERN ABOUT THEIR CANNABIS USE IN THE PREVIOUS 12 MONTHS, ALBERTA, 2012 – 2018

		2012/13		2013/14		2014/15		2015/16		2016/17		2017/18		
		+	-	+	-	+	-	+	-	+	-	+	-	
ADDITION SERVICE TYPE*	Total	N	2235	4151	2362	4560	2556	5362	2508	5525	2288	5961	2144	6338
	Detox	%	22.15	17.66	20.28	17.63	24.10	18.82	23.72	21.87	21.02	19.71	22.11	21.33
		n	495	733	479	804	616	1009	595	1208	481	1175	470	1341
		95%CI	22.11,22.19	17.64,17.68	20.25,20.31	17.61,17.65	24.07,24.13	18.81,18.83	23.69,23.75	21.86,21.88	20.99,21.05	19.70,19.72	22.07,22.15	21.32,21.34
	Opioid	%	0.45	1.73	0.55	1.75	0.59	2.20	0.76	2.28	1.70	3.44	2.12	5.95
	Dependency	n	10	72	13	80	15	118	19	126	39	205	45	374
	Program	95%CI	0.44,0.46	1.72,1.74	0.54,0.56	1.74,1.76	0.58,0.60	2.19,2.21	0.75,0.77	2.27,2.29	1.69,1.71	3.43,3.45	2.11,2.13	5.94,5.96
	Outpatient	%	69.49	72.95	71.08	73.55	68.19	72.17	67.42	68.79	69.27	69.35	68.16	65.55
		n	1553	3028	1679	3354	1743	3869	1691	3800	1585	4133	1449	4121
		95%CI	69.45,69.53	72.93,72.97	71.04,71.12	73.53,73.57	68.15,68.23	72.15,72.19	67.38,67.46	68.77,68.81	69.23,69.31	69.33,69.37	68.12,68.20	65.54,65.56
	Residential	%	7.92	7.66	8.09	7.06	7.12	6.81	8.09	7.06	8.00	7.50	7.62	7.17
		n	177	318	191	322	182	365	203	390	183	447	162	451
		95%CI	7.90,7.94	7.65,7.67	8.07,8.11	7.05,7.07	7.10,7.14	6.80,6.82	8.07,8.11	7.05,7.07	7.98,8.02	7.49,7.51	7.60,7.64	7.16,7.18
	UTILIZATION**	Addiction	mean	1.72	1.56	1.71	1.54	1.76	1.53	1.66	1.56	1.74	1.60	1.76
Treatment		SD	1.24	1.06	1.22	1.00	1.22	1.07	1.14	1.04	1.33	1.16	1.45	1.16
Enrollments		95%CI	1.67,1.77	1.53,1.59	1.66,1.76	1.51,1.57	1.71,1.81	1.50,1.56	1.62,1.70	1.53,1.59	1.69,1.79	1.57,1.63	1.70,1.82	1.59,1.65
Emergency		mean	3.57	3.09	3.70	3.16	3.59	3.26	3.55	3.21	3.91	3.56	4.29	3.65
Department		SD	6.62	5.96	6.65	6.28	6.02	6.03	5.91	5.32	6.47	7.00	9.15	6.24
Visits		95%CI	3.30,3.84	2.91,3.27	3.43,3.97	2.98,3.34	3.36,3.82	3.10,3.42	3.32,3.78	3.07,3.35	3.64,4.18	3.38,3.74	3.90,4.68	3.50,3.80
Hospital		mean	1.19	0.78	1.16	0.84	1.16	0.80	1.06	0.81	1.31	0.83	1.28	0.89
Admissions		SD	2.98	2.27	2.96	2.34	2.88	2.33	2.86	2.32	3.08	2.36	2.92	2.41
		95%CI	1.07,1.31	0.71,0.85	1.04,1.28	0.77,0.91	1.05,1.27	0.74,0.86	0.95,1.17	0.75,0.87	1.18,1.44	0.77,0.89	1.16,1.40	0.83,0.95

* A single client could have multiple new enrollments of various service types within a single year.

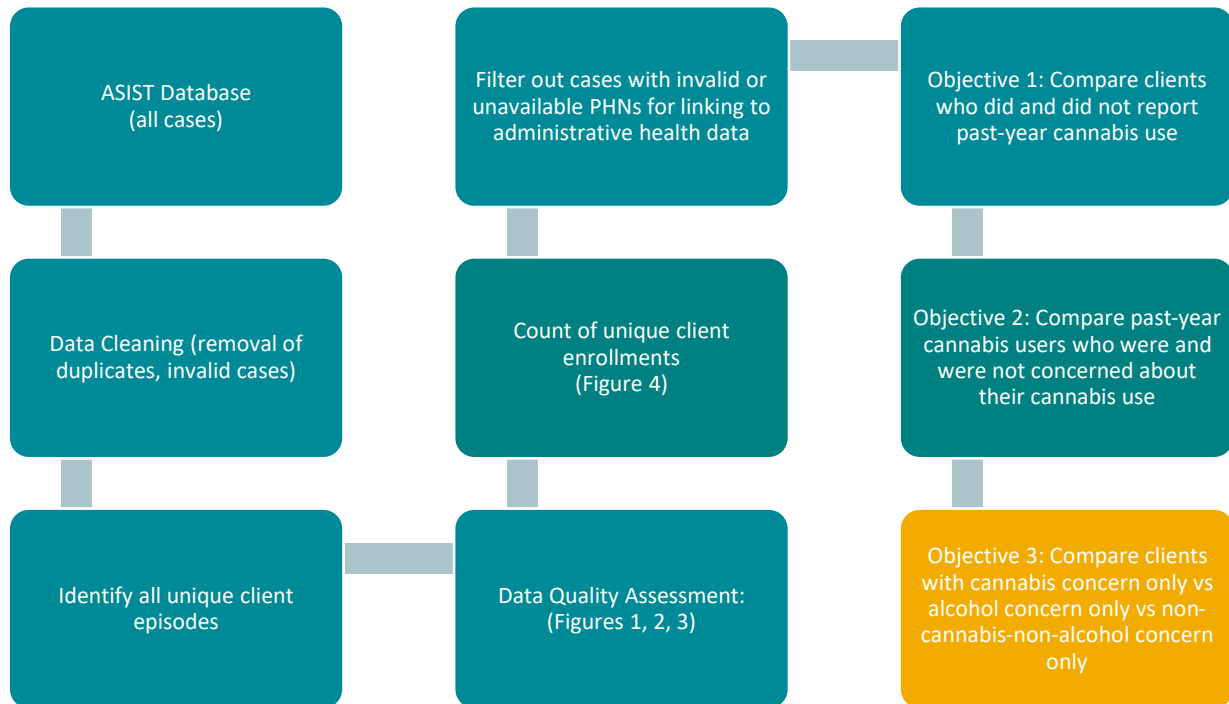
** Average number of times a client visited an emergency department for any reason, was admitted as an inpatient for any reason, and the number of addiction treatment enrollments that occurred within the same fiscal year as the index enrollment to a specialty addiction treatment service. For example, someone who used cannabis in the past 12 months had an average of 3.5 visits to an ED in the same fiscal year, compared to 3.6 visits by those who did not use cannabis in the past 12 months.

Cannabis Use and Concerns among Clients Seeking Addiction Treatment (2012-2018)

TABLE 6. MENTAL HEALTH COMORBIDITIES OF PAST-YEAR CANNABIS USERS WHO DID (+) AND DID NOT (-) REPORT A CONCERN ABOUT THEIR CANNABIS USE IN THE PREVIOUS 12 MONTHS, ALBERTA, 2012 – 2018

		2012/13		2013/14		2014/15		2015/16		2016/17		2017/18		
		+	-	+	-	+	-	+	-	+	-	+	-	
MENTAL HEALTH COMORBIDITIES	Total	N	2235	4151	2362	4560	2556	5362	2508	5525	2288	5961	2144	6338
	Substance	%	70.78	67.31	72.90	69.45	75.20	70.46	75.28	72.96	77.14	72.62	74.44	72.91
		n	1582	2794	1722	3167	1922	3778	1888	4031	1765	4329	1596	4621
		95% CI	70.74,70.82	67.29,67.33	72.86,72.94	69.43,69.47	75.17,75.23	70.44,70.48	75.25,75.31	72.94,72.98	77.11,77.18	72.61,72.63	74.40,74.48	72.90,72.92
	Mood	%	62.73	55.79	63.25	57.32	64.87	56.45	62.84	56.16	64.29	55.51	59.38	53.52
		n	1402	2316	1494	2614	1658	3027	1576	3103	1471	3309	1273	3392
		95% CI	62.69,62.77	55.77,55.81	63.21,63.29	57.30,57.34	64.83,64.91	56.43,56.47	62.80,62.88	56.14,56.18	64.25,64.33	55.49,55.49	59.34,59.42	53.50,53.54
	Anxiety	%	55.12	47.80	55.55	50.04	57.39	50.47	57.06	51.46	57.17	50.80	55.22	50.33
		n	1232	1984	1312	2282	1467	2706	1431	2843	1308	3028	1184	3190
		95% CI	55.08,55.16	47.78,47.82	55.51,55.59	50.02,50.06	57.35,57.43	50.45,50.49	57.02,57.10	51.44,51.44	57.13,57.21	50.78,50.78	55.17,55.27	50.31,50.35
	Other	%	49.62	45.84	50.80	47.96	52.27	47.41	51.36	48.27	51.84	48.53	51.59	47.98
		n	1109	1903	1200	2187	1336	2542	1288	2667	1186	2893	1106	3041
		95% CI	49.58,49.66	45.82,45.86	50.76,50.84	47.94,47.98	52.23,52.31	47.39,47.43	51.32,51.40	48.25,48.25	51.80,51.88	48.51,48.51	51.54,51.64	47.96,48.00
	Develop-mental	%	23.98	17.51	23.20	17.08	22.38	16.67	21.13	15.40	22.16	15.80	20.57	14.91
	n	536	727	548	779	572	894	530	851	507	942	441	945	
	95% CI	23.94,24.02	17.49,17.53	23.16,23.24	17.06,17.10	22.35,22.41	16.66,16.68	21.10,21.16	15.39,15.39	22.12,22.20	15.79,15.79	20.53,20.61	14.90,14.92	
Personality	%	21.88	14.86	21.30	16.62	22.42	16.17	21.29	16.18	24.56	15.65	23.37	14.96	
	n	489	617	503	758	573	867	534	894	562	933	501	948	
	95% CI	21.84,21.92	14.84,14.88	21.27,21.33	16.60,16.64	22.39,22.45	16.16,16.18	21.26,21.32	16.17,16.17	24.52,24.60	15.64,15.64	23.33,23.41	14.95,14.97	
Schizo-phrenia	%	21.70	20.67	24.22	20.94	25.47	21.15	22.49	20.24	23.82	20.00	24.63	20.97	
	n	485	858	572	955	651	1134	564	1118	545	1192	528	1329	
	95% CI	21.66,21.74	20.65,20.69	24.18,24.26	20.92,20.96	25.44,25.50	21.14,21.16	22.46,22.52	20.23,20.23	23.78,23.86	19.99,19.99	24.59,24.67	20.96,20.98	
Cognitive	%	7.02	5.78	7.20	5.92	6.65	5.15	6.42	4.81	6.99	5.18	6.58	4.47	
	n	157	240	170	270	170	276	161	266	160	309	141	283	
	95% CI	7.00,7.04	5.77,5.79	7.18,7.22	5.91,5.93	6.63,6.67	5.14,5.16	6.40,6.44	4.80,4.80	6.97,7.04	5.17,5.17	6.56,6.60	4.46,4.48	
Eating	%	1.57	1.64	1.57	1.62	1.21	1.44	1.67	1.19	1.31	1.24	1.54	1.61	
	n	35	68	37	74	31	77	42	66	30	74	33	102	
	95% CI	1.56,1.58	1.63,1.65	1.56,1.58	1.61,1.63	1.20,1.22	1.44,1.44	1.66,1.68	1.19,1.19	1.30,1.32	1.24,1.24	1.53,1.55	1.61,1.61	
Sex	%	1.25	0.92	1.19	1.01	0.98	0.84	1.12	0.87	1.49	0.67	0.93	1.01	
	n	28	38	28	46	25	45	28	48	34	40	20	64	
	95% CI	1.24,1.26	0.92,0.92	1.18,1.20	1.01,1.01	0.97,0.99	0.84,0.84	1.11,1.13	0.87,0.87	1.48,1.50	0.67,0.67	0.92,0.94	1.01,1.01	

Objective 3: Comparing Clients Who Were Concerned about Only Cannabis, Only Alcohol, and Other Non-cannabis-non-alcohol Substance Use



Clients Concerned with Cannabis Only, Alcohol Only, and Other Non-cannabis-non-alcohol Use: Demographics, Healthcare Utilization & Mental Health Comorbidities

To get a more complete picture of clients who use cannabis, an analysis was conducted comparing clients who identified cannabis as their only substance of concern to a) other clients whose only concern was alcohol, and b) clients concerned with one or more drugs (excluding cannabis and alcohol). The reason for these comparisons is so we can compare clients who are only concerned with cannabis to 1) the most prevalent single substance of concern being alcohol and 2) the average specialty addiction treatment services client who is a non-cannabis-non-alcohol user. While a client has indicated that they are only concerned with a single substance that does not mean that they did not use other substances within the last 12 months. It is important to note that a small fraction of AHS AMH clients identify their only concern is cannabis. Therefore the focus of this analysis is not about volumes; rather, the focus is to isolate the profile of clients who are concerned only about cannabis to minimize dilution of associations due to clients who are concerned with multiple substances.

Cannabis Use and Concerns among Clients Seeking Addiction Treatment (2012-2018)

Compared to clients who reported being only concerned about using alcohol in the year preceding index enrollment, or reported being concerned about multiple substances excluding cannabis and alcohol, clients only concerned about using cannabis in the year preceding index enrollment in specialty addiction services were (a) on average 10 years younger than the non-cannabis-non-alcohol clients and 15 years younger than alcohol only clients and (b) less likely to have completed high school (Tables 7A & 7B). These trends occurred across each fiscal year in the study period.

Compared to clients who reported being only concerned about using alcohol in the year preceding index enrollment, or reported being concerned about multiple substances excluding cannabis and alcohol, clients only concerned about using cannabis in the year preceding index enrollment in specialty addiction services were seen primarily in an outpatient setting (Tables 8A & 8B). This trend occurred across each fiscal year in the study period.

Compared to clients who reported being only concerned about using alcohol in the year preceding index enrollment, or reported being concerned about multiple substances excluding cannabis and alcohol, clients only concerned about using cannabis in the year preceding index enrollment in specialty addiction services were less likely to have a substance abuse disorder diagnosis (Tables 9A & 9B). This trend occurred across each fiscal year in the study period.

Cannabis Use and Concerns among Clients Seeking Addiction Treatment (2012-2018)

TABLE 7A. DEMOGRAPHIC PROFILES OF CLIENTS CONCERNED WITH CANNABIS ONLY, ALCOHOL ONLY, AND NON-CANNABIS-NON-ALCOHOL USE, ALBERTA, 2012 – 2015

			2012/13			2013/14			2014/15		
			Alcohol	Cannabis	Non-cannabis-non-alcohol	Alcohol	Cannabis	Non-cannabis-non-alcohol	Alcohol	Cannabis	Non-cannabis-non-alcohol
AGE	Total	N	2789	289	7215	2681	311	7688	2672	300	8899
	Age	mean	41.72	25.78	35.49	42.09	25.59	34.78	41.82	25.48	34.20
		SD	13.46	11.68	12.38	13.28	11.12	12.25	13.36	11.35	12.05
		95%CI	41.22,42.22	24.43,27.13	35.20,35.78	41.59,42.59	24.35,26.83	34.51,35.05	41.31,42.33	24.20,26.76	33.95,34.45
GENDER	Female	%	36.32	31.83	40.42	36.18	30.87	38.46	35.74	33.33	38.50
		n	1013	92	2916	970	96	2957	955	100	3426
		95% CI	36.29,36.35	31.51,32.15	40.41,40.43	36.14,36.22	30.58,31.16	38.45,38.47	35.70,35.78	33.02,33.64	38.49,38.51
	Male	%	63.43	68.17	59.21	63.63	69.13	61.25	63.88	66.00	61.10
		n	1769	197	4272	1706	215	4709	1707	198	5437
		95% CI	63.40,63.46	67.85,68.49	59.20,59.22	63.59,63.67	68.84,69.42	61.24,61.26	63.84,63.92	65.69,66.31	61.09,61.11
EDUCATION	High School+	%	63.00	33.91	51.67	65.95	41.16	52.46	61.68	34.00	50.92
		n	1757	98	3728	1768	128	4033	1648	102	4531
		95% CI	62.97,63.03	33.59,34.23	51.66,51.68	65.92,65.98	40.85,41.47	52.45,52.47	61.64,61.72	33.69,34.31	50.91,50.93
	< High School	%	33.99	61.94	46.04	31.15	55.95	45.17	28.97	59.67	41.12
		n	948	179	3322	835	174	3473	774	179	3659
		95% CI	33.96,34.02	61.61,62.27	46.03,46.05	31.12,31.18	55.64,56.26	45.16,45.18	28.94,29.00	59.35,59.99	41.11,41.13
EMPLOYMENT	Employed	%	46.90	43.94	38.97	49.42	42.12	38.71	48.24	38.67	37.84
		n	1308	127	2812	1325	131	2976	1289	116	3367
		95% CI	46.86,46.94	43.60,44.28	38.96,38.98	49.38,49.46	41.81,42.43	38.70,38.72	48.20,48.28	38.35,38.99	37.83,37.85
	Un-employed	%	50.30	51.90	58.60	47.71	54.02	59.00	47.83	57.33	58.62
		n	1403	150	4228	1279	168	4536	1278	172	5217
		95% CI	50.26,50.34	51.56,52.24	58.59,58.61	47.67,47.75	53.71,54.33	58.99,59.01	47.79,47.87	57.01,57.65	58.61,58.63

Notes: The percentage of patients with missing education information ranged from 2.29% to 9.36% from 2012/13 to 2014/15. The percentage of patients with missing employment information ranged from 2.29% to 4.15% from 2012/13 to 2014/15.

Cannabis Use and Concerns among Clients Seeking Addiction Treatment (2012-2018)

TABLE 7B. DEMOGRAPHIC PROFILES OF CLIENTS CONCERNED WITH CANNABIS ONLY, ALCOHOL ONLY, AND NON-CANNABIS-NON-ALCOHOL USE, ALBERTA, 2015 – 2018

			2015/16			2016/17			2017/18		
			Alcohol	Cannabis	Non-cannabis-non-alcohol	Alcohol	Cannabis	Non-cannabis-non-alcohol	Alcohol	Cannabis	Non-cannabis-non-alcohol
AGE	Total	N	2627	240	9567	2847	227	9723	2841	226	9848
	Age	mean	42.34	26.38	34.47	41.99	28.42	34.79	42.01	28.39	34.55
		SD	13.24	11.66	11.87	13.25	12.04	11.87	13.43	13.55	11.81
		95%CI	41.83,42.85	24.90,27.86	34.23,34.71	41.50,42.48	26.85,29.99	34.55,35.03	41.52,42.50	26.62,30.16	34.32,34.78
GENDER	Female	%	36.28	29.58	37.51	35.72	28.19	38.73	37.13	26.99	39.36
		n	953	71	3589	1017	64	3766	1055	61	3876
		95%CI	36.24,36.32	29.21,29.95	37.50,37.52	35.69,35.75	27.80,28.58	38.72,38.74	37.10,37.16	26.61,27.37	39.35,39.37
	Male	%	63.11	69.58	61.90	63.36	68.72	60.38	62.23	71.24	59.89
	n	1658	167	5922	1804	156	5871	1768	161	5898	
	95%CI	63.07,63.15	69.20,69.96	61.89,61.91	63.33,63.39	68.32,69.12	60.37,60.39	62.20,62.26	70.85,71.63	59.88,59.90	
EDUCATION	High School+	%	59.65	38.75	48.03	60.91	38.77	47.19	61.84	37.61	46.43
		n	1567	93	4595	1734	88	4588	1757	85	4572
		95%CI	59.61,59.69	38.35,39.15	48.02,48.04	60.88,60.94	38.35,39.19	47.18,47.20	61.81,61.87	37.19,38.03	46.42,46.44
	< High School	%	25.01	47.92	39.11	24.87	40.97	39.97	23.58	39.82	40.00
	n	657	115	3742	708	93	3886	670	90	3939	
	95%CI	24.98,25.04	47.51,48.33	39.10,39.12	24.84,24.90	40.55,41.39	39.96,39.98	23.55,23.61	39.40,40.24	39.99,40.01	
EMPLOYMENT	Employed	%	41.07	35.42	33.44	40.71	33.04	30.44	41.92	31.42	28.92
		n	1079	85	3199	1159	75	2960	1191	71	2848
		95%CI	41.03,41.11	35.03,35.81	33.43,33.45	40.68,40.74	32.63,33.45	30.43,30.45	41.89,41.95	31.02,31.82	28.91,28.93
	Un-employed	%	46.48	52.92	57.11	46.40	48.02	58.12	44.56	44.69	58.65
	n	1221	127	5464	1321	109	5651	1266	101	5776	
	95%CI	46.44,46.52	52.51,53.33	57.10,57.12	46.37,46.43	47.59,48.45	58.11,58.13	44.53,44.59	44.26,45.12	58.64,58.66	

Notes: The percentage of patients with missing education information ranged from 12.86% to 20.26% from 2015/16 to 2017/18. The percentage of patients with missing employment information ranged from 9.45% to 23.89% from 2015/16 to 2017/18.

Cannabis Use and Concerns among Clients Seeking Addiction Treatment (2012-2018)

TABLE 8A. HEALTHCARE UTILIZATION OF CLIENTS CONCERNED WITH CANNABIS ONLY, ALCOHOL ONLY, AND NON-CANNABIS-NON-ALCOHOL USE, ALBERTA, 2012 – 2015

		2012/13			2013/14			2014/15				
		Alcohol	Cannabis	Non-cannabis-non-alcohol	Alcohol	Cannabis	Non-cannabis-non-alcohol	Alcohol	Cannabis	Non-cannabis-non-alcohol		
UTILIZATION**	ADDITION SERVICE TYPE*	Total	N	2789	289	7215	2681	311	7688	2672	300	8899
		Detox	%	26.32	9.00	24.09	22.08	5.79	24.61	19.28	7.00	25.40
		n	734	26	1738	592	18	1892	515	21	2260	
		95% CI	26.29,26.35	8.81,9.19	24.08,24.10	22.05,22.11	5.64,5.94	24.60,24.62	19.25,19.31	6.83,7.17	25.39,25.41	
		%	0.04	0.00	2.05	0.00	0.32	1.47	0.00	0.33	2.24	
		n	1	0	148	0	1	113	0	1	199	
		95% CI	0.04,0.04	0.00,0.00	2.05,2.05	0.00,0.00	0.28,0.36	1.47,1.47	0.00,0.00	0.29,0.37	2.24,2.24	
		%	66.80	86.16	64.55	69.00	90.68	65.28	72.00	88.33	64.33	
		n	1863	249	4657	1850	282	5019	1923	265	5725	
		95% CI	66.77,66.83	85.93,86.39	64.54,64.56	68.97,69.03	90.50,90.86	65.27,65.29	71.97,72.03	88.12,88.54	64.32,64.34	
	%	6.85	4.84	9.31	8.91	3.22	8.64	8.72	4.33	8.03		
	n	191	14	672	239	10	664	233	13	715		
	95% CI	6.83,6.87	4.69,4.99	9.30,9.32	8.89,8.93	3.11,3.33	8.63,8.65	8.70,8.74	4.20,4.46	8.02,8.04		
	mean	1.43	1.27	1.67	1.39	1.24	1.68	1.39	1.26	1.65		
	SD	0.90	0.69	1.19	0.81	0.60	1.16	0.92	0.62	1.16		
	95%CI	1.40,1.46	1.19,1.35	1.64,1.70	1.36,1.42	1.17,1.31	1.65,1.71	1.36,1.42	1.19,1.33	1.63,1.67		
	mean	3.55	1.76	3.66	3.50	1.55	3.97	3.56	1.89	3.80		
	SD	6.27	3.03	6.85	6.23	2.64	7.44	6.61	3.31	6.57		
	95%CI	3.32,3.78	1.41,2.11	3.50,3.82	3.26,3.74	1.26,1.84	3.80,4.14	3.31,3.81	1.52,2.26	3.66,3.94		
	mean	1.07	0.81	1.02	1.10	0.57	1.09	1.05	0.76	1.00		
	SD	2.41	2.34	2.76	2.60	1.55	2.75	2.41	2.69	2.59		
	95%CI	0.98,1.16	0.54,1.08	0.96,1.08	1.00,1.20	0.40,0.74	1.03,1.15	0.96,1.14	0.46,1.06	0.95,1.05		

* A single client could have multiple new enrollments of various service types within a single year.

** Average number of times a client visited an emergency department for any reason, was admitted as an inpatient for any reason, and the number of addiction treatment enrollments that occurred within the same fiscal year as the index enrollment to a specialty addiction treatment service. For example, someone who used cannabis in the past 12 months had an average of 3.5 visits to an ED in the same fiscal year, compared to 3.6 visits by those who did not use cannabis in the past 12 months

Cannabis Use and Concerns among Clients Seeking Addiction Treatment (2012-2018)

TABLE 8B. HEALTHCARE UTILIZATION OF CLIENTS CONCERNED WITH CANNABIS ONLY, ALCOHOL ONLY, AND NON-CANNABIS-NON-ALCOHOL USE, ALBERTA, 2015 – 2018

		2015/16			2016/17			2017/18			
		Alcohol	Cannabis	Non-cannabis-non-alcohol	Alcohol	Cannabis	Non-cannabis-non-alcohol	Alcohol	Cannabis	Non-cannabis-non-alcohol	
ADDITION SERVICE TYPE*	Total	N	2627	240	9567	2847	227	9723	2841	226	9848
	Detox	%	21.55	8.33	27.45	22.34	7.49	24.81	23.76	8.07	25.04
		n	566	20	2626	636	17	2412	670	18	2448
		95% CI	21.52,21.58	8.10,8.56	27.44,27.46	22.31,22.37	7.26,7.72	24.80,24.82	23.73,23.79	7.83,8.31	25.03,25.05
	Opioid Dependency Program	%	0.00	0.00	2.40	0.04	0.44	3.86	0.00	0.45	6.02
		n	0	0	230	1	1	375	0	1	589
		95% CI	0.00,0.00	0.00,0.00	2.40,2.40	0.04,0.04	0.38,0.50	3.86,3.86	0.00,0.00	0.39,0.51	6.02,6.02
	Outpatient	%	70.92	88.75	62.18	70.39	84.58	63.52	68.55	89.24	60.89
		n	1863	213	5948	2004	192	6176	1933	199	5953
		95% CI	70.89,70.95	88.49,89.01	62.17,62.19	70.36,70.42	84.27,84.89	63.51,63.53	68.52,68.58	88.97,89.51	60.88,60.90
Residential	%	7.54	2.92	7.97	7.24	7.49	7.82	7.70	2.24	8.05	
	n	198	7	762	206	17	760	217	5	787	
	95% CI	7.52,7.56	2.78,3.06	7.96,7.98	7.22,7.26	7.26,7.72	7.81,7.83	7.68,7.72	2.11,2.37	8.04,8.06	
Addiction Treatment Enrollments	mean	1.37	1.28	1.63	1.36	1.24	1.68	1.38	1.20	1.72	
	SD	0.84	0.69	1.17	0.91	0.72	1.25	0.85	0.63	1.29	
	95% CI	1.34,1.40	1.19,1.37	1.61,1.65	1.33,1.39	1.15,1.33	1.66,1.70	1.35,1.41	1.12,1.28	1.69,1.75	
Emergency Department Visits	mean	3.51	2.23	3.72	3.62	2.22	3.94	3.48	1.88	4.16	
	SD	5.86	3.91	6.63	6.27	3.54	7.38	6.19	2.88	7.92	
	95% CI	3.29,3.73	1.74,2.72	3.59,3.85	3.39,3.85	1.76,2.68	3.79,4.09	3.25,3.71	1.50,2.26	4.00,4.32	
Hospital Admissions	mean	1.03	0.77	0.96	1.05	0.84	1.02	1.03	0.81	1.06	
	SD	2.38	2.14	2.62	2.44	2.23	2.65	2.39	2.20	2.66	
	95% CI	0.94,1.12	0.50,1.04	0.91,1.01	0.96,1.14	0.55,1.13	0.97,1.07	0.94,1.12	0.52,1.10	1.01,1.11	

* A single client could have multiple new enrollments of various service types within a single year.

** Average number of times a client visited an emergency department for any reason, was admitted as an inpatient for any reason, and the number of addiction treatment enrollments that occurred within the same fiscal year as the index enrollment to a specialty addiction treatment service. For example, someone who used cannabis in the past 12 months had an average of 3.5 visits to an ED in the same fiscal year, compared to 3.6 visits by those who did not use cannabis in the past 12 months

TABLE 9A. MENTAL HEALTH COMORBIDITIES OF CLIENTS CONCERNED WITH CANNABIS ONLY, ALCOHOL ONLY, AND NON-CANNABIS-NON-ALCOHOL USE, ALBERTA, 2012 – 2015

		2012/13			2013/14			2014/15			
		Alcohol	Cannabis	Non-cannabis-non-alcohol	Alcohol	Cannabis	Non-cannabis-non-alcohol	Alcohol	Cannabis	Non-cannabis-non-alcohol	
MENTAL HEALTH COMORBIDITIES	Total	N	2789	289	7215	2681	311	7688	2672	300	8899
	Substance	%	74.65	41.87	75.98	76.35	43.41	78.59	76.35	53.33	78.49
		n	2082	121	5482	2047	135	6042	2040	160	6985
		95% CI	74.62,74.68	41.54,42.20	75.97,75.99	76.32,76.38	43.10,43.72	78.58,78.60	76.32,76.38	53.00,53.66	78.48,78.50
	Mood	%	58.62	44.29	62.25	59.98	51.45	63.22	59.92	55.67	62.25
		n	1635	128	4491	1608	160	4860	1601	167	5540
		95% CI	58.59,58.65	43.95,44.63	62.24,62.26	59.94,60.02	51.14,51.76	63.21,63.23	59.88,59.96	55.35,55.99	62.24,62.26
	Anxiety	%	49.01	40.48	55.97	50.50	41.80	56.70	52.66	42.67	56.71
		n	1367	117	4038	1354	130	4359	1407	128	5047
		95% CI	48.97,49.05	40.15,40.81	55.96,55.98	50.46,50.54	41.49,42.11	56.69,56.71	52.62,52.70	42.35,42.99	56.70,56.72
	Other	%	47.72	32.53	50.08	46.74	34.73	52.03	46.37	40.33	51.75
		n	1331	94	3613	1253	108	4000	1239	121	4605
		95% CI	47.68,47.76	32.21,32.85	50.07,50.09	46.70,46.78	34.43,35.03	52.02,52.04	46.33,46.41	40.01,40.65	51.74,51.76
	Develop-mental	%	13.12	15.57	18.36	12.61	14.79	19.25	13.47	18.00	18.83
n		366	45	1325	338	46	1480	360	54	1676	
	95% CI	13.10,13.14	15.32,15.82	18.35,18.37	12.59,12.63	14.57,15.01	19.24,19.26	13.44,13.50	17.75,18.25	18.82,18.84	
Personality	%	13.09	12.11	20.87	14.17	13.18	20.51	13.44	14.00	19.13	
	n	365	35	1506	380	41	1577	359	42	1702	
	95% CI	13.07,13.11	11.89,12.33	20.86,20.88	14.14,14.20	12.97,13.39	20.50,20.52	13.41,13.47	13.77,14.23	19.12,19.14	
Schizo-phrenia	%	11.01	4.15	7.91	9.32	3.22	7.93	10.70	4.67	7.27	
	n	307	12	571	250	10	610	286	14	647	
	95% CI	10.99,11.03	4.01,4.29	7.90,7.92	9.30,9.34	3.11,3.33	7.92,7.94	10.68,10.72	4.53,4.81	7.26,7.28	
Cognitive	%	9.36	21.80	17.62	9.88	25.08	19.06	10.07	33.67	18.98	
	n	261	63	1271	265	78	1465	269	101	1689	
	95% CI	9.34,9.38	21.52,22.08	17.61,17.63	9.86,9.90	24.81,25.35	19.05,19.07	10.05,10.09	33.36,33.98	18.97,18.99	
Eating	%	1.86	1.73	1.61	1.45	0.96	1.50	2.02	0.67	1.35	
	n	52	5	116	39	3	115	54	2	120	
	95% CI	1.85,1.87	1.64,1.82	1.61,1.61	1.44,1.46	0.90,1.02	1.50,1.50	2.01,2.03	0.62,0.72	1.35,1.35	
Sex	%	0.86	0.69	1.18	0.75	0.96	1.11	0.71	1.67	1.06	
	n	24	2	85	20	3	85	19	5	94	
	95% CI	0.85,0.87	0.63,0.75	1.18,1.18	0.74,0.76	0.90,1.02	1.11,1.11	0.70,0.72	1.59,1.75	1.06,1.06	

Cannabis Use and Concerns among Clients Seeking Addiction Treatment (2012-2018)

TABLE 9B. MENTAL HEALTH COMORBIDITIES OF CLIENTS CONCERNED WITH CANNABIS ONLY, ALCOHOL ONLY, AND NON-CANNABIS-NON-ALCOHOL USE, ALBERTA, 2015 – 2018

			2015/16			2016/17			2017/18		
			Alcohol	Cannabis	Non-cannabis-non-alcohol	Alcohol	Cannabis	Non-cannabis-non-alcohol	Alcohol	Cannabis	Non-cannabis-non-alcohol
MENTAL HEALTH COMORBIDITIES	Total	N	2627	240	9567	2847	227	9723	2841	226	9848
	Substance	%	76.48	48.33	79.48	75.97	53.30	80.34	74.76	38.50	79.79
		n	2009	116	7604	2163	121	7811	2124	87	7858
		95% CI	76.45,76.51	47.92,48.74	79.47,79.49	75.94,76.00	52.87,53.73	80.33,80.35	74.73,74.79	38.08,38.92	79.78,79.80
	Mood	%	57.14	48.33	60.01	56.30	56.39	59.93	51.88	42.92	57.19
		n	1501	116	5741	1603	128	5827	1474	97	5632
		95% CI	57.10,57.18	47.92,48.74	60.00,60.02	56.27,56.33	55.96,56.82	59.92,59.94	51.85,51.91	42.49,43.35	57.18,57.20
	Anxiety	%	52.23	43.33	56.33	50.05	46.26	55.06	48.82	40.71	54.18
		n	1372	104	5389	1425	105	5353	1387	92	5336
		95% CI	52.19,52.27	42.93,43.73	56.32,56.34	50.02,50.08	45.83,46.69	55.05,55.07	48.79,48.85	40.28,41.14	54.17,54.19
	Other	%	45.53	38.33	51.31	43.66	37.44	51.72	42.41	32.30	50.27
		n	1196	92	4909	1243	85	5029	1205	73	4951
	95% CI	45.49,45.57	37.93,38.73	51.30,51.32	43.63,43.69	37.02,37.86	51.71,51.73	42.38,42.44	31.89,32.71	50.26,50.28	
Developmental	%	12.52	15.42	17.88	12.82	21.59	18.29	10.77	15.04	17.77	
	n	329	37	1711	365	49	1778	306	34	1750	
	95% CI	12.50,12.54	15.13,15.71	17.87,17.89	12.80,12.84	21.23,21.95	18.28,18.30	10.75,10.79	14.73,15.35	17.76,17.78	
Personality	%	11.23	16.25	18.03	11.66	13.22	18.35	10.70	12.83	16.86	
	n	295	39	1725	332	30	1784	304	29	1660	
	95% CI	11.21,11.25	15.95,16.55	18.02,18.04	11.64,11.68	12.93,13.51	18.34,18.36	10.68,10.72	12.54,13.12	16.85,16.87	
Schizophrenia	%	8.56	6.25	6.62	7.83	3.08	6.26	7.22	1.33	5.97	
	n	225	15	633	223	7	609	205	3	588	
	95% CI	8.54,8.58	6.05,6.45	6.61,6.63	7.81,7.85	2.93,3.23	6.26,6.26	7.20,7.24	1.23,1.43	5.97,5.97	
Cognitive	%	8.64	22.92	18.34	9.24	25.11	18.39	7.74	27.43	18.48	
	n	227	55	1755	263	57	1788	220	62	1820	
	95% CI	8.62,8.66	22.58,23.26	18.33,18.35	9.22,9.26	24.74,25.48	18.38,18.40	7.72,7.76	27.04,27.82	18.47,18.49	
Eating	%	1.71	2.08	1.34	1.44	0.44	1.34	1.51	0.44	1.39	
	n	45	5	128	41	1	130	43	1	137	
	95% CI	1.70,1.72	1.96,2.20	1.34,1.34	1.43,1.45	0.38,0.50	1.34,1.34	1.50,1.52	0.38,0.50	1.39,1.39	
Sex	%	0.65	0.00	1.00	0.53	1.76	0.92	0.95	0.44	1.00	
	n	17	0	96	15	4	89	27	1	98	
	95% CI	0.64,0.66	0.00,0.00	1.00,1.00	0.53,0.53	1.65,1.87	0.92,0.92	0.94,0.96	0.38,0.50	1.00,1.00	

Notes

Substance of Use: A client enrolling in an addiction treatment service has indicated that they have used a substance in the last 12 months.

Substance of Concern: A client enrolling in an addiction treatment service has indicated that they are concerned with their use of a substance within the last 12 months.

Health service utilization was broken down into three parts:

1. Emergency department visits. This data was collected by aggregating the number of times a study participant appeared in the *National Ambulatory Care Reporting System* (NACRS) database within each fiscal year.
2. Hospital inpatient visits. This data was collected by aggregating the number of times a study participant appeared in the *Discharge Abstract Database* (DAD) within each fiscal year.
3. Addiction service treatment enrollments. This data was collected by aggregating the number of unique enrollments a study participant had within each fiscal year in Addiction and Mental Health System for Information and Service Tracking (ASIST).

The study participants were identified from the ASIST database and then linked to other administrative data for analysis. Please note the data limitations of ASIST in the data quality notes section (pp. 11-11).

ASIST is the only source used for addiction information in this report. This report does not reflect any activity that might be occurring where the main information system is different.

Data Sources

AHS Administrative Data Repository (DRRX):

- Discharge Abstract Database (DAD)
- National Ambulatory Care Reporting System (NACRS, since 2010)
- Addiction and Mental Health System for Information and Service Tracking (ASIST)

Appendix A: Data Systems

Addiction and Mental Health System for Information and Service Tracking (ASIST) is the clinical application used by addiction staff throughout the province and is one of the electronic health records for addiction services clients. Information collected on different information systems in some zones were not included in the results. ASIST collects data for treatment, prevention and information services provided and entered by clinicians.

Discharge Abstract Database (DAD) which captures admissions to acute care facilities including dates, a primary diagnosis, and up to 24 secondary diagnoses coded using the Canadian Enhancement of the International Statistical Classification of Diseases, 10th Revision (ICD-10). Trained professionals code diagnosis codes, and record data elements according to national guidelines set forth by the Canadian Institute for Health Information (<https://www.cihi.ca/en/discharge-abstract-database-metadata>).

Practitioner Claims Database, which records physician billing claims and up to 3 diagnosis codes, coded using the International Statistical Classification of Diseases, 9th Revision (ICD-9). This data is collected primarily to facilitate payment to physicians by the provincial government but is commonly used for health research studies.

National Ambulatory Care Reporting System (NACRS, since 2010) and *Alberta Ambulatory Care Reporting System (AACRS, before 2010)*, which include visits to emergency departments including relevant dates, a primary diagnosis, and up to 9 secondary diagnoses coded using ICD-10. Diagnosis codes are coded by trained professionals using national guidelines, and data elements are recorded according to national guidelines set forth by the Canadian Institute for Health Information (<https://www.cihi.ca/en/national-ambulatory-care-reporting-system-metadata>).

Appendix B: ICD Codes

Table 10. ICD-9/10 Coding Algorithms for Comorbid Condition Case Definitions.

Comorbidities	ICD-10	ICD-9
Liver Disease	B18.x, K70.0–K70.3, K70.9, K71.3–K71.5, K71.7, K73.x, K74.x, K76.0, K76.2–K76.4, K76.8, K76.9, Z94.4, I85.0, I85.9, I86.4, I98.2, K70.4, K71.1, K72.1, K72.9, K76.5, K76.6, K76.7	070.22, 070.23, 070.32, 070.33, 070.44, 070.54, 070.6, 070.9, 570.x, 571.x, 573.3, 573.4, 573.8, 573.9, V42.7, 456.0–456.2, 572.2–572.8
AIDS/HIV	B20.x–B22.x, B24.x	042.x–044.x
Substance	F10–F19, F55	291.0–291.9, 292.0–292.9, 303.0–303.9, 304.0–304.9, 305.0–305.9
Mood	F30, F31, F34.0, F32, F33, F34.1, F38.1, F34.8, F34.9, F38.0, F38.8, F39	296.0–296.1, 296.4–296.8, 296.2, 296.3, 300.4, 311, 296.9
Anxiety	F40, F41, F42, F93.0–F93.2, F43.0, F43.1, F43.8, F43.9	300.0, 300.2, 300.3, 309.8, 308.3
Schizophrenia	F20–F29	295.0–295.9, 298.8, 298.9, 297.1–297.3, 297.0–297.3, 297.8–297.9, 298.0–298.4
Personality	F60, F61, F62, F68, F69	301.0–301.9
Other	F44, F45, F48, F53, F54, F59, F99, G21, G24, G25, T50.9, T74.0–T74.2, Z00.4, Z04.6	300, 3001, 30011, 30013, 30014, 30015, 30016, 30019, 3007, 30070, 30081, 30082, 3009, 30090, 306, 3069, 307, 30789, 3100, 31000,

Cannabis Use and Concerns among Clients Seeking Addiction Treatment (2012-2018)

		3101, 31010, 3102, 3108, 3109, 313, 316, 7999
Developmental	F80-F84, F88-F90, F94, F95, F98	299, 2990, 29900, 29901, 2991, 29911, 2998, 29980, 29981, 2999, 29990, 29991, 307, 3070, 30723, 3076, 30921, 3120, 31200, 31220, 3128, 31281, 31289, 3129, 31290, 313, 31381, 31389, 31400, 31401, 3149, 315, 31500, 3152, 31531, 3159, 31590, 317, 31700, 318, 3180, 31800, 3181, 31810, 319, 31900
Cognitive	F00-F07, F09, G30	290, 2900, 29000, 2901, 29010, 29013, 2902, 29020, 29021, 2903, 29030, 2904, 29040, 29041, 29042, 29043, 2908, 2909, 293, 2930, 29300, 2931, 29389, 2939, 294, 2940, 29400, 2941, 29410, 2948, 29480, 2949, 78009
Eating	F50, F98.2, F98.3	307.1, 307.50, 307.51, 307.54
Sex	F52, F64, F65, F66	302.0–302.9

Cannabis Use and Concerns among Clients Seeking Addiction Treatment (2012-2018)

Table 11. ICD-9/10 “Other” mental health diagnosis breakdown.

Diagnosis Group	ICD10
OTH	Disassociative Disorders
	General Psychiatric Examination
	Other Conditions that are a Focus of Clinical attention
	Other Neurotic Disorders
	Postpartum Depression
	Psychological and behavioural factors
	Somatoform Disorders
	Unspecified Mental Disorder
	Unspecified behavioral syndromes
DIS	Developmental Disorders
	Impulse-Control Disorders
ISH	Intentional Self-Harm
NEU	Intellectual Disability
SLE	Nonorganic sleep disorders
	Other Conditions that are a Focus of Clinical attention
	ICD9
OTH	...[Specified Psychological Factor] Affecting...[Indicate the General Medical Condition]
	Age-Related Cognitive Decline
	Depersonalization Disorder
	Dissociative Amnesia
	Encopresis w Const/Incont
	Identity Problem
	Neurotic Disorders
	Organic Mental Disorder
	Organic Personality Disorder
	Other Ill-Defined & Unknown Causes of Morbidity/Mortality
	Pain Disorder Associated With Psychological Factors
	Physiological Malfunction Arising from Mental Factors
	Physiological malfunction arising from mental disorders
	Psychalgia
	Sleep Disorder Due to ç [Indicate the General Medical Condition], Mixed Type
	Somatoform Disorder, Hypochondriasis
	Special Symptoms or Syndromes, NEC
	Specific Nonpsychotic Mental Disorders d/t Organic Brain Dam
Unspecified Mental Disorder (non Psychotic)	

Cannabis Use and Concerns among Clients Seeking Addiction Treatment (2012-2018)

Vaginismus (Not Due to a General Medical Condition)
cardiovascular
cocaine affecting fetus via placenta or breast milk
disorder of organs
endocrine
gastrointestinal
genitourinary
musculoskeletal
observation and evaluation for suspected conditions not found
observation for unspecified suspected condition
other specified physiological
pecific Nonpsychotic Mental Disorders d/t Organic Brain Dam
respiratory
screening for alcoholism
skin disorder

OFC

Added By Macro
Adult Antisocial Behavior
Adverse Effects Of Work Environment
Alcoholism In Family
Borderline Intelligence
Circadian Rhythm Sleep Disorder
Convalescence Following Psychotherapy And Other Treatment For Mental Disorder
Family Disruption
Follow-Up Examination Following Psychotherapy And Other Treatment For Mental Disorder
Gambling And Betting
General Psychiatric Examination, Other And Unspecified
General Psychiatric Examination, Requested By The Authority
Health Problems Within Family
Legal Circumstances
Malingering
Mental And Behavioral Problems
Mental And Behavioral Problems With Communication (including Speech)
Mental And Behavioral Problems With Learning
Noncompliance With Treatment
Observation & Evaluation for Suspected Conditions not Found
Observation And Evaluation For Suspected Conditions Not Found
Observation For Suspected Malignant Neoplasm
Observation For Suspected Mental Condition
Observation and Evaluation for Suspected Conditions not found

Cannabis Use and Concerns among Clients Seeking Addiction Treatment (2012-2018)

Other Behavioral Problems
Other Family Circumstances
Other Mental Problems
Other Parent-Child Problems
Other Persons Seeking Consultation W/O Complaint/Sickness
Other Psychological Or Physical Stress, Not Elsewhere Classified
Other Psychosocial Circumstances
Other spec. Family Circumstance
Parasomnia NOS
Personal History Of Affective Disorders
Personal History Of Alcoholism
Personal History Of Mental Disorder
Personal History Of Neurosis
Personal History Of Other Mental Disorders
Personal History Of Schizophrenia
Personal History Of Unspecified Mental Disorder
Physical Abuse
Physical Abuse of Child
Primary Hypersomnia
Problems With Aged Parents Or In-Laws
Refusal Of Treatment For Reasons Of Religion Or Conscience
Screening For Alcoholism
Screening For Depression
Screening For Developmental Handicaps In Early Childhood
Screening For Mental Retardation
Screening For Other Specified Mental Disorders And Developmental Handicaps
Screening For Unspecified Mental Disorder And Developmental Handicap
Sexual Abuse of Adult (if focus of clinical attention is on the perpetrator and abuse is by person other than partner)
Sexual Abuse of Child (if focus of attention is on victim)
Sleep
Sleepwalking Disorder
Special Screening For Mental Disorders And Developmental Handicaps
Special Symptoms or Syndromes, Not Elsewhere Classified
Unemployment
Unspecified Mental Or Behavioral Problem
Unspecified Psychosocial Circumstance
child maltreatment syndrome
colostomy status

Cannabis Use and Concerns among Clients Seeking Addiction Treatment (2012-2018)

	family disruption
	housing economic
	inadequate housing
	unspecified family circumstance
ADJ	Adjustment Disorder with Depressive Mood
	Adjustment Disorder with Disturbance of Conduct
	Adjustment Disorder with Mixed Disturbance
	Adjustment Disorder, Nos
	Adjustment Reaction
	Adjustment reaction
	Post-Traumatic Stress Disorder
FAS	Alcohol Affecting Fetus Or Newborn Via Placenta Or Breast Milk
IMP	Disorders of impulse control
	Disturbance of Conduct, NOS
	Disturbance of Conduct, Not Elsewhere Classified
	Kleptomania
	Pyromania
	Trichotillomania