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## Comparison of Drug Abuse in Different Military Populations

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**ABSTRACT:** Quantitative analytical data, generated at the Navy Drug Screening Laboratory, Great Lakes, Illinois, expressed as percent confirmed positives for four drugs of abuse (marijuana metabolite, cocaine metabolite, amphetamines, and opiates) are summarized and compared according to their population of origin. The four populations of interest included U.S. Navy and Marine Corps recruits and service school members.

Confirmed positive urines for marijuana showed a small but significant decline ( $p < 0.001$ ) from about 1.2% confirmed positive among U.S. Navy recruits entering service school commands in 1984 to 0.9% among Navy service school members in 1988 and from 2.0% among U.S. Marine Corps recruits entering service schools in 1984 to 0.8% among Marine Corps service school members in 1988. Navy and Marine Corps recruits showed a significantly higher ( $p < 0.001$ ) confirmed positive use rate (6.1 and 3.3%, respectively) compared to service school members, perhaps reflecting their recent civilian use pattern. The relatively high confirmed positive cocaine rate among all groups may have reflected an increasing trend in all populations, confirming a similar trend in high school and other civilian populations. Generally, the frequency of confirmed positive urines with amphetamines and opiates, based upon the findings at the Navy Drug Screening Laboratory at Great Lakes, has been static except for an apparent recent increase in amphetamine use in 1988. The decline in confirmed positive drug urinalyses among service school members from both the Navy and Marine Corps indicated that perhaps education and maturity had a positive effect upon their behavior.

**KEYWORDS:** toxicology, abuse drugs, military populations, use patterns

Despite a long history of drug abuse in society, it is in recent years that techniques for epidemiologic analysis of the overall problem have been developed to a degree of usefulness. Interpretation of drug abuse data in the civilian population is further complicated by the fact that drug use is an illicit behavior overshadowed by a fear of self-incrimination. Nevertheless, repeated cross-sectional surveys have been used to monitor prevalence of use, trends, and changes in attitude toward drug use over the years. In contrast to this, changing trends within the military can be followed with a high degree of accuracy based on the rate of the confirmed use of four controlled drugs resulting from the random analysis drug-screening program.

The large database available in the Navy Drug Screening Laboratories uniquely provides an interesting opportunity for a comparison of use rates between recruits at entry into the

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military and members who have already completed basic training and are currently enrolled in service schools. Recruits initially bring with them into the military service an extension of their civilian social practices. In contrast, those in the service schools have matured into the philosophy of the Departments of Navy and Defense regarding use of drugs of abuse.

A comparison of the use rates for four drugs of abuse from civilian populations and several military populations forms the basis of this paper.

## Methods

### *Acquisition of Specimens*

Specimens of urine are received at the Navy Drug Screening Laboratory, Great Lakes (NDSL), in boxes containing a maximum of twelve bottles. Specimens are accompanied by the Urine Sample Custody Document (OPNAV Form 5350/2) and are labeled to identify the batch number, specimen number, Social Security Number (SSN) and signature of the donor, and appropriate signatures of the unit specimen collection coordinator and other personnel involved in transmitting the specimen from the local command to NDSL. Two to three millilitres of each specimen are poured for the initial screening analysis, each test tube being individually identified by a printed number label corresponding to an identical number label affixed to the original bottle.

### *Radioimmunoassays*

Initial screening of all specimens is by a competitive-binding radioimmunoassay (RIA) procedure (Abuscreen, Roche Diagnostic Systems, Nutley, New Jersey). Specific antibodies are used to identify each drug separately in individual aliquots of the urine specimens. All RIA procedures are based upon competitive binding to antibody of the tentative drug metabolite or parent drug from urine specimens and <sup>125</sup>I-radiolabelled antigen from the Roche RIA kit. Specimen counts per minute (CPM) values less than the CPM value of the appropriate Control Reference Standard are indicative of the presence of the drug (or its metabolite) in the urine specimen. Specimens that originally screen negative are not tested further and are reported as being negative. Specimens screening positive are repoured for a second RIA assay and are confirmed by gas chromatography/mass spectrometry (GC/MS).

### *Confirmation of Drug*

Three ions from the appropriate drug and two ions from the internal standard in the Select Ion Monitoring (SIM) mode are used for GC/MS analysis of each drug. For identification as positive for a drug, a specimen must quantitate above the cutoff concentration and must have the same retention time, the same ions, and the same ion ratios as an authentic drug standard. The general operation of the Navy Drug Screening Laboratories has been reported elsewhere [1,2].

Confirmation of drug use is monitored by the presence of the parent drug or a major metabolite of the drug as follows: amphetamines as amphetamine or methamphetamine; cocaine as benzoylecgonine; opiates as codeine or morphine; and marijuana as 11-nor-delta-9-tetrahydrocannabinol-9-carboxylic acid (THC-COOH).

Overall trends and percent increase or decrease were calculated using linear regression analysis on confirmation rates for samples collected from May 1983 through March 1988. All population category data were corrected for Armed Forces Institute of Pathology quality control specimens before the calculation of the results. Comparisons of direct analytical data with information based on cross-sectional surveys were not intended for refined statistical analysis, but were intended only to indicate general trends.

## Results

This report covers the 1 794 014 subject specimens analyzed at NDSL-Great Lakes in the 253 weeks between 19 May 1983 and 31 March 1988. Of these, 1 709 750 (95.0%) were negative by RIA for all six drugs included in the screening program as defined by appropriate cutoff levels set by the Department of the Navy [2]. Of these specimens, 90 255 (5.03%) screened positive by the RIA procedure, subsequently yielding 46 716 specimens which were confirmed positive by GC/MS (51.8% of total screened; 2.6% of total tested). The raw data are presented in Table 1.

### Marijuana

The results from Table 2 show that recruits had a significantly higher incidence of positives compared to service school members. Navy recruits had a THC-COOH positive rate (6.2%) that was almost six times the THC-COOH-positive rate for Navy service school members (1.1%). Marine recruits had a THC-positive rate (3.2%) that was almost three times the THC positive rate for Marine service school members (1.3%). Comparison between the services indicated a similar rate of marijuana positives at the service schools, whereas positives for Navy recruits were twice as frequent as for Marine recruits.

Regression analysis of data in Table 2 shows an overall decrease in marijuana positives. From 1983 to 1988 the Marine recruit positive marijuana rate decreased by 1.3% per year, compared with a 3.9% per year decrease for Navy service school members and an 18% per year decrease for Marine service school members. The increase from 1983 to 1984 may in part be due to the change in cutoff from 50 to 20 ng/mL which occurred at that time. Looking only at the data from June 1985 to April 1988, it is seen that among Navy recruits, the apparent use of marijuana has declined by 3.3% per year. During the same interval, Navy

TABLE 1—Total specimens tested and confirmed positive for drugs.<sup>a</sup>

Year	Navy					Marine Corps				
	Number Tested	THC-COOH	COC	AMP	OPI	Number Tested	THC-COOH	COC	AMP	OPI
RECRUITS										
1983	38 905	285	251	64	190	30 759	924	14	4	5
1984	81 753	493	561	83	189	50 367	1 706	25	10	9
1985	71 423	785	857	68	210	42 005	1 464	44	3	22
1986	70 231	2 174	1 127	75	305	43 699	1 314	136	5	48
1987	57 756	3 321	649	21	96	38 829	1 174	179	14	34
1988	7 973	550	174	4	6	9 169	251	40	6	3
Total	328 041	7 608	3 619	315	996	214 828	6 833	438	42	121
SERVICE SCHOOLS										
1983	75 647	836	192	141	170	15 197	263	44	20	36
1984	188 233	2 484	580	231	381	29 544	614	96	19	65
1985	214 035	2 936	680	202	403	43 581	633	135	25	93
1986	243 677	3 035	874	212	477	43 665	428	132	23	91
1987	265 376	2 856	1 000	256	459	46 166	540	184	20	76
1988	72 647	736	346	88	102	13 377	94	40	12	20
Total	1 059 615	10 979	8 940	1 130	1 992	191 530	2 572	631	119	381

<sup>a</sup>THC-COOH = marijuana metabolite; COC = cocaine metabolite; AMP = amphetamines; and OPI = codeine and morphine.

TABLE 2—*Marijuana-confirmed positive specimens in total population, percent.*

Year	Navy Recruits	Navy Service School	Marine Recruits	Marine Service School
1983 <sup>a</sup>	N/A	1.02	2.91	1.64
1984	N/A	1.23	3.30	2.00
1985	6.30 <sup>b,c</sup>	1.22	3.60	1.36
1986	6.40 <sup>c</sup>	1.16	3.30	0.88
1987	5.90	0.97	3.00	1.09
1988 <sup>d</sup>	6.80	0.92	2.90	0.75
Average	6.24	1.12	3.23	1.34

<sup>a</sup>Includes data from 19 May to 31 Dec. (for all drugs).

<sup>b</sup>Includes data from 1 June to 31 Dec. 1985.

<sup>c</sup>Some recruit marijuana analyses not confirmed before July 1986; the THC-COOH confirmation rate were assumed to be the same as the weekly THC-COOH confirmation rate for the other groups (~90%).

<sup>d</sup>Includes data from 1 Jan. to 31 March (for all drugs).

and Marine members in service schools showed a decreased use of marijuana by 11% per year, based on the rate of confirmed positive urine findings, whereas marijuana positives fell 8% per year for marine recruits.

### Cocaine

Average values for 1983 to 1988 show that Navy recruits were confirmed positive for cocaine metabolite (benzoylecgonine) three to four times as often as members of Navy service schools (1.2 versus 0.31%). Marine recruits were positive for cocaine at a rate of 0.21%, which is lower than the rate for Marine service school members of 0.31%. Interestingly, from 1986 to 1988, Marine recruits and Navy and Marine service school members have an identical positive cocaine confirmation rate of approximately 0.36%. The data are summarized in Table 3.

All four groups show an increasing trend with respect to cocaine positives. Marine recruits had a very low incidence of cocaine positives during 1983 to 1985. However, from 1986 to 1988, the positive cocaine confirmation rate of marine recruits increased to a rate similar to that of the service school members. Navy recruits showed a higher rate of increase (21% per

TABLE 3—*Cocaine-confirmed positive specimens in total population, percent.*

Year	Navy Recruits	Navy Service School	Marine Recruits	Marine Service School
1983	0.64	0.24	0.04	0.28
1984	0.66	0.28	0.02	0.29
1985	1.17	0.29	0.09	0.29
1986	1.54	0.34	0.30	0.27
1987	1.28	0.35	0.45	0.38
1988	2.15	0.45	0.40	0.37
Average	1.15	0.31	0.21	0.31

year) compared to Navy service school members with a rate of 10% per year. Part of this increase may be due to the change in cutoff value from 500 ng/mL of benzoylecgonine to 300 ng/mL, which occurred in April 1984, and a further change from 300 to 150 ng/mL in October 1986 [3]. However, analysis of pre- and post-cutoff change rates indicate that in all cases, the overall trends were upward beyond that accounted for by the cutoff change. Analysis of the data indicated that the 1986 cutoff change would increase confirmed positives by 3%.

### *Amphetamine*

Navy recruits show a confirmed positive rate of 0.073%, which is only slightly lower than the Navy service school rate of 0.10%, as summarized in Table 4. In comparison, amphetamine use for Marine service school members is lower (0.056%), whereas amphetamine use for Marine recruits is only 0.012%. One must use caution in interpreting differences between these population groups because of the overall low usage rate of amphetamines of less than 0.1%, as seen at NDSL-Great Lakes.

Data reflecting the yearly trends for amphetamine use are more varied. Among Navy recruits, there has been a decline of 32% per year, and for service school members, there has been a decline of 13% per year. Confirmed detection of amphetamines has undergone a large rise of 67% per year among Marine recruits (although Marine recruits still have the lowest overall incidence of amphetamine use), and 14% per year decline among Marine service school members.

There appears to be an upward trend in the confirmed amphetamine rate for Marine recruits and a downward trend among Navy recruits, Navy service school, and Marine service school populations.

The cutoff value for amphetamine and methamphetamine has remained at 500 ng/mL throughout the study period.

### *Codeine/Morphine*

Navy recruits comprise the population group having the largest opiate use (0.32%) (Table 5). Navy and Marine service schools follow with a use rate of about 0.19%. Marine recruits comprise the lowest use group with a rate of 0.06%.

Confirmed rate of positive urines with opiates, codeine and morphine, has decreased slightly for Navy recruits and for Navy and Marine service school members, but increased by 6% per year among Marine recruits. Again, of the four populations, Marine recruits have the lowest use rate for opiates.

It should be noted that no distinction is possible between opiates (particularly codeine)

TABLE 4—*Amphetamine-confirmed positive specimens in total population, percent.*

Year	Navy Recruits	Navy Service School	Marine Recruits	Marine Service School
1983	0.15	0.18	0.00	0.12
1984	0.09	0.11	0.01	0.05
1985	0.08	0.08	0.00	0.05
1986	0.07	0.08	0.00	0.04
1987	0.02	0.09	0.03	0.04
1988	0.04	0.11	0.06	0.10
Average	0.07	0.10	0.01	0.06

TABLE 5—*Opiate-confirmed positive specimens in total population, percent.*

Year	Navy Recruits	Navy Service School	Marine Recruits	Marine Service School
1983	0.48	0.21	0.01	0.23
1984	0.22	0.19	0.01	0.21
1985	0.29	0.18	0.05	0.20
1986	0.43	0.18	0.09	0.20
1987 <sup>a</sup>	0.23	0.20	0.13	0.18
1987/1988 <sup>b</sup>	0.04	0.11	0.01	0.12
Average <sup>c</sup>	0.32	0.19	0.06	0.20

<sup>a</sup>Covers opiate use before cutoff change in August 1987.

<sup>b</sup>Covers opiate use after cutoff change in August 1987.

<sup>c</sup>Average value for pre-cutoff change.

obtained in cold/cough preparations or in pain formulations and those involved in abuse use. Since October 1987 [4], the data reflect a correction for inadvertent ingestion in food in the form of poppy seeds. At that time, the cutoff values for codeine and morphine were increased from 300 ng/mL each to 2000 and 4000 ng/mL, respectively, to correct for possible non-abuse ingestion through poppy seeds. No comparable alterations have been made for the other three drugs based on possible inadvertent use.

#### *Barbiturates and Phencyclidine (PCP)*

Data for the barbiturates and PCP were not included in the present study because of the very low incidence of positive urine specimens at NDSL-Great Lakes.

#### **Discussion**

The Navy drug-screening program has been an incontrovertible success in curbing the use of four drugs of abuse by members of the Navy and Marine Corps. The program has been instrumental in fostering a decrease use of drugs of abuse from a high of 47%, based on a non prejudicial self-admitted use survey in 1980 [5], to the current "hard-core" rate of about 3%. While it is admittedly difficult to compare the self-disclosed use survey data with data obtained through actual analysis, the trend of the surveys was subsequently borne out by the findings of the earlier laboratory analyses. Whether this decline should be attributed to the educational training which forms part of the Navy program or to the fear of being caught, the success of the program has been significant in detecting and abating drug users in the military.

The database provided by the five Navy laboratories provides a rare opportunity to examine a number of demographic considerations relating to drug use because of the "zero-tolerance" policy promulgated by the Secretary of Navy and carried out by Navy Medical Command [6, 7]. The data presented in this communication derive primarily from the Drug Screening Laboratory at Great Lakes, Illinois. This laboratory is charged with analysis of urine specimens, for the most part collected through random screening procedures, from almost 300 recruit training and service school commands within continental United States. As such, these data reflect both the use patterns of members at entry into the military service and also at the beginning of a service member's professional Navy career (in professional service training schools). Thus, the data are derived from essentially enlisted personnel. Other Navy laboratories deal with service members engaged in staff functions or with mem-

bers of the Atlantic, Mediterranean, and Pacific fleets, representing a different population distribution. Each of the five Navy laboratories currently analyzes approximately 400 000 specimens each year.

The varied populations from which each laboratory draws its specimens suggests that differences in drug-use patterns might exist based on geographic location as well as on the chronologic age and social maturity level of the service member. In fact, this is borne out in comparing overall findings from the various Navy laboratories based on the member population serviced by that laboratory [8, 9]. Thus, in all five Navy laboratories, marijuana has the highest confirmed positive rate, with the recruit population tested at NDSL-Great Lakes being two to three times greater than in any other group. The San Diego laboratory has the second highest confirmed positive rate for marijuana, about 38% of that of the Great Lakes laboratory (overall). The Oakland laboratory finds the lowest rate, about 20% of that at Great Lakes. Cocaine has the second highest confirmed positive rate in all laboratories with Great Lakes and San Diego laboratories showing the highest rates. The confirmed positive rate for cocaine compared with the confirmed positive rate for marijuana varies between laboratories. At the Great Lakes laboratory, cocaine confirmed positives are approximately 35% of the marijuana rate, at Norfolk and Jacksonville laboratories, near 55%, and at San Diego and Oakland laboratories, about 75%.

The San Diego laboratory has a confirmed positive rate for amphetamines more than twice the combined rate for the other four laboratories together (63% of total), though this represents only about 13% of all confirmed positive specimens identified at San Diego laboratory. Finally, NDSL-Jacksonville identifies twice as many opiate confirmed positive specimens as does any other laboratory, amounting to about 20% of the total confirmed positive specimens identified at Jacksonville laboratory. These data are based on fourth quarter 1987 results and are summarized in Table 6.

Unlike the reasonably uniform populations serviced by the other four Navy laboratories, the population serviced at NDSL-Great Lakes is bifurcated. Most of the recruit population is made up of 17- to 18-year olds, completing their first 16 weeks in the military service, still

TABLE 6—Summary of Navy Drug Screening Laboratories confirmation positive data, percent of total.<sup>a</sup>

Category	NOR <sup>b</sup>	JAX	OAK	SDG	GRC	GSS
AMP-FY87	0.02	0.02	0.11	0.44* <sup>d</sup>	0.03	0.09
AMP-FY88	0.02	0.02	0.09	0.41*	0.05	0.08
COC-FY87	0.46	0.45	0.46	0.89*	0.86*	0.36
COC-FY88	0.56	0.64	0.56	1.08*	1.00*	0.39
OPI-FY87	0.17	0.17	0.18	0.16	0.21	0.18
OPI-FY88	0.07	0.14	0.08	0.08	0.04	0.11
THC-FY87	1.28	1.29	1.03	1.76*	4.45*	1.07
THC-FY88	1.00	1.10	0.76	1.44	3.74*	0.84
Total, <sup>c</sup> FY87	1.97	1.97	1.86	3.30*	5.62*	1.75
Total, FY88	1.73	1.93	1.57	3.06	4.92*	1.47

<sup>a</sup>Derived from Refs 8 and 9. Actual numbers may differ from those in text because text data are based on calendar year at NDSL, while data are based on fiscal year (FY) over all Navy laboratories. FY87 includes 26 Sept. 1986 to 18 Sept. 1987; FY88 includes only 25 Sept. 1987 to 18 Dec. 1987.

<sup>b</sup>NOR = Norfolk, Virginia; JAX = Jacksonville, Florida; OAK = Oakland, California; SDG = San Diego, California; GRC = Great Lakes-Recruits; GSS = Great Lakes-Service Schools.

<sup>c</sup>AMP = amphetamines; COC = cocaine metabolite; OPI = codeine and morphine; THC-COOH = marijuana metabolite.

<sup>d</sup>Asterisk (\*) indicates those values in each drug category which are significantly different from others in the category at 90% confidence based on the Q test [10].

<sup>e</sup>Totals for all six drugs over all laboratories.

dominated by the freer and generally less impeded civilian moral and ethical values. The service school population is made up of a somewhat older (19- to 25-year olds) group with 1 to 3 years of service who are attending their first or second service school for specialty training. Although the difference in chronologic age between the 2 groups probably is not significant, the major point of differentiation between the 2 groups is the level of social maturation and inculcation into the Navy philosophy regarding drug use.

The nature of the data as collected at NDSL-Great Lakes makes it impossible to track individuals as they pass from the recruit category into the service schools and beyond; direct comparison is possible, however, between the total recruit population serviced over a specific time interval and the total service school population serviced over the same time interval.

### *Military Populations*

The use of four illicit drugs in the armed forces appears to be at its lowest point in six years [11, 12], whereas the use among civilians has apparently remained relatively high. Comparison of the data in the 1980 and 1982 worldwide military surveys [5, 13] shows an overall 34.5% decline in use of illicit drugs, whereas cocaine use has remained constant in 1980 and 1985, at 17% for college students, who are contemporaries of the majority of recruit and service-school members in military service [14-17].

In general, the drug of abuse most likely to be confirmed positive by the Navy testing procedures remains marijuana. The second most used drug is cocaine, but marijuana use exceeds cocaine use by some three- or four-fold. The use rate in the service schools is much lower than for incoming recruits. One observes a dramatic difference in use among Marine recruits where confirmed positive urines for marijuana appears to be used eight times more frequently than is cocaine.

The continuing success of the Navy's drug program is demonstrated by the marked decrease in marijuana use observed in service schools and in the smaller decrease in the Marine recruit populations. Between 1985 and 1988, the use of marijuana has declined in Navy service schools by 25% (1.22 to 0.92%) and in Marine service schools by 45% (1.36 to 0.75%). Among the recruit populations, the use of marijuana has declined in Marine recruits by 19% (3.6 to 2.9%) and has increased in Navy recruits by 8% (6.3 to 6.8%); however, overall analysis of Navy recruit data shows a 0.5% per year decrease. The significance of this declining trend is supported by the still apparent decline from 1985 to 1988, despite a lowering of the cut-off from 20 to 15 ng/mL in 1986.

Cocaine confirmed positive urines have increased in all groups, which may reflect the overall increase of cocaine use in the United States. Reflecting prior nonmilitary use, Navy recruits showed a greater confirmed positive rate for cocaine than do either of the service schools. It is surprising that Marine recruits had the lowest cocaine usage rate, even with a large yearly percentage increase of 54%.

All groups except Marine recruits show a decline in amphetamine positives. Again it is interesting that Marine recruits have a surprisingly low incidence of amphetamine use. Looking at the 1987 to 1988 data, there appears to be a recent increase in amphetamine use in 1988. Continuing monitoring of these data will tell if this trend is real or not.

Analyzing pre- and post-cutoff change, there were no obvious trends for opiate use for Navy recruits or for Navy or Marine service school members, but there is a small increasing trend for Marine recruits. Because of the prescription uses of codeine as well as positives from poppy seeds, it is difficult to assess opiate abuse from these data. The change in cutoff from 300 ng/mL to 2000 (codeine) and 4000 (morphine) ng/mL resulted in a (normalized) 55% decline in confirmed opiate positives.

Overall, the use of marijuana appears to have decreased and the use of cocaine has increased, based on confirmed positive urinalyses. Amphetamines show a decreasing trend in selected populations, and opiate-confirmed positives appear to be static.



Differences between Navy recruits and Marine recruits may be due to the different procedures used in the two services for accession testing. The unusually low apparent drug usage for Marine recruits may be attributed to pre-enlistment, recruiter-initiated notification of impending urine testing for drugs.

An interesting, though preliminary study [18], permits extension of the civilian:military comparisons to the post-military population. A total of 2443 urine specimens collected as part of the separation-from-service procedure at seven separation centers revealed 58 (2.4%) confirmed positives for 1 or more drugs. Of these, 9 represent drugs not under consideration in the present communication, but 38 (1.6%) morphine and 11 (0.5%) amphetamine positive specimens were included. Neither marijuana nor cocaine were part of the analytical schedule.

Thus, the study indicated a 1.6% confirmed positive opiate rate compared with 0.2 to 0.3% in the present study and a 0.5% amphetamine rate compared with 0.05% in the present study, further confirming the successes accruing to the current Department of Defense drug-testing program.

### *Civilian Populations*

The National High School Senior survey is an annual census of 16 000 to 18 000 current enrollees in 130 continental U.S. public and private high schools. The stability of the survey procedure permits valid comparisons and measurements of trends over the years since the survey was initiated in 1975. The census includes a post-graduate follow-up to determine age-related risk factors.

In 1972, 48% of young adults between 18 and 25 had tried marijuana [14]. The use level declined from 1978 (37% monthly; 11% daily use) to 1984, and levelled off in 1985 (26% monthly; 5% daily use). The current figure for use during the past month has now declined by 10% [16,20]. This is reflected further by the fact that the average age for the population who has ever used marijuana (26 years and up) is getting older [14]. In contrast, the abuse of cocaine has increased recently [16] following an earlier decline from 9% in 1972 to 6.7% in 1985 [16]. The number of persons entering the 18- to 25-year category are increasingly turning to cocaine as the active marijuana users become older. Based on emergency-room episodes for drug-related problems, the civilian use of all illicit drugs has increased by 41% over the years 1980 to 1985 [20].

The National Household Survey on Drug Abuse [17,19] shows a decrease in abuse of marijuana for males and females between 1979 and 1982, but, in 1982, the first use among females was twofold higher than among males in the 12- to 25-year-old population. This survey has been conducted every 2 to 3 years since 1971. Since all household members over 12 years of age are included, the results tend to be conservative. The abusers of cocaine were almost invariably abusers on marijuana first. The probability of abusing cocaine increased with the frequency and recency of marijuana abuse [21].

### **Conclusions**

At least for use of marijuana and cocaine for which significant data are available, the civilian use rate for marijuana is approximately 5.0% compared with a recruit military-confirmed positive urinalysis rate of 6.2% (Navy) and 3.2% (Marine) and a service school rate of 1.1% (Navy) and 1.3% (Marine). The civilian use rate for cocaine is rising again after several years of decline. The Navy recruit military positive rate is 1.2% and is increasing; the service-school military rate is 0.31% and also rising. As reflected by the analytical results at NDSL-Great Lakes, the recruit-population drug-use pattern is in fact suggestive of the earlier civilian-use pattern. In spite of the small current upward trend for cocaine in both the civilian and military populations, education coupled with maturation and inculcation with

the Navy philosophy against illicit drug use has produced the anticipated reduction in drug-use rate in the military.

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