

Drug Abuse Discharges from Non-Federal Short-Stay Hospitals

JOSEPH C. GFROERER, BA, EDGAR H. ADAMS, SCD, AND MARY MOIEN, MS

Abstract. An analysis of inpatient drug abuse cases was done using the National Hospital Discharge Survey (NHDS). An estimated two million discharges with a drug abuse diagnosis occurred in non-federal short-stay hospitals during 1979–85, a figure which is believed to be an underestimate. Compared to other hospital inpatients, drug abuse inpatients are more likely to be male, ages 15–44, and other than White race. Increases in hospital use for drug abuse

treatment were found to have occurred between 1979 and 1985, with discharge rates per 10,000 population increasing from 3.1 to 6.0 for drug dependence and from 3.8 to 7.7 for nondependent drug abuse. Concurrent increases in availability of hospital-based inpatient drug and alcohol treatment programs and insurance coverage for drug abuse treatment were found to have occurred during the same period. (*Am J Public Health* 1988; 78:1559–1562.)

Introduction

Data on people receiving treatment for drug abuse have been collected and analyzed for a number of years by the National Institute on Drug Abuse (NIDA).^{1–6} Nevertheless, there are no published national data on patients treated for drug abuse as inpatients in short-stay hospitals.

The purpose of this paper is to analyze drug abuse treatment data from the National Hospital Discharge Survey (NHDS) for the period 1979–85.

In addition, this study will evaluate the usefulness of the NHDS as a data source for drug abuse descriptive epidemiology and surveillance. Because drug abuse is an illicit deviant behavior, data on trends and changes in drug use patterns are difficult to obtain. The availability of data from a variety of sources can serve to provide corroboration of findings and occasionally may highlight regional variability. The NHDS population includes drug abusers referred to hospitals from drug treatment programs and private physicians, as well as people coming into hospital emergency rooms who are admitted as inpatients. NIDA's Drug Abuse Warning Network (DAWN) indicates that over 40 per cent of emergency room episodes involving drug abuse result in admission to the hospital.⁵ Because of this overlap, comparisons between DAWN and NHDS will be discussed.

Methods

Data Source

The NHDS is conducted by the National Center for Health Statistics (NCHS) on a continuous basis. The data are obtained from the face sheets of a sample of inpatient medical records that are abstracted from a national sample of non-federal short-stay general and specialty hospitals in the United States. The sample is updated periodically to account for changes in the universe, such as the opening of new hospitals. Approximately 195,000 medical records from 407 participating hospitals were sampled in the 1985 NHDS, representing approximately 0.5 per cent of all discharges from non-federal short-stay hospitals in the US in 1985.⁷ The response rate for hospitals has always been over 80 per cent in the NHDS. Sample data are weighted to provide nationally

representative estimates of hospital discharges. Estimates of relative standard errors are provided to users of the data in charts shown in NHDS reports which approximate relative sampling errors for a wide variety of estimates. Over a seven-year period, the approximate relative standard error of an estimate of 100,000 discharges would be 9 per cent, and for an estimate of 20,000 discharges it would be 13 per cent.

Information on patient characteristics, admission and discharge dates, expected method of payment, geographic region of hospital, medical diagnoses and procedures are collected. Diagnosis and surgical and nonsurgical procedures are coded using the International Classification of Diseases (ICD) system. Since 1979, *The International Classification of Diseases—9th Revision—Clinical Modification* (ICD-9-CM)⁸ has been used. Up to seven ICD-9-CM diagnostic codes are produced from each abstract record, with the first-listed code usually representing the principal diagnosis.

Definitions and Analytic Methods

Drug abuse discharges were defined as those with any listing of the following diagnostic categories:

ICD-9-CM Code	Description
304	Drug dependence
305.2–305.9	Non-dependent abuse of drugs, excluding alcohol abuse and tobacco use disorder
965.0, 965.8, 967, 968.5, 969	Poisoning by drugs, including only opiates and related narcotics, pentazocine, sedatives and hypnotics, cocaine, and psychotropic agents

The "poisoning by drugs" codes were included in the drug abuse definition because these codes involve many drugs which are known to be widely abused such as opiates, pentazocine, sedatives and hypnotics, cocaine, antidepressants and tranquilizers. Drug abuse discharges that included an ICD-9-CM code for suicide (codes E950–E958) were included in this study. Suicide attempts are known from DAWN to be involved in many emergency room episodes for sedatives and tranquilizers. Specifically excluded were poisoning by aspirin, acetaminophen, anticonvulsants, and anesthetics (except cocaine).

Also excluded from the drug abuse definition were drug psychoses cases (ICD-9-CM code 292) that did not specifically mention one of the above listed drug categories. Analysis of these cases showed that most involved a "correct drug properly administered" (ICD-9-CM codes E930–E949) as causing the psychoses.

Address reprint request to Joseph C. Gfroerer, Mathematical Statistician, Statistical and Epidemiologic Analysis Branch, Division of Epidemiology and Statistical Analysis, National Institute on Drug Abuse, 5600 Fishers Lane, Rm 11A-55, Rockville, MD 20857. Dr. Adams is Director of the Division of Epidemiology and Statistical Analysis, NIDA; Ms. Moien is Chief, Hospital Care Statistics Branch, Division of Health Care Statistics, National Center for Health Statistics. This paper, submitted to the *Journal* September 9, 1987, was revised and accepted for publication May 23, 1988.

TABLE 1—Drug Abuse Discharges from Hospitals by Diagnostic Category, 1979–85

Diagnostic Category	ICD-9-CM Codes	Discharges in Thousands	
		First Listed	All Listed
Total drug abuse		829	1,998
Drug dependence	304	294	718
Opiates	304.0	74	177
Cocaine	304.2	14	41
Marijuana + hashish	304.3	25	99
Unspecified drug dependence	304.9	140	313
Non-dependent drug abuse (excluding alcohol, tobacco)	305.2–305.9	213	903
Marijuana	305.2	7*	51
Opiates	305.5	12	45
Cocaine	305.6	12	57
Unspecified drug abuse	305.9	173	742
Poisoning by drugs	965.0, 965.8, 967, 968.5, 969	322	449
Opiates and related narcotics	965.0	18	36
Pentazocine	965.8	12	19
Sedatives and Hypnotics	967	74	107
Cocaine	968.5	**	9*
Psychotropic agents	969	215	302

*Based on small sample (30–59 cases).

**Sample size too small to be reliable (less than 30 cases).

Data analysis involved tabulation of drug abuse discharges from 1979 to 1985. Weighted data were used for all tables, so that the data represent estimates of discharges from all non-federal short-stay hospitals in the United States. Only differences that are statistically significant at the .05 level are specifically mentioned in the text.

Results

An estimated 2 million hospital discharges involving drug abuse occurred during 1979–85, with 829,000 having drug abuse as the principal diagnosis. Table 1 shows the distribution of these discharges by specific diagnosis. A large proportion of drug abuse discharges on the NHDS file have

the drug unspecified: 48 per cent of first-listed drug dependence diagnoses, and 81 per cent of first-listed non-dependent drug abuse diagnoses. Thus, comparison of population rates and totals among specific drug types is not possible.

Table 1 also shows that when drug poisoning is listed as a diagnosis, it usually is listed first (72 per cent of the 449,000 discharges), while this is not the case for the other drug abuse categories (41 per cent for drug dependence and 24 per cent for nondependent drug abuse). However, analysis of these other drug abuse categories suggests that even when drug abuse was not listed first, it was usually directly related to the first-listed diagnosis. In these cases, alcohol abuse or psychiatric disorders were usually listed first.

Drug abuse accounted for 0.8 per cent of an estimated 263 million discharges (excluding newborn infants) during 1979–85. Table 2 shows that drug abuse was more likely to be involved in discharges for males (54 per cent vs 40 per cent), for people ages 15–44 (76 per cent vs 40 per cent), and for races other than White (22 per cent vs 14 per cent).

While drug dependence and non-dependent drug abuse discharges appear to be very similar in terms of demographics, drug poisoning discharges are more likely to be female, more likely to be under age 15 or over age 44, and more likely to be White.

The drug poisoning discharges also are more likely to involve suicide attempts. While 18 per cent of drug poisoning discharges mention suicide (ICD codes E950–E958), less than 1 per cent of drug dependence and non-dependent drug abuse discharges do so. While keeping in mind the underreporting involved because most NHDS discharges for drug abuse are coded as drug unknown, the demographic characteristics of patients discharged for opiates, cocaine, and marijuana show interesting differences. Only 13 per cent of the opiate discharges were under age 25, while 32 per cent of cocaine and 58 per cent of marijuana discharges were under age 25. The marijuana discharges were more likely to be White than were opiate or cocaine discharges (73 per cent vs 47 and 50 per cent). Characteristics of patients discharged for poisoning by barbiturates, benzodiazepine tranquilizers, and antidepressants showed patterns similar to those for the combined drug poisoning category.

Drug abuse discharge rates are highest for 25–34 year-

TABLE 2—Demographic Distribution of All-listed Drug Abuse Discharges and Non-Drug Abuse Discharges, 1979–85

Characteristics	No Drug Abuse Diagnosis	Drug Abuse Diagnosis	Drug Dependence (304)	Non-dependent Drug Abuse (305.2–305.9)	Poisoning by Drugs (965.0, 965.8, 967, 968.5, 969)
Number of discharges (in thousands)	260,718	1,998	718	903	449
Sex					
% Male	40	54	61	59	38
% Female	60	46	39	41	62
Age (years)					
% Under 15	9	3	2	2	7
% 15–24	14	26	25	29	25
% 25–34	16	35	37	38	27
% 35–44	10	15	16	15	15
% 45+	50	21	21	16	26
Race					
% White	77	67	63	66	78
% Other	14	22	24	24	13
% Unknown	9	11	13	10	9

NOTE: Excludes newborn infants.

TABLE 3—Trends in All-Listed Drug Abuse Discharge Rates by Major Diagnostic Category, Sex, and Age (rates per 10,000 population)

Major Diagnostic Category	1979	1981	1983	1985
Drug Dependence (ICD Code 304)				
Total	3.1	4.3	4.6	6.0
Sex				
Male	3.9	5.1	5.7	8.0
Female	2.4	3.5	3.5	4.2
Age (years)				
Under 15	**	**	**	**
15-24	4.5	6.4	6.0	7.4
25-34	6.7	9.3	10.2	14.4
35-44	3.4*	6.6	5.7	8.4
45+	2.5	2.5	3.1	3.7
Non-dependent Abuse of Drugs (ICD Codes 305.2-305.9)				
Total	3.8	4.6	6.3	7.7
Sex				
Male	4.3	5.4	7.6	9.8
Female	3.2	3.8	5.0	5.7
Age (years)				
Under 15	**	**	**	**
15-24	6.6	8.2	10.1	13.4
25-34	7.3	9.4	14.5	18.4
35-44	3.4	4.7	8.0	9.6
45+	2.8	2.6	3.0	2.9
Poisoning by Drugs (ICD Codes 965.0, 965.8, 967, 968.5, 969)				
Total	3.0	2.8	2.4	3.3
Sex				
Male	2.1	2.1	1.6	2.7
Female	3.7	3.4	3.1	3.8
Age (years)				
Under 15	1.2*	**	**	1.1*
15-24	4.6	4.2	3.3	4.5
25-34	4.2	4.6	3.6	5.5
35-44	2.4*	4.0	2.8*	3.4
45+	2.8	1.9	2.4	2.8

*Based on small sample (30-59 cases).
 **Sample size too small to be reliable (less than 30 cases).

olds in all three diagnostic groups (Table 3). Males have higher rates for drug dependence and nondependent abuse while rates for drug poisoning are higher for females. Discharge rate trends by diagnostic group show that, while rates roughly doubled between 1979 and 1985 for both drug dependence and non-dependent drug abuse, rates for poisoning by drugs declined somewhat from 1979 to 1983, then increased in 1985 (Table 3). These trends occurred for both males and females, and for most age groups. Trends for specific drug types suggest very large increases in discharges for opiates, cocaine, and marijuana and relatively stable rates for poisoning by barbiturates, benzodiazepine tranquilizers, and antidepressants.

Discussion

The usefulness of NHDS data on drug abuse treatment is limited by both sampling and non-sampling errors. Because of the relatively low rate of discharge for drug abuse (compared to heart disease, cancer, or delivery, for example), sampling errors are unacceptably high for some subgroup estimates. To perform analysis of small subgroups, it is therefore necessary to combine data years; thus, analysis of annual data, such as for trends, can only be done for large

population subgroups or for combined diagnostic categories. These approaches were employed in the tabulations shown in this paper.

The use of NHDS published relative standard error (RSE) charts also has its limitations. While these charts represent an approximation of the RSE for a wide variety of estimates, it is possible that errors for estimates of drug abuse discharges are somewhat larger than errors for other diagnoses because of the distribution of the drug abuse discharges among the hospitals in the sample. If this is the case, the RSE charts would underestimate the actual sampling errors associated with drug abuse discharge estimates.

The major non-sampling error problem with the NHDS drug abuse data involves the diagnostic coding. For a variety of reasons, it is likely that underreporting of drug abuse diagnoses occurs. First, the stigma associated with a patient having a drug abuse diagnosis may result in physicians in some cases not including drug abuse information. This practice could also be related to insurance coverage in that patients with no coverage for drug abuse treatment may be given other diagnoses that are covered by insurance. Also, physicians may not be sufficiently trained to recognize drug abuse, especially in comorbid conditions. In one recent study, physicians identified only 40 per cent of patients who suffered from alcohol or other substance abuse.⁹

Finally, since the NHDS abstractors primarily use only the face sheet, some diagnoses may not be identified, even if they are in the body of the medical record. Thus, it is likely that the proportion of hospital discharges related to drug abuse was larger than the 0.8 per cent estimated from the NHDS for 1979-85.

The use of face sheets may also lead to inaccurate coding of principal diagnoses, as was shown in an NHDS reliability study.¹⁰ In that study, for patients found to have mental disorders, of which drug dependence and nondependent abuse are subgroups, 81 per cent of principal diagnoses were identified by NHDS, compared to 90 per cent of all-listed mental disorders that were identified by NHDS.

Thus the all-listed data are a better indicator of drug abuse involvement in the hospitalized population. A separate analysis, not tabulated here, showed that very little double-counting of discharges occurs, since less than 5 per cent of the discharges had diagnoses in more than one of the three major drug abuse diagnostic categories. However, specific drug type categories do involve some double-counting, especially the cocaine category. About half of the estimated 98,000 discharges for cocaine dependence or non-dependent abuse also had diagnoses of marijuana or opiate abuse, a finding which is consistent with other studies of cocaine treatment patients.^{2,6}

It must also be stressed that NHDS estimates reflect counts of discharges, not people. It is unknown to what extent people have multiple inpatient hospital episodes during a year or a seven-year period.

Despite its limitations, the NHDS appears to be a useful source of drug abuse treatment data. As an ongoing nationally representative survey, it can be used to monitor trends in the use of inpatient hospitalization for drug abuse treatment. Patient characteristic and diagnostic information available from NHDS provide descriptive epidemiologic statistics for a population of drug abusers receiving the most intense and expensive type of care.

A comparison of NHDS and DAWN data⁶ indicated generally consistent patterns in terms of patient characteristics (age, sex, and race) and trends. There are several major

differences in coverage between the two surveys, however. DAWN collects data from a non-random sample of hospital emergency rooms primarily in 27 major metropolitan areas, with a supplemental national panel of emergency rooms outside those areas. Although over 40 per cent of the drug-related emergencies are admitted as inpatients and thus become part of the NHDS universe, over half are released without being admitted.⁵ Similarly, many NHDS drug-related cases are not admitted through the hospital emergency room and are therefore not eligible for DAWN. Hospital admissions may reflect chronic conditions rather than the acute conditions generally seen in emergency rooms. Another difference in the two surveys is that the NHDS includes some short-stay specialty hospitals, while DAWN includes only general hospitals.

Nevertheless, similarities in the DAWN and NHDS data suggest that despite the large proportion of NHDS cases with unknown drug, the discharges that do specify drug provide useful information on the characteristics of drug abuse discharges. However, for barbiturates, benzodiazepine tranquilizers, and antidepressants, DAWN metropolitan area and national panel data indicate decreases while NHDS data do not do so. Since NIDA is currently implementing a nationally representative sample in DAWN, comparisons between NHDS and DAWN will be much more informative in the near future.

An interesting finding from the NHDS data is the sharp increase in utilization of hospitals for drug abuse treatment between 1979 and 1985, a period during which the prevalence of drug use in the US population was stable or declining, with the exception of cocaine use.¹¹ This increase in hospital discharges may be related to increasing availability of hospital care and the increasing availability of insurance coverage for drug abuse treatment. Availability of hospital inpatient treatment for drug abuse can be measured by the number of community hospitals which have alcohol/chemical dependency inpatient units and by the number of beds in those units. The trend in availability of these units¹²⁻¹⁵ closely parallels trends in discharge rates for drug dependence and non-dependent drug abuse (Table 3). A Department of Labor survey of medium and large companies^{16,17} estimated that 36 per cent of workers in these companies had drug abuse treatment coverage in 1982, while 59 per cent had coverage in 1985. Also, increase in the demand for treatment may be occurring, as the drug-using cohorts of the 1960s and 1970s become older and the long-term health consequences of chronic drug use begin to emerge. Moreover, data from clients in drug abuse treatment facilities suggest a lag period of several years between first use of drugs and first entry into treatment.^{18,19} Thus, an increase in treatment demand would be expected to follow by several years the increases in prevalence of drug use which occurred in the 1970s. Trends toward more dangerous patterns of use (such as smoking cocaine and polydrug use) in recent years may also be influencing treatment demand. Finally, it is also possible that physicians are becoming more adept at recognizing patients' drug abuse problems.

In summary, the NHDS drug abuse data are useful as a

descriptive epidemiologic surveillance tool which when used with other data can serve to increase our understanding of drug abuse problems and shifting treatment demand. Users should be aware of the limitations of the data, however, particularly the likelihood that drug abuse diagnoses are underreported, with the implication being that the NHDS data underestimate the actual level of hospital discharges involving drug abuse.

REFERENCES

1. National Institute on Drug Abuse: Data from the Client Oriented Data Acquisition Process (CODAP). Annual Data 1981. NIDA Statistical Series E, Number 25. DHHS Pub. No. (ADM)82-1223. Washington, DC: Govt Printing Office, 1982.
2. National Institute on Drug Abuse: Demographic Characteristics and Patterns of Drug Use of Clients Admitted to Drug Abuse Treatment Programs in Selected States: Annual Data 1984. Washington, DC: Govt Printing Office, 1987.
3. National Institute on Drug Abuse: Main Findings for Drug Abuse Treatment Units, September 1982. Data from the National Drug and Alcoholism Treatment Utilization Survey (NDATUS). NIDA Statistical Series F, Number 10. DHHS Pub. No. (ADM)83-1284. Washington, DC: Govt Printing Office, 1983.
4. Eaton WW, Kessler LG (eds): Epidemiologic Field Methods in Psychiatry: The NIMH Epidemiologic Catchment Area Program. New York: Academic Press, 1985.
5. National Institute on Drug Abuse: Data from the Drug Abuse Warning Network (DAWN). Annual Data 1985. NIDA Statistical Series I, Number 5. DHHS Pub. No. (ADM)86-1469. Washington, DC: Govt Printing Office, 1986.
6. National Institute on Drug Abuse: Trends in Drug Abuse Related Hospital Emergency Room Episodes and Medical Examiner Cases for Selected Drugs: DAWN 1976-1985. NIDA Statistical Series H, Number 3. DHHS Pub. No. (ADM)87-1524. Washington, DC: Govt Printing Office, 1987.
7. National Center for Health Statistics, Graves EJ: Utilization of Short-Stay Hospitals. Annual Summary for the United States, 1985. Vital and Health Statistics, Series 13, No. 91. DHHS Pub. No. (PHS)87-1752, Public Health Service. Washington, DC: Govt Printing Office, 1987.
8. US Public Health Service, Health Care Financing Administration: International Classification of Diseases, 9th Revision, Clinical Modification. DHHS Pub. No. (PHS)80-1260. Washington, DC: Govt Printing Office, September 1980.
9. Coulehan JL, et al: Recognition of alcoholism and substance abuse in primary care patients. Arch Intern Med 1987; 147:349-352.
10. Institute of Medicine: Report of a Study, Reliability of National Hospital Discharge Survey Data. Washington, DC: National Academy of Sciences, 1980.
11. National Institute on Drug Abuse: National Survey on Drug Abuse: Main Findings, 1985. Washington, DC: NIDA, 1985.
12. American Hospital Association: Hospital Statistics 1980 Edition. Chicago: AHA, 1980.
13. American Hospital Association: Hospital Statistics 1982 Edition. Chicago: AHA, 1982.
14. American Hospital Association: Hospital Statistics 1984 Edition. Chicago: AHA, 1984.
15. American Hospital Association: Hospital Statistics 1986 Edition. Chicago: AHA, 1986.
16. Bureau of Labor Statistics: Employee Benefits in Medium and Large Firms, 1985. Bulletin 2262. US Dept of Labor. Washington, DC: Govt Printing Office, July 1986.
17. Bureau of Labor Statistics: Employee Benefits in Medium and Large Firms, 1982. Bulletin 2176. US Dept of Labor. Washington, DC: Govt Printing Office, August 1983.
18. National Institute on Drug Abuse: Epidemiology of Heroin: 1964-1984. Washington, DC: Govt Printing Office, 1985.
19. Adams EH, Kozel NJ: Cocaine use in America: Introduction and overview. In: Kozel NJ, Adams EH: Cocaine Use in America: Epidemiologic and Clinical Perspectives. National Institute on Drug Abuse Research Monograph 61. DHHS Pub. No. (ADM)85-1414. Washington, DC: Govt Printing Office, 1985.