

## ESTIMATING SUBSTANCE ABUSE TREATMENT NEED FROM THE NHSDA

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### 1. INTRODUCTION

Measurement of the alcohol and drug abuse (i.e., substance abuse) problem and evaluation of policy alternatives involves the use of many different indicators. The impact on the criminal justice system can be measured with estimates of the number of drug-related offenses and the number of arrestees and prisoners who have substance abuse problems. Study of interdiction efforts requires estimates of the volume of illicit drugs produced in source countries, the amount supplied to the U.S., and the amount seized by law enforcement agencies. Estimates of initiation of alcohol and drug use, prevalence of use among young people, and attitudes about alcohol and drugs are useful in relation to planning and evaluating prevention strategies. The impact of substance abuse on the health care system is studied by using data on contacts with health care facilities and estimates of the prevalence of substance abuse-related health problems.

One indicator is the number of people who have problems with their alcohol or drug use severe enough to need some sort of intervention. We call these indicators "treatment need" estimates. Treatment need estimates are critical in planning the allocation of resources such as specialized facilities that treat substance abusers.

There are significant methodological issues involved in defining and estimating treatment need. For example, it is important to distinguish between the *need* for treatment and the *demand* for treatment. This is because some portion of the population needing treatment, defined in terms of some measure of the severity of their substance abuse problem, will not seek treatment. Overall national estimates of treatment need are somewhat limited in their usefulness because different populations and types of substance abusers require different types of treatment. Estimates of treatment need for state and local areas are most valuable, as they can be used to allocate resources.

One of the most difficult problems in estimating treatment need is that household surveys may not fully cover key populations that may have significant numbers of people needing treatment, such as arrestees and the homeless. There is evidence that both these populations have higher drug abuse prevalence than the

general household population (SAMHSA, 1994). Estimates of treatment need may be improved by combining household survey data with separate estimates from the criminal justice population and the homeless.

In recent years, several methods have been developed to estimate treatment need using the National Household Survey on Drug Abuse (NHSDA). These methods were generally developed to estimate drug abuse treatment need, not alcohol treatment need. Although the NHSDA focuses primarily on drug abuse, it also collects data on alcohol use that would allow extensions of these methods to cover alcohol.

The National Institute on Drug Abuse (NIDA) developed an illicit drug index in 1989 that defined heavy drug users who need treatment as those who had used illicit drugs at least 200 times in the past year. An estimated four million Americans met this criteria in 1988. By assuming that 25 percent of these drug users would stop using drugs without formal treatment and another 25 percent were hard core addicts that were too difficult to reach, the Office of National Drug Control Policy determined that there were 2 million people with drug problems for which treatment would be beneficial (ONDCP, 1989).

A shortcoming of NIDA's illicit drug index was that it was based solely on the frequency of drug use, without considering problems associated with use. Another model developed by NIDA was based on reported problems and symptoms of abuse or dependence on illicit drugs. This method was an approximation of criteria in the Diagnostic and Statistical Manual of Mental Disorders, Third Edition (DSM-III) published by the American Psychiatric Association (APA, 1980). This method produced an estimate of 3.5 million people with drug abuse or dependence in 1991.

A study sponsored by the Institute of Medicine (IOM) in 1990 developed a methodology for estimating drug abuse treatment need using a combination of frequency of use and problems/symptoms indicators from the NHSDA. The IOM also supplemented these NHSDA estimates with data from prison and homeless populations to produce a more comprehensive estimate of need. This method resulted in an estimated 4.6 million people needing treatment in 1988. Throughout this paper this method will be referred to as the **FREQ** method.

A method for estimating treatment need from the NHSDA has recently been considered by the Office of Applied Studies of the Substance Abuse and Mental Health Services Administration (SAMHSA). This method uses an algorithm that approximates the criteria from the Diagnostic and Statistical Manual of Mental Disorders, Third Edition, Revised (DSM-III-R) for illicit drug dependence (APA, 1987). This method will be referred to as the DEP method.

This paper will compare the FREQ method and the DEP method. Since the FREQ method does not apply to alcohol, alcohol was not included in the comparison. One objective of this comparison is to better understand the strengths and weaknesses of these two methods, providing a basis for further improvements in treatment need estimation by SAMHSA. This comparison is based on an analysis of the 1991 NHSDA.

## 2. METHODS

The NHSDA has been conducted periodically by the Federal Government since 1971. Sponsored by SAMHSA, it is the primary source of data on the prevalence of illicit drug use in the U.S. The respondent universe for the NHSDA is the civilian noninstitutionalized population 12 years of age and older within the U.S. The 1991 Survey employed a multistage probability sample of 32,594 persons (SAMHSA, 1993).

### 2.1 DEP Method

The DEP method attempts to approximate the DSM-III-R. The DSM-III-R defines a person as dependent for a substance if they meet 3 out of 9 criteria pertaining to that substance. The NHSDA questionnaire includes items on symptoms and problems that are combined to approximate five of the nine DSM-III-R criteria for dependence. These five DSM-III-R criteria cover tolerance, withdrawal, inability to stop or control use of substance, giving up or reducing social, occupational or recreational activities, and continued use despite knowing that one has a social, psychological, or physical problem due to use. The DEP method defines a person as dependent and thus needing treatment if they respond positively to 2 out of these 5 criteria pertaining to a substance. The four DSM-III-R criteria not covered by the NHSDA include taking substance in larger amounts or over a longer period than intended, time spent in getting, taking and recovering from the substance, intoxication or withdrawal symptoms when expected to fulfill major obligations at work, school, home or when substance is physically hazardous, and taking substance to relieve or avoid withdrawal symptoms.

There are some difficulties with using the DSM-III-R as a model for the DEP method. One is that the DSM-III-R was designed to be used by clinicians to diagnose patients while the DEP method is being applied to data obtained from a survey interview. Also the questions in the NHSDA used by the DEP method only approximate the criteria that they cover.

### 2.2 FREQ Method

The FREQ method for estimating treatment need is based on combining data from three separate variables: 1) frequency of drug use (highest frequency of use in the past month out of cocaine, marijuana and inhalants) 2) symptoms of dependence (based on all five of the six questions in the Drugs section of the 1991 NHSDA and 3) problems/consequences (based on all 11 questions in the Drug Problems section of the 1991 NHSDA).

Persons are assigned a clear, probable, possible or unlikely need for treatment based on values from these variables. Persons assigned a "clear" or "probable" need for treatment under the FREQ method are assumed to need treatment and throughout this analysis these persons will be referred to as those who need treatment under the FREQ method. Details of this method are given in Gerstein & Harwood, 1990.

### 2.3 Analysis Plan

To compare the DEP and FREQ methods, we identified specific differences in the way the two methods assign treatment need. We defined particular population subgroups of drug users that would illustrate these differences and compared the proportion of each subgroup that would be classified as needing treatment under each method. For each population subgroup, we determined if the proportion needing treatment by the DEP method was significantly different from the proportion needing treatment by the FREQ method using a Z test. To measure the agreement at the individual level between the FREQ method and the DEP method, we used the kappa statistic.

The kappa statistic is the ratio of the excess agreement beyond chance and the maximum possible excess agreement. These results are given in Table 1.

## 3. RESULTS

Throughout the discussion in the following sections, symptoms of dependence will be referred to as *symptoms*, problems/consequences will be referred to as *problems*, and DSM-III-R criteria covered by the NHSDA will be referred to as *criteria*.

In the population aged 12 and older, the overall prevalence of persons needing treatment was 1.28 percent based on the DEP method and 1.93 percent based on the FREQ method. These rates correspond

with an estimated 2,588,000 persons needing treatment based on the DEP method and 3,906,000 persons needing treatment based on the FREQ method. The Kappa statistic for this population was .494.

For most populations the individual-level agreement between the two methods was low. Kappa statistics for all populations in our study were less than .5. For most populations studied, the FREQ method classified a higher proportion of the population as needing treatment than the DEP method. Our analysis of subpopulations was intended to explain this.

### 3.1 Past Month vs Past Year Use

One important difference between the two methods is the way they address the recency of drug use. The FREQ method only includes persons who used drugs in the past month, while the DEP method includes all past year users, even if they did not use drugs in the past month. To study the impact of this difference, we looked at a population of drug users who had used drugs frequently during the past year and reported having problems or symptoms, but had not used in the past month. Specifically we defined this population to be no use of any illicit drug in the past month and used some illicit drug at least weekly or more often in the past year and reported two or more problems or symptoms or two or more criteria. The estimated size of this population was 345,000 persons. Forty five percent of the persons in this population needed treatment under the DEP method and by definition 0 percent of the persons in this population needed treatment under the FREQ method.

Another population examined consisted of an estimated 792,000 persons who had treatment for a drug problem at any time in the past year at a hospital, treatment center, or mental health center. Since persons who recently received treatment may have a higher probability of not using drugs in the past month, the two methods are likely to produce different estimates due to the FREQ method requiring past month use. For this population, the DEP estimate of treatment need (45 percent) was statistically different from the FREQ estimate (21 percent) at the .01 level.

Because the DEP method is based on the past year, one cannot tell whether a person, meeting the definition of treatment need by the DEP method, met the definition before or after receiving treatment. Since the FREQ estimate is based on the past month, it is more likely that a person meeting the definition of treatment need met the definition after receiving treatment.

These differences in the FREQ and DEP estimates illustrate the difference between a point prevalence estimate and a period prevalence estimate. Essentially, the DEP estimate is more like a period prevalence

estimate for the past year, since it includes anybody who had a serious drug problem at any time in the past year. For the DEP method, having treatment could be an indication that the person should be included in the treatment need estimate. On the other hand, the FREQ estimate is closer to a point prevalence estimate because it only counts persons currently using an illicit drug. For this method having treatment in the past year may indicate the opposite, i.e. that the person does not currently need treatment.

Overall the effect of the reference period difference in the two methods should be to classify more people as needing treatment in the DEP method than the FREQ method. This suggests that the difference in overall estimates would be greater if they were made temporally consistent and shows that the DEP method defines a more severely affected population of drug abusers.

### 3.2 Symptoms, Problems and Criteria

A number of populations with various patterns of reporting on these and other items were studied to explore the relationship between symptoms and problems in the FREQ method and criteria in the DEP method and how they affect the assignment of treatment need. One population consisting of an estimated 5,814,000 persons included persons reporting two or more symptoms, two or more problems or two or more criteria. For this population, the percent of persons needing treatment by the FREQ method (46 percent) was not statistically different from the percent needing treatment by the DEP method (45 percent).

Because the DEP method is primarily based on reported criteria and has a longer reference period, one might expect higher treatment need estimates for the DEP method than the FREQ method for these populations. Apparently the symptoms and problems reported by many drug users are not severe enough to qualify for the DSM-III-R criteria (which are constructed from the symptoms and problems), but do not meet the threshold for treatment need under the FREQ method. In the FREQ method, if a person reports the same symptom for more than one drug it is counted as more than one symptom. In the DEP method if the same criteria is reported by more than one drug it is counted only once for each drug. In addition, the FREQ method counts each of the 11 questions in the problems sections of the NHSDA as 11 separate problems. The DEP method counts 1 of these questions as one criteria and 7 others as another criteria.

### 3.3 Frequency of Use

The DEP method does not consider frequency of use, while the FREQ method does. However, the FREQ method bases its estimate of frequency on only cocaine,

marijuana or inhalants. Several different populations with frequent marijuana and cocaine use were studied to observe differences in estimates for the FREQ and DEP methods. These populations were also analyzed by problems, symptoms, and criteria to examine the relationship between these variables for populations of frequent cocaine or marijuana users.

One population studied consisted of an estimated 1,015,000 persons who use marijuana daily or almost daily with no other illicit drug use. For this population the percent of persons needing treatment by the DEP method (14 percent) was statistically different from the percent of person needing treatment by the FREQ method (50 percent). This shows that there is a large population of frequent marijuana users who do not report problems because of their use. They are defined as needing treatment in the FREQ method but not the DEP method. There are an estimated 642,000 daily marijuana users that report no symptoms or problems. Forty percent of these persons are in need of treatment by the FREQ method compared with 0 percent by the DEP method. When the population of persons using marijuana daily or almost daily was restricted to only include persons with two or more DSM-III-R criteria, the estimated size of population was 965,000 and the difference in the percent needing treatment by the FREQ method (95 percent) and the percent needing treatment by the DEP method (91 percent) was not significant.

When frequent cocaine users were examined similar relationships between the DEP and FREQ methods were observed.

Several observations can be made from these comparisons. For populations of frequent users, the FREQ estimate is generally larger than the DEP estimate. The only exception is for populations with 2 or more DEP criteria. Since the DEP method does not consider frequency of use, this is probably due to persons who use drugs on a frequent basis but do not report any problems. However, when the population was restricted to weekly or daily populations of cocaine or marijuana users with two or more DSM-III-R criteria, the percent needing treatment by the DEP method was larger or not statistically different from the percent needing treatment by the FREQ method. Another important observation is that for frequent cocaine users, the DEP estimates tend to be closer to or larger than the FREQ estimates. Frequent cocaine users are reporting more DSM criteria than frequent marijuana users.

### 3.4 Other Populations

Several other populations were examined. One population included an estimated 727,000 persons who

used a needle to inject a stimulant, cocaine or heroin in the past year. Persons who use needles to inject drugs are at high risk for AIDS and other health problems and any treatment need definition should include a large portion (if not all) of these drug abusers. Both methods classified less than half of this population as needing treatment. The FREQ estimate of treatment need (48 percent) was not statistically different from the DEP estimate (29 percent) at the .05 level. A subgroup of this population at greater health risk includes an estimated 426,000 persons described above who shared a needle with someone else at least once in their life. For this population, the FREQ estimate of 58 percent was statistically different from the DEP estimate of 22 percent at the .05 level.

One special population consisted of an estimated 4,478,000 persons who used one or more prescription drugs nonmedically in the past year but did not use any other illicit drugs. For this population, both the FREQ and DEP methods estimate a very small proportion of persons as needing treatment. The FREQ estimate (0 percent) was statistically different from the DEP estimate (2 percent) at the .05 level.

For the population who used heroin at least once in the past year (381,000) the estimate of treatment need by the DEP method (48 percent) was not statistically different from the estimate of treatment need by the FREQ method (33) percent.

## 4. CONCLUSIONS

From the investigation of the DEP and FREQ estimates of treatment need on different populations, the following conclusions have been reached:

1. Many populations of serious drug users are only partially assigned as needing treatment by both the FREQ and the DEP methods. For example, less than half of the persons who used needles in the past year, less than half of the persons who used heroin in the past year, and less than half of the persons who used cocaine weekly or more often were estimated to need treatment by each method.

2. Both methods estimate a very small proportion of persons using prescription drugs as needing treatment.

3. The two methods do not estimate the same people as needing treatment (kappa statistics were less than .5 for all populations and less than .2 for more than half the populations).

4. The FREQ method generally estimates a larger proportion of persons as needing treatment. The following lists some reasons:

a) In the FREQ method, a person can be defined as needing treatment without any symptoms or problems if they used a drug more than 9 times in the past month. The DEP method is based only on reported symptoms or problems.

b) In the FREQ method, if a person reports the same symptom for more than one drug it is counted as more than one symptom. In the DEP method if the same criteria is reported for more than one drug it is counted only once for each drug.

c) The FREQ method counts each of the 11 questions in the "problems" sections of the NHSDA as 11 separate problems. The DEP method counts 1 of these questions as one criteria and the 7 others as another criteria.

d) The DEP method determines treatment need on a drug by drug basis. To be counted as needing treatment a person must meet two or more DSM-III-R criteria for at least one drug. A person meeting only two criteria for two different drugs would not be counted as needing treatment under the DEP method. For the FREQ method if a person meets two symptoms from two different drugs it is counted as two symptoms.

In summary, the FREQ method defines a broader group of drug abusers as needing treatment while the DEP method defines a smaller more severely impaired group of drug abusers as needing treatment. For some populations clearly in need of treatment the FREQ estimate is better than the DEP estimate since it estimates a larger proportion of the persons in these populations as needing treatment. For other populations the DEP estimate may differentiate better between the less serious and more serious drug users clearly in need of treatment.

## 6. RECOMMENDATIONS

From the results of this comparison of treatment need by the FREQ and DEP methods, we give the following recommendations for estimating drug abuse treatment need:

1. Some heavy drug users who report no problems due to their use should be counted as needing treatment, to account for respondents who deny problems.

2. Account for persons who use more than one drug and who may have an overall drug problem not concentrated in one drug.

3. Use independent sources to improve estimates of treatment need from populations that are not well represented in the NHSDA such as the criminal justice population and the treatment population. This could be done by ratio estimation or by supplementing the estimates of treatment need from the NHSDA with independent estimates of populations not well represented in the household survey such as the homeless.

4. Include certain categories of drug users automatically (e.g. IV drug users).

5. Keep the algorithm as simple as possible so it can be used by different studies.

In summary, we hope that this analysis motivates research on treatment need estimation which ultimately results in improvements. SAMHSA is continuing to refine and develop methods of estimating treatment need using the NHSDA and other sources. This work includes the extension of these methods to cover alcohol and incorporates some of the above recommendations.

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Table 1: For each population, the population size, the percent needing treatment by the DEP and FREQ methods, the P values for t-test of difference in rates, and Kappa statistics.

Population	Estimated Size of Population	% Needing Treatment		P Value	Kappa
		DEP	FREQ		
Total Population	202,859,000	1.28	1.93	.000	.494
No illicit drug use in the past month and used some illicit drug at least weekly or more often in past year and reported two or more problems or symptoms or two or more criteria	345,000	44.8	0	.000	.000
Had treatment for a drug problem in the past year at a hospital, treatment center or mental health center.	792,000	45.3	21.4	.000	.286
Two or more symptoms two or more problems or two or more DSM-III-R criteria.	5,814,000	44.5	45.5	.752	.307
Two or more symptoms.	3,764,000	55.9	55.6	.682	.177
Two or more DSM-III-R criteria.	2,757,000	93.9	61.2	.000	.066
Use of marijuana daily or almost daily with no other illicit drug use in past year.	1,015,000	14.0	50.1	.000	.202
Used marijuana daily with no symptoms or problems	642,000	0	39.9	.000	0
Used marijuana daily with two or more DSM-III-R criteria	965,000	95.0	91.0	.239	.019
Used cocaine weekly or more often	625,000	40.4	47.5	.141	.450
Used cocaine weekly or more often with no symptoms or problems	163,000	0	23.3	.002	0
Used cocaine weekly or more often with two or more DSM-III-R criteria	255,000	98.8	74.2	.000	.065
Used two or more illicit drugs in the past year.	9,809,000	19.8	28.7	.000	.424
Used a needle to inject a stimulant, cocaine or heroin in the past year.	727,000	29.3	48.4	.132	.229
Used a needle to inject a stimulant, cocaine, or heroin in the past who shared a needle with someone else at least once in their life.	426,000	21.8	58.0	.042	.145
Used one or more prescription drugs in the past year but did not use any other illicit drugs.	4,478,000	2.3	0	.051	0
Used heroin at least once in the past year.	381,000	47.6	33.1	.185	.234