# Why do people use medical marijuana? The medical conditions of users in seven U.S. states

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## Abstract

Since 1996, more than 20 states and the District of Columbia have legislated medical marijuana laws. Relatively little is known about the identity of medical marijuana users, and specifically, what medical conditions they claim to have, although the initial campaigns to pass such legislation had been particularly associated with cancer, AIDS, and glaucoma patients. Past studies (most of which are focused on Californian data) find that medical marijuana users identify a diverse variety of medical conditions, and that those with cancer, HIV/AIDS and glaucoma made up only a small percentage of authorized users. This study seeks to contribute to this field of research by taking a more comprehensive approach, by examining the stated medical conditions of marijuana users from every state where the information is available. It records the medical conditions of nearly 230,000 individuals across seven states. The data sets that make up this study were provided by the Health or the Public Health Departments of seven U.S. States: Arizona, Colorado, Montana, Nevada, New Mexico, Oregon and Rhode Island. Our findings suggest that a very small proportion of medical marijuana patients report having serious medical conditions (i.e. HIV/AIDS, glaucoma, cancer, Alzheimer's), while almost all

(91%) of medical marijuana users report using marijuana to alleviate severe or chronic pain. Our results are consistent with past research that found that only a small minority of medical marijuana users report serious, life-threatening illnesses. The implications of these findings are that, although the political campaigns to pass such referenda and legislation often revolved around the needs of the terminally ill, the reality is that most people who utilize such programs do not suffer from serious medical conditions, and that state officials should inform the public about who may utilize such a program if enacted. These findings may indicate the need to develop stricter guidelines to ensure that medical marijuana is not diverted to young people, especially given recent research showing that it is.

## Introduction

After delta-9-tetrahydrocannabinol (THC) was identified as the active ingredient in cannabis in 1964, interest in researching cannabinoids piqued, and subsequent studies have identified the benefits of cannabinoids for pain relief, antiemetic therapy, seizures and epilepsy, and other conditions. Generally, however, the medical uses of marijuana do not intend to directly address a particular disease, but rather, to treat the symptoms that can be caused by various diseases and/or their treatments (Institute of Medicine [IOM], 1999).

In 1996, California passed Proposition 215, the Compassionate Use Act, which authorized doctors to recommend medical marijuana use for patients suffering from "cancer, anorexia, AIDS, chronic pain, spasticity, glaucoma, arthritis, migraine or any

other illness for which marijuana provides relief" (Cal. Health & Saf. Code, § 11362.5 (1996). Since then, additional states, including – Arizona, Alaska, Colorado, Connecticut, Delaware, Hawaii, Illinois, Maine, Maryland, Michigan, Montana, Nevada, New Jersey, New Mexico, Oregon, Rhode Island, Vermont, and Washington – as well as the District of Columbia, have enacted similar pieces of legislation, and there are now thousands of medical marijuana dispensaries and hundreds of thousands of medical marijuana users across the United States; in 2012, at least 286,243 people were registered medical marijuana users in the United States (Bowles, 2012). That does not account for the many more who are not registered yet still utilize state medical marijuana laws.

Relatively little is known about the identity of medical marijuana users, and specifically, what medical conditions they claim to have. The campaign in California had been particularly associated with cancer, AIDS, and glaucoma sufferers. However, given that recent studies reveal that the majority of users report pain, not chronic illnesses, it is unclear whether the patients for which such programs were originally promoted (i.e. those suffering from the above-mentioned conditions), are the ones actually utilizing medical marijuana programs. Indeed, recent research has suggested that by 2006, medical marijuana users in California were likely to be identifying a diverse variety of medical conditions, and that overall, those with cancer, HIV/AIDS and glaucoma actually made up only a small percentage of authorized users (Reinarman et al., 2011; Nunberg, Kilmer, Pacula, & Burgdorf, 2011).

Two previous studies have researched the identity of medical marijuana users, but the authors restricted their data to the same sample of around 1,700 such users at nine assessment clinics across California in 2006 (Reinarman et al., 2011; Nunberg et al., 2011). A 2007 study examined characteristics of medical marijuana seekers in California, but restricted their sample to long-term marijuana users who self-selected to participate (O'Connell & Bou-Matar, 2007).

An evaluation of 1,745 medical marijuana patients in California reveals that 82.6 percent self-reported pain relief as their primary use for medical marijuana and that 86.1 percent administer the drug by smoking it (Reinarman et al., 2011), although few studies have been published on the effects and risks of inhaled marijuana. Likewise, the most frequently diagnosed conditions made by MediCann physicians were musculoskeletal and neuropathic chronic pain such as back pain and arthritis (58.2%). HIV/AIDS, cancer, and glaucoma combined comprised of 4.4% of all diagnoses (Nunberg et al., 2011). Other studies reveal similar outcomes. In an examination of Canadian adults in Ontario, Ogborne, Smart, & Adlaf (2000) find that the most commonly cited reason for using medical marijuana was pain or nausea. Moreover, they find that compared with nonusers, self-reported medical marijuana patients tended to be younger and more likely to have used cocaine.

In addition, residents of states with medical marijuana programs have a higher prevalence of marijuana use, abuse, and dependence (Cerdá, M., Wall, M., Keynes, K.M., Galea, S., Hasin, D., 2012). A more recent study of medical marijuana laws across the United States

finds that access to dispensaries and home cultivation increase marijuana consumption, particularly among youth (Pacula, R.L., Powell, D., Heaton, P., & Sevigny, E.L., 2013). While specific reasons for this relationship are not yet known, this concerning evidence points to the need for further understanding of both the characteristics of medical marijuana users, as well as the larger mechanisms at play within states with medical marijuana laws. An analysis of Denver, Colorado adolescents (ages 14-18) in treatment, finds that 73.8% used someone else's medical marijuana and that for each additional year (age) at which the onset of regular marijuana use was delayed, the likelihood of using medical marijuana declines by 21% (Salomonsen-Sautel, S., Sakai, J.T., Thurstone. C., Corley, R., & Hopfer, C., 2012). Likewise, adolescents in states with medical marijuana laws have a higher likelihood of using marijuana and lower perception of its riskiness, compared to adolescents in states without medical marijuana laws (Wall, M.M., Poh, E., Cerdá, M., Keynes, K.M., Galea, S., Hasin, D.S., 2011).

At the federal level, the United States' Controlled Substances Act (CSA) cites cannabis – which contains the psychoactive substance, delta-9-tetrahydrocannabinol (THC) – as a Schedule I controlled substance with a "high potential for abuse" and with no "currently accepted medical use" (CSA, 1970). However, on the state level, marijuana laws vary a great deal and in states where medical marijuana is legally accessible, the guidelines for receiving a license can vary as well. For instance, certain debilitating conditions are approved in some states but not in others. (For example, while Hepatitis C is approved in states such as Arizona, Rhode Island, and New Mexico, it is not an approved debilitating condition in Colorado and Connecticut.) Regulatory inconsistencies between states may pose limitations to the data since a patient in Colorado with, for example, hepatitis C,

might mention another approved condition (such as chronic pain, which can be a symptom of Hepatitis C) in order to obtain a medical marijuana card.

Given that medical marijuana has now become much more widely available to patients in a variety of states, a new study examining the medical conditions of marijuana users across the whole country would be a useful addition to research on the topic.  This study seeks to contribute to this field of research by taking a more comprehensive approach, and by examining the stated medical conditions of marijuana users from every state where the information is available. It records the medical conditions of nearly 230,000 individuals across seven states. As far as we know, this is the only study of its kind, which considers multiple states with respect to reasons for medical marijuana use. Moreover, while other studies are confined to California, this is a non-California analysis.

Our findings suggest that a very small proportion of medical marijuana patients report having serious medical conditions (i.e. HIV/AIDS, glaucoma, cancer, Alzheimer's), while most use marijuana to relieve chronic pain, nausea, or muscle spasms. The implications of these findings are that, although the political campaigns to pass such referenda and legislation showcased the terminally ill, the reality is that most people who utilize such programs do not suffer from serious medical conditions.

## Methods

The data sets that make up this study were provided by the Health or the Public Health Departments of seven U.S. States: Arizona, Colorado, Montana, Nevada, New Mexico, Oregon and Rhode Island.

Ideally, the results would include data from all 17 jurisdictions where medical marijuana use has been authorized; however, our access to statistics from a number of states was limited. Delaware, the District of Columbia, and New Jersey are either in the process of developing their medical marijuana programs, or have only recently introduced them, and thus do not yet have demographic statistics for users. California, Maine, and Washington do not collect demographic data on users in their medical marijuana programs, while Alaska does not make such data available to the public. Hawaii, Michigan, and Vermont do not publish demographic data on their websites, and when contacted, did not respond to inquiries.

Therefore, we have access to data from seven states. The Health Departments of Arizona, Colorado, Montana, New Mexico, Oregon, and Rhode Island make demographic data on patients enrolled in their medical marijuana programs freely available on their websites (Arizona Department of Health Services, 2011; Colorado Department of Public Health and Environment, 2011; Montana Department of Public Health and Human Services, 2011; New Mexico Department of Health, 2011; Oregon Public Health Authority, 2012; Rhode Island Department of Health, 2011). Furthermore, when contacted, the Public Health Department of Nevada sent their most recent demographic statistics on medical

marijuana users in their program (Nevada Health Division, 2012), although they do not publish this data on their website. The health departments' data are recorded when patients complete the medical marijuana application (either web- or paper-based). Typically, an application form requires general information such as the patient's name and date of birth, as well as information regarding the patient's debilitating medical conditions (often completed by the patient's physician).

Registered users enrolled in each state's medical marijuana programs are required to state their medical condition in order to obtain authorization from a physician. (Age and sex are also recorded, and typically, though not always, also published). In six of the seven states, users can select multiple medical conditions. New Mexico is the exception, as users there can only select one medical condition, which may explain why the findings from that state differ greatly from the other data sets.

These data sets each provide a "snapshot" of medical marijuana users registered in a state at any one time – the date of these data sets range from April 2011 to January 2012. It should be noted, however, that the respective Health Departments might have published more recent demographic statistics since this data was collected.

The data, which was received in Excel spreadsheets, were converted for use in SPSS statistical analysis software. We created several new variables to determine: a) the ages of the individuals using medical marijuana; b) whether they were under or over 50 years of age; c) whether they had a "serious" condition (defined as having reported using

medical marijuana for cancer, HIV, AIDS or Alzheimer's disease); and d) whether they were using medical marijuana for chronic pain and no other condition. We conducted a frequency test to determine the number (and percentages) of people who reported using medical marijuana for any given condition. Next, we conducted a series of frequency tests comparing women versus men, looking at the number (and percentages) who: a) reported using medical marijuana at all; b) reported using medical marijuana for any given condition; c) reported using medical marijuana for a "serious condition"; d) reported using medical marijuana for both a "serious condition" and chronic pain; e) reported using medical marijuana for both cancer and nausea; and f) reported using medical marijuana for only chronic pain and no other condition. We also conducted frequency tests to determine the mean ages (and whether they were older or younger than 50 years) of women and men using medical marijuana for serious conditions. Lastly, we ran a one-sample t-test (a statistical method examining a comparison of the average of the sample and the population with an adjustment for the number of cases in the sample and the standard deviation of the average) to determine whether the mean age of the women using medical marijuana differed from the mean age of the men using medical marijuana.

The first set of analyses uses the data from each of the seven states and examines the total number and percentage of patients reporting each medical condition by state, and overall. The second set of analyses focuses specifically on people in Arizona and Rhode Island – the only states that released more detailed data when approached – and presents more information on the sex and age of medical marijuana users by medical condition listed.

Given this, data from twenty-one people in Rhode Island who did not list a sex were removed from these analyses.

## Results

A. *Medical Conditions Cited by Medical Marijuana Users by State*

Overall, 234,075 people from seven different states reported 19 medical conditions for their medical marijuana use (see Table 1). The clearest finding from this set of results is that almost all (91%) of medical marijuana users report using marijuana to alleviate severe or chronic pain. Severe pain was most commonly cited as a medical condition in Colorado, where it was reported by 96% of medical marijuana users. It was least commonly cited in New Mexico, where only 24% of users reported severe pain (however, this may be due to the fact that patients in New Mexico are only able to cite one medical condition – severe pain may often be a secondary symptom of another, primary, medical condition). However, the high level of use of medical marijuana for pain relief is remarkably consistent across the data – reported by over 85% of patients in five of the seven states.

**Table 1: Medical Conditions Cited by Medical Marijuana Users Across Seven States**

| Medical Condition* | AZ | CO | MT | NV | NM | OR | RI | Total |
|---|---|---|---|---|---|---|---|---|
| **Cancer** | 859 | 2828 | 968 | 102 | 562 | 1837 | 288 | **7444** |
| % of users | 4.40% | 2.23% | 3.65% | 3.01% | 10.74% | 3.7% | 8.20% | **3.18%** |
| **AIDS/HIV** | 290 | 678 | 968 | 45 | 236 | 692 | 138 | **3047** |
| % of users | 1.50% | 0.53% | 3.65% | 1.32% | 4.51% | 1.41% | 3.90% | **1.30%** |
| **Glaucoma** | 383 | 1165 | 968 | 55 | 94 | 655 | 61 | **3381** |
| % of users | 2.00% | 0.94% | 3.65% | 1.62% | 1.80% | 1.33% | 1.70% | **1.44%** |

| Condition | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Cachexia** | 311 | 1655 | 947 | 113 | 79 | 1057 | 204 | **4366** |
| % of users | 1.60% | 1.31% | 3.57% | 3.34% | 1.51% | 2.15% | 5.80% | **1.87%** |
| **Seizures** | 458 | 1819 | 577 | 75 | 0 | 1186 | 75 | **4190** |
| % of users | 2.40% | 1.43% | 2.18% | 2.21% | 0% | 2.41% | 2.10% | **1.79%** |
| **Sclerosis** | 17 | 0 | 44 | 0 | 194 | 0 | 0 | **255** |
| % of users | 0.10% | 0% | 0.17% | 0% | 3.71% | 0% | 0% | **0.11%** |
| **Chronic or Severe Pain** | 16966 | 120567 | 24739 | 3048 | 1250 | 44756 | 2170 | **213496** |
| % of users | 87.30% | 95.97% | 93.38% | 89.96% | 23.88% | 90.93% | 62.10% | **91.21%** |
| **Muscle Spasms** | 2758 | 24828 | 4389 | 1461 | 0 | 12170 | 1076 | **46682** |
| % of users | 14.20% | 19.58% | 16.57% | 43.12% | 0% | 24.73% | 30.80% | **19.94%** |
| **Nausea** | 2377 | 15503 | 3365 | 616 | 207 | 6630 | 603 | **29301** |
| % of users | 12.20% | 12.22% | 12.70% | 18.18% | 3.95% | 13.47% | 17.30% | **12.52%** |
| **Epilepsy** | 0 | 0 | 10 | 0 | 151 | 0 | 0 | **161** |
| % of users | 0% | 0% | 0.04% | 0% | 2.88% | 0% | 0% | **0.07%** |
| **Crohn's Disease** | 253 | 0 | 6 | 0 | 65 | 0 | 0 | **324** |
| % of users | 1.30% | 0% | 0.02% | 0% | 1.24% | 0% | 0% | **0.14%** |
| **Hepatitis C** | 1010 | 0 | 0 | 0 | 52 | 0 | 273 | **1335** |
| % of users | 5.20% | 0% | 0% | 0% | 0.99% | 0% | 7.80% | **0.57%** |
| **Painful peripheral neuropathy** | 0 | 0 | 29 | 0 | 386 | 0 | 0 | **415** |
| % of users | 0% | 0% | 0.11% | 0% | 7.37% | 0% | 0% | **0.18%** |
| **Alzheimer's disease** | 0 | 0 | 0 | 0 | 0 | 50 | 6 | **56** |
| % of users | 0% | 0% | 0% | 0% | 0% | 0.10% | 0.2% | **0.02%** |
| **PTSD** | 0 | 0 | 0 | 0 | 1688 | 0 | 0 | **1688** |
| % of users | 0% | 0% | 0% | 0% | 32.24% | 0% | 0% | **0.72%** |
| **Spinal Cord Damage with Intractable Spasticity** | 0 | 0 | 0 | 0 | 175 | 0 | 0 | **175** |
| % of users | 0% | 0% | 0% | 0% | 3.34% | 0% | 0% | **0.07%** |
| **Inflammatory autoimmune-mediated Arthritis** | 0 | 0 | 0 | 0 | 73 | 0 | 0 | **73** |
| % of users | 0% | 0% | 0% | 0% | 1.39% | 0% | 0% | **0.03%** |
| **Hospice Care** | 0 | 0 | 0 | 0 | 17 | 0 | 0 | **17** |
| % of users | 0% | 0% | 0% | 0% | 0.32% | 0% | 0% | **0.01%** |
| **ALS** | 0 | 0 | 0 | 0 | 6 | 0 | 0 | **6** |
| % of users | 0% | 0% | 0% | 0% | 0.11% | 0% | 0% | **0.00%** |
| **Total** | 19430 | 126816 | 26492 | 3388 | 5235 | 49220 | 2177 | **234075** |

*In New Mexico, patients could only select one medical condition. In all other states, patients could select multiple medical conditions, so percentages do not add up to 100%.*

The second most commonly cited medical condition by medical marijuana users is muscle spasms, reported by 20% of users across the seven states. This rises to 43% in Nevada, and again, New Mexico is the anomaly, where no users cite muscle spasms as their primary medical condition. A further 12.5% of patients report nausea as a contributing factor in their use of medical marijuana. This is also remarkably consistent

across the whole data set – in five of the seven states it accounts for between 12 and 12.5% of cases. The exceptions are New Mexico, where just 4% of patients cite nausea, and Nevada, where 18% cite it. Together, these three conditions account for the vast majority of medical marijuana use – no other medical condition is reported by more than 3.2% of the users.

Indeed, consistent with the Reinarman and Nunberg findings, cancer, HIV/AIDS and glaucoma patients make up a very small percentage of medical marijuana users. Only 3% (rising to 11% in New Mexico) are cancer patients, and less than 1.5% report either of the other two conditions. Patients of other high profile diseases – Alzheimer's, Crohn's disease, Hepatitis C and Lou Gehrig's disease (ALS) – collectively account for less than 1% of the total number of marijuana users. In total, 4.5% of users report cancer, HIV/AIDS, or Alzheimer's, the three conditions that represent the three most common causes of death as reported by the World Health Organization. These results are not consistent with general population prevalence rates for these illnesses - 41% of Americans will have cancer at some point in their lives (United Press International, 2010), while 0.38% currently have HIV/AIDS, and 0.70% have glaucoma. Meanwhile, only 47% of the general population reports chronic pain.

There are several anomalies within the data sets. Almost one third (32%) of medical marijuana patients in New Mexico report posttraumatic stress disorder (PTSD) as their primary medical issue (however, New Mexico is the only state reviewed in this data set that designates PTSD a qualifying condition for medical marijuana). Meanwhile, a third

of users in Rhode Island did not specify a medical condition. However, if we remove New Mexico and Rhode Island from the results, which together only account for fewer than 10,000 patients in a study of 230,000, the findings are extraordinarily consistent.

B. _Medical Conditions of Marijuana Users in Arizona and Rhode Island by Sex and Age_

i. _Background on the Arizona and Rhode Island Samples_

Arizona's population is around six times that of Rhode Island's and the data reports roughly six times as many medical marijuana users in Arizona (19,430 individuals) than in Rhode Island (3,473). In other words, the proportion of medical marijuana users relative to the general population is roughly equivalent in both states. Moreover, the two states' general demographic profiles with regards to age and sex are comparable. Rhode Island has a slightly (but negligible) higher percentage of residents over the age of 50 years than Arizona (34.7% and 31.6%, respectively) and in both states, there is a larger proportion of women than men over the age of 50 (US Census Bureau, 2012).

Sex and age demographics are also comparable in both samples (see Table 2). Both Arizona and Rhode Island have three times more male than female medical marijuana users (despite women consisting of exactly half of each state's population) and in both states, the mean ages of men are slightly lower than the mean ages of the women (42.4 years old versus 46.0 years old in Arizona; $p < .001$ and 44.7 years old versus 47.7 years

old in Rhode Island; p < .001).   Further analysis reveals that in both states, a larger percentage of women fall into the older-than-50 group.

### Table 2: Demographics of Samples from Arizona and Rhode Island

|  | Arizona | Rhode Island |
|---|---|---|
| **Females** | 4,983 (25.6%) | 873 (25.1%) |
| Mean Age | 46.0 years old | 47.7 years old |
| Percentage Over 50 | 45.7% | 46.0% |
| **Males** | 14,447 (74.4%) | 2,600 (74.9%) |
| Mean Age | 42.4 years old | 44.7 years old |
| Percentage Over 50 | 35.8% | 38.2% |
| **TOTAL** | 19,430 people | 3,473 people |

ii.      *Medical Conditions by Sex and Age*

Table 3 breaks down reported marijuana usage for each medical condition by sex and age.   In both states, significantly more women than men reported using medical marijuana for cancer while significantly more men than women reported using it for Hepatitis C  (see Table 3).  In addition, significantly more women than men in Arizona reported using medical marijuana for glaucoma, nausea, and Crohn's disease, while more men reported using it for HIV/AIDS.  Interestingly, in Arizona, more women than men reported using medical marijuana for muscle spasms; these results are reversed in Rhode Island.

As expected, the mean ages of people reporting certain medical conditions differed depending on the condition reported and the sex of the individual reporting it. Individuals of both sexes who used medical marijuana for cancer, glaucoma, and Hepatitis C were

significantly older than individuals who used medical marijuana for other medical conditions. Individuals of both sexes in Arizona who used medical marijuana for chronic pain or nausea, and individuals in Rhode Island who used medical marijuana for nausea or muscle spasms were significantly younger than individuals who used medical marijuana for other medical conditions.

**Table 3: Mean Ages Reported for Different Medical Conditions by Sex in Arizona and Rhode Island**

| Medical Condition | Arizona | | | Rhode Island | | |
|---|---|---|---|---|---|---|
| | Percentage by Sex | Mean Age for that Condition (vs. Rest of Population) | Percentage Over 50 (vs. Rest of Population) | Percentage by Sex | Mean Age for that Condition (vs. Rest of Population) | Percentage Over 50 (vs. Rest of Population) |
| **Cancer** | | | | | | |
| Females | 5.6%** | 53.9 (vs. 45.5)** | 66.9 (vs. 44.5) | 12.5%** | 54.6 (vs. 46.7)** | 68.8 (vs. 42.8) |
| Males | 4.0% | 54.6 (vs. 41.9)** | 72.3 (vs. 34.3) | 6.8% | 56.4 (vs. 43.9)** | 78.5 (vs. 35.2) |
| **AIDS** | | | | | | |
| Females | 0.3%** | 44.5 (vs. 46.0) | 33.3 (vs. 45.7) | 0.6% | 50.0 (vs. 47.7) | 60.0 (vs. 46.0) |
| Males | 1.3% | 46.9 (vs. 42.4)* | 39.2 (vs. 35.8) | 1.3% | 51.6 (vs. 44.6)* | 55.9 (vs. 37.9) |
| **HIV** | | | | | | |
| Females | 0.1%** | 47.4 (vs. 46.0) | 37.5 (vs. 45.7) | 1.7% | 49.1 (vs. 47.6) | 40.0 (vs. 46.2) |
| Males | 0.5% | 45.1 (vs. 42.4) | 39.7 (vs. 35.7) | 3.2% | 49.8 (vs. 44.5)** | 50.0 (vs. 37.8) |
| **Glaucoma** | | | | | | |
| Females | 2.5%** | 58.5 (vs. 45.7)** | 80.3 (vs. 44.8) | 2.1% | 56.7 (vs. 47.5)* | 77.8 (vs. 45.4) |
| Males | 1.8% | 55.1 (vs. 42.2)** | 70.7 (vs. 35.2) | 1.6% | 55.5 (vs. 44.5)** | 78.0 (vs. 37.5) |
| **Cachexia** | | | | | | |
| Females | 1.6% | 46.2 (vs. 46.0) | 46.3 (vs. 45.7) | 7.6% | 49.5 (vs. 47.5) | 53.0 (vs. 45.5) |
| Males | 1.6% | 42.5 (vs. 42.4) | 38.0 (vs. 35.8) | 5.3% | 49.6 (vs. 44.4)** | 52.2 (vs. 37.4) |
| **Seizures** | | | | | | |
| Females | 2.7% | 43.3 (vs. 46.1) | 34.4 (vs. 46.0) | 2.9% | 38.8 (vs. 47.9)** | 20.0 (vs. 46.8) |
| Males | 2.2% | 39.8 (vs. 42.5)** | 26.2 (vs. 36.0) | 1.9% | 42.4 (vs. 44.8) | 34.7 (vs. 38.2) |
| **Sclerosis** | | | | | | |
| Females | 0.1% | 52.5 (vs. 46.0) | 75.0 (vs. 45.7) | 0.0% | N/A | N/A |
| Males | 0.1% | 51.5 (vs. 42.4) | 53.8 (vs. 35.8) | 0.0% | N/A | N/A |
| **Chronic or Severe Pain** | | | | | | |
| Females | 87.4% | 45.6 (vs. 48.9)** | 44.4 (vs. 54.6) | 65.4% | 47.6 (vs. 47.9) | 45.0 (vs. 48.0) |
| Males | 87.3% | 41.9 (vs. 46.2)** | 34.0 (vs. 48.4) | 61.2% | 44.3 (vs. 45.4) | 35.6 (vs. 42.2) |
| **Muscle Spasms** | | | | | | |
| Females | 16.1%** | 46.8 (vs. 45.8) | 46.4 (vs. 45.6) | 25.8%** | 44.0 (vs. 48.9)** | 38.2 (vs. 48.8) |
| Males | 13.5% | 42.7 (vs. 42.4) | 36.1 (vs. 35.7) | 32.2% | 39.6 (vs. 47.1)** | 22.3 (vs. 45.7) |
| **Nausea** | | | | | | |
| Females | 15.6%** | 43.1 (vs. 46.5)** | 34.3 (vs.47.8) | 19.1% | 42.1 (vs. 49.0)** | 32.3 (vs. 49.3) |
| Males | 11.1% | 38.9 (vs. 42.9)** | 26.8 (vs. 36.9) | 16.5% | 38.4 (vs. 46.0)** | 20.5 (vs. 41.6) |
| **Crohn's Disease** | | | | | | |
| Females | 1.7%* | 42.6 (vs. 46.1) | 30.6 (vs. 46.0) | 0.0% | N/A | N/A |
| Males | 1.2% | 40.2 (vs. 42.4) | 23.8 (vs. 35.9) | 0.0% | N/A | N/A |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Hepatitis C** | | | | | | |
| Females | 3.8%** | 52.7 (vs. 45.7)** | 75.4 (vs. 44.5) | 5.6%* | 52.8 (vs. 47.4)* | 73.5 (vs. 44.4) |
| Males | 5.7% | 53.6 (vs. 41.7)** | 75.9 (vs. 33.4) | 8.6% | 53.7 (vs. 43.9)** | 72.2 (vs. 35.0) |
| **Alzheimer's disease** | | | | | | |
| Females | 0.1% | 75.0 (vs. 46.0)** | 100.0 (vs. 45.7) | 0.1% | 70.0 (vs. 47.7) | 100.0 (vs. 46.0) |
| Males | 0.0% | 60.2 (vs. 42.4) | 60.0 (vs. 35.8) | 0.2% | 63.4 (vs. 44.7)* | 60.0 (vs. 38.1) |

\*\* $p < .001$
\* $p < .005$

### iii.    Chronic Pain

As discussed previously, the largest group of medical marijuana patients reported using the drug to address chronic and debilitating pain. A more in-depth analysis of this category finds that only a very small percentage of those people reporting chronic pain also reported a serious underlying medical condition, such as cancer or HIV/AIDS.[*] In Arizona, only 2.9 percent of those with chronic pain also reported a serious condition; in Rhode Island only 3.4 percent.  There is no significant difference between the women who reported a serious condition and the men who did so in either Arizona (3.3 percent versus 2.7 percent, respectively) or in Rhode Island (4.9 percent versus 2.8 percent).

Nearly two-thirds of the individuals from Arizona and a little over one-third of the individuals from Rhode Island reported using medical marijuana for chronic pain and no other medical condition. Given that both samples had three times as many men than women in them, it is not surprising that the subsample of those who only used medical marijuana for chronic pain and no other condition was also comprised of three times as many men. However, the percentages of women who only reported chronic pain and no other conditions were similar to the percentages of men who only reported chronic pain

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[*] In this case, "serious" conditions refer to those with mortality rates of over 1.0% according to the World Health Organization's 2008 Causes of Death Summary Table. These include malignant neoplasms, HIV/AIDS, and Alzheimer and other dementias.  See Table 4.

and no other conditions. For example, in Rhode Island 37.1 percent of all women only reported chronic pain, compared to 34.7 percent of all men.

Interestingly, the mean ages of those who reported using medical marijuana only for chronic pain was significantly lower in Arizona and significantly higher in Rhode Island. However, once again, the differences were small, ranging from one to three years. Therefore, the only noticeable difference between the samples of the two states occurred in the number of people reporting only chronic pain who were over 50. In Arizona, 34.9 percent of people who reported use of medical marijuana only for chronic pain were over 50 compared to 44.3 percent of people who reported using it for other conditions ($p <$ .001). In Rhode Island, there is little difference between those who reported only using it for chronic pain who were over 50 (42.1 percent) and those who reported using it for other conditions and were over 50 (39.1 percent)

    *iv.     Serious vs. Less-Serious Medical Conditions*

To help simplify and better understand the data, all of the diseases listed by medical marijuana users are divided into "serious" conditions and "less-serious" conditions using the World Health Organization's 2008 Causes of Death Summary Tables (see Table 4). Of the thirteen diseases in this study, the three with mortality rates of over 1.0% (i.e. Malignant Neoplasms, Alzheimer's Disease and other dementias, and HIV/AIDS) are included in the serious category. The other ten diseases are not listed in the World Health Organization's Causes of Death Summary Tables or had mortality rates of less than 1.0% and thus are labeled as "less serious."

## Table 4: Medical Conditions Ranked Using WHO's 2008 Cause of Death Summary Tables

| Disease | Number of People | Percentage[i] |
|---|---|---|
| Malignant Neoplasms (i.e. Cancer) | 1,193,257 | 19.33% |
| Alzheimer and Other Dementias | 215,890 | 3.50% |
| HIV/AIDS | 68,605 | 1.11% |
| Hepatitis C | 10,785 | 0.17% |
| Epilepsy | 9,675 | 0.16% |
| Multiple Sclerosis | 5,273 | 0.09% |
| Glaucoma | 26 | 0.00% |
| Cachexia or Wasting Syndrome | N/A | N/A |
| Muscle Spasms | N/A | N/A |
| Agitation (related to Alzheimer's) | N/A | N/A |
| Severe, Dehabilitating Chronic Pain | N/A | N/A |
| Severe Nausea | N/A | N/A |
| Crohn's | N/A | N/A |
| | | |

In Arizona, 5.7 percent of the sample report having serious conditions compared to 11.7 percent in Rhode Island. In general, those with serious conditions are significantly more likely to be over 50 than those with a less-serious condition in both Arizona (63.7 percent versus 36.8 percent, $p < .001$) and Rhode Island (67.9 percent versus 36.5 percent, $p < .001$).

In Rhode Island, significantly more women than men report using medical marijuana for serious conditions (see Table 5). In Arizona, there is no significant difference between the number of women who report using medical marijuana and the number of men reporting it. The clearest finding from these results is that medical marijuana users for serious conditions, regardless of sex, are significantly older than those using it for less-serious conditions in both states ($p < .001$); in both states, almost twice as many users

with serious conditions are over the age of 50 when compared to those with less-serious conditions.

**Table 5: Serious versus Less-Serious Medical Conditions in Arizona and Rhode Island**

| Medical Condition | Arizona | | | Rhode Island | | |
| --- | --- | --- | --- | --- | --- | --- |
| | Percentage by Sex | Mean Age | Percentage Over 50 | Percentage by Sex | Mean Age | Percentage Over 50 |
| **Serious** | | | | | | |
| Females | 6.1% | 53.8 | 65.6% | 14.5%* | 54.0 | 65.4% |
| Males | 5.6% | 52.1 | 63.0% | 10.7% | 54.4 | 69.1% |
| **Less-Serious** | | | | | | |
| Females | 93.9% | 45.5 | 44.4% | 85.5% | 46.6 | 42.8% |
| Males | 94.4% | 41.8 | 34.2% | 89.3% | 43.6 | 34.5% |
| | | | | | | |

## Conclusion

Only a very small percentage of all medical marijuana patients in the seven states reported having serious conditions. Even in the two states where patients could indicate multiple conditions (Arizona and Rhode Island), the proportions of serious conditions reported are low (5.7% and 11.7%, respectively). Those with serious conditions were significantly older than those with less serious conditions. These data do not mirror nation-wide disease prevalence rates of the general population.

In the only two states with more detailed data, we also found that men were significantly more likely to use medical marijuana programs for illnesses like pain or nausea, even though men and women in the general population have similar prevalence rates of these two – indicating that men are much more likely to use marijuana as medicine than women.

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Lastly, we must acknowledge limits to the data. We do not know exactly how patients reported the reasons for their use of medical marijuana. It is possible they just listed the symptoms that they were treating (i.e. nausea, chronic pain) rather than the underlying medical condition. Also, there are obvious limits to any self-reported data. In addition, states have different procedures for patients to obtain medical marijuana, and some programs are larger than others, making it easier for prospective patients to obtain a medical marijuana card.

Still, our results are consistent with Reinarman et al. (2011) and Nunberg et al. (2011) who found that only a small minority of medical marijuana users report serious, life-threatening illnesses.

Medical marijuana is an ever-growing topic in state governments and has important implications for drug abuse, generally. Particularly in light of recent findings that indicate higher overall marijuana use in states with medical marijuana programs, state officials should inform the public about who may utilize such a program if enacted. For instance, a recent study by Pacula and colleagues (2013) indicates that the existence of home cultivation and large dispensaries are positively associated with marijuana use, while Cedrá, et al.'s (2012) study finds a positive relationship between marijuana programs and marijuana use, abuse, and dependence. In states with current programs in place, these findings should be made widely available to a public who likely believes that medical marijuana is only confined to the seriously ill. Finally, these findings may also indicate

the need to develop stricter guidelines to ensure that medical marijuana is not diverted to young people, especially given recent research showing that it is. (For instance, a 2012 study of Denver-area teens in treatment found that 74% of them got their marijuana from *somebody else*'s medical marijuana an average of 50 times (Salomonsen-Sautel, S., et al., 2012).)

## Reference List:

Arizona Department of Health Services. (2011). *Application Monthly Report – Arizona MedicalMarijuana Program.* Retrieved from http://www.azdhs.gov/medicalmarijuana/reports/

Bowles, D. (2012). Persons registered for medical marijuana in the United States. *Journal ofPalliative Medicine 15*(1), 9.

Cal. Health & Saf. Code, § 11362.5 (1996).

Cedrá, M., Wall, M., Keyes, K. M., Galea, S., & Hasin, D. (2012). Medical marijuana laws in 50 states: investigating the relationship between state legalization of medical marijuana and marijuana use, abuse and dependence. *Drug and Alcohol Dependence 120*(1), 22-27.

Centers for Disease Control and Prevention (2012 July). HIV in the United States: At a Glance. Retrieved from: http://owl.english.purdue.edu/owl/resource/560/10/

Colorado Department of Public Health and Environment. (2011). *Medical Marijuana RegistryProgram Update.* Retrieved from: http://www.colorado.gov/cs/Satellite/CDPHE-CHEIS/CBON/1251593016680

Controlled Substances Act § 812 Schedules of controlled substances. (1970).

Glaucoma Research Foundation (2013 April 22). Glaucoma Facts and Stats. Retrieved from: http://www.glaucoma.org/glaucoma/glaucoma-facts-and-stats.php

Institute of Medicine. (1999). *Marijuana and Medicine: Assessing the Science Base*. Retrieved from: http://www.nap.edu/openbook.php?record_id=6376

Kazura, A. (2012). Medical marijuana and teens: Does an adjective make a difference? *Journal of the American Academy of Child and Adolescent Psychiatry 51*(7), 667-669.

Montana Department of Public Health and Human Services.  (2011).  *Medical Marijuana Program Current Registry*.  Retrieved from http://www.dphhs.mt.gov/marijuanaprogram

Nevada Health Division Medical Marijuana Program. (2012). *Medical Marijuana Program Statistics*.  Retrieved from http://health.nv.gov/medicalmarijuana.htm

New Mexico Department of Health. (2011). *Medical Cannabis Numbers.*  Retrieved from: http://nmhealth.org/mcp

Nunberg, H., Kilmer, B., Pacula, R. L., & Burgdorf, J. R. (2011). An Analysis of Applicants Presenting to a Medical Marijuana Specialty Practice in California. *Journal of Drug Policy Analysis 4*(1), 1-16.

O'Connell, T. J., & Bou-Matar, C. B. (2007).  Long term marijuana users seeking medical cannabis in California  (2001–2007): demographics, social characteristics, patterns of cannabis and other drug use of 4117 applicants.  *Harm Reduction Journal 4*(16), 16-22.

Ogborn, A.C., Smart, A.G., & Adlaf, E.M. (2000). Self-reported medical use of marijuana: a survey of the general population. *Canadian Medical Association Journal 160*(2), 1684-1686.

Oregon Public Health Authority. (2011). *Medical Marijuana Program.*  Retrieved from: http://public.health.oregon.gov/DiseasesConditions/ChronicDisease/MedicalMarijuanaProgram/Pages/data.aspx.

Pacula, R.L., Powell, D., Heaton, P., & Sevigny, E.L. (2013). Assessing the affects of medical marijuana laws on marijuana and alcohol use: The devil is in the details. *National Bureau of Economic Research Working Paper 19302.*

Reinarman, C., Nunberg, H., Lanthier, F., & Heddleston, T. (2011). Who Are Medical Marijuana Patients? Population Characteristics from Nine California Assessment Clinics*.  Journal of     Psychoactive Drugs 43*(2), 128-135.

Rhode Island Department of Health. (2011). *Rhode Island Medical Marijuana Program.* Retrieved from: http://www.health.ri.gov/publications/programreports/MedicalMarijuana2011.pdf

Salomonsen-Sautel, S., Sakai, J.T., Thurstone. C., Corley, R., & Hopfer, C. (2012). Medical Marijuana Use Among Adolescents in Substance Abuse Treatment.

*Journal of the American Academy of Child & Adolescent Psychiatry 51*(7), 694-702.

Wall, M.M., Poh, E., Cerdá, M., Keynes, K.M., Galea, S., Hasin, D.S. (2011)**.** Adolescent Marijuana Use from 2002 to 2008: Higher in States with Medical Marijuana Laws, Cause Still Unclear. *Annals of Epidemiology 21*(9), 714-716.

United Press International (2010 May 7). 41 percent of Americans will get cancer. *Life Extension Daily News*. Retrieved from: http://www.lef.org/news/LefDailyNews.htm?NewsID=9654&Section=DISEASE

United Press International (30 April 2012). Chronic pain common in American adults. *Personal Liberty Digest*, Retrieved from: http://personalliberty.com/2012/04/30/chronic-pain-common-in-american-adults/

United States Census Bureau. (2012). *Statistical Abstract.* Washington, DC: Government Printing Office. Retrieved from: http://www.census.gov/compendia/statab/2012edition.html

World Health Organization. (2008). *Cause-specific mortality, 2008: WHO region by country* [Data file]. Retrieved from http://apps.who.int/ghodata/?vid=10012

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About the Authors

Kevin A. Sabet, Ph.D. has studied, researched, and written about drug policy, drug markets, drug prevention, drug treatment, criminal justice policy, addiction, and public policy analysis for almost 18 years. In 2000, he served in the Office of National Drug Control Policy in the Clinton Administration and from 2003-2004 he was the senior speechwriter at the Office of National Drug Control Policy in the George W. Bush Administration. From 2009-2011, he was a political appointee and senior drug policy advisor to President Obama's drug control director, R. Gil Kerlikowske. He was the youngest senior staffer in that office and the only one to have ever served as a political appointee in a Democrat and Republican administration.

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He has been featured on the front page of the New York Times and in virtually every top media publication and news channel. He received his doctorate and M.S. from Oxford University as a Marshall Scholar in 2007 and 2002, respectively, and his B.A. in Political Science from the University of California, Berkeley in 2001. He resides in Cambridge, MA.

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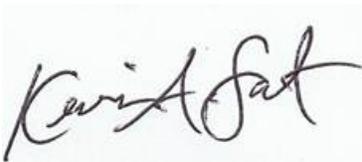
Thesis "*Evaluating the Effect of Independence on Female Alcohol Consumption in the First Two Years of College*". She was first author on an article published in Spring 2011 in the *Michigan State University Journal of Medicine and Law*, entitled "*Public Health, State Alcohol Pricing Policies, and the Dismantling of the 21st Amendment: A Legal Analysis*." She has presented at several national conferences, including the American Public Health Association, the Public Health Law Conference, the Association for Psychological Science, Alcohol Policy 14, Alcohol Policy 15, and Alcohol Policy 16.

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Conflict of Interest Statement

I declare that I have no proprietary, financial, professional or other personal interest of any nature or kind in any product, service and/or company that could be construed as influencing the position presented in, or the review of, the manuscript entitled except for the following: NONE

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