



PeaceHealth

The Spirit of Health



PeaceHealth Oregon Network

Cannabinoid Hyperemesis Syndrome Research

“Use and legalization of Cannabis”
Clinical trends, implications and impact

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Cannabinoid Hyperemesis Syndrome

Research and References

- New Mexico Study published 10/2018 (Annals of Social Science ISSN:2641-838X)
- Colorado Study published 3/2019 (Annals of Internal Medicine 2019,170:531-537)
- Surgeon Generals Advisory 8/2019 (HHS.gov)
- PeaceHealth Internal research 2019-2020



A mysterious syndrome that makes marijuana users violently ill is starting to worry doctors ([Business Insider](#))

A new study documents a sharp rise in emergency room visits linked with marijuana following legalization in Colorado. One of the key drivers of the ER visits is a mysterious syndrome characterized by severe nausea and repeated vomiting. Called cannabinoid hyperemesis syndrome, or CHS, very little is known about the condition.

The only known cure for CHS is to stop using marijuana. Researchers still aren't sure what causes it.

Colorado Study Abstract:

Background: Little is known about the relative harms of edible and inhalable cannabis products.

Objective: To describe and compare adult emergency department (ED) visits related to edible and inhaled cannabis exposure.

Design: Chart review of ED visits between 1 January 2012 and 31 December 2016.

Setting: Large urban academic hospital in Colorado.

Participants: Adults with ED visits with a cannabis-related International Classification of Diseases, Ninth or 10th Revision, Clinical Modification (ICD-9-CM or ICD-10-CM), code.

Measure: Patient demographic characteristics, route of exposure, dose, symptoms, length of stay, disposition, discharge diagnoses, and attribution of visit to cannabis.

Results: There were 9973 visits with an ICD-9-CM or ICD-10-CM code for cannabis use. Of these, 2567 (25.7%) visits were at least partially attributable to cannabis, and 238 of those (9.3%) were related to edible cannabis. Visits attributable to inhaled cannabis were more likely to be for cannabinoid hyperemesis syndrome (18.0% vs. 8.4%), and visits attributable to edible cannabis were more likely to be due to acute psychiatric symptoms (18.0% vs. 10.9%), intoxication (48% vs. 28%), and cardiovascular symptoms (8.0% vs. 3.1%). Edible products accounted for 10.7% of cannabis-attributable visits between 2014 and 2016 but represented only 0.32% of total cannabis sales in Colorado (in kg of tetrahydrocannabinol) during that period.

Limitation: Retrospective study design, single academic center, self-reported exposure data, and limited availability of dose data.

Conclusion: Visits attributable to inhaled cannabis are more frequent than those attributable to edible cannabis, although the latter is associated with more acute psychiatric visits and more ED visits than expected.

Primary Funding Source: Colorado Department of Public Health and Environment.



Although cannabis is widely used as a natural alternative to many pharmaceutical drugs, there are medical conditions that just don't work well with it, most notably [bipolar disorder](#), some eating disorders and Cannabinoid Hyperemesis Syndrome (CHS).

What is Cannabinoid Hyperemesis Syndrome?

Cannabinoid Hyperemesis Syndrome is caused by chronic, and heavy cannabis use. People experience **nausea, vomiting** and moderate to severe **abdominal pain** lasting one to seven days. Hot showers relieve the symptoms so one develops the habit of taking **frequent hot baths**. **Medications intended to relief Nausea won't work.**

As these studies confirmed, including PH internal research, **these patients are more likely** to utilize Emergency room services on a very frequent basis.

Research Article

Volume 2 Issue 1 - October 2018

DOI: 10.19080/ASM.2018.02.555577

Ann Soc Sci Manage Stud

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Cannabinoid Hyperemesis Syndrome; A Growing Concern for New Mexico



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Submission: August 10, 2018; Published: October 09, 2018

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Abstract

Background: In 2012, New Mexico became the 12th state to allow the use of cannabis for medical use. Cannabinoid hyperemesis syndrome (CHS) is characterized by recurrent episodes of heavy nausea, vomiting, and abdominal pain. Early identification of patients with CHS will assist in decreasing orders for invasive and expensive medical procedures.

Methods: A retrospective analysis was performed using emergency department (ED) data from 2010-2015 in New Mexico. CHS was defined as an ED visit with a combination of persistent vomiting and cannabis related diagnosis codes. Trends over the six years were analyzed by patient characteristics; sex, age, and geographic location, as well as overall counts of visits for this health condition. A weighted national estimate using the Nationwide Emergency Department Sample (NEDS) was used as a comparison to New Mexico state data.

Results: The overall number of ED visits increased by 24.2% from 2010 to 2015. The annual number of ED visits for CHS increased by 585.7% in New Mexico. In the U.S., a similar increase in CHS was observed at 423.3%. In New Mexico, CHS visits were more likely to be male, between the age of 18-29 years, and reside in the northeast region of the state.

Conclusion: This analysis demonstrated that ED visits for CHS are increasing and as more states adopt recreational marijuana use legislation, larger increases will be observed.

Keywords: Cannabis; Emergency department; Cyclic vomiting; Hot showers



Annals of Internal Medicine

ORIGINAL RESEARCH

Acute Illness Associated With Cannabis Use, by Route of Exposure

An Observational Study

Andrew A. Monte, MD, PhD; Shelby K. Shelton, MPH; Eleanor Mills, BS; Jessica Saben, PhD; Andrew Hopkinson, BS; Brandon Sonn, MS; Michael Devivo, BA; Tae Chang, MD; Jacob Fox, BA; Cody Brevik, MD; Kayla Williamson, MS; and Diana Abbott, PhD

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Ann Intern Med. 2019;170:531-537. doi:10.7326/M18-2809

For author affiliations, see end of text.

This article was published at Annals.org on 26 March 2019.

Annals.org

U.S. Surgeon General's Advisory: Marijuana Use and the Developing Brain

I, Surgeon General VADM Jerome Adams, am emphasizing the importance of protecting our Nation from the health risks of marijuana use in adolescence and during pregnancy. Recent increases in access to marijuana and in its potency, along with misperceptions of safety of marijuana endanger our most precious resource, our nation's youth.

KNOW THE RISKS. TAKE ACTION. PROTECT OUR FUTURE.



"Adams said science shows that marijuana is harmful to the developing brains of teenagers and to the human fetus. The drug has also gotten stronger, with a three-fold increase in the concentration of the active ingredient THC in cultivated plants over the last 20 years. **"This Ain't your mother's marijuana,"** he said. The THC concentration in marijuana plants has [increased threefold between 1995 and 2014](#), according to the report, and concentrated products can contain up to 75% THC. "The higher the THC delivery, the higher the risk," Adams said.

- The surgeon general said his advisory is a direct result of scientific research that runs counter to changing social mores.
- Adams said. "Over time there has been a change in attitudes about marijuana creating a false sense of security."
- "While the perceived harm of marijuana is decreasing, the scary truth is that the actual potential for harm is increasing," Surgeon General Jerome Adams.
- Surveys show that an increasing number of adolescents and pregnant women use the drug, which can be eaten, smoked or vaped. But the surgeon general told NPR in an interview that many people are not aware of just how potent the drug can be.

The American Medical Association said it strongly supports the government's effort, adding that it for some time it has been recommending against marijuana use by teens, pregnant women and women who are breastfeeding.

Links to articles and advisories:

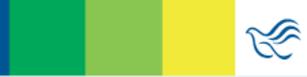
[Hhs.gov - Advisory-on-marijuana-use-and-developing-brain](https://www.hhs.gov/advisory-on-marijuana-use-and-developing-brain)

[npr.org - surgeon-general-sounds-alarm-on-risk-of-marijuana-addiction-and-harm](https://www.npr.org/surgeon-general-sounds-alarm-on-risk-of-marijuana-addiction-and-harm)

A typical patient with CHS dx



When	Type	Provider	Dept	Specialty	Description	Rest CSN
03/04/2019	Office Visit	Nielsen, Hollys J, FNP	WEUC URG...	Urgent Care	Bilious vomiting with nausea	445456494
12/03/2018	Office Visit	Cronin, Kimberly A, MD	WEUC URG...	Urgent Care	History of nausea and vomiting	442682420
1 Year Ago						
08/23/2018	Admission (Discharged)	Singh, Amandeep, MD	UDMC MU	Bedded Unit		439605521
08/23/2018	ED		RBMC ED	Emergency Me	Dehydration; Intractable cyclical vomiting with nausea; AKI (acute kidney injury) (HCC)	439596550
08/02/2018	Admission (Canceled)	Barasa, Samson W, MD	RBMC CAR...	Bedded Unit		438974627
08/01/2018	ED to Hosp-Admissio...	Brown, Jeremy T, MD	UDMC MU	Bedded Unit	AKI (acute kidney injury) (HCC); Intractable cyclical vomiting with nausea; Dehydration; Cannabinoid hyperemesis syndrome (HCC)	438973718
08/01/2018	ED		UDMC ED	Emergency Me		438958844
07/31/2018	ED		RBMC ED	Emergency Me		438913005
07/24/2018	ED to Hosp-Admissio...	Ready, Katherine F, MD	RBMC MOTH...	Obstetrics	Intractable cyclical vomiting with nausea; Lactic acidosis; Dehydration	438727756
07/24/2018	Admission (Pending)	Draghici, Violeta, MD				438718067
07/24/2018	ED	Day, Michael L, MD	UDMC ED	Emergency Me	Severe dehydration; Altered mental status, unspecified altered mental status type; Intractable vomiting with nausea, unspecified vomiting type; Hyp...	438701207
07/01/2018	ED		UDMC ED	Emergency Me	Cannabinoid hyperemesis syndrome (HCC)	438066667
06/30/2018	ED		UDMC ED	Emergency Me	Cannabinoid hyperemesis syndrome (HCC)	438059333
06/29/2018	ED		UDMC ED	Emergency Me	Non-intractable cyclical vomiting with nausea (Primary Dx)	438029432
06/02/2018	ED	Jacobs, Bianca G, MD	UDMC ED	Emergency Me	Generalized abdominal pain (Primary Dx); Non-intractable vomiting with nausea, unspecified vomiting type	429563480
06/02/2018	ED		UDMC ED	Emergency Me	Generalized abdominal pain	429450806
05/27/2018	ED		UDMC ED	Emergency Me	Laceration of scalp, subsequent encounter	428240538
05/27/2018	ED	Ziemski, Glenn, MD	UDMC ED	Emergency Me	Vasovagal syncope; Cannabis hyperemesis syndrome concurrent with and due to cannabis abuse (HCC)	427568160
04/27/2018	ED		UDMC ED	Emergency Me	Constipation, unspecified constipation type; Abdominal pain, unspecified abdominal location	417936745
04/11/2018	ED		UDMC ED	Emergency Me	Nausea and vomiting, intractability of vomiting not specified, unspecified vomiting type (Primary Dx); Constipation, unspecified constipation type; H...	411820846
04/11/2018	ED	Doherty, Melissa J, MD	UDMC ED	Emergency Me	Right lower quadrant abdominal pain; Other constipation	411723486
12/02/2017	ED	Callahan, Robert J, MD	UDMC ED	Emergency Me	Generalized abdominal pain (Primary Dx); Left against medical advice	373526480
11/24/2017	ED		UDMC ED	Emergency Me		371258507



Introduction:

PeaceHealth Oregon Network, Dr. Friedlander conducted a limited scope preliminary study, utilizing a similar study set up as the researchers from Colorado State, with the goal of understanding the impact of cannabis legalization in Oregon on PeaceHealth's hospitals in Lane County.

Anecdotally acute care providers felt that the number of patients entering the system through the Emergency department with Cannabis related symptoms (explosive vomiting, constipation, etc.) increased with the legalization and commercialization of cannabis products in a large scale and most part unregulated market, specifically the lack of health advisories and strength, etc.

Hypothesis:

Cannabis was legalized by the Oregon legislature in July 2015. With legalization, barriers to access and growth of cannabis have been removed. This has resulted in more *“potent strains of cannabis, possibly causing unexpected health impacts and as such a greater need for health care.”* In this preliminary study, the following questions were answered:

Part I ... Did the number of health care visits with Cannabis ICD related dx increase following legalization?

Part II ... Focus population - Cannabis ICD with a ICD for Nausea and Vomiting (ex. *Cannabinoid Hyperemesis Syndrome (CHS)*)

- Did that specific population increase?
- What is the impact on frequent emergency room visits for this group?

Part III ...“Clinical and Social Work Interventions”

- What can we do to improve patient and community health?

Data Source:

1. Premier Quality Advisor for the period of 2014 – 2018
2. PeaceHealth internal historical data derived from the EMR system, for the period in scope and based in ICDs in scope for the period of 2010 – 2019, Acute Care and Critical Access Hospitals (SHMC RiverBend, SHMC University, Cottage Grove General Hospital, Peace Harbor Hospital)



“Colorado Study” – Cannabis ICD

Appendix Table. ICD Codes Used for Data Pull

ICD-10-CM marijuana and cannabis codes

F12 Cannabis related disorders
 F12.1 Cannabis abuse
 F12.10 Cannabis uncomplicated
 F12.12 Cannabis abuse with intoxication
 F12.120 Cannabis uncomplicated
 F12.121 Cannabis delirium
 F12.122 Cannabis with perceptual disturbance
 F12.129 Cannabis abuse unspecified
 F12.15 Cannabis abuse with psychotic disorder
 F12.150 Cannabis abuse with delusions
 F12.151 Cannabis abuse with hallucinations
 F12.159 Cannabis abuse unspecified
 F12.18 Cannabis abuse with other cannabis-induced disorder
 F12.180 Cannabis abuse with cannabis-induced anxiety disorder
 F12.188 Cannabis abuse with other cannabis-induced disorder
 F12.19 Cannabis abuse with unspecified cannabis-induced disorder
 F12.2 Cannabis dependence
 F12.20 Cannabis dependence uncomplicated
 F12.21 Cannabis dependence in remission
 F12.22 Cannabis dependence with intoxication
 F12.220 Cannabis dependence uncomplicated
 F12.221 Cannabis dependence with delirium
 F12.222 Cannabis dependence with perceptual disturbance
 F12.229 Cannabis dependence unspecified
 F12.25 Cannabis dependence with psychotic disorder
 F12.250 Cannabis dependence with delusions
 F12.251 Cannabis dependence with hallucinations
 F12.259 Cannabis dependence unspecified
 F12.28 Cannabis dependence with other cannabis-induced disorder
 F12.280 Cannabis dependence with cannabis-induced anxiety disorder
 F12.288 Cannabis dependence with other cannabis-induced disorder
 F12.29 Cannabis dependence with unspecified cannabis-induced disorder
 F12.9 Cannabis use, unspecified
 F12.90 Cannabis use uncomplicated
 F12.92 Cannabis use, unspecified with intoxication
 F12.920 Cannabis use uncomplicated
 F12.921 Cannabis use with delirium
 F12.922 Cannabis use with perceptual disturbance
 F12.929 Cannabis use unspecified
 F12.95 Cannabis use, unspecified with psychotic disorder
 F12.950 Cannabis use with delusions
 F12.951 Cannabis use with hallucinations
 F12.959 Cannabis use unspecified
 F12.98 Cannabis use, unspecified with other cannabis-induced disorder
 F12.980 Cannabis use, unspecified with anxiety disorder
 F12.988 Cannabis use, unspecified with other cannabis-induced disorder
 F12.99 Cannabis with unspecified cannabis-induced disorder
 T40.7X1A Poisoning by cannabis, accidental/unintentional
 T40.7 Poisoning by, adverse effect of and underdosing of cannabis (derivatives)
 T40.7X Poisoning by, adverse effect of and underdosing of cannabis (derivatives)
 T40.7X1 Poisoning by cannabis (derivatives), accidental (unintentional)
 T40.7X1A initial encounter
 T40.7X1D subsequent encounter
 T40.7X1S sequela
 T40.7X2 Poisoning by cannabis (derivatives), intentional self-harm
 T40.7X2A initial encounter
 T40.7X2D subsequent encounter
 T40.7X2S sequela
 T40.7X3 Poisoning by cannabis (derivatives), assault
 T40.7X3A initial encounter
 T40.7X3D subsequent encounter
 T40.7X3S sequel
 T40.7X4A Poisoning by cannabis, undetermined

Appendix Table—Continued

ICD-9-CM cannabis codes

305.2 Marijuana/cannabis abuse, nondependent
 305.20 Marijuana/cannabis abuse, unspecified
 305.21 Marijuana/cannabis abuse, continuous
 305.22 Marijuana/cannabis abuse, episodic
 305.23 Marijuana/cannabis abuse, in remission
 304.3 Marijuana/cannabis dependence
 304.31 Marijuana/cannabis dependence unspecified
 304.32 Marijuana/cannabis dependence episodic
 304.33 Marijuana/cannabis dependence in remission
 T40.7 Poisoning by cannabis

ICD-9-CM = International Classification of Diseases, Ninth Revision, Clinical Modification; ICD-10-CM = International Classification of Diseases, 10th Revision, Clinical Modification.

PeaceHealth – focused population

Population research 1:

Patients with ICD for Nausea/Vomiting

- ICD-9 ...787.01
- ICD-10 ... R11

Question:

With the legalization of cannabis, have the number of patient’s with cannabis-related complications increased?

Population research 2:

Patients with ICD for Nausea/Vomiting only

- ICD-10 ... R11

Conduct chart reviews to obtain information of causes and impact on frequent visits to the emergency department with CHS increased.

Question:

Population for frequent emergency room visit for patients with symptoms of Nausea/Vomiting + cannabis use – a potential dx of CHS (Cannabinoid Hyperemesis Syndrome F12.188)



Part I

“Public Health Concerns”

Did the number of visits with Cannabis related ICDs increase in the PeaceHealth Oregon Network since legalization of Cannabis in July 2015?

Did visits go up?



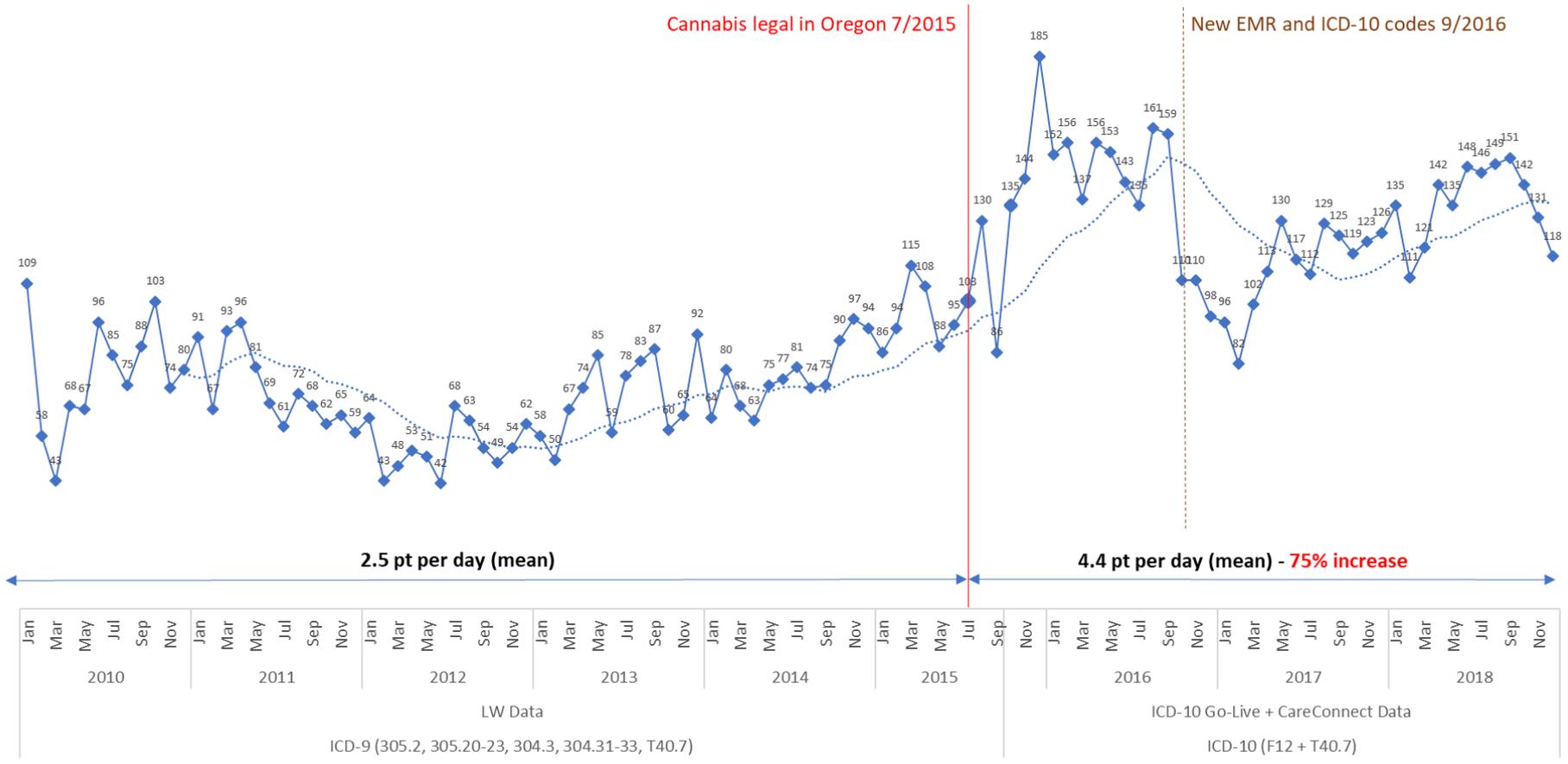
75% increase post legalization (SHMC RiverBend and University District only)

About 4.4 pts per day are coded with a cannabis related ICD (RiverBend and UD only)

SHMC RB + UD: Cannabis related visits (based on ICD coding)

Cannabis legal in Oregon 7/2015

New EMR and ICD-10 codes 9/2016



2.5 pt per day (mean)

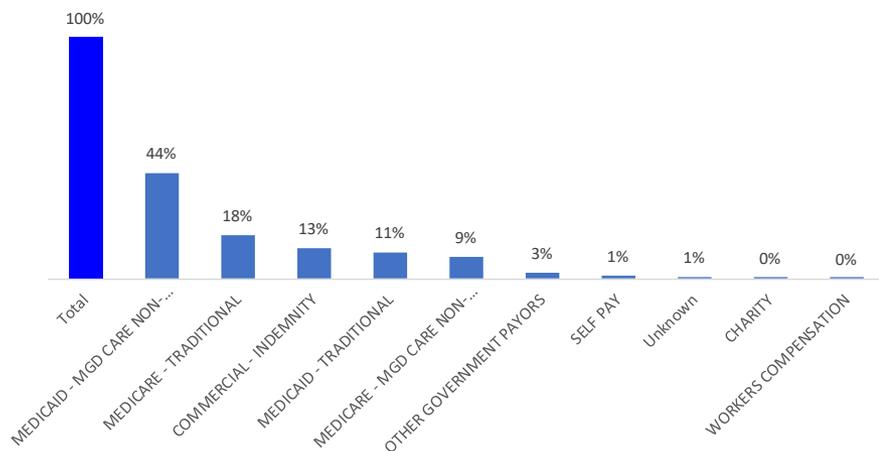
4.4 pt per day (mean) - 75% increase

LW Data
ICD-9 (305.2, 305.20-23, 304.3, 304.31-33, T40.7)

ICD-10 Go-Live + CareConnect Data
ICD-10 (F12 + T40.7)



2018 Cannabis Dx by ICD10 F12 ... Distribution by Payor

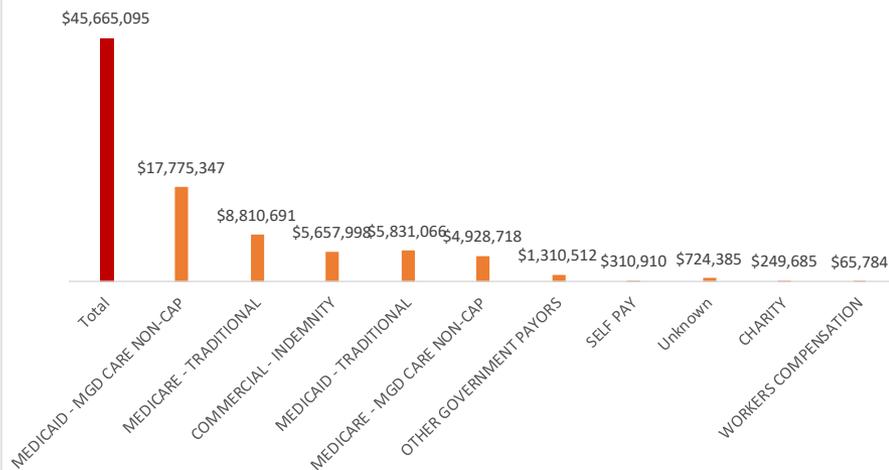


Source:

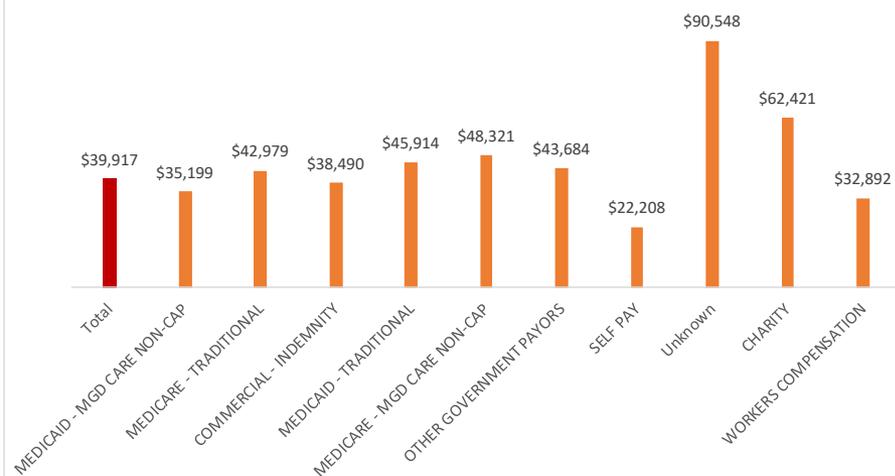
Premier Inc Quality Advisor data for SHMC UD and RiverBend

- Period of CY2018
- ICD-10s with indication of Cannabis (code selection in alignment with Colorado State Study)
- **Population size = 1144 pt.** in 2018 with Cannabis ICD
- Charges are a total of the entire health care episode and not just Cannabis ICDs.

2018 Cannabis Dx by ICD10 F12 ... by Total Charges



2018 Cannabis Dx by ICD10 F12 ... by Mean Charges





Part II

“Clinical Concerns”

Are there more patients with Cannabis
ICDs + symptoms of Nausea and
Vomiting?

ex. Cannabinoid Hyperemesis Syndrome (CHS)

Did visits go up for Cannabis with Nausea + Vomiting?

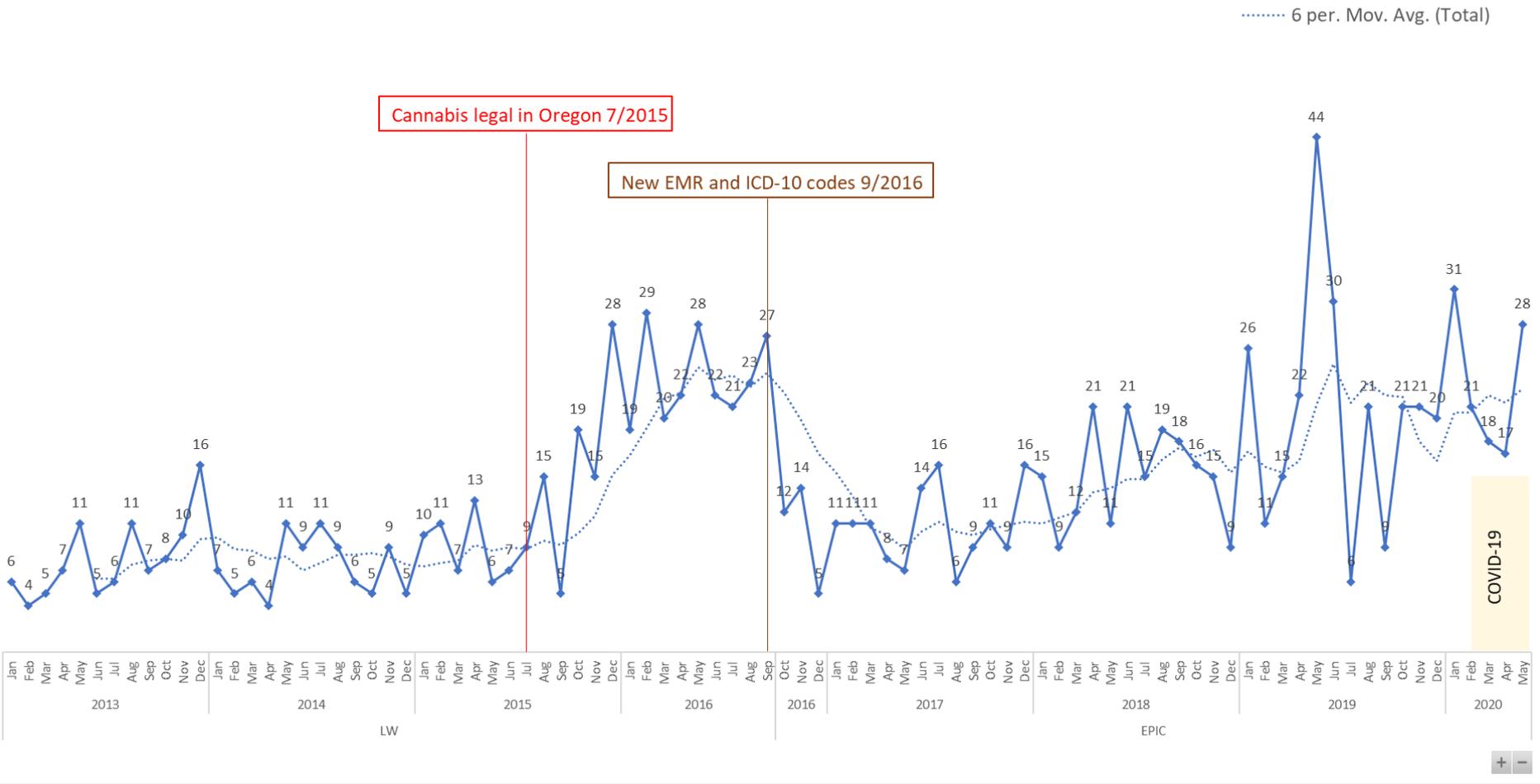


For PeaceHealth Lane County (Acute and Critical Access) a 250% initial increase post legalization

- An average of 0.25 patients/day pre- vs 1 patient/day post-legalization
- The drop with implementation of new EMR and ICD-10, is potentially attributed due provider documentation and ICD coding changes.
 - Most recent period still about 100% higher than pre-legalization

PeaceHealth Oregon Network Acute Care and Critical Access - Patients with "Cannabis" CPT + "Nausea and Vomiting"

— Total
 6 per. Mov. Avg. (Total)



+ -

Increase attributed to ...



Total population size – 1083 pt. (1/2010 – 6/2019)

Data confirms the significant increase of visits post cannabis legalization in Oregon, it confirms what previous studies in other states (Colorado, New Mexico) have observed once they legalized cannabis.

A major clinical concern of the providers at PeaceHealth is the population with symptoms of Nausea/Vomiting, and indication of Cannabis use, specifically heavy cannabis users.

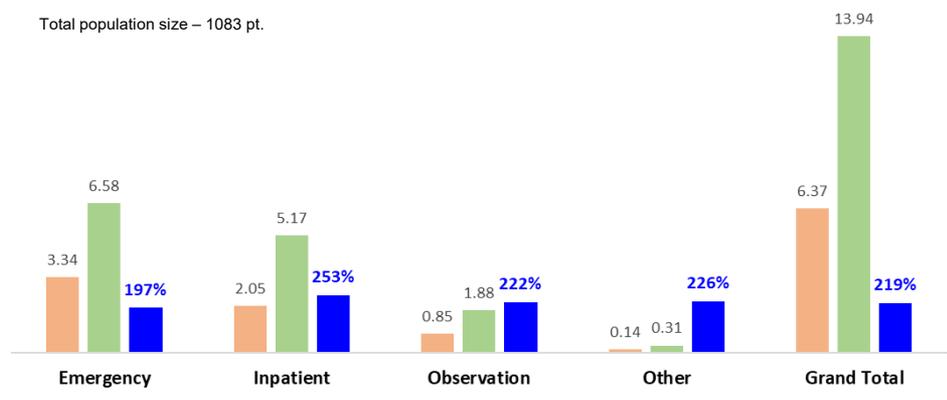
While cannabis has been in circulation for many years, it is unknown how current distribution (ease of access), cannabis strains and potency are adversely affecting population health.

See also *US Surgeon General assessment* on next slide

Pre/Post legalization increase - Account Type

Before / Month After / Month Increase (%)

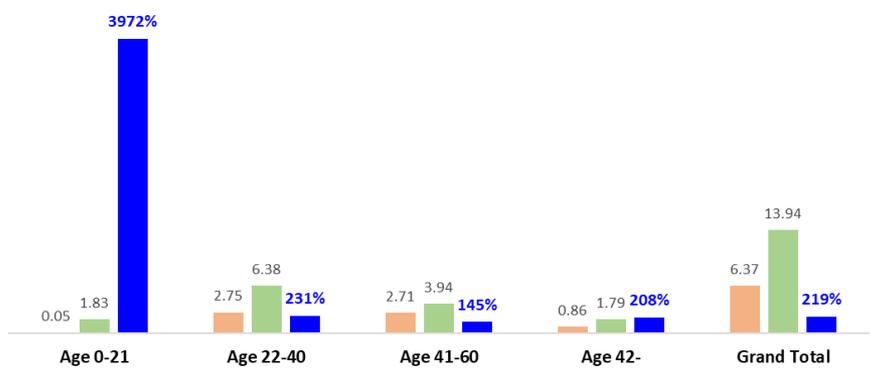
Total population size – 1083 pt.



Pre/Post legalization increase - Age Groups

Before / Month After / Month Increase (%)

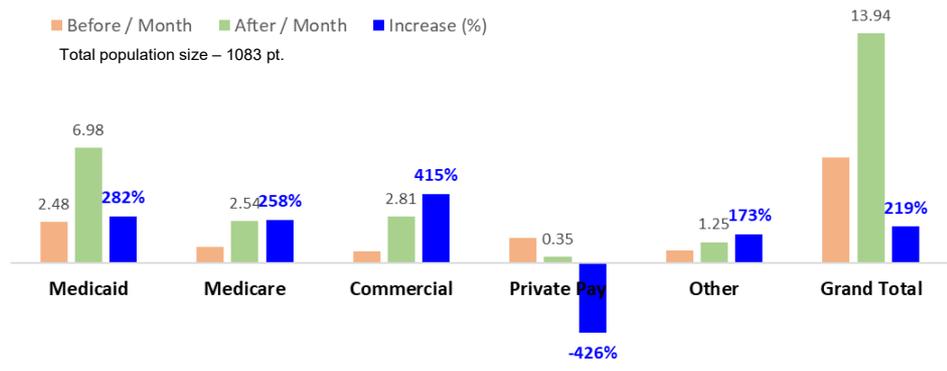
Total population size – 1083 pt.



Pre/Post legalization increase - Payer

Before / Month After / Month Increase (%)

Total population size – 1083 pt.



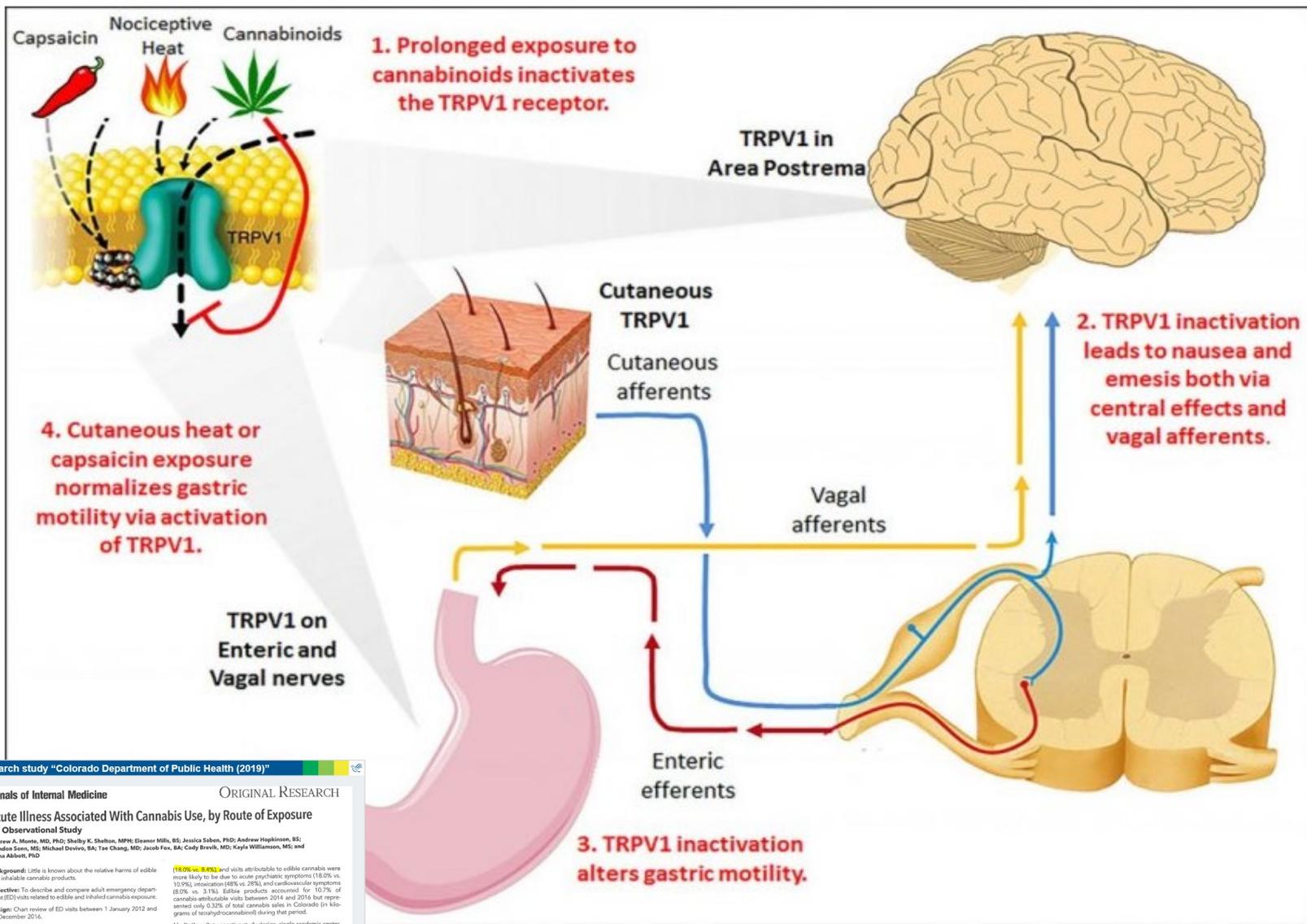


2018 pt. with Nausea/Vomiting cpt - PeaceHealth Lane County

Visits	Patients	% of total pt.	Sum of pt visits	% of pt. visits	Mean # of Visits/pt.	Total Charges	% of charges	Total Payment
0-3	8200	99%	9333	93%	1.1	\$ 75,414,237	94%	\$ 23,926,697
>4	112	1%	663	7%	5.9	\$ 5,006,106	6%	\$ 1,458,771
> 4 Other Dx	70	63%	411	62% / 4% of total	5.9	\$ 3,128,816		\$ 911,732
> 4 CHS Dx	42	37%	252	38% / 3% of total	5.9	\$ 1,877,290		\$ 547,039
Total	8312		9996		1.2	\$ 80,420,343		\$ 25,385,468

In 2018, 112 Cannabinoid Hyperemesis Syndrome (CHS) patients presented in our PeaceHealth Oregon community:

- Average of about [6 emergency room visits per patient](#) related to Nausea/Vomiting
- About 7% of the total visit volume (663 total)
- Chart review of all 112 patients, established that approximately:
 - [37% \(or 42 patients age range between 15 and 74\) had an indication of heavy Cannabis use](#), fitting the clinical description of CHS (F12.188)
 - 63% were ruled out for CHS, potentially due to lack of clinical documentation.
- Due to CHS still being a relatively new diagnosis, the data is highly dependent on proper CPT coding and provider charting, something PeaceHealth will be focusing on in the future.



Research study "Colorado Department of Public Health (2019)"

Annals of Internal Medicine ORIGINAL RESEARCH

Acute Illness Associated With Cannabis Use, by Route of Exposure

An Observational Study

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Background: Little is known about the relative harms of edible and inhalable cannabis products.

Objective: To describe and compare adult emergency department (ED) visits related to edible and inhaled cannabis exposure.

Design: Chart review of ED visits between 1 January 2012 and 31 December 2016.

Setting: A large urban academic hospital in Colorado.

Participants: Adults with ED visits with a cannabis-related International Classification of Diseases, Ninth or Tenth Revision, Clinical Modification (ICD-9-CM or ICD-10-CM) code.

Measurements: Patient demographic characteristics, route of exposure, dose, symptoms, length of stay, disposition, discharge diagnoses, and attribution of visit to cannabis.

Results: There were 9973 visits with an ICD-9-CM or ICD-10-CM code for cannabis use. Of these, 2567 (25.7%) visits were at least partially attributable to cannabis, and 238 of those (9.3%) were related to edible cannabis. **Key messages:** Edible cannabis is more likely to be for cannabinoid hyperemesis syndrome.

Results: Edible and visits attributable to edible cannabis were more likely to be due to acute psychiatric symptoms (18.0% vs. 10.9%), amnesia (8% vs. 2%), and cardiovascular symptoms (8.0% vs. 3.1%). Edible products accounted for 10.7% of cannabis-attributable visits between 2014 and 2016 but represented only 0.32% of total cannabis sales in Colorado (in kilograms of tetrahydrocannabinol) during that period.

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For author affiliations, see end of text.
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cannabis in these CHS patients inactivates the TRPV1 receptors, and normalizes gastric motility.



Annals of Internal Medicine

ORIGINAL RESEARCH

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Participants: Adults with ED visits with a cannabis-related International Classification of Diseases, Ninth or 10th Revision, Clinical Modification (ICD-9-CM or ICD-10-CM), code.

Measurements: Patient demographic characteristics, route of exposure, dose, symptoms, length of stay, disposition, discharge diagnoses, and attribution of visit to cannabis.

Results: There were 9973 visits with an ICD-9-CM or ICD-10-CM code for cannabis use. Of these, 2567 (25.7%) visits were at least partially attributable to cannabis, and 238 of those (9.3%) were related to edible cannabis. Visits attributable to inhaled cannabis were more likely to be for cannabinoid hyperemesis syndrome

(18.0% vs. 8.4%), and visits attributable to edible cannabis were more likely to be due to acute psychiatric symptoms (18.0% vs. 10.9%), intoxication (48% vs. 28%), and cardiovascular symptoms (8.0% vs. 3.1%). Edible products accounted for 10.7% of cannabis-attributable visits between 2014 and 2016 but represented only 0.32% of total cannabis sales in Colorado (in kilograms of tetrahydrocannabinol) during that period.

Limitation: Retrospective study design, single academic center, self-reported exposure data, and limited availability of dose data.

Conclusion: Visits attributable to inhaled cannabis are more frequent than those attributable to edible cannabis, although the latter is associated with more acute psychiatric visits and more ED visits than expected.

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For author affiliations, see end of text.

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Annals.org



9973 patient visits 2012-2016 Colorado ED Annals 170:531-37 2019

ORIGINAL RESEARCH

Acute Illness Associated With Cannabis Use, by Route of Exposure

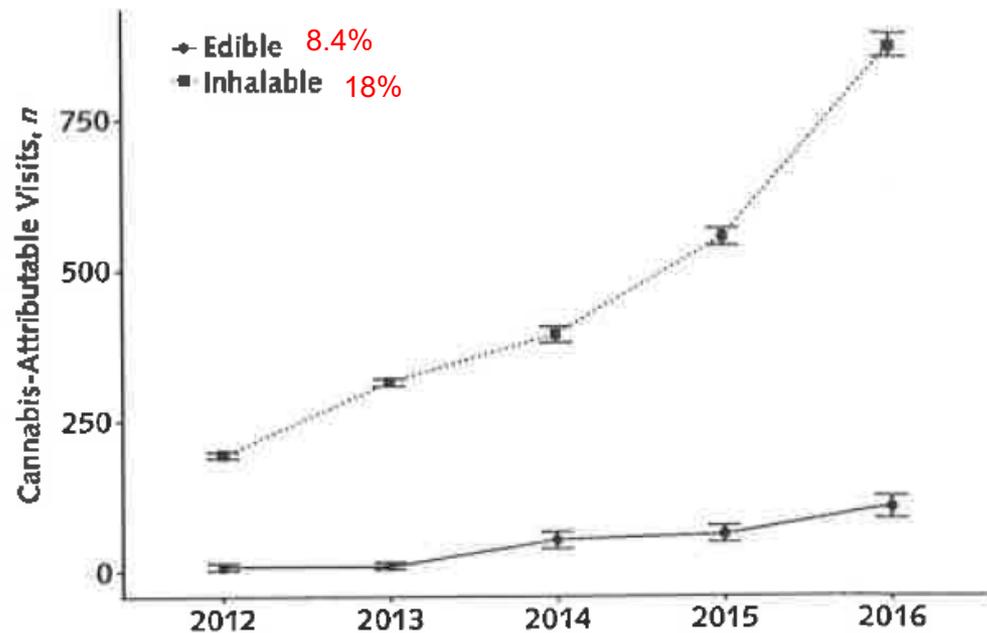
Table 2. Most Common Clinical Conditions Associated With Cannabis-Attributable Visits, by Route of Exposure

Condition	Edible Exposure (n = 238), n (%)	Inhalable Exposure (n = 2329), n (%)	Absolute Difference (Edible – Inhalable) (95% CI), percentage points	Total Visits, n (%)
Gastrointestinal symptoms	36 (15.1)	752 (32.3)	-17.2 (-12.2 to -22.1)	788 (30.7)
Cannabinoid hyperemesis syndrome	20 (8.4)	420 (18.0)	-9.6 (-5.7 to -13.5)	440 (17.1)
Intoxication	115 (48.3)	647 (27.8)	20.5 (13.9 to 27.1)	762 (29.7)
Psychiatric symptoms	62 (26.1)	571 (24.5)	1.6 (-4.2 to 7.4)	633 (24.7)
Acute psychiatric symptoms	43 (18.0)	254 (10.9)	7.1 (2.1 to 12.1)	297 (46.9)
Acute exacerbation of underlying chronic disease	1 (0.4)	93 (4.0)	-3.6 (-2.5 to -4.7)	94 (14.1)
Chronic psychiatric condition	1 (0.4)	99 (4.3)	-3.9 (-2.8 to -5.0)	100 (15.8)
Cardiovascular symptoms	19 (8.0)	73 (3.1)	4.9 (1.4 to 8.4)	92 (3.6)



ORIGINAL RESEARCH

Figure 2. Exposure to edible and inhalable cannabis products in cannabis-attributable visits at UCHED from 2012 to 2016.

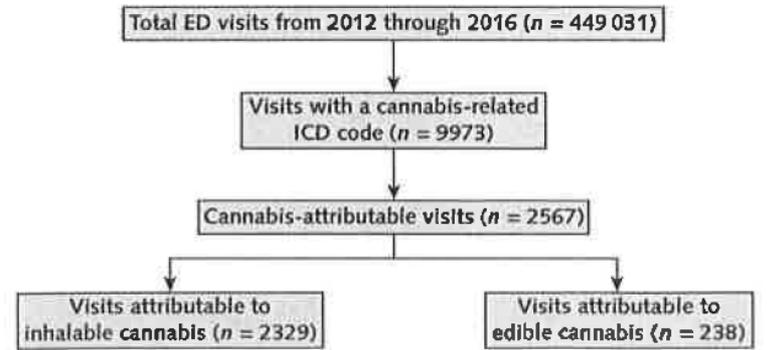


Error bars indicate 95% CIs. UCHED = UCHealth University of Colorado Hospital Emergency Department.

PeaceHealth Note:

Due to the lack of charting data, the break down by delivery modes was not within the scope for PeaceHealth study

Figure 1. Flow chart of visit selection and review.



ED = emergency department; ICD = International Classification of Diseases.



1. The age range was very wide (15-74 y.o.) for CHS.
2. The CHS patients are strongly addicted and in strong denial based on multiple visits and lengthy discussions with multiple physicians.
3. E.D. provider education is needed about recognition, coding and the application of treatment protocols, reaching far beyond emergency care.
4. The cost of heavily addicted patients to society is high.
5. Medical treatment is costly (readmissions), compounding already stressed emergency services.
6. Our analysis was dependent on PeaceHealth internal data, while access to cannabis community health related data would have been very helpful.
7. The THC content of the cannabis has become extremely high and has grave consequences on adolescents, pregnant woman and their children.



Part III

“Clinical and Social Work Interventions”

What can Health care providers do to improve patient and community health?



Institute ED protocols for CHS

- Assist with the proper and more consistent coding
- Improved clinical diagnosis and treatment planning.

Allocate Social Work resources early

- A new model for transitional care planning and interventions
- Referring CHS patients to community resources

Cannabinoid Hyperemesis Syndrome (CHS)

ED protocol for PeaceHealth Oregon

Classic CHS patient:

- Frequent ED and hospital admissions, due to re-occurring Nausea and Vomiting, associated with heavy Cannabis use.

Protocol:

1. IV access
2. CBC, CMP, Lipase, Lactate
3. Fluid Bolus of 0.9% NaCl or LR (one liter or more as indicated by clinical condition/labs)
4. Ondansetron 4 mg SL/IV (If concern for QTc prolongation, ECG should be obtained first)
 - a. Repeat once after 60 minutes prn continued nausea and vomiting
5. Prochlorperazine 10 mg IV
6. Diphenhydramine 25 mg IV
7. Haldol 2 mg IV (If concern for QTc prolongation, ECG should be obtained first)
 - a. Repeat once after 60 minutes prn continued nausea and vomiting
8. Ketorolac 15 mg IV if complaint of pain (presuming no contraindication)
9. Capsaicin cream 0.1% applied to abdominal wall
10. No benzodiazepine or opiate administration unless clear clinical indication for use; not simply as a request of patient
11. Evaluate patient condition for disposition status. Admit for intractable nausea and vomiting despite above care or for serious electrolyte abnormalities / other clinical concerns per judgement of ED physician / Physician Assistant
12. Goal should be for disposition status within 3-4 hours of beginning therapy in the ED – patient's with protracted symptoms after all of the above therapy rarely recover to point of safe disposition home from the ED
13. If disposition is to home, be certain to provide resource sheets for drug treatment programs.
14. If patient has had three or more previous ED visits for the same, [initiate social work referral orders](#), and have patient speak with social workers / crisis workers if available for evaluation and possible assistance entering treatment programs for substance abuse.
15. Be certain [to enter a diagnosis of Cannabinoid Hyperemesis Syndrome \(Code is F12.188\) into CareConnect](#) (EPIC), specifically so that these patient encounters can be tracked / reviewed for efficacy of this protocol and amendment as needed
16. Inform patient that they may be contacted by a pharmacy resident for follow up as part of a research study.
17. If possible, please try to include in the HPI if patient has been using hot showers for relief, how many years they have been using a THC product, what the primary THC product of choice is that that they use, where they obtain it (commercial versus home grown/made), when the initial onset of their symptoms began

SW Standard Work is being developed, has been delayed due to COVID-19

2/25/2020 – updated draft by Dr. Christoffer Poulson (ED Emergency Medicine in collaboration with Dr. Michael Friedlander (Hospital Medicine)

- A new ED CHS protocol was implemented in Feb. 2020
- Social Work intervention standard work has been delayed due to COVID-19
- Effectiveness of both will be determined by monthly chart reviews (monitoring phase)

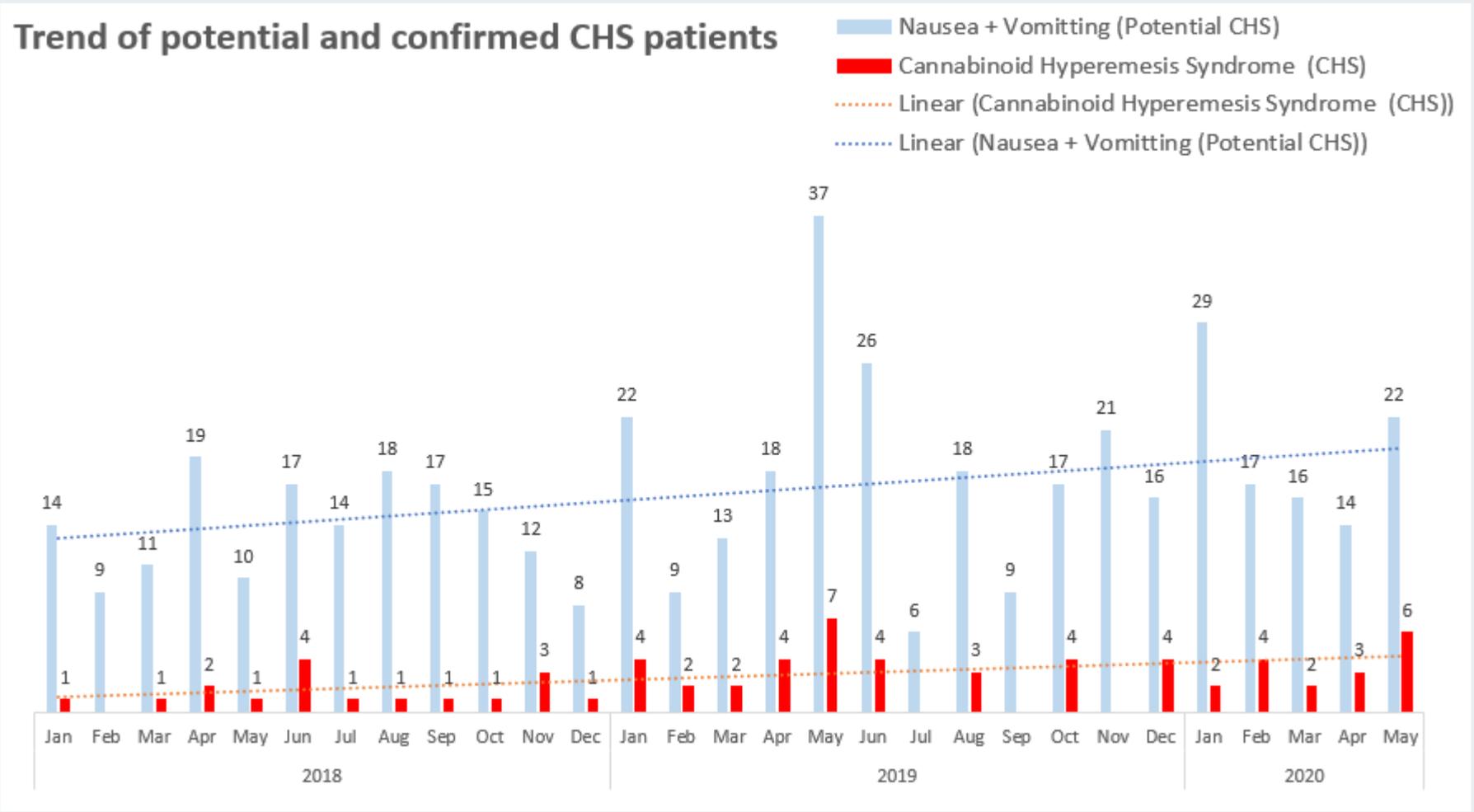




Chart Review of potential CHS (Cannabis use with Nausea/Vomiting)

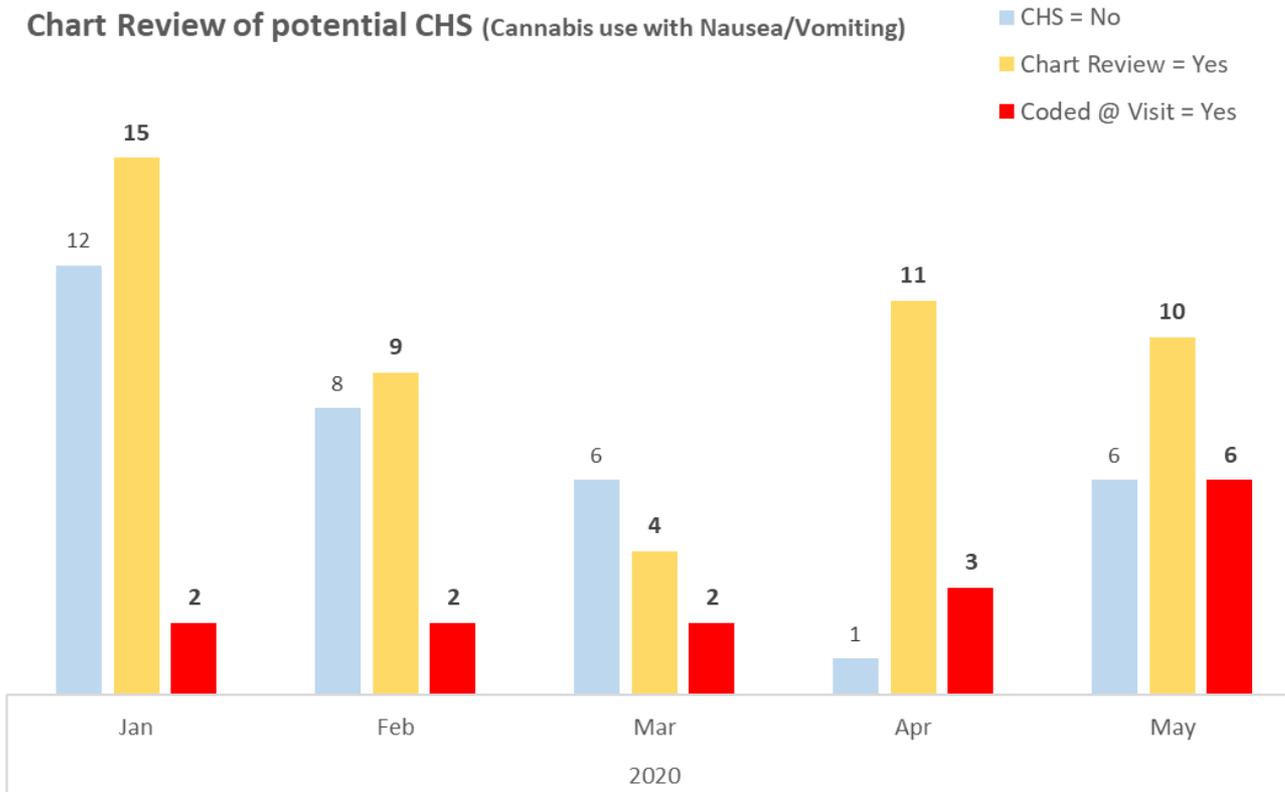


Chart Notes:

Making progress with the new ED order set. COVID-19 mitigation has slowed roll-out.

Up to 20 chronic CHS patients per month who seek care in the Emergency Department could benefit from SW interventions

Examples:

A patient 28 year of age with 8 ED visits and 5 admissions over the period of 3 months, just discharged. Referred to SW on 4/10/20

A patient 53 years of age with 9 ED visits and 6 admissions over 4 months, has diabetic gastroparesis complicated by heavy cannabis use. Considering SW interventions with next ED visit.



- Review most recent findings with ED provider teams to ensure proper documentation and coding for CHS
- Manual trigger for Social Work interventions, based on current data (1/1/20 to 5/31/20) and learning.
- **On-going Chart Reviews**
 - Monthly chart reviews to track documentation, coding and SW interventions
- **Daily Management:**
 - Build a system of daily management of protocol adherence
- **Informatics Solution:**
 - Build algorithm to let the EMR identify patients fitting the CHS profile
 - Triggering a Social Work consult order automatically



Part VI

“Hard-Wire Standard Work”

Assessing ED order set applications and
Social Work interventions.

Despite our focus since February on the planning, managing and mitigation of the Coronavirus pandemic, the work has continued, especially during the phase of opening and transition to the “new normal”

Chart reviews of potentially CHS patients by Dr. Friedlander has focused on the application of order-sets and interventions.

Sample Records	ED CHS Order-set used	SW Interventions initiated	SW Follow up executed
****67934	No	Yes	Attempted
****53137	Yes	Yes	Attempted
****76112	No	Yes	Attempted
****34773	Yes	Yes	Attempted

PeaceHealth Internal

1. Proper Identification/dx @ entry:

- Proper coding for CHS (use F12.188)
- Update EMR to capture cannabis delivery modes (edible, smoke, vape inject, etc.)
- Cannabis use, need to recognize frequent visits due to nausea and vomiting, with common nausea meds being ineffective and identify properly.
- **Initiation and education of ED staff and protocol for treatment.**

2. Treatment Planning:

- Clinical research on the effectiveness of prescribing Capsaicin (Zostrix)



3. **Transitional care planning:**

- **For addicted patients with frequent visits have a crisis eval and addiction referral. Will be working on a resource list.**

Public Health collaboration

1. Health Advisories:

- Education of the community about the risks and side effects of high frequency use.
- Recognition of symptoms of CHS
- “Home” remedies for treatment
- Recognition of heat (showers) as marker
- Risk of dehydration and electrolyte deficiencies.
- When to seek medical attention.

2. Market regulation:

- Warning labels for retail sales
- Public Health to increase awareness of Surgeons General Report 8/19/19 on Cannabis.
- Potency, purity, concentration, potential contamination--warnings.
- Publicize the delivery modes (edible, smoke, vape) and their respective frequency of negative manifestations thru public health.
- Established time of onset of CHS
- Publicize risks of prolonged emesis thru the Health Department.
- Creation of a State Fund should be considered from cannabis tax proceeds, to aid with addiction costs, medical and public awareness campaign, and social issues.

A cyclist wearing a red shirt and black shorts is riding away on a paved road. The road is lined with a stone wall on the right, which is covered in moss and has fallen autumn leaves scattered along its base. The background is filled with trees showing vibrant autumn colors in shades of yellow, orange, and green. A green banner with a yellow vertical stripe on the right side is overlaid across the middle of the image.

Q&A