

The Underreporting of Cocaine-Related Trauma: Drug Abuse Warning Network Reports vs Hospital Toxicology Tests

ABSTRACT

Objective. The purpose of this study was to assess whether cocaine-related trauma is underreported to the US Federal Drug Abuse Warning Network (DAWN).

Methods. We compared DAWN reports filed by an urban emergency department with the department's toxicology results for patients treated for major trauma. DAWN regulations in effect during the study period required the reporting of all patients treated for injury who used drugs or who tested positive for drugs of abuse.

Results. Of 520 patients treated for major trauma, 217 (42%) were tested for a variety of drugs. Of these, 82 (38%) tested positive for cocaine. Of the 102 patients injured in motor vehicle accidents, 20 (20%) tested positive for cocaine. Of the 59 patients injured in motor vehicle accidents who were under age 40, 18 (30%) tested positive for cocaine. Of 100 victims of violent assault, 57 tested positive for cocaine. During the time period studied, DAWN recorded 48 hospital visits associated with cocaine, none involving trauma or injury.

Conclusions. Cocaine-related trauma was unreported to DAWN despite the hospital's compliance with the system's guidelines. The pattern of DAWN reports from other institutions suggests that underreporting of cocaine-related injury is widespread. (*Am J Public Health*. 1993;83:369-371)

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Introduction

Over the past 20 years, cocaine use has become a major contributing factor to illness requiring emergency treatment¹ and the leading cause of drug-related death in the United States.² After a decade of unremitting increase in deaths and medical emergencies due to cocaine,³ the Secretary of Health and Human Services announced in May 1990 that cocaine-related medical emergencies had dropped sharply.⁴ This report was based on data gathered by the Drug Abuse Warning Network (DAWN), a large-scale system for the collection of data about emergency department visits and deaths related to drug abuse.

DAWN was started in 1972 by the Drug Enforcement Administration as a surveillance system for new drugs of abuse. Responsibility for DAWN was assumed in 1980 by the National Institute of Drug Abuse, which began using DAWN statistics as the major indicator of drug-related morbidity and mortality in the United States.⁵ The network collects data weekly from over 500 hospital emergency departments and 85 medical examiner's offices in 21 states.⁶ Participating facilities are supposed to report all cases in which a patient's presenting problem was induced by or related to drug abuse (with the exception of illness or injury due to alcohol alone). This includes any use of an illegal drug for suicidal, recreational, or psychic effects and any illness relating to dependence on illegal drugs (e.g., cellulitis in an intravenous drug user).⁶ We compared drug screen results of patients treated in an urban trauma center with DAWN reports and found that drug-related trauma was unreported.

Methods

This study was conducted at the Hospital of the University of Pennsylvania, a Level I trauma center in inner-city Philadelphia. The hospital registers approximately 60 000 adult emergency visits annually. In 1989, the emergency department was formally audited by DAWN and found to be in complete compliance with its guidelines (Susan Arnold, principal in charge of the DAWN project, Birch and Davis Consultants, personal communication, February 1990).

The treatment protocol for patients with major trauma (defined as Injury Severity Score ≥ 16)⁷ admitted to the emergency department of the Hospital of the University of Pennsylvania includes sampling of serum and urine for toxicology testing. The complete toxicology screen includes analysis of serum for volatile alcohols by head-space gas chromatography⁸ and testing of urine by enzyme-multiplied immunoassay technique EMIT DAU procedures (Syva, Palo Alto, Calif). Specific drugs detected by this method include cocaine's principal metabolite ben-

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TABLE 1—Drug Screen Results for Patients Treated for Major Trauma, January 1 to June 30, 1990

	Patients in Motor Vehicle Accidents (n = 102), %	Victims of Violent Assault (n = 100), %	All Patients Tested (n = 217), %
Positive for cocaine	20	57	38
Cocaine alone	8	26	16
With ethanol only	8	12	10
With other reportable drugs ^a	4	19	12
Positive for ethanol only (> 100 mg%)	15	15	15
Negative	44	14	29

^aIncludes amphetamines, benzodiazepines, marijuana, opioids, and phencyclidine.

zoylecgonine, opiates, barbiturates, and benzodiazepines. Organic extracts of urine are analyzed by thin-layer chromatography (Toxi Lab Inc, Irvine, Calif) for other drugs of abuse and prescription medications. All positive results are confirmed by gas chromatography-mass spectrometry analysis of the organic extracts.⁸ Preliminary toxicology results are generally reported between 1.5 and 2 hours after the receipt of specimens by the laboratory.

We reviewed all admission toxicology results for patients seen for major trauma for the period between January 1 and June 30, 1990. We compared the list of patients who tested positive for cocaine with the list of cases reported to DAWN from the Hospital of the University of Pennsylvania during the same time period. For each case with a positive drug screen that was not reported to DAWN, we reviewed the original emergency department record to see whether evidence of drug use was noted and not reported (a violation of DAWN guidelines) or whether drug use was not noted and therefore not detected by the DAWN reporters (DAWN guidelines apparently followed but not effective).

Results

Despite the formal drug testing protocol, only 217 (42%) of 520 major trauma patients seen in the Emergency Department between January 1 and June 30, 1990 had complete (i.e., both blood and urine) toxicology screens. This rate of complete toxicology testing is consistent with that reported by other trauma centers that routinely screen patients for drugs.^{9,10} An additional 251 patients (48%) had only blood sent (which was not analyzed for cocaine

or other drugs). Patients in the latter group were transferred to the operating room, discharged, or declared dead before a urine specimen could be obtained. The 217 patients who received complete toxicology screens ranged in age from 17 to 83 years; 171 (79%) were male. Of these patients, 102 sustained their injuries in motor vehicle accidents, 100 in violent assaults, and the rest in falls or industrial accidents.

Eighty-two (38%) of the trauma patients who received complete toxicology screens tested positive for cocaine (Table 1). A larger percentage of motor vehicle accident victims tested positive for cocaine than tested positive for alcohol alone (20% vs 15%). Fifty-nine of the patients injured in motor vehicle accidents were younger than 40 years old, and 18 (31%) of these patients tested positive for cocaine and 11 (19%) tested positive for ethanol alone. Of the 100 victims of violent assault who were tested, 57 (57%) tested positive for cocaine.

During the period between January 1 and June 30, 1990, DAWN received reports of 89 cases (0.5%) of drug-related illness from the Hospital of the University of Pennsylvania, out of 18 315 emergency visits reviewed. All of the reported cases were overdoses. No cases were reported in the accident/injury category. Forty-eight of the case reports (54%) mentioned cocaine, 31 (35%) listed only therapeutic drugs, and 10 (11%) mentioned other drugs of abuse. DAWN had received 151 reports from the Hospital of the University of Pennsylvania in the previous comparable period (all for overdoses); the 89 cases reported in the first half of 1990 thus reflected the downward trends in the national DAWN program. None of the emergency department patients treated for trauma who tested positive for cocaine

were mentioned in the DAWN reports. When we reviewed the emergency department records of trauma patients who tested positive for drugs we found that none contained any specific mention of drug abuse or the results of the drug screens.

Discussion

DAWN began collecting reports on drug-related injuries in 1987. Until 1991, DAWN used a very broad definition of drug-related injury.^{6,11} For example, the guidelines specifically stated that any patient treated for injuries sustained in a motor vehicle accident who used illegal drugs was reportable, regardless of his or her role in causing the accident.⁶ Despite these guidelines, cases of trauma and injury have consistently accounted for less than 5% of DAWN reports since the system began collecting such data. This small percentage is in sharp contrast with mounting evidence of the important association between cocaine use and severe injuries.^{9,10,12}

This paper reports on a comparison of DAWN data with toxicology results in a defined trauma center population. We found that drug-associated trauma was not reported to DAWN despite the fact that the hospital had been found to be in compliance with the system's guidelines. The underreporting of cocaine-related injury does not appear to be limited to one institution. In the year preceding the study period (the latest time for which such statistics were published) there were 2947 cases involving cocaine reported by DAWN hospitals serving the nine-county Philadelphia metropolitan reporting area.¹³ Only 3% of these cases involved accident or injury. This percentage translates to only 88 injury cases from an area that collected data from six Level I trauma centers (one of which recently reported that 54% of its trauma patients screened positive for cocaine)¹⁴ and numerous other emergency medical facilities.

There are several features of the DAWN system that limit the reporting of drug-related injuries. DAWN reports from emergency departments are usually generated by clerical personnel who review medical records for mentions of drug abuse. Often, severely injured patients do not give a history of drug abuse while in the emergency department. DAWN reviewers are specifically limited by the system's guidelines to reviewing only the visit records generated in the emergency department and emergency department logs.

Records generated after a patient has left the emergency department are generally excluded from review.⁶ This is probably the reason why most of the DAWN cases involving cocaine are reported for overdose even though cocaine overdoses per se are not very common.¹⁵

Facilities that collect data for DAWN are not required to carry out drug testing on their patients, and most do not.^{16,17} In centers that do carry out a program of drug testing, testing is sporadic^{9,10} and the turn-around time for drug screens often exceeds the length of stay in the emergency department. Toxicology results become available only after the patient has left the emergency department and the emergency record has been retired.

Officials of the National Institute on Drug Abuse have maintained that the fraction of drug-related injuries documented by DAWN has remained constant over time and that the warning network provides a useful measure of trends in drug-abuse-related injury.¹⁸ Unfortunately, in the absence of any concrete data to support this assertion, the validity of the DAWN system as a monitor of drug-related injury is open to question. This is an important issue because DAWN has "become the critical source of information on drug abuse-related illness for Federal agencies, Senate and House committees, drug abuse researchers and health care providers."⁶

Cocaine use is a major contributing factor to serious injuries,¹⁹ spontaneous abortion,²⁰ birth defects,²¹ and other illnesses throughout the United States. Accurate reporting of cocaine-related emergencies is necessary for proper surveillance and objective evaluation of measures directed toward their prevention and control.^{22,23} The DAWN system has recently been modified to survey a broader area of the United States, but its methods of data collection have not been changed.¹¹ It would be worth incorporating routine tox-

icological testing into parts of the DAWN program as well as broadening the scope of data that are reported to DAWN. As the head of the National Institute on Drug Abuse recently wrote, "The importance of accurate assessment of the public health and social consequences of drug abuse warrant increased efforts to improve systems designed to measure these phenomena."²⁴ □

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