Lost Taxes and Other Costs of Marijuana Laws

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Executive Summary

Government reports indicate that the nation's marijuana laws cost taxpayers $41.8 billion annually. This calculation is based on (a) a reconciliation of estimates of the annual supply of marijuana in the United States and estimates of its overall value and (b) Office of Management and Budget (OMB) data on the share of the Gross Domestic Product diverted by regulatory taxes to US Government budgets.

Government reports from the Office of National Drug Control Policy, the Library of Congress, and other sources indicate that the supply of marijuana in the United States is 14,349 metric tons, or 31.1 million pounds. Various price indexes from public and private sources produce a retail price of $7.87/gr or $3,570/lb, setting the overall retail value of the illicit marijuana market at $113 billion.

The Office of Management and Budget reports that local, state, and the federal government receipts represent 28.7% of the gross domestic product as tax revenue. The diversion of $113 billion from the taxable economy into the illicit economy deprives taxpayers of $31.1 billion annually.

According to the Uniform Crime Reporting Program of the Federal Bureau of Investigation, marijuana arrests consist of 5.54% of all arrests. The Bureau of Justice Statistics reports that total criminal justice expenditures in the United States in 2004, for example, were $193 billion. Marijuana arrests cost taxpayers $10.7 billion annually.

Federally-funded surveys indicate that marijuana has remained widely available over the last 25 years. The Monitoring the Future Survey indicates that since 1992 surveys report that at least 2 out of 5 eighth grade students, 2 out of 3 10^{th} grade students, and 4 out of 5 high school seniors find marijuana widely available.

Despite marginal changes in annual data, marijuana use in the United States has remained fundamentally unchanged in the last decade and a half. Since the beginning of annual surveys on drug use, now called the National Survey on Drug Use and Health, in 1990 the average level of annual marijuana use has been 9.3% (± 1%) of the population age 12 and over. In 1990 10.2% of this population used marijuana in the last year, and in 2005 annual usage was at 10.5%.

During this period the average monthly use of marijuana averaged 5.1% (± .6%). In 1990 monthly marijuana usage was at 5.1%; in 2005 monthly marijuana usage was reported by 6% of this population. During this period monthly use of marijuana by adolescents age 12 to 17 averaged 6.9% (± 1.6%). In 1990 monthly marijuana use was reported by 5.2% of this age group; in 2005 this age group reported monthly marijuana use by 6.8%.

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Introduction

The social and economic costs of drug abuse are often used to justify contemporary policies which treat marijuana use, cultivation, and sale as criminal offenses in most of the United States. These costs are frequently an excuse to refuse to consider whether alternative policies might be more effective. For example, it is argued that marijuana's legalization cannot be considered because legalization would result in a substantial increase in its use and would produce unacceptable increases in the social and economic costs of drug abuse. This report challenges the premise of such an argument by looking at both the costs and results of current policies.

Certainly, there is widespread consensus that easy access to marijuana can be harmful to adolescents and people afflicted with mental illness such as schizophrenia. However, it is equally obvious that current laws making marijuana possession illegal have failed to protect these vulnerable groups.

After funding decades of scientific research, the United States Government has failed to make a convincing case that marijuana is more harmful to individual health than alcohol or tobacco. An examination of the scientific record is beyond the scope of this report, however it is relatively easy to support the assertion that the government has failed to convince many scientific and other experts, let alone millions of marijuana users, that the drug is more dangerous than alcohol. Consider the following offhand remarks reported by the national media during 2007.

A June 14, 2007 report by ABC News on marijuana cultivation features comments on whether marijuana is a gateway drug by Columbia University neuroscientist Dr. Carl Hart:

> "I don't know of any evidence to support the statement that marijuana is the biggest cause of addiction," Dr. Hart told ABC News, who also challenged Walters' claim that 60 percent of drug treatment goes to marijuana users. "About ten percent of the folks who ever try marijuana will become addicted or dependent, whereas about 15 to 20 percent of those individuals who [try] cocaine will become addicted," he said, citing DEA statistics he's studied.
>
> A quarter of the people who try heroin become addicted, Hart said, and a full third of those who try tobacco become addicted.
>
> "Is marijuana a gateway drug?" Hart asked rhetorically. "It's a difficult question because I think people focus on, 'you try marijuana you're going to go on to other drugs,' when the vast majority of the folks who [use] marijuana do not go on to other drugs. But certainly, those individuals who've tried cocaine and they have tried heroin, most of them have used marijuana. And most of them have used alcohol underage, and most of them have smoked tobacco as well. So if you think about 'gateway' in that

> sense, certainly you can say it's a gateway. But what is the meaning of gateway when you put it together like that?"[1]

A June 25, 2007 article in Newsweek regarding parent-sanctioned alcohol use by teens reported the following comment:

> "Aaron White of Duke University Medical Center, who studies adolescent alcohol use . . . says parents should think twice about offering alcohol to teens because their brains are still developing and are more susceptible to damage than adult brains. 'If you're going to do that, I suggest you teach them to roll joints, too,' he says, 'because the science is clear that alcohol is more dangerous than marijuana.'"[2]

The Washington Post provided a profile of Dr. Drew Pinsky and his appearance before a group of conservative Congressional Staff members at a presentation sponsored by the Independent Women's Forum advertised as a "Campus Sex and Dating Conference" hosted by House Minority Leader John Boehner. According to the Washington Post:

> "The conservative National Review several years ago described Pinsky, host of the radio show 'Loveline,' as a 'hip cultural warrior' who delivers family values in a stealthy package. . . Turning to drug use, Pinsky asserted that, as a matter of health, marijuana 'is certainly no worse than alcohol and cigarettes and maybe better.'"[3]

Just as there is a lack of consensus that marijuana is more harmful than alcohol or tobacco, and thus requires greater legal suppression and criminal penalties rather than a regulatory and more public-health oriented public policy approach, there is also a lack of consensus and data that current policies are either successful at restricting access to marijuana, cost-effective, or both. The government publishes considerable data on marijuana, including its supply, use, availability, and price. Marginal changes in these figures are often spun by Administration officials as proof their policies are successful. Indeed, over the long-term, these data are reasonable indicators with which to evaluate the effectiveness of public policy.

But this data has two specific functions within the scope of this report. First, over the long term this data demonstrates the boundary of what the government asserts is acceptable performance for their marijuana-related policies. Despite the rhetoric and hyperbole that accompanies their annual strategies and budgets, consistent data suggests that marijuana use and supply have not significantly diminished over the long-term and are unlikely to diminish in the future. Second, these data provide us with additional boundaries within which to estimate the cost of this approach to marijuana laws.

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[1] Avila, Jim and The ABC News Law & Justice Unit. Marijuana McMansions. ABC News. June 14, 2007. http://www.abcnews.go.com/TheLaw/WNT/story?id=3242760&page=1

[2] Kantrowitz, Barbara and Anne Underwood. The Teen Drinking Dilemma. Newsweek. June 25, 2007. http://www.msnbc.msn.com/id/19263094/site/newsweek/page/0/

[3] Milbank, Dana. Sex and the Conservative. The Washington Post. Tuesday, July 17, 2007; A02

We really don't know the exact number of marijuana users, the precise amount of marijuana the market supplies, the specific frequency and amounts users consume and what they pay for it. But the extensive data supplied by the government gives us boundaries within which the precise figures can be found; they provide us with what modeling experts call a solution area. This report estimates the costs of marijuana laws within this context of current policy performance and available data.

The report opens with a critical appraisal of the government's estimation of the costs of drug abuse with emphasis on the minor role of marijuana's contribution to these costs. Section 1 also looks at the role of utilizing such costs in analysis of contemporary public policies that rely on criminal sanctions to control marijuana's use, production, and sale in the United States.

Section 2 of the report reviews data from the National Survey on Drug Use and Health on the extent of marijuana use in the United States since 1990, with particular attention to use by age group. This section also reviews information on the consumption of marijuana, frequency of use, the effects of developing tolerance to marijuana, and profiles of heavy marijuana use in order to provide some background on how the vast sums of marijuana available in the US are consumed by the using population.

Section 3 of the report reviews data from both the National Survey on Drug Use and Health and the Monitoring the Future survey on the topic of the availability of marijuana. Despite law enforcement's best efforts marijuana remains widely available to all age groups, particularly adolescents and teenagers. Survey data also indicates how many individuals sell drugs, providing additional understanding on the mechanisms by which marijuana is available in the nation's schools – school children sell marijuana to other adolescents.

Section 4 presents data on the price of marijuana is provided from several sources. Historical and contemporary data are presented, including data derived from police purchases of marijuana, NSDUH survey data, and reports from High Times magazine on the price of marijuana in the United States. A composite price from these various sources is compiled to represent the price of marijuana over the last four years for use in placing a value on the annual supply of marijuana in the United States.

Section 5 provides data on the supply of marijuana and introduces three types of supply estimates. The first is based on seizures of marijuana by federal law enforcement agencies. Another source of supply estimates consists of reports from federal inter-agency committees as well as reports on marijuana's availability by the Federal Research Service of the Library of Congress. A third approach to estimating annual supply is based on calculating the consumption of marijuana accounted for by data from NSDUH and its predecessor surveys. A composite supply estimate is derived by taking the average of 4 supply estimates from these various sources.

The economic value of the annual marijuana supply is generated by applying the price index derived in Section 4 to the supply estimate generated by Section 5. The budgetary

impact of this value is derived in Section 6 with the use of data from the Office of Management and Budget on the tax revenue derived from the nation's Gross Domestic Product. The reasoning behind this valuation is that the diversion of funds to the marijuana market represents a loss of capital to the taxable economy and subsequently a loss of tax revenue to local, state, and the federal government. The concluding commentary reviews the benefits and advantages of the regulation and legalization of marijuana.

1. The Federal Government's Report on the Economic Costs of Drug Abuse as It Concerns Marijuana Use.

The Office of National Drug Control Policy (ONDCP) periodically updates and publishes a comprehensive report on "The Economic Costs of Drug Abuse." The most recent version is based on the period of 1992 to 2002[4]. Few of the costs detailed in this report concern marijuana use. The total annual cost of drug abuse presented in the report is an impressive $180.8 billion. These costs are divided into three categories – productivity, health, and other costs.

Over two-thirds (71.3%) of the costs of drug abuse are attributed to lost productivity, expressed in calculations of lost economic activity due to premature death, drug-abuse related illness, institutionalization, the productivity loss of victims of crime, incarceration and crime careers. Even though marijuana is the most popular illegal drug in the United States, these factors are disproportionably associated with chronic heroin and cocaine addiction. Furthermore $39 billion in lost productivity is attributed by the ONDCP report to incarceration for all drug-related offenses (regardless of the drug). This is not a cost of drug abuse but, rather, the costs of current policies.

When discussing crime careers, the ONDCP study explains that "Studies of addicts of expensive drugs such as heroin and cocaine entering treatment consistently find that on the order of a third of them rely on illegal activities, such as drug dealing and manufacture, property crime and commercial sex, to buy drugs and make a living."[5] Similarly, the figures concerning premature death are derived from cases involving diseases such as TB, hepatitis B and C and HIV/AIDS, diseases associated with chronic dependency on heroin and cocaine and other factors not commonly associated with marijuana use.

The health care costs associated with drug abuse represent a much smaller share of the economic and social costs of drug abuse, $15.8 billion or 8.7%. These costs include nearly $6 billion for community based treatment services, $3.7 billion for HIV/AIDS related services, $1.4 billion for hospital and ambulatory care services, and $1.2 billion for federal prevention services. Marijuana use does account for portions of the treatment and prevention expenditures, however it should be noted that in 2005, for example, 56.7% of treatment referrals for marijuana were generated by the criminal justice system.[6] Many of the economic costs of marijuana use are actually generated by contemporary marijuana policies.

The cost of goods and services lost to crime is the only category of the economic costs of drug abuse that is substantially related to marijuana use, and here primarily through the costs of enforcing the nation's marijuana laws. Criminal Justice Systems and Other

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[4] Office of National Drug Control Policy (2004). The Economic Costs of Drug Abuse in the United States, 1992-2002. Washington, DC: Executive Office of the President.
http://www.whitehousedrugpolicy.gov/publications/economic_costs/

[5] ONDCP (2004) pg III-1.

[6] Treatment Episodes Data Set, 2005. Substance and Mental Health Services Administration (SAMSHA).

Public Costs are estimated by the ONDCP report to be $36.4 billion, including $14.2 billion for state and local corrections facilities, $9.8 billion for law enforcement expenses, and $6.2 billion for federal supply reduction activities. These expenses are calculated on a simple percentage basis, that is, the percentage share of drug related arrests also represents the percentage share of overall justice system expenses. Marijuana arrests accounted for 45% of all drug arrests in 2002[7], for example, and consequently account for $16.4 billion in law enforcement costs.

When addressing costs associated with incarceration, law enforcement, and supply reduction it is important to note that these are costs associated with the implementation of current public policies that are brought about by the existing laws criminalizing marijuana use. These are not effects of marijuana use. These are the costs and effects of marijuana laws. These are measures of policy output AND NOT indications of policy effectiveness or impact. This is an elementary aspect of policy analysis. For example, a recent university textbook in public administration explains that:

> "[F]rom the perspective of policy analysis, it is crucial not to confuse policy outputs with policy outcomes. The outputs do not tell us much about the performance or the achievement of a stated objective . . . only a naïve political observer would assume that a governmental purpose is achieved because a statute is enacted, an administrative agency is empowered, or funds are spent. Too much has been learned about the limits of government to assume that the output necessarily has the intended outcome."[8]

The impact of contemporary marijuana policy in the United States can be examined by looking at the reports on marijuana's supply, availability, price, and usage over the last twenty years as well as the economic and social costs associated with these impacts. This long term perspective is necessary to offset the tendency of policy officials such as the Director of ONDCP to focus on marginal changes in these indicators and present them to the public as evidence of successful policies, particularly when it comes to the subject of marijuana control.

[7] Federal Bureau of Investigation, Crime in the United States, 2002.
[8] Rosenbloom, David H. and Robert S. Kravchuk. Public Administration, Sixth Edition. Boston, MA: McGraw Hill. 2005. pg 353.

2. Marijuana Usage

Since 1990 a reported 20.5 million people have used marijuana in an average year. From 1990 to 2005 annual usage was at its greatest reported level in 2002 at 25.9 million and its lowest level in 17.4 million in 1992. (See Table 1.)

The National Survey on Drug Use and Health and its predecessor, the National Household Survey on Drug Abuse, are among the most professional, sophisticated, and reliable population surveys conducted. Nonetheless, for both practical and methodological reasons they do not provide a complete accounting of drug use in the United States. For example in 2002 the National Survey on Drug Use and Health (NSDUH) revised its data collection procedures and increased their estimate of annual marijuana users from 21.1 million (as reported in the 2001 survey results) to 25.7 million.[9] NSDUH is a very extensive survey, and in 2002 respondents were paid to complete the entire survey. While this improved data collection, it also calls attention to incomplete data collection in prior years. At best, NSDUH provides data on the minimum number of drug users in the country.

A report by ONDCP on drug consumption in the United States includes this explanation why surveys likely underreport drug use:

> "These estimates may be low. Users are likely to under report socially disapproved behaviors, even when those behaviors are legal. They would seem to have even more incentive to under report illegal behaviors. Given under reporting rates for tobacco and alcohol use, it might be reasonable to inflate marijuana estimates by about one-third."[10]

A recent study issued by the Substance Abuse and Mental Health Services Administration (SAMHSA) provides additional data on this trend. Comparing self-reporting of marijuana use within the past month with urine testing of the same subjects

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[9] Substance Abuse and Mental Health Services Administration, Office of Applied Studies, Department of Health and Human Services. 2001 National Household Survey on Drug Abuse. See Table H1. http://www.drugabusestatistics.samhsa.gov/nhsda/2k1nhsda/vol1/toc.htm 2002 National Survey on Drug Use and Health. See Table 1.31A http://www.drugabusestatistics.samhsa.gov/nhsda/2k2nsduh/Overview/2k2Overview.htm#chap1

[10] Office of National Drug Control Policy (ONDCP) "What America's Users Spend on Illegal Drugs, 1988 - 2000" December, 2001. NCJ 192334. Washington, DC: Office of National Drug Control Policy. Pg 27. http://www.whitehousedrugpolicy.gov/publications/pdf/american_users_spend_2002.pdf The following footnote is provided in the ONDCP report to substantiate this conclusion:

"Researchers disagree about trends in reporting practices, but they agree that self-reported tobacco use is only about three-quarters as large as reports based on foreign imports and tobacco sales resulting in state and federal excise taxes. K.E. Warner, 'A Possible Increases in the Under reporting of Cigarette Consumption,' Journal of the American Statistical Association, 73 (1978):314-317. E.J. Hatziadreu, J.P. Pierce, M.C. Fiore, et. Al., 'The Reliability of Self-Reported Cigarette Consumption in the United States,' American Journal of Public Health, 79, (1989): 1020-1023."

indicated that 40% of the individuals who tested positive for marijuana use had declined to accurately report their marijuana use prior to urine testing.[11]

Despite marginal changes in annual data, marijuana use in the United States has remained fundamentally unchanged in the last decade and a half. Since the beginning of annual surveys on drug use, now called the National Survey on Drug Use and Health, in 1990 the average level of annual marijuana use has been 9.3% (± 1%) of the population age 12 and over. In 1990 10.2% of this population used marijuana in the last year, and in 2005 annual usage was at 10.5%. (See Table 2.)

During this period the average monthly use of marijuana averaged 5.1% (± .6%). In 1990 monthly marijuana usage was at 5.1%; in 2005 monthly marijuana usage was reported by 6% of this population. During this period monthly use of marijuana by adolescents age 12 to 17 averaged 6.9% (± 1.6%). In 1990 monthly marijuana use was reported by 5.2% of this age group; in 2005 this age group reported monthly marijuana use by 6.8%. (See Table 4.)

Since the NSDUH was revised and improved in 2002 the number of annual users has remained essentially unchanged at 25 million plus per year. (See Table 1.)

If, as suggested by ONDCP and SAMSHA, illicit drug use is under-reported, then it is reasonable to inflate reports of marijuana use by two-thirds (reflecting the 40% under-reporting of use in the SAMSHA report), then the number of annual marijuana users in the United States is closer to 41 million than 25 million. This will be a key factor in accounting for the consumption of the available marijuana supply (see below).

[11] Harrison, Lana D. , Steven S. Martin, Tihomir Enev, and Deborah Harrington. "Comparing Drug-Testing and Self-Report of Drug Use among Youths and Young Adults in the General Population." Washington, D.C.: SAMSHA. May, 2007. http://www.oas.samhsa.gov/validity/drugTest.pdf Table 5.1, pg 61.

Table 1. Prevalence of Annual Marijuana Use, by Age (1990 – 2005)

Year	Age 12-17	Age 18-24	Age 25-34	Age 35+	Total
1990	2,266,998	7,135,749	6,974,862	4,076,743	20,454,352
1991	2,027,075	6,994,300	5,589,503	4,624,054	19,234,931
1992	1,676,333	6,341,801	5,481,217	3,900,905	17,400,256
1993	2,136,138	6,482,924	5,143,919	4,810,284	18,573,265
1994	2,490,533	6,105,144	4,208,314	5,008,553	17,812,545
1995	3,145,255	6,075,672	4,234,133	4,299,635	17,754,695
1996	2,924,936	6,627,703	4,021,150	4,824,519	18,398,308
1997	3,556,258	6,184,269	3,946,343	5,759,291	19,446,161
1998	3,197,152	6,738,646	3,361,814	5,412,408	18,710,020
1999	3,284,779	6,919,126	3,434,145	5,443,578	19,081,627
2000	3,107,946	6,881,795	3,419,821	5,201,523	18,611,085
2001	3,561,834	7,870,393	3,899,770	5,733,235	21,065,231
2002	3,906,855	9,220,918	4,985,301	7,823,062	25,936,136
2003	3,808,955	9,102,722	5,105,873	7,573,329	25,590,879
2004	3,661,713	9,177,965	4,845,469	7,948,214	25,633,361
2005	3,352,736	9,204,892	5,241,362	7,627,208	25,426,198

Table 2. Percentage Prevalence of Annual Marijuana Use, by Age (1990 – 2005)

Year	Age 12-17	Age 18-24	Age 25-34	Age 35+	Total
1990	11.30%	24.60%	18.00%	3.60%	10.20%
1991	10.10%	24.50%	14.40%	4.00%	9.50%
1992	8.10%	22.70%	14.30%	3.30%	8.50%
1993	10.10%	22.90%	13.80%	4.00%	9.00%
1994	11.40%	21.80%	11.50%	4.10%	8.50%
1995	14.20%	21.80%	11.80%	3.40%	8.40%
1996	13.00%	23.80%	11.30%	3.80%	8.60%
1997	15.80%	22.30%	11.20%	4.40%	9.00%
1998	14.10%	24.10%	9.70%	4.10%	8.60%
1999	14.20%	24.30%	10.20%	4.00%	8.60%
2000	13.30%	23.70%	10.40%	3.80%	8.30%
2001	15.10%	26.70%	11.90%	4.10%	9.30%
2002	15.80%	29.70%	14.20%	5.40%	11.00%
2003	15.20%	28.70%	14.60%	5.20%	10.80%
2004	14.50%	28.50%	13.90%	5.40%	10.70%
2005	13.20%	28.30%	15.00%	5.10%	10.50%

Source: National Survey on Drug Use and Health; National Household Survey on Drug Abuse; Substance Abuse and Mental Health Services Administration (SAMHSA), Department of Health and Human Services.

Table 3. Prevalence of Monthly Marijuana Use, by Age (1990 – 2005)

Year	Age 12-17	Age 18-24	Age 25-34	Age 35+	Total
1990	1,030,277	3,692,349	3,340,249	2,143,041	10,205,916
1991	874,363	3,713,701	2,704,804	2,428,493	9,721,360
1992	837,651	3,066,076	3,140,469	1,906,001	8,950,197
1993	1,043,150	3,141,534	2,504,469	2,302,858	8,992,012
1994	1,314,817	3,389,236	2,522,093	2,886,294	10,112,440
1995	1,828,063	3,325,929	2,424,477	2,263,991	9,842,460
1996	1,599,650	3,678,033	2,252,401	2,564,806	10,094,891
1997	2,115,914	3,556,906	2,098,683	3,337,095	11,108,598
1998	1,877,860	3,854,770	1,893,711	3,389,526	11,015,866
1999	1,675,613	4,049,183	1,802,007	2,931,661	10,458,464
2000	1,678,451	3,950,357	1,943,764	3,141,108	10,713,680
2001	1,889,091	4,711,489	2,216,395	3,305,040	12,122,015
2002	2,023,254	5,375,778	2,721,389	4,463,414	14,583,835
2003	1,991,946	5,448,261	3,033,129	4,301,974	14,775,311
2004	1,896,861	5,285,266	2,928,350	4,566,727	14,677,204
2005	1,728,265	5,469,642	3,018,693	4,340,777	14,557,377

Table 4. Percentage Prevalence of Monthly Marijuana Use, by Age (1990 – 2005)

Year	Age 12-17	Age 18-24	Age 25-34	Age 35+	Total
1990	5.20%	12.70%	8.60%	1.90%	5.10%
1991	4.30%	13.00%	7.00%	2.10%	4.80%
1992	4.00%	11.00%	8.20%	1.60%	4.40%
1993	4.90%	11.10%	6.70%	1.90%	4.30%
1994	6.00%	12.10%	6.90%	2.30%	4.80%
1995	8.20%	12.00%	6.70%	1.80%	4.70%
1996	7.10%	13.20%	6.30%	2.00%	4.70%
1997	9.40%	12.80%	6.00%	2.60%	5.10%
1998	8.30%	13.80%	5.50%	2.50%	5.00%
1999	7.20%	14.20%	5.40%	2.20%	4.70%
2000	7.20%	13.60%	5.90%	2.30%	4.80%
2001	8.00%	16.00%	6.80%	2.40%	5.40%
2002	8.20%	17.30%	7.70%	3.10%	6.20%
2003	8.00%	17.20%	8.70%	2.90%	6.20%
2004	7.50%	16.40%	8.40%	3.10%	6.10%
2005	6.80%	16.80%	8.70%	2.90%	6.00%

Source: National Survey on Drug Use and Health; National Household Survey on Drug Abuse; Substance Abuse and Mental Health Services Administration (SAMHSA), Department of Health and Human Services.

In the early 1990s the National Household Survey on Drug Abuse collected data on the amount of marijuana consumed and the frequency of use by individuals who reported marijuana use in the last month. Table 5 is based on data derived from the Household Survey by Kevin Chen, Denise Kandel and Mark Davies in an article in the journal Drug and Alcohol Dependence.[12] It shows that over 20% of monthly marijuana users consumer more than 3 marijuana joints (cigarettes) per day.

Table 5. Amount of Marijuana Consumed Per Day by Monthly Marijuana Users (1991-1993)

Joints	Teen Male	Teen Female	Adult Male	Adult Female
1	45.24%	46.85%	51.65%	59.28%
2	22.51%	25.00%	24.35%	18.57%
3	9.74%	13.06%	10.96%	10.76%
4 or more	22.51%	15.09%	12.87%	11.60%

Source: National Household Survey on Drug Abuse; Substance Abuse and Mental Health Services Administration (SAMHSA), Department of Health and Human Services; Chen, Kevin, Denise Kandel and Mark Davies. "Relationships between frequency and quantity of marijuana use and last year proxy dependence amng adolescents and adults in the United States." Drug and Alcohol Dependence, 46 (1997) 43-67.

There is little reliable research on the average size of a marijuana cigarette. A 2001 ONDCP report utilizes a benchmark of approximately .4 grams per joint.[13] A training manual prepared by the California Commission on Peace Office Standards and Training estimates a slender "matchstick" type of marijuana cigarette 3/16th inches in diameter to be .34 grams in weight, a typical homemade 5/16th inches in diameter cigarette to be .50 grams, and a tobacco cigarette-refilled with marijuana would contain approximately .90 grams of marijuana.[14] Marijuana cigarettes produced for research purposes are designed to replicate the size and use of marijuana cigarettes used by consumers. The marijuana provided by the federal government for research and a limited number of legal patients is grown at the University of Mississippi, and processed into standardized cigarettes by the Research Triangle Institute in North Carolina. As described in one study, "these cigarettes were approximately 85 mm (length) by 25mm (circumference), weighed from 750 to 900 mg."[15]

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[12] Chen, Kevin, Denise Kandel and Mark Davies. "Relationships between frequency and quantity of marijuana use and last year proxy dependence amng adolescents and adults in the United States." Drug and Alcohol Dependence, 46 (1997) 43-67. See Table 5, pg 62.

[13] Office of National Drug Control Policy (ONDCP) "What America's Users Spend on Illegal Drugs, 1988 - 2000" December, 2001. NCJ 192334. Washington, DC: Office of National Drug Control Policy. Pg 27. http://www.whitehousedrugpolicy.gov/publications/pdf/american_users_spend_2002.pdf The following footnote is provided in the ONDCP report to substantiate this conclusion: "Using several self-report surveys, BOTEC Analysis Corporation estimated. . . . that an ounce could be divided into 60 joints"

[14] California Commission on Peace Office Standards and Training, (NCJRS Ref. #140188)

[15] Azorlosa, J., Greenwald, M., Stizer, M., "Marijuana Smoking: Effects of Varying Puff Volume and Breathhold Duration." Journal of Pharmacology and Experimental Therapeutics 2782:560-569. 1995.

Aside from frequency of use, another reason marijuana users consume seemingly large quantities of the drug is due to the development of tolerance, as explained in the following comment from a landmark article explaining the phenomenon's neurological basis by way of changes in the levels of cannabinoid receptors in the brain that accompany heavy use:

> "[E]xperienced users are capable of consuming enormous quantities of the drug with few or no obvious ill effects. Scores in cognitive tasks, both in human and non-human primate studies, show a paucity of measurable effects associated with chronic use . . . tolerance to most psychoactive and physiological effects does occur in humans when high doses are administered daily."[16]

> "[Indications of receptor regulation in other neuronal systems] stand in stark contrast to the massive and homogenous changes in cannabinoid receptor levels found in the present [animal] study. The magnitude of the present effect, like the striking behavioral tolerance, may stem in part that, unlike other psychoactive agonist drugs, cannabinoids can be administered in very high doses. It is ironic that the magnitude of both tolerance (complete disappearance of the inhibitory motor effect) and receptor down-regulation (78% loss . . .) is so large, whereas cannabinoid dependence and withdrawal phenomena are minimal."[17]

Reports of heavy marijuana use are well documented in the scientific literature, particularly in articles about the effects of marijuana use on the lungs and articles about treatment strategies for dependence that develops among some frequent users. For example:

> "Subjects were eligible if they . . .had a history of smoking or otherwise using the equivalent of 10 'joints' of marijuana per week for at least 5 years. . .Of the 1,163 volunteers, 396 met all the eligibility criteria . . ."[18]

> "Subjects used marijuana on an average of 78.71 of the 90 days before testing. Almost all the subjects (93%) used marijuana more than once on a typical day of use, and nearly 50% used it four or more times per day."[19]

> "Subjects were excluded 'because they had used marijuana fewer than 50 times in the past 90 days . . .'"[20] pg 92

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[16] Oviedo, A., Glowa, J., and Herkenham, M. (1993), "Chronic cannabanoid administration alters cannabinoid receptor binding in rat brain: a quantitative autoradiographic study." Brain Research, 616: 293-302. pg 293.

[17] Ibid pg. 300

[18] Bourque, Linda et al "Demographic and Health Characteristics of Heavy Marijuana Smokers in Los Angeles County" International Journal of Addictions 26(7), 739-755, 1991. pg 741-742.

[19] Stephens, Robert S., et al "Adult Marijuana Users Seeking Treatment." Journal of Consulting and Clinical Psychology. 1993, Vol 61, No 6, 1100-1104. pg 1101.

> "Marijuana use was measured on a four point scale "that included once (1), 2-3 times (2), 4-5 times (3), and 6 or more times (4) per day."[21]

These reports indicate that among many users marijuana use is both frequent and substantial. The prevalence of use reported in national surveys, frequency of use, the amount used per day, the amount consumed per day, tolerance, and the recognition of the characteristics of heavy marijuana use by researchers are all factors that help explain how a minimum of 25 million annual marijuana users in the United States can consume the estimated supply of marijuana available each year.

[20] Stephens, Robert S. et al "Treating Adult Marijuana Dependency: A Test of the Relapse Prevention Model." Journal of Consulting and Clinical Psychology. 1994 Vol 62 No 1, 92-90. pg 92.
[21] Ibid pg. 94.

3. Marijuana Availability

It is undisputed that marijuana is and has been widely available throughout the United States since the 1970s. Reports cited above indicate that over the last 20 years there was been a minimum of 8,000 mt or 17.6 million pounds of marijuana available annually for US consumers.

The 2003 Library of Congress report presents data from a 2001 National Drug Threat Survey (NDTS) of the National Drug Intelligence Committee (NDIC)[22] which reports:

> "that 96.9 percent of state and local law enforcement agencies nationwide describe the availability of marijuana as high or medium; only 1.8 percent describes it as low. From region to region, the proportions of agencies reporting high or medium availability were very similar and ranged only from 98.9 percent in the Mid-Atlantic region to 91.6 percent in the Florida/Caribbean"[23]

Table 6 below presents data from the National Survey on Drug Use and Health (formerly the National Household Survey on Drug Abuse) on the availability of marijuana from 1991 through 2005, by age group. On a percentage basis this table indicates how many people reported that marijuana was "fairly easy" or "very easy" to acquire. During this period, in an average year 54.81% of 12 to 17 year olds reported that marijuana was easy to get. Marijuana was most available to 18 to 25 year olds, 77.45% of which reported it was easy to get in an average year. Of 25 to 34 year olds in an average year 67.47% found marijuana easy to get, while only 52.24% of those 35 and over found marijuana easy to acquire in an average year.

Overall, from 1991 to 2005 in an average year 58.44% of the public found marijuana readily available. Over the last several years the percentage of the 12 to 17 year old age group finding marijuana easy to get has declined, from 57.9% in 1997 to 50.9% in 2005. However, during the same period availability to 18 to 25 year olds has remained essentially unchanged, 77% in 1997 to 76.5% in 2005.

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[22] Established in 1993, the National Drug Intelligence Center (NDIC) is a component of the U.S. Department of Justice and a member of the Intelligence Community. The General Counterdrug Intelligence Plan, signed by the President in February 2000, designated NDIC as the nation's principal center for strategic domestic counterdrug intelligence. http://www.usdoj.gov/ndic/index.htm

[23] Marijuana Availability In The United States And Its Associated Territories -- A Report Prepared By The Federal Research Division, Library Of Congress Under An Interagency Agreement with The National Guard Bureau Counterdrug Office (Ngb-Cd). December 2003. Federal Research Division, Library of Congress. Washington, D.C. 20540−4840 http://www.loc.gov/rr/frd/pdf-files/MarAvail.pdf Pg 10.

Table 6. Percentage of Population Reporting Marijuana Fairly Easy or Very Easy to Get (1991 – 2005)

Year	Age 12-17	Age 18-24	Age 25-34	Age 35+	Total
1991	53.60%	78.50%	73.20%	55.60%	62.10%
1992	51.00%	77.50%	69.80%	52.50%	59.10%
1993	55.40%	80.30%	69.70%	50.80%	58.70%
1994	57.60%	79.10%	71.10%	53.90%	60.80%
1995	na	na	na	na	na
1996	57.70%	77.50%	67.70%	53.50%	59.50%
1997	57.90%	77.00%	68.40%	54.50%	60.10%
1998	56.30%	77.10%	66.90%	52.20%	58.20%
1999	56.50%	76.60%	65.20%	50.20%	56.80%
2000	54.20%	75.60%	63.30%	48.10%	54.70%
2001	55.30%	76.80%	63.40%	50.70%	56.60%
2002	54.90%	77.50%	67.40%	52.00%	58.10%
2003	53.70%	78.00%	65.60%	53.60%	58.80%
2004	52.40%	76.30%	66.40%	52.20%	57.60%
2005	50.90%	76.50%	66.50%	51.60%	57.10%
Average	**54.81%**	**77.45%**	**67.47%**	**52.24%**	**58.44%**

Source: National Survey on Drug Use and Health; National Household Survey on Drug Abuse; Substance Abuse and Mental Health Services Administration (SAMHSA), Department of Health and Human Services.

Monitoring the Future (MTF) is an annual survey conducted by researchers at the University of Michigan, and it has collected data on the availability of marijuana to 8th, 10th, and 12th grade students. (See Table 7.) The MTF data also reports declining availability of marijuana to 8th, 10th, and 12th graders over the last 10 years. Among 8th graders the percentage reporting marijuana was easy to acquire has declined from 54% in 1997 to 40% in 2006, while among 10th graders this percentage has declined from 80% in 1997 to 70% in 2006. Among 12th graders this percentage has declined from 89% to 85% in this same period.

Two trends in the MTF data, though, remain unchanged over the years. First of all, as students enter 10th and 12th grade more and more of them find marijuana easy to acquire. Second, from 1975 to the present at least 4 out of 5 high school seniors report that marijuana is fairly easy or very easy to get.

Regardless of annual changes in this survey data, since 1992 these surveys report that at least 2 out of 5 eighth grade students, 2 out of 3 tenth grade students, and 4 out of 5 high school seniors find marijuana widely available.

Table 7. Percentage of 8th, 10th, and 12th Grade Students Reporting Marijuana Fairly or Very Easy to Get

Year	8th	10th	12th
1975	na	na	87.80%
1976	na	na	87.40%
1977	na	na	87.90%
1978	na	na	87.80%
1979	na	na	90.10%
1980	na	na	89.00%
1981	na	na	89.20%
1982	na	na	88.50%
1983	na	na	86.20%
1984	na	na	84.60%
1985	na	na	85.50%
1986	na	na	85.20%
1987	na	na	84.80%
1988	na	na	85.00%
1989	na	na	84.30%
1990	na	na	84.40%
1991	na	na	83.30%
1992	42.30%	65.20%	82.70%
1993	43.80%	68.40%	83.00%
1994	49.90%	75.00%	85.50%
1995	52.40%	78.10%	88.50%
1996	54.80%	81.10%	88.70%
1997	54.20%	80.50%	89.60%
1998	50.60%	77.90%	90.40%
1999	48.40%	78.20%	88.90%
2000	47.00%	77.70%	88.50%
2001	48.10%	77.40%	88.50%
2002	46.60%	75.90%	87.20%
2003	44.80%	73.90%	87.10%
2004	41.00%	73.30%	85.80%
2005	41.10%	72.60%	85.60%
2006	39.60%	70.70%	84.90%

Source: The Monitoring the Future Survey. University of Michigan.

One of the reasons marijuana is so widely available to high school students is that many students sell marijuana to one another. The National Survey on Drug Use and Health, in addition to drug use and availability, also tracks the prevalence of individuals who sell drugs. In the 15 years from 1991 to 2005 the number of 12 to 17 year olds who have sold drugs in the last year has increased 90%, from 429,169 in 1991 to 814,924 in 2005, reaching its greatest level in 2002 at 1,080,549. (See Table 8.)

Table 8. Prevalence of Drug Selling Activity
by Age Group (1991 – 2005)

Year	Age 12-17	Age 18-24	Age 25-34	Age 35+	Total
1991	429,169	768,620	301,900	284,174	1,783,863
1992	313,360	541,539	255,192	40,492	1,150,583
1993	374,732	658,958	306,479	237,895	1,578,064
1994	514,532	741,291	149,245	290,891	1,695,959
1995	550,667	459,861	212,047	264,443	1,487,018
1996	na	na	na	na	na
1997	na	na	na	na	na
1998	779,579	1,469,104	332,633	430,579	3,011,895
1999	880,494	1,502,263	501,550	1,000,056	3,884,363
2000	805,710	1,457,380	392,424	792,184	3,447,698
2001	843,770	1,620,069	493,589	1,110,636	4,068,064
2002	1,080,549	1,840,911	767,800	903,633	4,592,893
2003	943,238	1,861,573	561,961	1,107,481	4,474,253
2004	967,419	1,930,223	613,244	1,013,707	4,524,593
2005	814,924	1,916,607	790,906	1,013,388	4,535,825

Source: National Survey on Drug Use and Health; National Household Survey on Drug Abuse; Substance Abuse and Mental Health Services Administration (SAMHSA), Department of Health and Human Services.

Table 9. Percentage Prevalence of Drug Selling Activity
by Age Group (1991 – 2005)

Year	Age 12-17	Age 18-24	Age 25-34	Age 35+	Total
1991	2.20%	2.70%	0.80%	0.20%	0.90%
1992	1.50%	2.00%	0.70%	0.00%	0.60%
1993	1.80%	2.40%	0.80%	0.20%	0.80%
1994	2.40%	2.70%	0.40%	0.20%	0.80%
1995	2.60%	1.70%	0.60%	0.20%	0.70%
1996	na	na	na	na	na
1997	na	na	na	na	na
1998	3.40%	5.30%	1.00%	0.20%	1.40%
1999	3.90%	5.40%	1.60%	0.80%	1.80%
2000	3.50%	5.00%	1.20%	0.70%	1.60%
2001	3.60%	5.50%	1.50%	0.80%	1.80%
2002	4.40%	6.00%	2.20%	0.60%	2.00%
2003	3.80%	5.90%	1.60%	0.80%	1.90%
2004	3.80%	6.00%	1.70%	0.80%	1.90%
2005	3.20%	6.00%	2.30%	0.70%	1.90%

Source: National Survey on Drug Use and Health; National Household Survey on Drug Abuse; Substance Abuse and Mental Health Services Administration (SAMHSA), Department of Health and Human Services.

While these figures indicate sales of any illicit drug there is a strong likelihood, given marijuana's widespread popularity and overall availability, that most of this sales activity involves marijuana. Overall, the number of individuals of any age who reported drug selling activity doubled from 1991 to 2005. The number of individuals increased during this time from 1,783,863 in 1991 to 4,535,825 in 2005, and the corresponding percentage increased from .9% to 1.9%.

Data on the extent of marijuana use by students and other age groups will be reviewed in greater detail below. However, a comparison of the number of monthly users of marijuana between the ages of 12 and 17 with the number of drug sellers in the same age group reveals a significant characteristic which might explain the persistent prevalence of adolescent marijuana use.

According to the 2005 National Survey on Drug Use and Health there are 1,728,265 monthly users of marijuana in this important age group of 12 to 17 year olds. The number of adolescents in this group who have sold drugs represents almost half of the number who have used marijuana in the last month: 814, 924 or 47%. On a percentage basis, 6.8% of adolescents report using marijuana in the last month and 3.2% of adolescents report selling drugs in the last year. These figures suggest that teenage drug sales is one of the key factors that explain both the widespread availability and usage of marijuana to middle and high school students.

4. The Price of Marijuana

There are five sources for determining the price of marijuana.

The most common is the prices of marijuana cited by police in news reports about marijuana seizures. Another common source is a range of prices reported in government reports on marijuana-related trends, such as the NNICC reports cited in the section below on the marijuana supply[24]. The problem with these sources is that they are not representative of the average price of marijuana but instead simply indicate the highest price on the market and/or the lowest and highest price on the market. Another problem is that the anecdotal nature of these price quotes make comparison over time difficult. The three other sources of price quotes are a bit more reliable.

The federal government's System to Retrieve Information from Drug Enforcement (STRIDE) program tracks the prices paid by undercover police officers and informants conducting purchases under police supervision. The STRIDE program provides a data set of prices for illegal drugs at various quantities over a long range of time. Another source of price quotes for marijuana is the National Survey on Drug Use and Health, which among its many questions asks individuals how much marijuana they purchased when they last bought the drug and what they paid for it. Finally, High Times magazine regularly solicits price information on marijuana from its readers and currently compiles and publishes a monthly index on marijuana prices in the United States.

The NNICC reports that prices for commercial marijuana ranged from $50 to $100 in 1985. By 1992 the highest price for commercial marijuana, according to their reports, was $450. For higher quality sinsemilla, NNICC reports a range of $120 to $200 in 1985, increasing to a range of $75 to $650 in 1992.[25]

The STRIDE program provides quarterly data on marijuana prices from police purchases. These prices are not representative of the entire market, but they do provide a reasonable basis for tracking trends and changes in marijuana prices over time. The annual averages listed in Table 10 are for the purchase of 10 to 100 grams, roughly a bit less than ½ ounce to just over 3 ounces, from 1981 to 2003. In the 2nd quarter of 2003, the last period covered by the most recent published data from the STRIDE program, the price for a gram of marijuana in a purchase of less than 10 grams was $11.33 per gram.

[24] See Section 5 below for more information on The National Narcotics Intelligence Consumers Committee (NNICC)

[25] National Narcotics Intelligence Consumers Committee (NNICC). The NNICC Report of 1988: The Supply of Illicit Drug to the United States. Washington, DC: Drug Enforcement Administration. April 1989; National Narcotics Intelligence Consumers Committee (NNICC). The NNICC Report of 1993: The Supply of Illicit Drug to the United States. Washington, DC: Drug Enforcement Administration. August, 1994.

Table 10. Annual Averages of Marijuana Prices
(Purchase of 10 to 100 gr) in 2002 Constant Dollars

	Gram	Ounce		Gram	Ounce
1981	$3.42	$96.89	1993	$10.82	$306.75
1982	$4.82	$136.65	1994	$10.96	$310.72
1983	$7.59	$215.03	1995	$7.31	$207.24
1984	$4.32	$122.47	1996	$6.30	$178.61
1985	$5.92	$167.69	1997	$4.57	$129.42
1986	$9.44	$267.48	1998	$5.93	$168.12
1987	$6.86	$194.55	1999	$8.48	$240.34
1988	$7.74	$219.29	2000	$5.22	$147.85
1989	$7.92	$224.46	2001	$5.20	$147.42
1990	$9.90	$280.74	2002	$8.72	$247.28
1991	$10.61	$300.72	2003	$7.13	$201.99
1992	$7.20	$204.05			

Source: STRIDE[26]

The National Survey on Drug Use and Health provides another source of marijuana prices. Deriving a weighted average from the total number of grams of marijuana purchased and the total expenditures reported by the survey data provides another price index for marijuana for the years 2001 to 2005.[27] In this index the price of marijuana varies between a low of $5.47/gr in 2002 to a high of $6.69/gr in 2004, and also providing a price of $6.14/gr in 2005.

The prices provided by High Times are a bit greater than these other price quotes. High Times currently provides 4 price indexes. The overall price index averages $344 an ounce ($12.15/gr) for the period January 2005 to August 2007. The remaining indexes reflect three distinct price categories. The most expensive marijuana is referred to as "Kind" and had an average price of $451/oz ($15.91/gr) during this period. The "Mids" category had an average price of $277/oz ($9.76/gr), and the lowest quality category, labeled "Schwag" had an average price of $91/oz ($3.21/gr) from January 2005 through July 2007. According to High Times, mid-level quality marijuana had an average price of $282/oz during 2005, an average price of $269/oz during 2006, and an average price of $272/oz during the first half of 2007.

Table 11 constructs a current price index from the most recent STRIDE, NSDUH and High Times data by converting price data for the years 2003 to 2006 into 2007 constant dollars and taking an average of these four years. The result is a price of $7.87 per gram or $223/oz. This price will be used in a section below that calculates the value of the

[26] Office of National Drug Control Policy (2004). The Price and Purity of Illicit Drugs: 1981 Through the Second Quarter of 2003. Washington DC: Executive Office of the President (Publication Number NCJ 207768) http://www.whitehousedrugpolicy.gov/publications/price_purity/

[27] Gettman, Jon B. "Marijuana Production in the United States." Bulletin of Cannabis Reform. No. 2. December, 2006. http://www.drugscience.org/Archive/bcr2/bcr2_index.html

total annual supply of marijuana in the United States. These annual price estimates have been chosen as the best available data for the 4 years prior to 2007, the years that best coincide with the periods upon which the supply estimates are based.

Table 11. Price Index for the Years 2003 to 2006
Converted to 2007 Constant Dollars

	Price per gram	**2007 Constant Dollars**
STRIDE 2003	$7.13	$7.96
NSDUH 2004	$6.79	$7.39
NSDUH 2005	$6.14	$6.46
High Times 2006	$9.48	$9.66
	4 Year Average	$7.87

5. The Supply of Marijuana to the United States

There are three ways to estimate the amount of marijuana available for sale in the United States. The first method is based on federal seizures of marijuana. Another method is based on intelligence of foreign production, observations about domestic production, and other data used in federal inter-agency studies of the drug supply and their subsequent published reports. The third approach is to generate an estimate of supply based on consumption models based on survey and other data on marijuana usage. Consumption models are problematic because of under-reporting of use and a general lack of data on marijuana consumption.

a) Estimates Based on Seizures

The first approach is to examine federal seizures of marijuana. According to a Library of Congress report, "an estimated 50 percent of the marijuana available in the United States is imported."[28] "There seems to be general agreement among law enforcement officials that only a maximum of 10 percent of the marijuana being smuggled into the United States is intercepted."[29] According to this report:

> "Calculating the total amount of marijuana available in a given year based on the amount seized during that year necessarily provides only a rough estimate. If only 10 percent of illicit drugs are seized in any given year, then, based on the figure of 2,412,365 pounds of marijuana seized in 2002, one could estimate that in 2002 the total amount of marijuana that traffickers succeeded in smuggling into the country was roughly 24 million pounds, or about 10,889 metric tons. If one doubles that amount to take into account the domestic production of marijuana that was not seized, then the total amount would be closer to 22,000 metric tons."[30]

From 1998 to 2003 federal drug seizures averaged 2,410,571 lbs per year, On this basis one can estimate that on average traffickers succeeded in smuggling into the United States roughly 24.1 million lbs of marijuana annually, or 10,932 mt per year. As in the example above, taking domestic production into account this suggests that there is a supply of marijuana in the United States of 21,865 metric tons annually. (See Table 12.)

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[28] Marijuana Availability In The United States And Its Associated Territories -- A Report Prepared By The Federal Research Division, Library Of Congress Under An Interagency Agreement With The National Guard Bureau Counterdrug Office (Ngb-Cd). December 2003 Federal Research Division, Library of Congress. Washington, D.C. 20540−4840
http://www.loc.gov/rr/frd/pdf-files/MarAvail.pdf

[29] ibid pg 23.

[30] ibid pg 24

Table 12. Estimates of Foreign Supply of Marijuana to US
Based on Federal Seizures (1989 – 2003)

Fiscal year	Marijuana Seized (lbs)	Multiplied by 10 (lbs)	Multiplied by 10 (mt)
1989	1,070,965	10,709,650	4,856
1990	483,353	4,833,530	2,192
1991	499,097	4,990,970	2,263
1992	783,477	7,834,770	3,553
1993	772,086	7,720,860	3,501
1994	1,041,445	10,414,450	4,723
1995	1,308,171	13,081,710	5,932
1996	1,429,786	14,297,860	6,484
1997	1,488,362	14,883,620	6,749
1998	1,777,434	17,774,340	8,060
1999	2,282,313	22,823,130	10,350
2000	2,614,746	26,147,460	11,858
2001	2,673,410	26,734,100	12,124
2002	2,415,243	24,152,430	10,953
2003	2,700,282	27,002,820	12,246

Source: Sourcbook of Criminal Justice Statistics. Table adapted by SOURCEBOOK staff from tables provided by the U.S. Department of Justice, Drug Enforcement Administration, Federal-wide Drug Seizure System. Table 4.36. http://www.albany.edu/sourcebook/tost_4.html#4_v

b) Estimated Based on Government Study Groups

The next approach is taken by inter-agency government study groups. During the 1980s and 1990s the primary source of supply data on marijuana and other drugs was the National Narcotics Intelligence Consumers Committee (NNICC), which issued an annual report on the supply of illicit drugs to the United States. The NNICC Report was:

> "the product of a cooperative effort involving Federal Agencies with drug-related law enforcement, foreign and domestic policy, treatment, research, and intelligence responsibilities . . . In 1989, membership consisted of the Central Intelligence Agency, U.S. Coast Guard, U.S. Customs Service, Department of Defense, Drug Enforcement Administration, Federal Bureau of Investigation, Immigration and Naturalization Service, Internal Revenue Service, National Institute on Drug Abuse, Department of State, and the Department of the Treasury. The Office of National Drug Control Policy (ONDCP) was an observer. The Deputy Assistant Administrator for Intelligence of the Drug Enforcement Administration served as Chairman."[31]

[31] National Narcotics Intelligence Consumers Committee (NNICC). The NNICC Report of 1989: The Supply of Illicit Drug to the United States. Washington, DC: Drug Enforcement Administration. June 1990 pg 1.

In 1986 NNICC estimated that 8,050 metric tons (mt) of marijuana was available for consumption in the United States.[32] About one fourth (2,100 mt) was domestically produced; the rest was produced in Columbia, Mexico, Jamaica, Belize, and other foreign countries. According to NNICC, domestic production of marijuana increased considerably in the late 1980s, to 3,500 mt in 1987[33], 4,600 mt in 1988[34], and 5,500 mt in 1989 and 1990[35]. Foreign marijuana available for US consumption also increased from 5,950 in 1986 to 10,070 mt in 1988.[36]

By 2002 the government's estimate of marijuana available to consumers in the United States had increased to 17,000 mt. The 2003 Library of Congress report on "Marijuana Availability in the United States and Its Associated Territories"[37] cited above relied, in part, on a 2002 ONDCP report on "Drug Availability Estimates in the United States."[38] Based on the ONDCP report and other data, the Federal Research Service concluded that:

> "Using its two estimates derived for foreign- and domestically produced marijuana . . . ONDCP estimated the street availability of marijuana in 2001 to be between 10,000 and 24,000 pure metric tons."[39]

The 2002 ONDCP report indicated that "yields estimates for the availability of foreign-produced marijuana as high as 7,135 metric tons . . . [and that their] estimate for the availability of domestic marijuana rang[ed] between 5,577 and 16,731 metric tons."[40]

On the basis of these reports, domestic marijuana production was cited in reports on international drug production by the US Department of State at the level of 10,000 mt in 2002[41], 2003[42], and 2005[43].

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[32] National Narcotics Intelligence Consumers Committee (NNICC). The NNICC Report of 1988: The Supply of Illicit Drug to the United States. Washington, DC: Drug Enforcement Administration. April 1989.
[33] ibid
[34] ibid
[35] National Narcotics Intelligence Consumers Committee (NNICC). The NNICC Report of 1990: The Supply of Illicit Drug to the United States. Washington, DC: Drug Enforcement Administration. June, 1991.
[36] NNICC (1989)
[37] Federal Research Division, Library of Congress. Marijuana Availability In The United States And Its Associated Territories -- A Report Prepared By The Federal Research Division, Library Of Congress Under An Interagency Agreement With The National Guard Bureau Counterdrug Office (Ngb-Cd). December 2003 Federal Research Division, Library of Congress. Washington, D.C. 20540−4840 http://www.loc.gov/rr/frd/pdf-files/MarAvail.pdf
[38] Office of National Drug Control Policy (ONDCP) "Drug Availability Estimates in the United States," NCJ 197107. ONDCP, December 2002. Chapter 4. Marijuana Availability in the United States. http://www.whitehousedrugpolicy.gov/publications/drugfact/drug_avail/
[39] Federal Research Division (2003), pgs 22-23.
[40] ONDCP, 2002. pg 103.
[41] Bureau of International Narcotics and Law Enforcement, Department of State. "2002 International Narcotic Control Strategy Report." Washington, DC: Department of State. March 1, 2003. Pg II-7. http://www.state.gov/p/inl/rls/nrcrpt/2002/
[42] Bureau of International Narcotics and Law Enforcement, Department of State. "2003

After the 10,000 mt estimate of US domestic marijuana production was publicized in a December 2006 report in the Bulletin of Cannabis Reform[44] that received extensive media attention in the United States and other countries, the US Government lowered their official estimate. The 2006 State Department report places foreign marijuana production marketed to US consumers at 5,000 mt[45], and the 2007 State Department report estimates that 4,000 mt of foreign grown marijuana is marketed to the United States.[46] The 2007 National Drug Threat Assessment by the National Drug Intelligence Committee (NDIC) estimates domestic marijuana production to be 4,708 mt in 2006, based on the premise that law enforcement was able to seize and destroy 40% of the total crop.[47]

The claim that law enforcement seized 40% of the crop is suspect for several reasons. A 1982 report by DEA, for example, indicated that in most states eradication efforts seized 10 to 20% of marijuana grown there.[48] A 1994 report by ONDCP suggested that marijuana eradication programs on average eradicated 20% of all marijuana grown in the US.[49] As indicated above, the 2003 Federal Research Division report noted that it is widely recognized that law enforcement is only able to seize about 10% of the drugs reaching the US market.[50] The most recent State Department and NDIC reports provide a combined estimate that in 2006 at least 8,700 mt of marijuana was available for sale in the United States.

International Narcotic Control Strategy Report." Washington, DC: Department of State. March 1, 2004. See "Policy and Program Developments." http://www.state.gov/p/inl/rls/nrcrpt/2003/

[43] Bureau of International Narcotics and Law Enforcement, Department of State. "2005 International Narcotic Control Strategy Report." Washington, DC: Department of State. See "Policy and Program Developments." http://www.state.gov/p/inl/rls/nrcrpt/2005/

[44] Gettman, Jon B. "Marijuana Production in the United States." Bulletin of Cannabis Reform. No. 2. December, 2006. http://www.drugscience.org/Archive/bcr2/bcr2_index.html

[45] International Narcotics Control Strategy Report, 2006, U.S. State Department, March 2006. http://www.state.gov/p/inl/rls/nrcrpt/2006/

[46] International Narcotics Control Strategy Report, 2007, U.S. State Department, March 2007. http://www.state.gov/p/inl/rls/nrcrpt/2007/

[47] Domestic Cannabis Cultivation Assessment 2007, National Drug Intelligence Center, February 2007. http://www.usdoj.gov/ndic/pubs21/22486/index.htm

[48] Drug Enforcement Administration.1982 Domestic Cannabis Eradication/Suppression Program Report. December, 1982. http://www.drugscience.org/Archive/DCESP/dcesp1982.html

[49] Office of National Drug Control Policy (ONDCP). Marijuana Situation Assessment. September, 1994. pg. 45.

[50] Federal Research Division, Library of Congress (2003). Pg 23.

c) Estimates Based on Consumption Models

The most recent government produced report on marijuana consumption is a highly flawed 2001 ONDCP report titled "What America's Users Spend on Illegal Drugs, 1988 - 2000."[51] The most conspicuous problem with this report is its failure to account for the consumption of the supply of marijuana reported above. This 2001 ONDCP report estimates that Americans only consumed 1,047 mt of marijuana in 2000 and 927 mt in 1999.

The estimation of consumption used in this 2001 ONDCP report is based on the number of monthly marijuana users as estimated by the 2000 National Household Survey, a calculation of the average consumption of marijuana expressed in joints according to early 1990s surveys, and the assumption that a joint consists of .4 gr of marijuana. This approach is flawed for several reasons.

1) The report's estimate of total consumption is inconsistent with government reports of the total supply of marijuana available on the US market. The 2002 ONDCP report on the availability of marijuana in the United States discussed the inconsistency of this consumption estimate with contemporary marijuana seizures:

> "The result of the above calculations—that 927 metric tons of marijuana were consumed in the United States in 2000—must be regarded with some skepticism when marijuana seizure data for 2000 are acknowledged. According to the Federal-wide Drug Seizure System, in 2000, approximately 1,200 metric tons of marijuana were seized in the United States, and a large portion of the seized marijuana was from foreign sources. Thus, according to these estimates the amount of marijuana seized exceeded the amount of marijuana consumed in the United States . . . it seems unlikely that marijuana growers would continue to export into the United States when the probability of detection and seizure of product was as high as is implied by the combination of the consumption and seizure estimates."[52]

2) The report only relies on monthly marijuana users and does not include estimates of the consumption of annual marijuana users. This was also observed in the 2002 ONDCP Availability Report:

> "The failure to include . . . individuals who used marijuana in the past year (but not in the past month) probably has resulted in a much lower final consumption estimate . . . the marijuana consumption estimates yielded by these calculations are likely still underestimates, in part

[51] Office of National Drug Control Policy (ONDCP) "What America's Users Spend on Illegal Drugs, 1988 - 2000" December, 2001. NCJ 192334. Washington, DC: Office of National Drug Control Policy. Pg 27. http://www.whitehousedrugpolicy.gov/publications/pdf/american_users_spend_2002.pdf

[52] Office of National Drug Control Policy (ONDCP) "Drug Availability Estimates in the United States," NCJ 197107. ONDCP, December 2002. Chapter 4. Marijuana Availability in the United States. Pg. 140 http://www.whitehousedrugpolicy.gov/publications/drugfact/drug_avail/

> because the NHSDA data upon which the estimates are based rely on information self-reported by users themselves. This may render the estimates considerably lower as users likely underreport the amount of marijuana they consume . . . The *Full Market Model* provides a much higher, alternative estimate for the amount of marijuana consumed in the United States. DEA's Statistical Services Section yielded a marijuana consumption estimate of 4,270 metric tons for 2000."[53]

3) The report relies on an estimate of the weight of a "joint" that is inconsistent with other data. (See discussion above in Section 2.) A standard of .75/gr is a more realistic parameter for a consumption estimation model.

4) The consumption estimate was based on survey data that was obtained before the survey method was improved, providing more accurate and larger estimates of both monthly and annual marijuana use from 2002 on.

5) The consumption model was based on the assumption that the average monthly marijuana user consumed 18.7 joints per month. This parameter is based on the flawed assumption that the statistical distribution of monthly consumption amounts is a normal distribution and, consequently, that an average consumption is an accurate representation of all monthly users. More detailed survey data on marijuana consumption is available from the same survey the report relied on for this figure.

An improved consumption model has been prepared in conjunction with this report based on the following assumptions and parameters:

1) The consumption model should incorporate all 25 million annual users of marijuana reported in the most recent (2005) National Survey on Drug Use and Health.

2) The model should incorporate data on the number of days marijuana was used; NSDUH asks respondents how many days they used marijuana during the year.

3) The model should incorporate an estimated weight of the marijuana "joint" as .75 gr.

4) The model should incorporate survey data on the frequency and amount of marijuana consumed, and differences between the consumption practices of males and females.

5) Individuals who used marijuana between 1 and 11 times per year should be assigned a consumption level of .5 joints per usage day. This is an arbitrary assignment based on the assumption that they either used a small amount by themselves or shared one or two

[53] Ibid. pg 140-141. This claim is supported by the following footnote: "The *Full Market Model* incorporates the following drug use-related data sets and corresponding demand indicators: National Household Survey on Drug Abuse, Monitoring the Future study, Arrestee Drug Abuse Monitoring Program, Drug Abuse Warning Network, Treatment Episode Data Set."

joints with one or more additional individuals. The amount of marijuana consumed by these individuals is relatively minor.

6) The model should inflate the number of annual users by two thirds to account for non-reporting. (See section 2 above)[54]

7) The model should use a parameter of 15% in classifying non-consumable bulk product such as seeds and stems included in the purchase price of marijuana but not consumed in end use. [55]

The National Household Survey on Drug Abuse collected data from 1991 to 1993 on the amount of marijuana consumed (in terms of the number of joints) by different categories of monthly users of marijuana (in terms of 1-2 days per month, 3-4 days per month, 5-19 days per month, or 20-30 days per month.) Using the data from all three years, and expanding the categories into consumption days per year produced the consumption levels reported for males in Table 13 and females in Table 14 below. Unfortunately, the questions soliciting this data on consumption amounts and frequency were discontinued after the 1993 survey.

[54] See notes (7) and (8) above

[55] Marijuana users discard the seeds, stems, and occasional branches that are included in purchased marijuana. A 1992 report from the Drug Enforcement Administration indicates that in seeded marijuana, seeds account for 23% of the dried plant while stems and branches account for 43% of the plant. While many of the branches are discarded prior to sale, these figures indicate that seeds are a significant part of the purchased commodity. Source: Drug Enforcement Administration. "1992 Domestic Cannabis Eradiation/Suppression Program" December, 1992. pg 10.
http://www.drugscience.org/Archive/DCESP/DEA1992.pdf

Table 13. Frequency and Amount of Marijuana Consumption by Males (1991- 1993)

# of joints per consumption day	12 to 30 days per year	31 to 54 days per year	55 to 234 days per year	235 to 365 days per year
1	69.55%	59.60%	41.14%	34.29%
2	19.77%	25.10%	26.95%	25.01%
3	5.75%	4.96%	10.64%	20.96%
4	1.20%	3.12%	4.61%	3.74%
5	2.82%	3.57%	3.94%	4.74%
6 or more	0.91%	3.64%	12.72%	11.27%

Table 14. Frequency and Amount of Marijuana Consumption by Females (1991- 1993)

# of joints per consumption day	12 to 30 days per year	31 to 54 days per year	55 to 234 days per year	235 to 365 days per year
1	79.15%	53.80%	42.39%	35.50%
2	10.84%	22.28%	22.87%	26.86%
3	5.87%	17.12%	11.09%	14.43%
4	1.57%	2.22%	2.66%	8.38%
5	1.25%	1.89%	5.83%	2.66%
6 or more	1.32%	2.69%	15.17%	12.17%

Source: National Household Survey on Drug Abuse, 1991 – 1993. Substance Abuse and Mental Health Services Administration (SAMSHA).

In utilizing this data in a consumption model, it is assumed that the amount of marijuana consumed increases as the number of days used per year increases.

The 2005 National Survey on Drug Use and Health does include data on how many days per year the respondents used marijuana. This data, along with the consumption levels provided by the 1991 – 1993 survey data, provides another means of estimating marijuana consumption for each segment of annual marijuana users consuming marijuana for a specific number of days per year. Multiplying the number of days used per year by the number of joints consumed, the size of a joint, and the number of people using marijuana with the same frequency (days per year) is the basic method of estimating consumption. Using the consumption levels in Tables 13 and 14 along with the usage data from the 2005 survey produces evidence that Americans consumed at least 9,830 mt of marijuana in 2005. (When allowing for a larger size marijuana cigarette and increases in estimates of the number of marijuana users due to improved survey techniques, this estimate is similar to the "full market model" estimate reported above.)

d) Consolidated Estimate of Supply

The data discussed above provides four credible estimates of the annual supply of marijuana to the United States over the last several years. An estimate of 8,700 mt is contained in the most recent government reports and is contradicted by earlier government reports and the evaluation of consumption related data. The highest estimate of 21,865 mt is based on conventional wisdom among law enforcement and is based on anecdotal interpretation of data on seizures. The data reported in the 2002 ONDCP study of marijuana's availability, especially considering its review and republication by the 2003 report by the Library of Congress, provides the most credible and consistent estimates of marijuana supply, especially in light of the additional data on usage, availability and price provided earlier in this report.

Marijuana usage has remained consistent throughout the last several years, with at least 25 million Americans using the drug on an annual basis. All surveys indicate that the drug is easily available. The vast majority of the marijuana available to Americans each year is eventually bought and consumed. If this were not the case, the price would drop dramatically in response to over-supply. While the price of the drug remains high, this has not had an impact on use but instead appears, as a long term trend, to have served as an incentive for increased domestic production. Despite the evidence from the 2002 ONDCP availability report and the 2003 Library of Congress report, the consumption model presented above cannot account for their reported levels of supply.

Consequently, all the data presented above suggests the most reliable estimate of annual supply is one that takes each of four most prominent estimates into consideration: 1) the 21,865 mt estimate based on seizures and domestic production; 2) the 17,000 mt estimate reported by the Library of Congress; 3) the 8,700 mt estimate generated by combining State Department and NDIC reports; and 4) the 9,830 mt consumption estimate above derived from National Survey data. The average of these four estimates of supply is 14,349 mt of marijuana available in the US on an annual basis.

6. Budgetary Impact Due to the Diversion of Funds to the Illicit Marijuana Market

Based on a retail price of $7.87 a gram, a pound of marijuana is worth $3,570 and the commodity is worth $7,871,480 per metric ton. At this price the annual supply of 14,349 mt of marijuana available in the United States is worth $112.9 billion. The diversion of money spent on marijuana has a considerable impact on the fiscal budgets of all levels of government in the United States, especially through the diversion of this amount of money from the licit and taxed sectors of our economy to the illicit, untaxed, and unregulated illegal economy that thrives on these considerable expenditures.

The economist Joseph Schumpeter described entrepreneurial activity as a force of creative destruction on the economy. Entrepreneurs introduced new combinations of goods and services, and these attracted capital, diverting it from old combinations of goods and services. In the process this reallocation or redirection of spending diminished the value of the economic activity that loses the revenue to the new innovations. The creation of new economic channels effectively destroys many old channels of economic activity, a process defining the concept of creative destruction.

The market in marijuana in the United States is illicit, illegal, and as such it diverts capital away from the channels of the licit or legal economy, especially the channels from which local, state, and the federal government collect tax revenue. In this respect the emergence and growth of the illegal marijuana market is an act of creative destruction on the ability of government to collect tax revenue. Certainly some of the capital diverted into the marijuana market seeps back into the licit economy, but this phenomenon is no different from legal spending being re-circulated. The difference is that the initial purchase of marijuana, and a large portion of the redistribution of the purchase price, travels through economic channels which essentially avoid contributions to funding government.

It is obvious to most Americans that marijuana is not taxed, and that therefore there would be additional revenue for government if it were legal and taxed like other commodities. What is less apparent to most Americans is that the large, illicit market in marijuana costs government considerable revenue through its diversion of capital from the legal economy into the illicit economy. The primary budgetary impact of illegal marijuana sales is not the loss of potential tax revenue on marijuana, but the loss of actual tax revenue from the diversion of capital to the untaxed illegal market.

The 14,349 metric tons of marijuana purchased in the United States annually is worth $112.9 billion. If those funds were spent on legal commodities rather than marijuana those economic transactions would produce billions in tax revenues for local, state, and the federal government.

For example, according to the 2002 Economic Census by the US Bureau of the Census, the average business in the United States devotes 17.5% of its revenue to payroll. The money spent on marijuana, consequently, removes $112.9 billion from the gross domestic product, and results in a loss of payroll expenditures by businesses of $19.7 billion.

Allowing for 15% federal income tax, 15% social security tax (combining individual and employer shares), and estimating a state income tax rate of 4.7%, this results in a loss of $6.8 billion in taxes for state and the federal government. Assuming an estimated sales tax of 5.4%, the result is a loss of $6.1 billion in tax revenue for state governments. Assuming an effective corporate tax rate of 2.6% of gross revenue, the result is a loss of $2.9 billion in tax revenue. This minimal model produces a total loss of tax revenue of close to $15.9 billion.

A more accurate estimation of lost tax revenue can be acquired through examination of current levels of government revenue as a percentage of Gross Domestic Product (GDP). (See Table 15.) The diversion of funds into the illicit market in marijuana costs government $31.1 billion in tax revenue annually. Local, state, and the federal government receive 28.7% of the GDP in tax revenue. If the money spent on marijuana were instead spent on legal goods, it would add $112.9 billion to the GDP, producing $11.6 billion in revenue to state and local governments, $7.2 billion to the federal government in social security and other social insurance premiums, and $12.2 billion in other federal tax revenue. Marijuana Prohibition results in the creative destruction of $31.1 billion in tax revenue.

Table 15. Government Receipts by Source as Percentages of Gross Domestic Product Applied to the Illicit Marijuana Market. (Reference Year 2006)

Illicit Marijuana Market		$112,947,860,206
	GDP %[56]	
State/Local Government Revenue Loss	10.30%	$11,633,629,601
Federal Government Revenue Loss		
Individual Income Taxes	8.00%	$9,035,828,817
Corporation Taxes	2.70%	$3,049,592,226
Social Insurance	6.40%	$7,228,663,053
Excise Taxes	0.06%	$67,768,716
Other	0.07%	$79,063,502
Total Federal Revenue Loss	18.40%	$19,460,916,314
Total Federal/State Revenue Loss	28.70%	$31,094,545,915

In 2004 total US expenses on the criminal justice system (police protection, the judiciary, and corrections) totaled $193.5 billion[57]. The cost allocation employed by the ONDCP report on the costs of drug abuse is to calculate the cost of drug law enforcement by using

[56] Office of Management and Budget, The Budget for Fiscal year 2008, Historical Tables, (Washington, D.C.: Government Printing Office, 2007) Table 2.3, Year 2006, pg 34-35.
[57] Bureau of Justice Statistics, Justice Expenditure and Employment Extracts 2004, NCJ 215648. U.S. Bureau of the Census' Criminal Justice Expenditure and Employment Extracts Program (CJEE); filename: cjee0401.csv.

the percentage of drug arrests. In 2004 marijuana arrests accounted for 5.5% of all arrests. Consequently marijuana arrests cost taxpayers $10.7 billion in 2004.

Taken together, the lost tax revenue from the diversion of funds to the marijuana market and the cost of marijuana arrests produce a budgetary cost to local, state and the federal government of $41.8 billion.

7. Commentary

The budgetary cost of marijuana laws has been calculated above as $41.8 billion. The social cost consists of the widespread availability of marijuana to adolescents and teens as well as other ramifications of the government's utter lack of ability to exercise any control over the illicit marijuana market.

The failure to exercise control over the marijuana market through regulatory controls has resulted in many social problems. Discussion of these problems, such as the increasing potency of marijuana presenting increases in risks to adolescent users and increased visits to emergency rooms for marijuana related injuries, the increase in drug treatment referrals for marijuana by the criminal justice system, continued availability of marijuana to middle and high school students, and the increasing number of individuals involved in selling drugs over the last 20 years, are beyond the scope of this report. However, these problems all stem from the failure of current policy. The objective of drug control policies is to control the manufacture, distribution, and availability of drugs. These social problems, some of which are detailed with statistics presented in this report, all indicate a failure to exercise control.

Ironically, these policy failures are often cited by law enforcement as a justification for continuing current policies. Just as the costs of enforcing marijuana laws are cited as a cost of drug abuse rather than public policy, these social problems are misrepresented to the public as evidence that marijuana use requires criminal sanctions rather than regulation. Policy failures brought about by this lack of effective controls is not a valid justification of current policies. The statistical data cited in this report on the supply, availability, use, price, and value of marijuana demonstrate that the amount of lost taxes and other fiscal costs of current policy are increasing and proliferating over time.

The regulation and legalization of marijuana would produce the following benefits:

- Legalization would restore the capital flow in the illegal marijuana market to legitimate and taxable economic channels.

- Legalization would eliminate contemporary criminal justice and border security costs and provide for the reallocation of resources to other pressing drug, immigration, and homeland security problems.

- Legalization would likely deflate teen commerce in marijuana and consequently contribute to a reduction in availability of marijuana to teens and adolescents.

- Legalization would eliminate the flow of considerable capital away from the US economy by contributing to an increase in the amount of marijuana grown in the US for domestic consumption.

- Legalization would shift the fiscal costs related to marijuana use from all taxpayers to marijuana users themselves by way of excise taxes.