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Military Drug Positive Rates in the European Theater Drug Rates in Europe

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ABSTRACT: Urine samples were collected from Air Force and Army service members within the European Theater and analyzed for drugs of abuse employing radioimmunoassay and gas chromatography/mass spectroscopy (GC/MS). Data collected from January 1985 through December 1991 indicate that the total positive rate decreased from 4.67% to 0.69%. Of the drugs tested, tetrahydrocannabinol (THC) was the drug abused most in the European Theater during this time period.

KEYWORDS: toxicology, drug abuse, military, gas chromatography/mass spectrometry, gas analysis, urinalysis, radioimmunoassay, marijuana, cocaine, THC

The U.S. Armed Forces cannot tolerate even a low level of drug abuse. With today's sophisticated weaponry, even a single abuser could cause great harm to fellow soldiers and national security. Therefore, the military must maintain a state of readiness free of the effects of drug abuse. The National Drug Strategy issued under Presidential cover letter dated 10 September 1984 [1] recognized military needs and supported the deterrence and detection of drug abuse within the military. Preventing abusers from entering the military was subsequently mandated by the National Defense Authorization Act of 1988 [2]. The strategy included emphasis on the early identification of drug abuse through urinalysis conducted during the induction physical at the preaccession site.

During the Vietnam era, the military had been plagued with drug abuse worldwide. According to a 1971 survey [3], as many as 45% of U.S. soldiers in West Germany abused drugs.

Prior to 1985, the military focused on identifying drug abusers for purposes of rehabilitation. In 1985 the military established forensic toxicology drug testing laboratories in order to deter drug abuse and prevent drug abusers from entering the military by imposing disciplinary actions on identified abusers. It should be noted, however, that for individuals who recognize that they have a problem, self-referral for rehabilitation prior to mandatory urinalysis does not result in disciplinary action. Since 1985, military units have been randomly collecting urine from soldiers notified only a few hours before

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donating. The urine has been handled under forensic conditions and sent to the drug testing laboratories for subsequent analysis.

The Wiesbaden Forensic Toxicology Drug Testing Laboratory (WFTDTL) located in Wiesbaden, Germany, has been testing about 300 000 urine specimens annually from Army and Air Force soldiers stationed in the European Theater. This article describes the positive outcome of this drug program since 1985 as supported by the downward trend in the number of positive specimens detected each year.

Methods

Specimens were randomly collected using chain of custody procedures throughout the European Theater and sent to the Laboratory where they were tested for drugs of abuse. Samples were tested from a drug menu that has changed over the years (Fig. 1). From January 1985 through June 1989, every correctly collected specimen was tested for both marijuana and cocaine use by screening for tetrahydrocannabinol (THC) and cocaine metabolites and confirming for delta-9-tetrahydrocannabinol-carboxylic acid (THCA) and benzoylecgonine (BZE) respectively. In July 1989 the Laboratory began rotational testing from a six drug menu. From July 1989 until October 1989, each specimen was tested for both THC and cocaine use and one other drug from the listed menu. The rotational drug changed weekly. The Laboratory began rotational testing for cocaine use in October 1989, phencyclidine (PCP) and lysergic acid diethylamide (LSD) in January 1990, and barbiturates in November 1990.

Specimens were first screened for drugs of abuse employing a competitive-binding radioimmunoassay (RIA) procedure. Cocaine, THC, amphetamine, methamphetamine, opiates and PCP use was detected by using Abuscreen kits (Roche Diagnostic Systems, Nutley, New Jersey) with positive cutoffs of 300 ng/mL, 100 ng/mL, 1000 ng/mL, 1000 ng/mL, 300 ng/mL and 25 ng/mL, respectively. Barbiturates and LSD were tested using COAT-A-COUNT kits (Diagnostic Products Corporation, Los Angeles, California) with positive cutoffs of 200 ng/mL and 0.5 ng/mL respectively.

If a drug was detected in the urine at a concentration equal to or above the appropriate reference calibrator, a second aliquot of the specimen was taken using chain of custody procedures and again tested by RIA. If presumptively positive this second time, a third aliquot was taken using chain of custody for extraction in the presence of a deuterated internal standard, chemical derivatization when appropriate, and subsequent analysis employing gas chromatography/mass spectrometry (GC/MS).

The GC/MS analysis for each drug involved Selected Ion Monitoring (SIM) for three ions for the appropriate drug and three ions for the deuterated internal standard. The confirmation positive cutoffs were as follows: THCA (15 ng/mL), BZE (150 ng/mL), amphetamine (500 ng/mL), methamphetamine (500 ng/mL), morphine (4000 ng/mL), codeine (2000 ng/mL), PCP (25 ng/mL), barbiturates (200 ng/mL), and LSD (0.4 ng/mL).

For a specimen to be identified as positive by this method it must be positive by the initial RIA, positive by the chain of custody RIA, and in GC/MS have the same retention time, fragment into the same ions, and have the same ion ratios as an authentic drug and deuterated internal standard, quantitate above the Department of Defense cutoff concentration for the drug in question, and finally, meet all internal quality assurance criteria.

Results

The total number of specimens received and tested at the WFTDTL each year from 1985 to 1991 ranged from 272 660 in 1991 to 327 342 in 1987 and averaged 291 776 per year. The number of samples tested ranged from 263 373 in 1989 to 313 341 in 1987 and

TEST SELECTION MENUS¹

MENUS	JAN 85 THRU JUN 89		JUL 89	OCT 89	JAN 90		NOV 90 THRU DEC 91	
	FIXED	THC COC			THC COC	THC	THC	THC
ROTATIONAL			AMP COD METH MOR	AMP COC COD METH MOR	AMP COC COD LSD METH MOR PCP	AMP BARBS COC COD LSD METH MOR PCP		
MENU SIZE	2	6	6	6	8	9		
TESTS PER SPECIMEN	2	3	3	3	3	3		

¹
AMP • AMPHETAMINE
BARBS • BARBITURATES
COC • COCAINE
COD • CODEINE
LSD • LYSERGIC ACID DIETHYLAMIDE
METH • METHAMPHETAMINE
MOR • MORPHINE
PCP • PHENCYCLIDINE
THC • TETRAHYDROCANNABINOL

FIG. 1.—Test selection menus from January 1985 to December 1991.

averaged 278 428. There are a number of reasons that samples are received but not tested. According to Army regulation [4] and Department of Defense Directive [5], appropriately collected samples in approved containers must be received in a sealed box and be accompanied by a chain of custody document that is appropriately filled out. If any of these criteria are not met, the samples are not tested and reported as void. The void rate averaged 4.6% between 1985 and 1991 with a standard deviation of 1.2.

The percent positive rate for all drugs tested has steadily declined from 4.67 in 1985 to 0.69 in 1991 (Fig. 2). The positive rate for THC declined from 4.58% in 1985 to 0.61% in 1991 (Fig. 3). During this time period, THC had the highest positive rate of any drug and appeared to be the preferred drug of abuse in the European Theater.

The positive rate for cocaine use did not exceed 0.1% during this time period, decreasing from 0.09% to 0.04% between 1985 and 1990 but increasing to 0.08% in 1991 (Fig. 3).

The positive rates in 1989 through 1991 were less than 0.02% for amphetamines and less than 0.2% for opiates (Fig. 4). Although the WFTDTL did not start testing amphetamines until July of 1989, the Laboratory tested 82 899 samples for amphetamines in 1989, 104 701 samples in 1990, and 129 917 in 1991. Also, the WFTDTL did not start

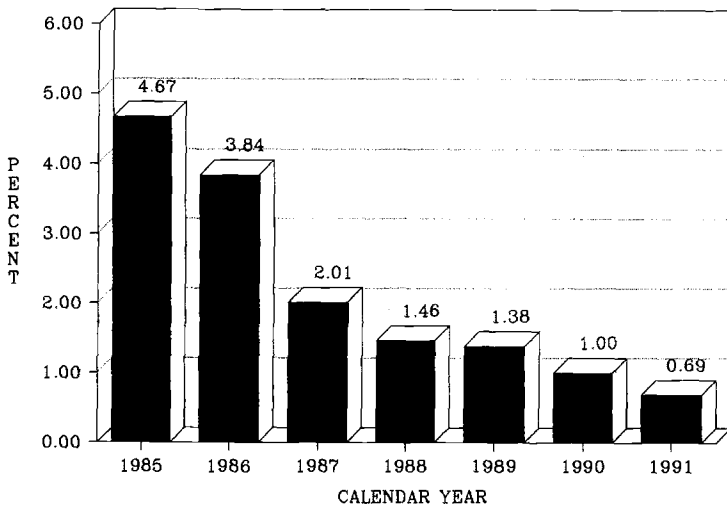


FIG. 2—Percent positives for all drugs tested at the Wiesbaden Forensic Toxicology Drug Testing Laboratory from 1985 through 1991.

testing opiates until July of 1989, but tested 45 186 samples for opiates in 1989, 69 893 in 1990, and 62 058 in 1991.

During 1990 and 1991, 195 689 specimens were tested for LSD and 161 583 were tested for PCP. Both these drugs had a positive rate of less than 0.03% during this time period (Fig. 4). There were no positives for LSD in calendar year (CY) 1991 and only 4 positives from 74 410 specimens tested for PCP. From November of 1990 through December 1991, 79 379 specimens were tested for barbiturates with no reported positives.

Discussion

The overall positive rate for the period of 1985 through 1991 reflected minimal impact from the modifications in the testing menus shown in Fig. 1. Although the number of drugs tested increased from two in 1989 to nine in November of 1990, there was a constant and significant decrease in the total number of positives for the entire period. While the total number of specimens received during this period remained relatively constant, the percent positives for all drugs (Fig. 2) dramatically decreased from 4.67% to 0.69%. The percent of THCA positives (Fig. 3) decreased in a very similar pattern from 4.58% to 0.61%. As can be derived from Fig. 3, marijuana was the drug most abused of those tested during this time period in the European Theater. Marijuana also remains the most commonly used illicit drug in the United States [6].

In 1989 the change in testing for cocaine use from the fixed to the rotational menu (Fig. 1) was the result of the percent of cocaine positives being less than 0.3%. Positive rates above 0.3% require that all specimens be tested for that drug in accordance with Department of Defense Directive 1010.1 [5]. Figure 3 shows that the positive percentage for cocaine use was less than 0.1% for the entire period. The positive rate for cocaine use dropped to 0.04% in 1990 but then increased to 0.08% in 1991. This could indicate the beginning of additional cocaine abuse or may simply indicate a normal fluctuation. Additional testing in the future will be required to determine which of the two possibilities is correct.

It does not appear that barbiturates are being abused by the military in the European Theater. From November 1990 through December 1991, 79 379 specimens were tested

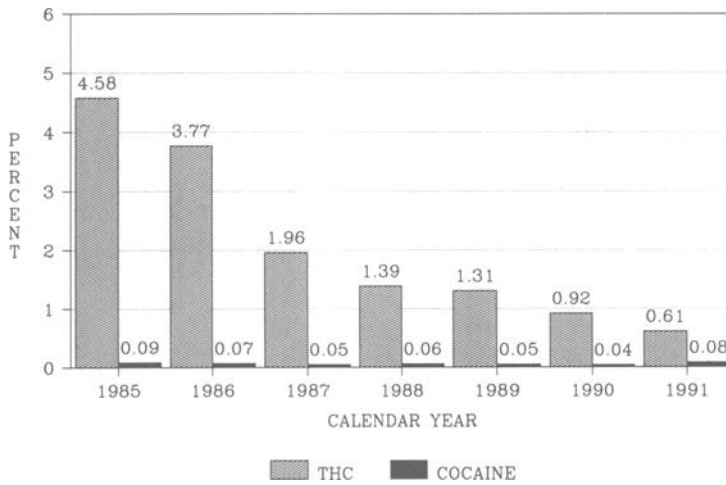


FIG. 3—Percent positives for marijuana and cocaine use for specimens received at the Wiesbaden Forensic Toxicology Drug Testing Laboratory from 1985 through 1991.

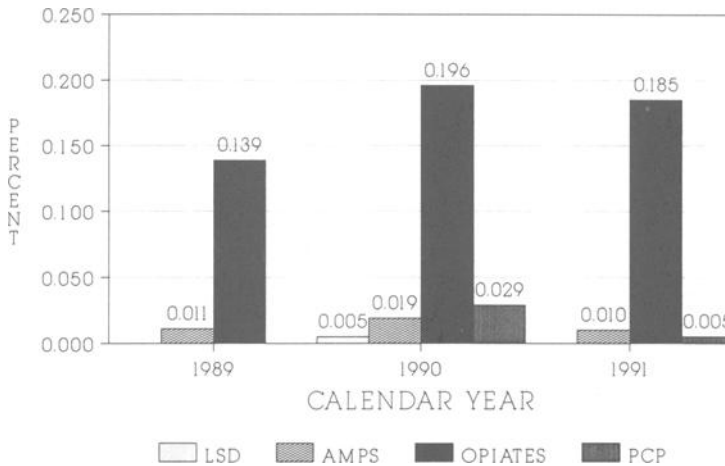


FIG. 4—Percent positives for amphetamines, opiates, LSD, and PCP for specimens received at the Wiesbaden Forensic Toxicology Drug Testing Laboratory from 1985 through 1991. LSD and PCP were not tested until January 1990.

for barbiturates with no positives detected. It should be noted, however, that only secobarbital, amobarbital, and pentobarbital are considered drugs of abuse by the military so specimens were tested for these barbiturates only.

PCP, LSD, and amphetamines contribute a small amount to the overall positive rate in the European Theater. PCP decreased from 0.029% in 1990 to 0.005% in 1991. LSD decreased from 0.005% in 1990 to no detected positives from 70 478 specimens tested in 1991. The positive rate for amphetamines remained about 0.01% for both 1990 and 1991.

Opiates appear to have stabilized at about 0.2% in 1991. It should be noted, however, that the largest percentage of opiate positives are codeine, followed by codeine plus morphine. Of nearly 180 000 specimens tested for opiates since June 1989, only three

have been positive for morphine only. In addition, we have not had a court case for opiates. These results suggest that the observed opiate positives, for the most part, are due to the use of prescription codeine. The morphine only positives may represent morphine or heroin abusers.

The overall decreased drug positive rates do not appear to be directly correlated with data available on seizures and overdose deaths in the general European community [7], although some drugs have shown periodic decreases. While the positive rates in the US Army Europe (USAREUR) military community have dramatically decreased, some areas of Europe [8] have actually reported a significant increase in domestic drug use as reflected by their rehabilitation figures. Also, the reduced military positive rate for marijuana does not correlate well with European cannabis seizures, which have increased over the last few years [7]. Certain drugs, such as "ice" and "crack" cocaine, have played only a minor role in Europe over the past few years but have been much more visible in the United States [9,10].

In 1980, 26% of Army personnel admitted to using marijuana/hashish within 30 days of the survey [11]. Data analyses of a 1982 survey of military personnel reported progress in curbing drug abuse, but mentioned that usage by Army personnel in Europe seemed higher than in other geographic areas [12]. The Wiesbaden laboratory results for THCA confirmed positives from October through December 1982, were 12.4%. It should be noted that the confirmation positive cutoff for THCA in 1982 was 75 ng/mL, which is more than three times higher than the cutoff since 1985. Even though blind proficiency samples are included in the 12.4% and not in subsequent data, it is probable that the positive rate at today's lower cutoffs would have been much higher.

Comparisons drawn from the 1985 Worldwide Survey of Alcohol and Nonmedical Drug Use Among Military Personnel and the 1985 National Household Survey on Drug Abuse (NHSDA) shows that the rate of any drug use for military members was approximately one-third that of all civilians [13].

The effect of the military drug testing program can be demonstrated by comparing results from similar populations. During a 1988 pilot study, where applicants for military service were not informed of testing prior to obtaining urine samples, the screened positive rate for marijuana or cocaine, or both was 9.8%. Subsequent announced testing of all applicants from June through December 1988 showed confirmed positive rates for marijuana or cocaine, or both, of 3.5% [14]. Since greater than 90% of specimens that are screened positive for THC and cocaine use actually confirm positive, the reduction in the positive rate after announced testing is real.

In contrast to the recruits, our laboratory results for active duty military in Europe for 1988 show a 1.5% positive rate for use of marijuana or cocaine, or both. Our laboratory used the same testing procedures and positive cutoff levels as the June through December 1988 results. Similar results between Navy recruits and Navy service school members have been reported [15]. A comparison of different military populations also shows significant decreases in drug abuse by 1989 [16].

Encouraging progress also has been reported in two 1990 surveys [6,17] that indicate that in the Continental United States, drug use among high school seniors is noticeably lower, reported use has been decreasing, and students have become more aware of the hazards of drug use. An overview between 1982 and 1987 surveys of drug use among students in the Department of Defense school system shows an even greater decrease [18]. It may be possible that with the majority of new entrants into the military consisting of high school graduates, the downward trend of drug use among high school seniors may be correlated with the decreased positive rate in the military.

In summary, the positive rate for drug use in the military has shown a significant decrease, contrary to the estimated availability of drugs in the European Theater. It would seem reasonable to conclude that the USAREUR policy against illicit drug use is

becoming more widely known and that the overall program of drug deterrence is having a positive affect on reducing the use and abuse of drugs within the military.

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